



Environmental Audit Committee

Oral evidence: Governing the marine environment, HC 551

Wednesday 8 January 2025

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Members present: Mr Toby Perkins (Chair); Ellie Chowns; Barry Gardiner; Anna Gelderd; Pippa Heylings; Chris Hinchliff; Martin Rhodes; Blake Stephenson; Cameron Thomas.

Questions 1 - 52

Witnesses

I: Dr Michaela Schratzberger, Science Director (Environment), Centre for Environment, Fisheries and Aquaculture Science (CEFAS); David Tomaney, Chief Data Officer, UK Hydrographic Office; and Alan Evans, Head of Marine Policy, National Oceanography Centre.

II: Professor Malgosia Fitzmaurice, Chair of Public International Law, Queen Mary University of London; Professor Philippa Webb, Professor of Public International Law, University of Oxford; and Professor Richard Barnes, Professor of International Law, University of Lincoln.



Examination of witnesses

Witnesses: Dr Michaela Schratzberger, David Tomaney and Alan Evans.

Chair: Welcome, everybody, to the next meeting of the Environmental Audit Committee. We are delighted to be joined by our first panel, on the global marine environment, as part of the "Governing the marine environment" review that we are doing. I invite our panellists to introduce themselves, their organisations and their roles.

David Tomaney: I am David Tomaney. I represent the UK Hydrographic Office, where I am the chief data officer. The UK Hydrographic Office discharges the UK's obligations as a coastal state for charting.

Dr Schratzberger: Good afternoon. I am Dr Michaela Schratzberger. I am the science director for environment and energy at the Centre for Marine Environment, Fisheries and Aquaculture Science, which is an Executive agency of the Department for Environment, Food and Rural Affairs.

Alan Evans: Hello. I am Alan Evans. I am from the National Oceanography Centre in the UK, otherwise known as the NOC, where I am head of marine policy. The NOC is an organisation that undertakes data collection and marine scientific research that supports governance of the world's ocean, as well as its seas. It is used by UK Governments, but also, more broadly, in a global effort to improve the marine environment through international agreements. We do this through a variety of ways to monitor the change.

However, there is always more that we can do, and we still have an opportunity for a step change in our understanding and management of the marine environment through increased ocean observations, if they are enabled in a sustained manner. That will, among other things, improve our ability to forecast the weather, to predict climate, to designate marine protected areas and to undertake marine spatial planning. Thank you for inviting me today and for giving me the opportunity to speak with you.

Q1 **Chair:** Great, thank you very much. We are looking forward to coming down to visit you in Southampton soon. I am sure that that will be helpful to the Committee. Thanks to you all for appearing.

This first panel is very much a scene-setter. The intention is to lay out some of the challenges, and we will then be hearing over the course of a number of sessions from different representatives with a variety of different perspectives on some of the issues facing us.

I will start with you, Dr Schratzberger. Could you lay out for us what you see as the key competing priorities for usage of the marine environment in England?

Dr Schratzberger: There are a number of them, and there is some good scientific consensus on what they are, so I am going to focus on them.



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They include, in no particular order, fisheries and aquaculture, as one of the oldest and most traditional uses of the marine environment. Fisheries obviously provide a source of food, employment and economic activity for millions of people worldwide, including the UK.

A second use is shipping and transportation. The marine environment is a major conduit for global trade. Worldwide, shipping accounts for over 80% of the world's goods transported by volume. Ports and shipping lanes are crucial for international commerce, and they provide connectivity and economic opportunities, especially for coastal communities.

A third priority revolves around energy production. Especially recently, the marine environment has increasingly been tapped for energy production, including, more traditionally, offshore oil and gas extraction and, more recently, wind-generated energies, and tidal and wave-generated energy as well.

A fourth use relates to tourism and recreation, especially coastal and marine tourism, which includes diving, snorkelling, boating, beach tourism and so on. That is a major economic driver that can generate quite substantial revenue, again, especially for local economies.

Mineral extraction is another common use because the seabed holds vast mineral resources, including sand, gravel and metals. We have seen well-publicised opportunities for deep-sea mining, which has the potential to provide materials for various industries but obviously also carries a significant environmental risk.

The other two uses that I would emphasise here are climate change mitigation and marine conservation. The ocean regulates our climate by absorbing carbon dioxide and heat, and activities such as carbon sequestration in coastal habitats, which is termed blue carbon, is related especially to vegetated environments such as salt marshes and seagrass areas. Ocean-based renewable energy, which I just mentioned, contributes to climate change mitigation efforts.

Of course, finally, the marine environment is used for marine conservation purposes, which includes marine protected areas, biodiversity conservation and habitat restoration. As I said, they are all important components of marine conservation strategies.

Q2 Chair: You have been through a number of different usages there. What do you see as the main current threats facing the marine environment?

Dr Schratzberger: Again, in no particular order, the scientific consensus is quite clear here. With the competing uses I just mentioned come some consequences. One of the major threats relates to pollution, which, again, is very well publicised: plastic waste and plastic pollution, but also oil spills, pollution from agricultural run-off containing pesticides, herbicides and fertilisers. That can lead to nutrient pollution, which is



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normally a limiting factor in a marine environment. Because of nutrient inputs, we often see algal blooms that, when they decompose, use up oxygen, which can lead to dead zones in deeper waters. There is also heavy metal contamination, toxins and other hazardous substances from industrial activities. They can also accumulate in the marine environment, posing health risks to both marine life and humans.

A second major threat relates to climate change—I have already mentioned that. There are primarily three key consequences of impacts in the marine environment. They are, first, ocean acidification. As I said, the ocean absorbs carbon dioxide, which means that the waters become more acidic. A lot of marine organisms that build carbonate shells, either in their internal skeleton or as a shell, might well struggle to do so. That can have consequences on the food web and the general composition of the flora and fauna.

A second climate change effect relates to rising sea temperatures. As the ocean absorbs heat, the waters become warmer. That can lead to well-publicised coral bleaching and, more generally, disrupt ecosystems, because it alters species distributions. Every species has a thermal window within which it can survive and thrive, and if that thermal window changes, so does the distribution of the species. We have heard about northward migration of fish species, for example, resulting from climate change.

A third effect relates to sea level rise. Of course, as the water becomes warmer, ice caps begin to melt, glaciers begin to melt, and that raises the sea level, which can lead to damage in coastal habitats—important habitats such as seagrasses, for example.

A third major threat relates to overfishing, which means that fish is caught and harvested at a rate that is greater than the rate at which it can replenish. That leads to depletion of certain target species. It leads to disruption of food chains, because we tend to remove the higher-level predators from the food chains, which means that there are some cascading effects as these predators are removed. Of course, there is also an economic impact associated with it because we have lots of communities that depend on income from fisheries.

A further threat relates to habitat destruction from a variety of activities, including coastal development as we introduce infrastructure that can have destructive effects on certain coastal habitats, in particular, which often include nurseries for target species.

I just mentioned bottom trawling, and dragging heavy gear across the seabed damages the topography and the composition of the seabed. Marine mining—the extraction of minerals, which I also mentioned earlier—is an important activity and can also change the composition of habitats and disrupt biological processes.



The final threat I wanted to mention is the introduction of invasive species into the marine environment. They can be introduced through shipping, for example—discharge of ballast water—but also through changing climate as invasive non-native species change their distributional ranges. The effects on marine ecosystems, again, are diverse. Some invasive species can out-compete native species, changing species distributions. Invasive predators can have a similar effect, and non-native species around the world have also been shown to introduce disease to which native organisms are ill-adapted.

Q3 Chair: Thank you very much. Mr Evans, looking across the world, which other countries have similar challenges in their marine environments to what we have specifically in the UK? Are there any lessons for us to learn about how these challenges are managed elsewhere?

Alan Evans: I would just like to applaud Dr Schratzberger; she stole my thunder there, because everything she listed I already had listed as well, so I would absolutely concur with what she says.

With regards to your question as to other countries, I would also point out that one of the threats to the marine environment is lack of knowledge and a lack of data to help us understand what is happening in the marine environment and the changes. One of the examples we can point to, which is a good demonstration of the foresight to acquire the data in order to manage a marine environment, would be what has happened in the Republic of Ireland.

Back in 2016, they took the decision to map their entire exclusive economic zone, as well as areas of continental shelf beyond their 200 nautical mile limit, amounting to about 880,000 sq km, and they have pretty much completely done that. The benefit of that is that now that they have that data, they not only have a map of the sea floor, so that they understand the shape and the depths of, but they understand how that impacts the biota that lives in certain parts of that marine environment. They understand how, when they come to planning for offshore wind or planning for aquaculture or fisheries, they already have that base map in place.

Of course, as they are acquiring that data, they are acquiring oceanographic information as well, so they are getting an understanding—

Q4 Chair: We will probably get on in more detail to the issue around data and what more we need to know. In terms of what we already know, are there other nations we can learn more from in terms of the steps they are taking at this moment?

Alan Evans: Certainly, the Ireland example is a good one. If you look at the US, they have done the same thing. They have undertaken a large programme to map their entire continental shelf as well. I can come back to you with more specific details on those, but there are examples of



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nations that have taken that approach to do the mapping and then learn from that.

Q5 Chair: Thank you. Mr Tomaney, in terms of how we are performing in this area—the pressures on our marine environment, steps we have taken and so on—how do you think the UK is performing in comparison to other nations?

David Tomaney: All nations struggle, I think, to survey and to capture the data of their marine environment. You still pretty much have to go there; we might get on to new technologies, and they offer some different approaches, but the fundamentals of physics still play into this, and you still pretty much have to go there. All countries have to take a view on where they need to put those assets.

In the UK, 27% of the UK seabed is mapped to modern standards. That is because, in principle, most of the surveying for UK waters, as is the case for most countries, is being done to ensure the safety of navigation—safety of life at sea obligations—and so focuses on shallower waters and the seabed that is more mobile. For instance, some of that charting in north-west Scotland, which is very granite and does not move very much, is very old indeed—in fact, not even last century.

All countries have that issue. It is an investment to deliver a complete understanding of the seabed, but as Dr Schratzberger says, these things can be very effective across a wide range of capabilities. In particular, one of the things we might want to dig into is whether we can better coordinate activity that is already occurring, in a way that ensures that we get the most efficient understanding of the seabed out of the work that is already going on.

Q6 Ellie Chowns: This segues nicely into my question, which is, what is our current state of understanding of the UK's marine environment? You have talked about 27% of the seabed being mapped. Can you expand on that a little—the marine environment as a whole, beyond mapping, including the biotic environment and so forth? Are there specific gaps in understanding that you have identified that we urgently need to fill?

David Tomaney: Just to reiterate, the Hydrographic Office is in the business of safe, secure and thriving oceans, and in that order. We are fundamentally a hydrographic office that deals with ensuring the safety of life at sea—making sure that mariners can transit point A to point B safely. All charting is designed with that purpose in mind. Charting is not a map: it is not designed to map the seabed; it is designed to chart the sea so that mariners can move safely across it. The cartographer's art is about what you leave out, not what you put in. It is making clear decisions, helping the mariner make good decisions. That is the first part. It is not really designed to provide a map.

We obviously provide additional information, particularly in the ocean environment—obviously, Alan will be able to speak to this—for defence



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and defence uses, because there are clear defence use cases for that. However, I think that thriving oceans is an area where, as an organisation and probably as a country, we could perhaps be accused of being a bit sea blind over the years. I think we take the maritime environment for granted.

There is an opportunity to better co-ordinate activity. There is a voluntary Centre for Seabed Mapping, which we set up and run, and 35 governmental organisations are part of it now. The aim is to try to better plan survey activity so that we are not surveying the same area twice for different purposes and we have a common standard around survey activities so that the same survey can be used for a number of different purposes. Those are the sorts of activities that might help us to make the most of the work we are already doing, before we even think about what additional work we need to do.

I am hesitant to talk in front of these two panel members in detail on the science, but when we are talking about oceanographic data, these are sparse datasets. You have to collect oceanographic data over time, and you have to do it at different times, to get anything useful in terms of what is happening to the ocean environment, but I am sure there are better people than me to speak to that.

Q7 Ellie Chowns: Could I pass the question on to Dr Schratzberger and Mr Evans as well?

Dr Schratzberger: I would like to iterate that the oceanographic data that Mr Tomaney has just mentioned are good, because they can be proxies for what might happen in these physical environments in terms of biology, ecology, ecosystem functions and so on. We often use seabed topography, for example, or certain characteristics of the seabed to infer what the ecosystem surrounding these physical structures actually looks like. That is useful.

With regard to the state of ecosystem knowledge based on existing data, we have seen some real technological advancements over the last five to 10 years, but there are some very persistent information and data gaps. I tend to put them into a number of categories. For me, they very much fall within the spatial and temporal coverage. Ecosystem processes we are particularly interested in, because they are crucial for functioning of the system, often occur at wide spatial and temporal scales. Providing the data at those ecosystem-relevant scales remains a challenge because there are multiple scales, and there are limited budgets and resources that we can employ to get this data.

The second category of persistent gaps falls is data standardisation and quality. We often try to knit together data from different monitoring activities, different international scientific surveys and so on. They are standardised to some extent, and there are some very good international efforts, such as OBIS, the Ocean Biodiversity Information System, or the Global Ocean Observing System, GOOS. But generally, data acquisition is



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not standardised at a level that would allow easy synthesis of the immense data holdings we actually have.

The third category of persistent gaps is biological and ecological data. Although we have lots of them, we have not got a lot of information on the ecology, and the old ecology in particular, of species that we know, or suspect, are vulnerable to the competing activities I mentioned earlier. So we have a lot of information, but not always for the right part of the system.

Finally, there is a general lack of socioeconomic and human impact data. The social sciences have some catch-up to do in terms of producing data that allow us to quantify not only the ecological and ecosystem effects of our activities and our impacts but also, importantly, the economic and social effects of such. They are generally my four categories of persistent data gaps.

Q8 **Ellie Chowns:** That is really helpful and clear, thank you. Mr Evans, would you like to add anything?

Alan Evans: We can start with a positive. For a long time, the UK has had a vision for clean, healthy, safe, productive and biologically diverse ocean and seas, so we are certainly starting from a good place. That is the good point.

The bad point is we do not have the system in place to actually monitor and understand whether that is in fact the case. I alluded earlier to the fact that one of the threats is a lack of knowledge, and the lack of knowledge is through a lack of data. The only way that we are going to truly understand what the environmental conditions of the UK mainland seas are is through sustained ocean observations.

Now, the UK has a wonderful programme of work through, the JNCC and others, where they identify certain areas for marine protection, let us say, but they identify those through relatively sparse data. As we have already heard, those data are not always the best, but those bodies go out and collect what data is required, and that is adequate to establish an MPA.

However, what happens where there is no data? How do we have a general understanding of what the marine condition is without having the foresight to have instruments in the water already monitoring that water column so we can understand what changes are taking place within the water system? They can change from weekly to monthly to annually to decadal changes. We need to understand this if we are to rightly and properly manage our marine estates.

Within that context, to answer your question on what the general condition is, it is difficult to answer that, to be perfectly honest, because it varies throughout the UK. While it is a relatively small area in the global ocean context, we have variations within the UK itself. I have just



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alluded to the gaps; the gaps are the data. We need the data for the parameters that Dr Schratzberger alluded to—heat, ocean acidification, oxygenation, sea level and all these things. We need better instruments, and we need far more of them.

Recently, at the end of the summer, the waters around the UK were the warmest they have ever been. We did not see it coming, because we did not have anything in the water to tell us what was going to happen. If we have instruments in the water that can monitor these things, we would be far better placed to manage our marine environment. That long-term ocean observation piece is critical to answer the questions we are trying to deal with here today.

Ellie Chowns: I could keep asking questions all day, but we probably need to move on, don't we?

Q9 **Anna Gelderd:** We have heard already, Mr Evans, that there is an opportunity for better co-ordination of the information that we already have. What is the role for emerging technologies in developing a greater understanding of the marine environment here in the UK?

Alan Evans: The NOC hosts the largest fleet of autonomous marine scientific robots in Europe. Many of you might have heard of Boaty McBoatface, and we are the home for Boaty McBoatface. So we are in a very good place in that sense, from a technology revolution perspective.

At NOC we also develop novel miniaturised sensors, because as the autonomous robots get smaller, you of course need smaller sensors to put on these smaller robots. At NOC we develop these as well. The combination of the taxis, the robots, and the sensors puts the UK in a very good place in that technology revolution. Both of those capabilities increase a massive potential for collecting data, including mapping. That data can be used by the marine science community, of course, but also for many other uses, such as repeat surveying of MPAs. Where we do establish an MPA and we want to understand the effectiveness of that, we do not need to send a ship out every time; we can send an autonomous underwater vehicle to do that mapping for us.

We can use these instruments for undertaking environmental assessments. If there are industries wanting to do work in the marine environment, we can send our robots out and get that baseline information, if it does not already exist. There is an increased interest in capturing carbon and storing that in wells underground. We need to understand whether they are leaking or not, and we can use those robotic instruments to do that. We can use them for monitoring all types of things, including underwater cables. We have heard recently about the issues with the blowing up—or snagging, let's call it—of underwater cables. We can use our robotic instruments for that monitoring as well. So we are in a good place on technology.



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While the technology exists, it is more about scaling up, and this is a challenge. Satellite observations give you information across geographically massive areas, but all you are doing with satellite information is getting pretty much what is happening at the surface; it does not tell you what is happening within the water itself. So we need these instruments in the water in order to understand what is happening there as well.

Currently, while we have the capability, a lot of this is done piecemeal. It is done through short-term scientific research projects, at least from a NOC perspective. That is not good enough. If we compare the funding the UK contributes to other science programmes, like CERN or space science, for example—we are talking hundreds of millions of pounds to support those science projects—with the cost of delivering sustained ocean observations through novel and innovative technologies, it is relatively small scale in comparison. It is not nothing, but it is, in comparison, relatively small scale. I believe that there is an opportunity here to do something about that.

The use of novel and emerging technologies is recognised as a priority. It was included in the 2024 G7 Science Ministers' declaration, which states: "New and emerging technologies are crucial to urgently tackle global crises". It goes on to say: "We acknowledge the importance of sustaining comprehensive global ocean research and observations of the physical, biogeochemical, biological and ecological properties of the seas and ocean". So it is not just us in the research community saying this; I think there is a general recognition that more needs to be done to observe the marine environment far more robustly than what we are currently doing.

As well as providing that baseline information for management, we also need it for reporting purposes. The UK likes to be seen to be doing best practice, and we have the UN SDG reporting. But it is sad to say that, for UN SDG 14.3.1, which relates to ocean acidification, the UK does not have a programme to report against it. One of the key indicators of climate change in the marine environment does not have a process by which we can monitor that change, and we do not have a process to then report that into a UN system. I think that that needs to be changed. Similarly, with regards to the SDGs again, there is no UK reporting of the amount of spend of UK research budgets on marine scientific research. When we are compared in the UN tables, these two factors are missing for the UK. That is not good, because the UK does do a lot of good things, but those statistics are missing. So we really should be improving on this.

In terms of addressing that—this is why we at NOC would like to see increased cross-Whitehall co-ordination, and we have alluded to that co-ordination—there is a recognition of the importance of leadership. From a science and technology perspective, we would like to see more engagement by the Department for Science, Innovation and Technology. I know they have UKRI, to which they delegate a lot of their responsibilities, but direct decision making in Whitehall needs to have



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DSIT in the room. From the forum that we are involved in, they are not as prominent as it possibly needs to be.

However, there are good things going on. The Ocean Policy Unit of the Foreign, Commonwealth and Development Office, within the legal directorate there, does fantastic work in the marine space, as does the international team in DEFRA in implementing many of the obligations that the UK has. The Department for Transport is now getting on board with developing governance for the autonomy piece because, at the minute, there is no regulation on how we use autonomy in the marine space. So there is a lot going on; it is not necessarily piecemeal, and I cannot say what happens within the walls of Whitehall, but the impression is it that is not necessarily cohesive or co-ordinated as well as it could be.

Q10 Anna Gelderd: Thank you for those important reflections. It is interesting to hear those missing pieces. What you talked a lot about there is some of the hard technology—the submarines, the pieces of equipment that need to be in the water. The Committee is very interested as well in the soft tech, such as the AI data processing, with such a large amount of space, and with such a large amount of information coming our way if we were to increase the amount of hard technology. Does anyone on the panel have a reflection about that AI/soft technology side?

David Tomaney: I can kick off. You are right. It is really important to separate the medium from the message. We are interested in understanding the seabed better. Our methodology for doing that has changed over the decades—over the centuries—from lead line, to single beam, to multi-beam, to autonomous vessels, to gliders. The medium we use to gather the data will change and continues to change, and is part of a process that starts with a ping. We refer to it at the Hydrographic Office as ping to ECDIS. ECDIS is the system on the back of a vessel that is displaying an electronic chart, and we want to reduce the time from the ping going into the water that tells us where the seabed is to the point at which it is on the back of the bridge. We want to reduce that from what can be months to days and hours.

In order to do that, you have to have an end-to-end process that has common standards around how you collect and manage that data, where the quality assurance of that data can be automated to a degree that means that the vast bulk of it is moving through quickly. Then, use automation. With artificial intelligence at its broadest, whether it is machine learning, deep learning or robotics, there are a number of tools that will enable us to deliver the effect we want, which is to get data to the back of a bridge. We have started that journey. We have some machine learning technology that we use to clean up multi-beam surveys. In terms of when I speak to my very expert staff, for me a multi-beam survey looks a lot like an MRI scan: it is a point cloud. We know that they are using artificial intelligence and tools to develop diagnostics for MRI, and it feels to me like it is the same sort of problem set. We have started to use that.



We have to think about it as an end-to-end process: the technology, the processing and then the use case in terms of what the mariner or, indeed, the scientist needs to know at the end.

Q11 Martin Rhodes: Turning to marine spatial planning, what role does it play in addressing the growing pressures on the marine environment?

Alan Evans: It has a key role, I would argue. Without marine spatial planning, it is not chaos—we had been using the marine space for many years before concepts such as marine spatial planning came along—but with increasing use of the marine space, it is important. As with managing the environment, you have to manage the uses of the marine space. Marine spatial planning is primarily for that purpose, and it is key that it takes place.

The UK has a pretty good track record in this space. In my capacity as the alternate head of the UK delegation at the intergovernmental commission of UNESCO in Paris, I collated UK MSP activities, which the IOC was using to draft a global international guide on MSP. MSP in the UK is devolved to the regions, and it is clear from contacting the four regions that they are delivering best practice, so that is very good news. If you look at the global reports, there is reference to many UK MSP activities in that sense.

The MMO for England, Natural Resources Wales, Marine Scotland and DAERA in Northern Ireland should be applauded for at least making good progress in the development and designation of MPAs. I do not want to badger on about this, but we need to get to a place where we understand what the pressures on the marine environments are, so that those MSPs can be as robust as possible. I will just keep on going back to the point that we need to understand the marine environment, yes.

Q12 Martin Rhodes: You set out right at the beginning the different usages of the marine environment. What are the challenges in achieving that balance between those different sectoral usages?

Dr Schratzberger: I will have a go at this. One of the major challenges is to identify where the activities conflict with each other, where the need for space or resources conflicts, and what the trade-offs of these different uses are. That is why, for me, marine spatial planning has this very important role in assessing and guiding decision makers where and when human activities occur in the ocean. That, for me, is the key here.

Then, it is about trying, as I mentioned earlier, to balance the different demands or different types of development and, in particular, the need to use and develop the marine environment sustainably, but also to provide space for the environment to restore and to recover, so that it can provide us with the services that we ask it to provide us with. That is not just climate change mitigation, but all sorts of other services as well.

Q13 Martin Rhodes: How should we be engaging stakeholders in that process of trying to find that balance?



Dr Schratzberger: The panel asked earlier about experiences elsewhere in the world. There are some very good examples across Canada and Norway, where very early, consistent and regular stakeholder involvement has brought a really important perspective and generated the buy-in necessary to not only identify those major trade-offs between use and protection—I am just mentioning them broadly now—but also to acknowledge them and to acknowledge that the benefits and costs of certain decisions regarding the use and the protection of the marine environment can be very much intergenerational.

Involving stakeholders and broad perspectives and integrating their knowledge—scientific knowledge and traditional knowledge—helps to find that common purpose. As I said, there are some good examples where this has worked well in decision making in Canada, in the US and in Norway, in particular.

David Tomaney: We are not marine spatial planning experts, but we do provide foundational data for it. I would make the point that good stakeholder management starts with good evidence-based decision making, which starts with good understanding of the environment. That requires you to bring complex and comprehensive datasets together so that you understand the whole picture. Quite a lot of this at the moment is quite disparate, and therefore it is quite hard to understand, when you are making decisions, whether you are making them with a full understanding of the environment.

Alan Evans: With regards to the question on stakeholder engagement, MMO is very active in this space. They have their different MSP areas and are very active in reaching out to do that stakeholder engagement.

On the point about AI, and picking up on David's point, bringing all that data together is critical, and the use of AI is going to be increasingly important as we collect more and more data. In particular, we have gone down this route of digital twins, if you are aware of that—this is the aspiration to reflect the natural environment in a digital space. The ambition is to have that in almost real time. Of course, that has to have things in the water to make it happen, and AI available to process that data to make it meaningful.

All these things need to come together. As David says, they are not necessarily all co-ordinated in the right way at the minute, but when we get our act together and bring all that together, I think it is quite a powerful piece. The UK is well capable of doing that.

Q14 **Cameron Thomas:** I have a follow-up question. Minister Creagh stated to this Committee in December that the UK had designated 38% of its seas as marine protected areas. That is well ahead of the Government's 30 by 30 target, but only 44% of those MPAs are deemed to be in a favourable condition. To your mind, is a new criteria required to set out what actually counts towards this 30 by 30 target? That question is to whomever might want to take it on.



David Tomaney: All I would say is that I recognise the figure. I am not qualified to say whether it meets the 30 by 30. We chart them, but I do not have a view on the policy.

Dr Schratzberger: I am not going to offer a view, but I can provide some insight into the scientific evidence base. Scientists are not really charged with defining what 30 by 30 looks like. Certainly, at the Centre for Environment, Fisheries and Aquaculture Science, our role for UK Government and Governments worldwide is to provide information on whether we are getting there. The 38% figure, to my knowledge, is very much based on the spatial extent of marine protected areas as they are designated. We know that many of the marine conservation zones, in particular, are multi-use areas that allow certain extractive activities, but there is now also a designation of three highly protected marine areas in English waters, for example, where all extractive activities, including fishing, mineral extraction and so on, are prohibited. The 38%, to my knowledge, refers to the spatial extent of designated areas.

Alan Evans: I would concur. It is a geographic extent figure. It does not reflect the effectiveness of the MPAs.

Q15 **Barry Gardiner:** In other words, what you are actually doing is putting a seal of guarantee on a line on a map, but what most people in the international community, and most of our constituents, think we are doing when we sign a treaty that says 30 by 30—it says 30% will be protected—is actually protecting them. Now, I am a huge believer in good data, and that is what you guys are providing, but that data has to then translate into effective protection. Mr Evans, you use words like “best practice” and you gave this rosy picture, but if you look at the Oceana report in 2023, they examined 104 different stocks, one third of which were overfished and a quarter of which were critically depleted in their size. All this data at the moment is not actually delivering for us the results that we need, is it?

Dr Schratzberger: I can make a start with an answer from my perspective as a scientist providing and strengthening the scientific evidence base that is used to make wise decisions regarding the environment. As I said earlier, the majority of marine protected areas in UK waters are marine conservation zones and they are multi-use zones, so they allow certain extractive activities.

Q16 **Barry Gardiner:** Are you surprised, Dr Schratzberger, that the Government have not fulfilled the commitment that, by the end of last year, they would have completed the process of introducing the additional protections that they were going to in the marine protected areas that have not had those apply to them? I cannot remember the exact numbers now, but it is a minority that have had those applied to them.



Dr Schratzberger: It is correct that, in various aspects of the marine environment, the UK is not currently meeting good environmental status, as set out.

Q17 **Barry Gardiner:** If you look at the last marine strategic framework, I think you will find that, according to the science, you had set 15 indicators. They included metrics for birds, fish, commercial fish, pelagic habitats, benthic habitats, food webs, seals and crustaceans. Eleven of those 15 were found to be in poor condition.

Dr Schratzberger: Yes, but the cause for this is not a scientific one. The role of scientific evidence is to provide an indication with regard to directional change. Are we moving towards achieving good environmental status among these indicators, yes or no? How close are we? Are we achieving favourable conditions in certain MPAs?

Q18 **Barry Gardiner:** The answer is no, isn't it?

Dr Schratzberger: For some of them, the answer is no. That is the role that the science and the scientific evidence plays. That information is then fed into the decision-making process, which then feeds through to changes in management measures or stricter regulations, but the science is—

Q19 **Barry Gardiner:** Let us talk about those. I am sorry, but we have limited time, and I am keen that we press on to some of the recommendations that you would like to see this Committee make in its report to Government, because that is what our session today is all about.

You mentioned earlier in your response to one of my colleagues that one of the pressures is overfishing. Are there recommendations that you would wish to make? Would you express surprise at the fact that the landing obligation is now being widely ignored? In a recent parliamentary answer, the Minister said that only one case had been brought for prosecution against any vessel in terms of the landing obligation. That is the discard ban, as we call it in popular parlance.

Dr Schratzberger: I am not a fisheries scientist and, as I said, nor will I express surprise or otherwise over some scientific facts that are fed into the decision-making process. Again, I am reiterating here what I said earlier: our role here as a panel and as experts is to provide the weight of evidence that then informs the decision making and the position of the UK Government to enter fisheries negotiations.

Q20 **Barry Gardiner:** Let me try a different tack, because I am trying to get some meaty recommendations out of you. Let us look at the likely impacts of climate change on the features in our MPAs. Let me start with a preliminary question. Do you consider as a scientist that looking at our MPAs from the point of view of their features, rather than taking a whole-site approach, is a scientifically valid way of proceeding?



Dr Schratzberger: There is a trend, and some recommendations have been made based on the weight of evidence, to look at marine protected areas from a whole-site perspective. We do know that the scientific evidence is clear with regard to the remaining challenges we have in generating a coherent network. There are some good directional trends for some features, for some marine protected areas, but as a network of protected areas they are not as effective as they could be, for various reasons. That is why we see those shortcomings with regard to meeting good environmental status for some of the indicators, especially those related to fishing and fish stocks.

Q21 **Barry Gardiner:** Could I say that you would agree that one of the recommendations that this Committee might profitably make would be for the Government to adopt a whole-site approach to marine protected areas, rather than simply looking at specific features?

Dr Schratzberger: Yes, I agree with that, because, again, as I said earlier, the scientific basis for that is strong, and it is also something that has been emphasised and recommended in the Benyon review of marine protected areas, for exactly the reasons you outlined. But I would like to iterate to the Committee that that recommendation is based on the weight of evidence, and not a personal view or a desire or a preference.

Q22 **Barry Gardiner:** Absolutely. You are here as scientists. That is why you are here, and that is what we respect. Thank you.

WWF published its ocean report saying that the potential impact of climate change on the oceans amounted to \$8.4 trillion. Is that a figure that you recognise? Are there other ways that you would like to express the potential impacts of climate change on the marine environment globally?

Dr Schratzberger: These figures are based on some publications over the last five or six years in some of the most reputable scientific journals, including *Nature*, *Science* and others. Certainly, quantifying the societal cost and the monetary cost of climate change, and other threats to marine environments, is impactful. It is something members of the public recognise as a big figure, as an almost incomprehensible amount of money.

There are ways of trying to quantify not only the cost of the threats to the marine environment and the cost of mitigating against the impacts that our activities have, but to use more value-based approaches in expressing the value and the benefit that intact and functioning marine environments have for society, for the economy and for the environment itself. These approaches are termed natural capital approaches, and I can provide some key references if that would be helpful, because they go along the lines that you just described for the effect of climate change.

Q23 **Barry Gardiner:** Certainly, natural capital is something that this Committee is desperately interested in, and it would be very good to



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have that from you.

I would like to ask you to turn your attention to the management strategies that could ensure that our MPAs were more than paper parks, and that they were actually adequately protected. Again, looking at the impact of deep-sea trawling, of trawling and of dredging, what is the impact that that has where it is allowed in our marine protected areas?

Alan Evans: I will just add to your previous comments on the value of emphasising how much dollar worth the ocean is; that is always important. Politicians all over the world always look at the pound sign—possibly first before everything. As Dr Schratzberger alluded to, the societal cost is greater than that, because if we mess up the ocean, you can say goodbye to society as it is today. If it was not for the ocean absorbing heat from the atmosphere, the atmospheric temperature would be 30 degrees warmer. We just could not exist on this planet. It provides us with half of the oxygen that we breathe. Those messages are something that society is probably more likely to take notice of than telling them it is worth \$8.4 trillion, to be perfectly honest.

Barry Gardiner: They are more likely to take it from people like yourself than they are from people like us.

Alan Evans: I would like to say we are equal in that sense.

Q24 **Barry Gardiner:** Can I ask you to focus on the strategies that we could take, and with specific reference to the ones that I have mentioned, in terms of protecting our MPAs?

Alan Evans: Sorry, could you repeat that question?

Barry Gardiner: I asked what management strategies we could adopt within our marine protected areas that would effectively protect them. I made reference to the fact that so much of our MPAs is, at the moment, subject to bottom trawling and to dredging. I asked you to give recommendations, perhaps, that this Committee might make to Government to effectively protect our MPAs.

Alan Evans: I may not offer any strategies, but one thing I may suggest is that the ocean is given more relevance and more recognition. I think everybody in this room recognises the value of healthy marine environments, but it was disappointing to see in the recent integrated review refresh a complete removal of reference to the ocean, UNCLOS and the relevance of UNCLOS to the marine environment. It is that kind of thing that is disappointing to see. Currently, there is a Climate and Nature Bill going through, and there is still no reference to the ocean in that Bill either. There is a lack of understanding within the Government sphere of the importance of the ocean. Once we get that in place, we can maybe start looking at those strategies. If the Government impetus is not there, sadly we are not going to go beyond where we are today.

Q25 **Barry Gardiner:** I totally agree with you. What are the strategies,



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though, that we could be recommending? Let me ask this in another way. What does the H stand for?

Dr Schratzberger: Highly.

Barry Gardiner: Well, indeed.

Dr Schratzberger: I was going to offer—

Barry Gardiner: In practice, what is the difference between a highly protected marine area and a protected marine area?

Dr Schratzberger: Okay, so the key difference is that in a highly protected marine area, all extractive activities are banned. There is no fishing, there is no mining.

Q26 **Barry Gardiner:** They are what most members of the public would consider protected?

Dr Schratzberger: Yes, probably. If you look at social surveys regarding the acceptability of restricting activities in a marine environment, depending on whether you ask stakeholders at the conservation end of the stakeholder range or at the user end, you see quite polarised views of it. However, what we found when we advised the UK Government on the need for highly protected marine areas back in 2016 and 2017 is that there is a general recognition across the stakeholder community that higher protection levels will be increasingly needed in order to achieve a sustainable future for aquatic environments.

Q27 **Barry Gardiner:** In practice, we need to start making sure that the activities that are being carried out in the marine protected areas, which are not being carried out in the highly marine protected areas, are not carried out, do we not?

Dr Schratzberger: I was going to offer some scientifically supported strategies that could be employed to achieve an overall greater protection of the marine environment.

Barry Gardiner: Good. That is what I need. Thank you.

Dr Schratzberger: Further limiting activities within existing marine protected areas is one strategy. Another is to expand the spatial extent of existing marine protected areas, recognising that conflicting use of space. Some examples from around the world that were successful or showed promise included restoring certain habitats or species within existing marine protected areas. There are some cases, for example, where planting more salinity-resistant mangroves or cultivating more coral bleaching-resistant corals has been successful. All these are strategies that have a scientific basis and that have proven successful.

Q28 **Barry Gardiner:** I know I must finish, Chair. Thank you for being so indulgent.



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I will just ask you about one last figure. We started off by talking about 30% of our oceans and 30% of the seas being protected. Do you recognise that, at the moment, the area of highly protected marine areas, which you and I agreed was what the public would consider protected, actually constitutes 0.015% of UK seas?

Dr Schratzberger: I do not know the scientific basis of the number.

Barry Gardiner: If you cannot verify it at the moment, could you write to us and give us any alternative figures?

Dr Schratzberger: Yes. What I can offer is a number I know. I know that in English waters three highly protected marine areas have been designated in addition to some of the special areas of conservation we have as part of the EU network. I will do my best to verify that number. Can I just double check with you: you are after the percentage of seabed—

Barry Gardiner: Of the UK's waters that are highly protected. I believe it is 0.015%.

David Tomaney: That feels like a maritime geospatial question, so I am very happy to take that away.

Q29 **Anna Gelderd:** In your organisations, as scientists, have you seen a trend that greater scientific advice has led to decisions being taken within that scientific advice?

Alan Evans: I could reflect on some of my own experiences. I was fortunate to be a member of the UK delegation during the successful BBNJ negotiations. In that respect, I must applaud the UK Government for embracing advice sought from organisations such as the NOC. I could offer my own advice, but they were always open to me bringing in experts from elsewhere to develop those positions going into negotiations. In that sense, I would applaud the UK Government, and I would encourage it, because the UK was seen during the negotiations—certainly post Brexit, when we could speak with our own voice—as very able and capable and as playing a good officer role in those negotiations. In part I would like to take some credit for the marine community in providing that scientific knowledge that the decision makers could use in developing their positions going into those negotiations. As a practice, I would encourage it, yes.

David Tomaney: We are not a policy area or regulatory area, but what I can speak to a little is how we support our defence customer. In that respect, our knowledge of marine mammals, how they react to sound in the water and how we control sound in the water, or how the Navy controls sound in the water, to minimise impact on marine mammals, is definitely something that has increased in understanding over time as science has become more clear about what these things are. That applies to marine mammals, but it also applies more broadly across the ocean environment, and how it is utilised and exploited by the Navy.



Anna Gelderd: There are perhaps a couple of examples, but there is more to do to create a trend that that scientific advice is then acted upon. It would be good to hear any further examples you want to share with us later, perhaps in written form.

Q30 **Chair:** Finally, Mr Evans, I know that you have been a member of the National Decade Committee looking alongside other nations at progress between 2021 and 2030. I wonder if you can give the Committee a quick progress report on how that is going and what your main takeaway is.

Alan Evans: As you allude to, the UK has a National Decade Committee. This committee is part of the framework of the broader UN Ocean Decade, where states are encouraged to have one of these committees to encourage contributions to the overall Ocean Decade programme.

It was slow progress starting in the UK, but we are getting up to speed now. We have an event happening in March to bring the community together to look at not only what scientific priorities we can take into the second half of the decade, but also what the policy landscape is. How can UK science not only contribute to the decade but also support UK policy? Hopefully, that workshop in March will bring the two communities together. Going forward, we should hopefully have a pretty good programme of UK contributions to the decade.

Q31 **Chair:** You are more hopeful for progress over the next five years than you are proud of the achievements over the last five in that committee?

Alan Evans: In the last five years, it has been more piecemeal. It has been individually led. There has not been a UK programme for the decade. When the UK had the presidency for the G7, we developed the decade navigation plan. Maybe we need to go back to that and try to implement that a bit better and have more co-ordination of UK programmes.

As is often the case in the UK science landscape, it is not centrally controlled; it is down to individuals and organisations to do their work. While the UK has contributed and there are several programmes led by UK institutes and individuals in the decade, there has not been cross-UK co-ordination of that.

Chair: Mr Tomaney, Dr Schratzberger and Mr Evans, thank you very much for the evidence that we have heard. We really appreciate you coming to see us today. The sitting is suspended.

Examination of witnesses

Witnesses: Professor Malgosia Fitzmaurice, Professor Philippa Webb and Professor Richard Barnes.

Q32 **Chair:** We now turn to the second panel of today's event. I am pleased to say that we are joined by—I do not know what the collective noun is for three lawyers—three law experts who will be talking to us about



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international law, particularly with our interest in future treaties and the treaties we are currently under. Could I invite the three of you to introduce yourselves, the organisations you work for and your particular areas of expertise? Can we start with you, please, Professor Barnes?

Professor Barnes: My name is Richard Barnes. I am a professor of international law at the University of Lincoln and adjunct professor of law at the University of Tromsø. I have far too long an experience of working in the law of the sea, but with particular interest in oceans governance, fisheries regulation, the interface between law and science, and other areas of societal interest.

Professor Fitzmaurice: I am professor of international law and international environmental law at Queen Mary University of London. I also teach in the International Maritime Law Institute in Malta, which is the institute within the International Maritime Organisation specially designed to promote education for a mid and higher level of management in the global south. I teach international law and the MARPOL convention.

Professor Webb: I am professor of public international law at the University of Oxford. I am a generalist in international law with a particular interest in international dispute settlement, international courts and tribunals, and the interaction of international and domestic law. I have recently represented the Commission of Small Island States in the law of the sea advisory opinion before the Hamburg tribunal, and I represented Tuvalu in the proceedings at the International Court of Justice on climate change.

Q33 **Chair:** Excellent. If I could start with you, Professor Webb, in terms of where we are now, what role do you think the current international treaties play in protecting the global marine environment?

Professor Webb: We are fortunate that, especially with the BBNJ, which has already been mentioned, coming in, we have quite a comprehensive legal framework for protection of the marine environment. The real issue is with the implementation of that approach. The UN convention on the law of the sea is the primary treaty, and that has been in place since 1982. It is sometimes called the constitution of the oceans because it is so comprehensive in what it covers.

The other advantage of the UN convention on the law of the sea is that it has an enforcement mechanism that provides for dispute settlement and for advisory opinions on the interpretation of obligations. I know that my colleagues are going to cover other treaties, but I will start by saying that we have a comprehensive framework, and the issue may really be with implementation.

Q34 **Chair:** Okay. Is there anything you would like to add on that particular question, Professor Fitzmaurice?

Professor Fitzmaurice: I would like to mention that the International Maritime Organisation is overseeing over 50 treaties that have to do with



law of the sea, maritime law, and some of them relate to protection of the marine environment directly. The best known is obviously the international convention for the prevention of pollution from ships, the so-called MARPOL convention. There are also other conventions; for instance, the new Hong Kong convention dealing with ships that are not seaworthy. It is coming into force this June.

There are quite a lot of conventions, and I am particularly interested in the MARPOL convention, which is considered to be one of the success stories in the protection of the marine environment. The popular feeling is that pollution from ships is the biggest polluter, which is not true. I would say that due to the MARPOL convention, which obviously is not perfect and could be improved, the pollution from ships amounts to 15% of pollution of the maritime areas. The biggest problem is land-based pollution, which accounts for 80% of the whole pollution, and I think we will come back to that later. I do not know if you would like me to tell you something about the MARPOL convention.

Chair: Yes, sure.

Professor Fitzmaurice: The MARPOL convention basically came to life as a response to the Torrey Canyon incident, which at the time was the biggest catastrophe you could imagine relating to the pollution of marine areas. The MARPOL convention is very complex from the point of view of international law, but also from the point of view of the law of the sea and the whole structure. It is a very complex convention, which consists of the umbrella treaty and then six annexes to the convention.

The umbrella treaty of MARPOL deals with general obligations of states. It writes an obligation of states in relation to MARPOL, whereas the annexes to MARPOL deal with particular sources of pollution of marine areas. I know it is very technical, but it is very relevant to say a few words about these annexes.

Annex I deals with all pollution, annex II with noxious liquids in bulk, annex III with harmful substances in package form, annex IV with sewage, and annex V with garbage. The newest annex, which is particularly important in relation to climate change, is annex VI, which is on air pollution. This is, in modern times, the most important annex in relation to climate change and the role of MARPOL and IMO in combating climate change from ships.

Annexes I and II are mandatory. When states become parties to the MARPOL convention, they are also obliged to ratify both annexes I and II. However, the remaining annexes are not mandatory, and that makes the MARPOL convention a very difficult convention from the point of view of compliance by states. There are different annexes, and different states are parties to the annexes. To compound the difficulty, annexes are amended regularly, and not all states are parties to the amended annex. This makes a complete kaleidoscope of obligations of states, and makes it sometimes very difficult even for the International Maritime Organisation



to be fully aware of the obligations of states in relation to all the annexes and amended annexes.

The compliance and sanctions in relation to the MARPOL convention are also quite complicated because the MARPOL is applied by states within the internal, domestic legal order. The sanctions in relation to the breach of MARPOL provisions also very much differ—I think you agree with me on that, Professor Barnes. It is very difficult also, and one of the drawbacks of MARPOL, that there is no uniform system of sanctions for breaches of MARPOL. It can range from fines to imprisonment. It depends on the domestic law of the state party to MARPOL.

Q35 Chair: On that particularly, Professor Barnes, you could help. In terms of the international marine treaties that have been ratified by the UK, how have they been implemented in domestic legislation? Do you think the current implementation of those commitments is adequate?

Professor Barnes: Thank you for the easy question, Mr Chairman. Just before I come to that, I will make a couple of general remarks to contextualise what I am going to say. First of all, I certainly agree that implementation is the key issue here. We have law, and we have quite a lot of good law, but it is the implementation that is the key challenge.

The second thing, as Professor Fitzmaurice indicated, is that it is quite a complex body of law. She talked about one instrument, but then we have multiple instruments and we have the relationship between them, and that creates challenges for implementation in and of itself. If you take the north-east Atlantic, where we are located, there are around 15 different instruments that directly and indirectly apply to the governance of the marine environment. Of these, UNCLOS, the convention on biological diversity, MARPOL, OSPAR and the recently adopted BBNJ agreement will be key.

The second point I am going to make again underpins issues of implementation. In the framing of the Committee's call for evidence, Mr Gardiner and Ms Gelderd said that the oceans are a commons. That is a really important observation here; they are common to all states. We all have an interest in the oceans, and what happens in the oceans is not particular to an individual state. The oceans are fluid. They are dynamic. What happens in one state's pollution will impact upon multiple states. How we exploit resources in one part of the oceans will have impacts for food chains and food webs in other parts of the oceans. As they are a commons, we have to approach things in a co-operative manner and we have to look at the interaction between different areas and different activities, because we cannot understand them, or at least attempt to regulate them effectively, in isolation. It is complex, it is interrelated and it depends upon co-operation.

Q36 Chair: In terms of my question, there has been agreement on the panel that the major problem is not the treaties, but the implementation of them. I asked you specifically about how the UK has implemented



something that we globally agreed to, so I will direct you back to that.

Professor Barnes: Coming back to that, it is not entirely straightforward. Clearly, we have a number of commitments under different instruments, but when we look at the transposition of these into domestic law, it tends to take place in a sectoral or a fragmented manner. We do not have, for example, a single piece of legislation that deals with the implementation of the UN convention on the law of the sea. It will be variously implemented, for example, through merchant shipping regulations, which deal with ship source pollution. It will be dealt with, for example, through aspects of EU and legacy EU law, which deals with habitat protection and with environmental impact assessments. We have the Marine and Coastal Access Act, which deals with the licensing of offshore activities, designation of marine protected areas, and so on. So we have a wider body of domestic law and legacy EU law that takes different elements of our international commitments and then implements those. When we are trying to think about whether it does it effectively, we are trying to get a map through quite a complex array of domestic legislation.

Q37 **Chair:** I appreciate that broad description. Would you say that, in general, the UK has effectively implemented that legislation or not?

Professor Barnes: I would hate to give a political answer. I think that the UK has, broadly speaking, adopted and developed, or put into place, domestic law giving effect to its obligations. Now, that is quite different from whether or not that is having the effect and delivering on the commitments that we have undertaken. Coming back to Mr Gardiner's observation, for example, we have a wide array of marine protected areas. The UK has something like 38% of its waters nominally protected, but we also know at the same time that only a fraction of those are actually achieving their conservation status or good environmental status. That is where the gap is. It is not so much that we are not transposing our international obligations into domestic law, but that we are not quite delivering on that.

Q38 **Barry Gardiner:** Professor Barnes, I will try to pick up what you have said and something that Professor Webb said earlier. Under the interstate dispute settlement procedures, do any of our treaty commitments—by that I do not just mean marine treaties—enable a company or a commercial interest to take the UK to court under an ISDS procedure if we were to introduce new restrictive measures in UK waters to protect the marine environment?

Professor Barnes: I am not sure—I think you are referring to this—that investor state dispute resolution would be the appropriate forum there. Professor Webb might have something to say.

Barry Gardiner: Professor Webb said something about dispute settlement, and it just made me concerned that there might be an exposure there.



Professor Barnes: Okay. I have a couple of general points here. There is international litigation, but for the most part states are very reluctant to take each other to court, because they lose control over the disputes. There is a clear obligation under many international law of the sea instruments to resolve disputes through peaceful means, but states seldom take recourse to international courts to resolve those disputes, given the broad number of potential disputes there are. That would be the first thing I would say about that.

The second thing is that there is, for example when we look at marine environmental protection, a particular reluctance of states to use dispute settlement, because often it is the case that the causes of the harm are not individual to particular states or that they reveal, potentially, that states are failing to comply with their equivalent obligations.

Q39 **Barry Gardiner:** It would not be a state taking a state to court; it would be a potential investor, as I understand it, taking the state to court. This has been done in a number of areas, and one of the most regularly cited is over tobacco legislation to outlaw or restrict tobacco sales within a country, which has then prompted companies to take measures, even though those were domestic legislation for public health purposes, akin to the public policy purposes that we are talking about in terms of protecting our marine spatial environment.

Professor Barnes: You tend to find that investor disputes arise because there has been a taking or restriction of an investment. The question would then be what that investment would be that the state has actually removed or hindered, and then whether that would be significant enough to actually spark litigation. If we are thinking about the marine environment, you would then have to imagine what the potential investments would be that would be unduly restricted and that would spark that litigation.

If we go back to the typical drivers of harm in the marine environment, it is fishing activities, potential climate change, and oil and gas activities. Largely, they are fairly well regulated at the moment. I am not entirely clear what those activities would be that would spark that litigation. Potentially, things like aquaculture may be something. Professor Webb, I do not know if you have anything.

Professor Webb: The potential is certainly there. We are seeing a trend in investment arbitration of environmental disputes coming through those bilateral investment treaties. As Professor Barnes said, you would have to fit it within the usual structure of such disputes in terms of, "Do we have an investment? Has there been a breach of fair and equitable treatment? Has there been an indirect or direct expropriation?" But there is no reason, in principle, why that could not apply to a restrictive measure that involves the marine environment.

The other, probably less visible phenomenon is that you can have disputes between states where, in fact, a state has been encouraged to



bring that dispute by a company, and that company may be contributing funds to the prosecution of that dispute. That is not something that I have seen involving the UK, but I have seen it in other parts of the world.

Q40 Barry Gardiner: Therefore, would it be something that you might see this Committee making a recommendation about in terms of restricting the way that we allow ISDS mechanisms to be incorporated in treaties that we conclude?

Professor Webb: There can be pros and cons to that, and I cannot give a firm recommendation to you in that regard, but it is prescient to be considering the role of ISDS and interstate dispute settlement and potential benefits and risks for the UK.

Barry Gardiner: Thank you very much. Sorry to interrupt.

Chair: No problem. Cameron Thomas.

Q41 Cameron Thomas: Professor Barnes, you mentioned that states prefer to settle these issues out of court. I would put it to you that that is not particularly effective and I would like to cite—I will read this so that I get it right—the fact that in 1986 Japan was a co-signatory to the International Whaling Commission, but continued to harpoon whales in the Southern ocean before and long after it was designated as a sanctuary, before just withdrawing its signature from the international convention for the regulation of whaling in 2019. It seems to me that the treaties are not really worth the paper they are written on if they are not enforced. What does effective enforcement actually look like?

Professor Barnes: Taking a step back here, international law is largely a consensual-based system of law, so it is rules that states create through their own volition, and that also extends to the dispute settlement process—states will have to agree to be bound by or opt in to dispute settlement procedures. We have to acknowledge that, and the example you have given there is where a state may opt out of or take itself out of a treaty regime where it fears that it will affect its vital interest. That is the nature of international law there. That is the first point.

The second point is that the existence of dispute settlement mechanisms acts as a driver on state practice. States do not like getting brought before international courts and tribunals; it has reputational damage, it has potential financial consequences and so on. The existence of these dispute settlement mechanisms, and particularly the strong ones under the law of the sea convention, can act as a driver for states to comply with their laws or to pursue the resolution of their disputes through alternate means. That second factor is quite important.

Ultimately, while I said that there is not that much international litigation, there is international litigation. We have a body of case law that has been developed by the International Court of Justice, by the International Tribunal for the Law of the Sea and by the Permanent Court of Arbitration, which has contributed to the development of and compliance



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with law there. At the moment, the UK is involved in litigation with the EU concerning its sand eels. So there are these mechanisms that can be and are used, even if they are not frequently used. These agreements are certainly worth more than the paper they are written on.

Q42 **Cameron Thomas:** As long as the parties to that agreement are at the table. What pressures—sorry, you look like you are going to respond.

Professor Barnes: No, I think that is a fair enough point. For me—this is an academic observation, though—the point is not to go to court. The point is to manage your disputes and to resolve your disputes through peaceful means. If that is diplomacy, conciliation or the ongoing maintenance and development of relations, that is a perfectly acceptable way of dealing with your disputes, as long as you are not exacerbating them or letting the issues go unaddressed.

Cameron Thomas: All right, I will leave that there. Thank you.

Q43 **Blake Stephenson:** I think there is a consensus on the panel that the framework is comprehensive and that the issue is with implementation. This Committee would like to assess how effective the international treaties are. With that context, Professor Barnes, what are the challenges in even assessing whether the UK is meeting its obligations?

Professor Barnes: I will go through instrument by instrument. I will not deal with them all. A couple of years ago, there was a review by the House of Lords International Relations and Defence Committee, which reviewed the law of the sea convention. It took evidence and went through various aspects of the convention, and largely concluded that the UK was complying with the convention and that the convention itself was broadly effective. It also acknowledged that it was a creature of its time. We are looking at something that is effectively 40 years old. There are some issues that have not been addressed by the convention that have arisen since. But generally speaking, it is holding together quite well. That is the starting point.

Most conventions regionally have reporting mechanisms. If you look at the OSPAR convention for the protection of the north-east Atlantic, there are periodic requirements for member states to report on the extent to which they are meeting and delivering on their commitments to reduce land-based sources of pollution and so on. That then is reviewed by the commission using experts and taking into account the extent to which that then is contributing towards OSPAR meeting its commitments. That process of ongoing monitoring, reports and then critical engagement with these international bodies, or through these international bodies, is quite an effective way of monitoring the implementation—I will qualify “effective” there because it is always a difficult thing to define.

Q44 **Blake Stephenson:** It is certainly complex, because there are scores of treaties and, as you say, they are implemented in UK law by being dotted around in lots of legislation. Therein lies some complexity in the



implementation, but also in tracking it—what is the Government doing on each of those parts of the legislation? Do you think there is sufficient transparency? I am thinking about our constituents. How do they know, without trawling through a House of Lords report, whether the UK is meeting its treaty obligations? I will open it up to anybody, actually, rather than putting Professor Barnes necessarily on the spot.

Professor Barnes: I have some observations.

Professor Fitzmaurice: On the MARPOL convention, reporting and transparency are not best implemented. There is under the MARPOL convention an obligation of a port state to report any infractions of the convention by another state to the flag state and to the International Maritime Organisation, and it is not very well implemented. This is one of the drawbacks: the lack of transparency, the lack of co-operation between states and the lack of reporting.

Another point that is not very well followed and implemented is data collection. It is very important in relation to protection of the marine environment, that data are up to date, and this is not up to date.

The implementation of the law of the sea convention is also a very costly business. For instance, the annexes of the MARPOL convention are related to reception facilities in ports. Garbage and sewage cannot be discharged into the sea. It has to be discharged into a reception facility in port. Many states do not have reception facilities, and this is one of the big drawbacks in implementation. I know it is very technical, but it is also very real. The lack of reception facilities puts into doubt the rationale of the state becoming a party to an annex of MARPOL if it cannot implement the obligations that are related to a particular annex.

I am in touch with the International Maritime Organisation—I talk to people who work there—and they often comment that states ratify an annex to MARPOL and then it is not implemented. This is really just an empty letter, an empty obligation. Therefore, it is very important that when a state decides to ratify a convention, it already has in place internal legislation and the means to implement it. It is very often a neglected issue. States are very enthusiastic to ratify a convention, and then it is never implemented, due to lack of domestic legislation, implementing international treaty, and economic and financial means to fulfil the obligations.

Q45 **Blake Stephenson:** Perhaps my final question would be a follow-up to that. Are there examples, in a UK context, of us doing just that—ratifying a treaty, putting it on the top shelf and letting it gather dust? That would be a bad example. Conversely, do we have good examples of how we have implemented treaties and how we have good, transparent reporting and know with a high degree of confidence that it has been implemented?

Professor Fitzmaurice: I have to say that the UK can probably be a bit criticised because it still has not ratified the BBNJ convention. But I would



refrain from criticism, because the convention should be responsibly ratified when the domestic legislation is in place. I think that sometimes the criticism goes too far. It is not practical and it is irresponsible to ratify a convention without the underlying legislation. From my practice, I saw many of those cases.

Professor Barnes: Yes, we can come back and talk about the BBNJ agreement in a moment. If you look at the law of the sea convention, which is the keystone agreement, it has been very well implemented. That is largely because its provisions are about the allocation of competence and the setting out of general obligations. It is fairly unequivocal that most aspects of that have been implemented as far as they go.

Q46 **Barry Gardiner:** Is it not ratified by the United States?

Professor Barnes: No. There are good reasons for that, but certainly having the US ratify it would be a good thing.

Pippa Heylings: That is very likely at the moment.

Professor Barnes: Increasingly, so it seems. If we take, for example, an agreement like OSPAR, which is much more technical, and which deals with the detail of the day-to-day activities of pollution prevention, it is much more difficult to see the extent to which that has been effectively implemented. There are two reasons for saying that.

The first one is that we always judge these agreements by fairly abstract standards. If we go back and say, well, if we did not have OSPAR, if we did not have MARPOL, then what would the state of the marine environment be, I think it would be considerably worse. Our conduct in terms of pollution, discharges, including land based, would be much worse. To an extent, they have made that difference.

The second challenge is that this is not a static environment we are dealing with. The reason we know that there are problems to do with the implementation of these agreements is that we better understand, and we have more science and more data that tells us exactly what the state of the environment is. It is very much an iterative approach here. We adopt these, we review, we reflect, we generate new science and data, and we go through this process of adapting to that. My view would be that there is progress, and we are trying to make progress on these things, even if we are not actually achieving the gold standard of having these headline indicators being achieved.

Professor Fitzmaurice: I would like to follow up what Professor Barnes said. Monitoring and collecting data is much more feasible within regional conventions like OSPAR or the Helsinki convention on the protection of the Baltic sea, which is of great interest to me as I come from Poland originally. The Baltic sea is very well monitored. They have joint monitoring of the coastal state and EU, and the spills are readily traced.



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The implementation and sanctions are more feasible than under general conventions that are basically global conventions.

With land-based pollution, which is 80% of the pollution of the oceans, it is far easier to implement within a regional treaty with states that are more or less at the same level of economic development and similar political development and common interest, which is very important, than it is in global conventions. So the OSPAR and Helsinki conventions are quite effective in regulation of smaller maritime areas than the global convention.

Pippa Heylings: I want to build on what you just said, Professor Barnes, which is that this is not in a static context, so we have to evolve with the evidence that is coming forward and adapt to that. I just want to say that it is a privilege to have Professor Webb with us, especially if you took an active part in what is considered a groundbreaking new legal advisory from the International Tribunal for the Law of the Seas. That was brought by the Commission of Small Island States on Climate Change, which asked for a legal opinion as to whether climate change should be considered as a pollutant in the marine environment. They go, as I understand, a resounding yes, that climate change and ocean acidification should be considered as marine pollution and therefore that that has implications for us all as states. Having worked with many small island states before I was elected, I understand how critical this is for them, but it is also actually about what this now means for us in the UK. How do you think the UK is and should be adapting policy in the light of this new advisory? I understand that this advisory is now part of international law.

Professor Webb: Even though it is called an advisory opinion, there are elements of it that are authoritative and binding on the UK. When the tribunal declares in an advisory opinion that a particular principle or rule is customary international law, that is binding on the UK. When it interprets a treaty to which the UK is a party in a substantive manner, that is also very authoritative for the UK. So it is advisory, but it is incredibly influential, and in some parts it will be binding.

Let me just say in six key points what ITLOS advised and then how I have seen the UK responding to that. It was a unanimous opinion of 21 judges from countries as diverse as South Africa, Iceland, Russia, China, India, Jamaica, Ukraine and Japan. It was pretty incredible to get unanimity from that collection.

The first point they made, as you have already rightly pointed out, is that greenhouse gas emissions are a form of marine pollution, and that therefore triggers existing obligations on the 170 parties, excluding the US, to UNCLOS.

Secondly, the tribunal said that states must take all necessary measures to prevent, reduce and mitigate marine pollution. That is to be determined objectively; it is not up to each state to decide what the



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necessary measure is, and it is to take into account the best available science.

Thirdly, the obligation to protect the marine environment is broad and meaningful. It is not just to prevent harm and to mitigate harm. There is also an obligation of restoration within that. We heard from the first panel about the importance of the so-called blue carbon ecosystems. That is where that restoration obligation will be meaningful.

Fourthly, states are obliged to protect the marine environment not only when we know an activity will harm it, but also where there is some scientific uncertainty, to take a precautionary approach to it.

Fifthly, because of the severe and irreversible effects of greenhouse gas emissions on the marine environment, the standard is stringent due diligence to deal with such pollution.

Finally, their sixth point is quite a technical point, but it is an important point for implementation. The tribunal said that the UNFCCC, the framework climate convention and the Paris agreement could be taken into account in assessing compliance with obligations with respect to the marine environment but they do not set the standard. They may be relevant and they may set a floor, and in a particular area they actually not be relevant, because they do not deal with it, but the tribunal said that they are only to be taken into account and that the obligations exist in the treaty and in customary international law.

I have not been able to identify any official statements by the UK on what it is doing with respect to this advisory opinion, but what is telling is that the UK has participated in both the written and the oral proceedings in the International Court of Justice, which is an even broader advisory opinion about states' obligations regarding climate change, not just through the lens of the law of the sea convention, but under nearly every aspect of international law. In its submissions, the UK expressly accepted that greenhouse gas emissions constitute marine pollution, so they accepted that element of the ITLOS advisory opinion. They also accepted that the best available science should be used.

However, on that last point—the sixth point that I mentioned from the ITLOS advisory opinion—the UK did not put that argument before the International Court of Justice. Instead, the UK said that the Paris agreement and the so-called climate change treaties, such as the UNFCCC, were the most relevant for setting obligations on climate change and that states have discretion under them. When it comes to questions of responsibility, it urged the ICJ not to look to general rules on state responsibility, but instead to look to the fairly flexible, informal and non-binding procedures under these climate change agreements. The UK also said that it considered that the prevention principle in international law did not apply in the context of greenhouse gas emissions. There were 95 participants in the ICJ proceedings—mostly states but also groups of states through organisations—and on these particular points, including



the Paris agreement as being the be-all and end-all and the prevention principle interpretation, the UK was either alone or just with a handful of other states in taking that position.

Q47 Pippa Heylings: What you have said there is about what the UK has acknowledged, but what we have been hearing about today is how effectively we have then brought that into domestic law, and the adapting that we are doing. Have you seen any indication that there are any policies within the UK around the oceans that are therefore increasing the urgency and the need to tackle climate change? We heard from the first panel that our climate change strategies are very limited in how we are considering marine management and marine measures, and how we are tackling climate change through that. I know that this is not limited to marine management, and there are terrestrial actions that cause greenhouse gases as well.

Secondly, what does this mean for us in terms of BBNJ—biodiversity beyond our national jurisdictions? Does this give us the possibility, which is what we have not been doing yet, of including climate and nature in those plans as well, beyond our national jurisdictions in the high seas?

Professor Webb: I cannot say that I have surveyed everything that the UK has been doing in this space since the issuance of the advisory opinion in May, and we do not yet have the ICJ advisory opinion—the hearings were in December, and the opinion is not expected for several months. Just from the position that the UK has been taking more generally and the way it put forward its submissions in the ICJ proceedings, I would not say that there is a great urgency yet. At the same time, it is important that the UK is participating. We heard earlier about how disappointing it is when a state just withdraws because they are not happy with what has been achieved. I think that in terms of being part of the process and expressing views, it would be good to see more co-ordination with other states. This is not something that only one state alone can deal with.

On your question about BBNJ, this very much does give an opportunity to include those elements in climate action going forward. Even in the law of the sea advisory opinion there was reference to BBNJ and taking those obligations into account in a harmonised way. That legal framework is already there for the UK to pursue, if it wished to.

Professor Barnes: Specifically with the BBNJ agreement, it has provisions on environmental impact assessment, but it also has novel provisions on the engagement of indigenous and local communities in that process. That creates a space for a wider range of interests to feed into this. I think those mechanisms do provide a way of advancing some of those interests that you have mentioned, but we must ratify it and adopt legislation to give effect to it prior to that.

Professor Fitzmaurice: I think there is wider progress in relation to the new strategy of the International Maritime Organisation on climate



change. In 2023 the International Maritime Organisation adopted a very comprehensive programme expanding annex VI of MARPOL to combat climate change emissions from ships. I think that the UK is quite active in this area. Again, from the technical point of view, there are certain new solutions that would minimise the emissions from ships, such as the energy efficiency design index. It is a very important technical area, and I think the UK is very much supporting this direction of implementation of annex VI. It is a very extensive programme that will stretch over several years, and the UK was one of the very active states in putting this new programme from the International Maritime Organisation into being.

Q48 Chris Hinchliff: We heard earlier about the importance of oceans as commons and that what happens elsewhere matters profoundly to us. My questions are about what more we can do to conserve the marine environment beyond our own jurisdiction. Could you set out to what extent the UK's own initiatives that go beyond its treaty obligations help to meaningfully define international norms and standards for marine protection? That is open to anyone.

Professor Barnes: I think there are a couple of areas where the UK can and should show leadership, and it does. One that we have alluded to already here is capacity building. I think the UK has invested, and does support other states, to develop skills and capacity to address these challenges. That is quite valuable, because sometimes the greatest gains can be made in some of these spaces, whereas if you are trying to refine and push it at the top end of marginal differences, it is quite expensive. Ensuring that adequate support is provided for those capacity-building measures directly through investment or through training initiatives is the first thing.

The second challenge is that we have a jurisdictional role in ocean spaces, and we have the commons that we have to co-operate with in respect of other states. Certainly, we can be active and we can be engaged, and we have to be to promote good governance in those fora. The UK can take a leading role, for example, in OSPAR and the North-East Atlantic Fisheries Commission and push through those bodies' strong environmental rules. It can try to build capacity and co-operation through those mechanisms.

Where it becomes more challenging is where it is trying to act outside its own jurisdiction or constraints. There are perhaps limits to what the UK can do in that context.

Q49 Chris Hinchliff: To follow up on that point, to what extent would you say that leadership shown by the UK, or potential leadership shown by the UK, in going beyond our treaty obligations helps encourage other nations in the implementation of the treaties that they are signed up to?

Professor Barnes: I think you have to be seen to act in good faith. It is important for us to deliver on our own commitments and to put our money where our mouth is. That leadership is important. We must be



careful about overreaching ourselves as well. For example, the UK is committed to ratifying the BBNJ agreement by June this year, but it has already accepted that that will probably require primary legislation. I could be wrong on this front, but I am not sure that that primary legislation is in process at the moment for us to have a legislative basis to be able to implement that. So, yes, the UK has to be active, and it has to advocate for these issues, but it has to do so within its own constraints and not overreach itself.

Professor Fitzmaurice: There are ongoing negotiations on global plastic pollution in the convention, and the UK was one of the most active states in pushing that to some kind of fruition. Unfortunately, it did not work out that way, and the last round of negotiations in South Korea was not successful. But the UK definitely had a leadership position and was very active in trying to come up with an acceptable text for the convention. The position of the UK can be contrasted with that of a group of states that were reluctant to come up with a final solution. The UK was one of the most active states and a leader of the group that wanted to conclude the global treaty against plastic pollution.

Professor Webb: The Commonwealth is a forum through which the UK could play even more of a leadership role. When you think about the membership of the Commonwealth, so many small island states, climate-vulnerable states, are members and would benefit incredibly from more capacity building, information sharing, best practices and even sharing the best available science that is probably more accessible to the UK.

Q50 **Anna Gelderd:** How effective are non-legally binding instruments such as memoranda of understanding in protecting the marine environment, compared to ratified treaties, which are legally binding, on the states that are party to them?

Professor Fitzmaurice: Maybe I can start on this. Memoranda of understanding are a very common tool in international maritime law and international environmental law. As you say, however, they are non-binding instruments. They have a very important role in forming objectives and co-operation between states. States do not feel the pressure to fulfil an MOU in the same way as they have to follow a treaty. There is no rule of *pacta sunt servanda* in relation to memoranda of understanding. Nevertheless, states very much try to follow them.

Quite often memoranda of understanding are the first stage, the leading stage, to getting into more binding, more formal instruments such as treaties. This can be a very valuable starting point for negotiations in co-operation between states. For example, before the Helsinki convention on the protection of the marine environment of the Baltic sea was concluded, there were several memoranda of understanding and declarations that were non-binding. In the end, they formed the background for concluding a formal agreement. Memoranda of understanding also help to ensure that states are on the same page and have the same objectives, and they provide a blueprint for perhaps future binding agreements.



There is no pressure, but states put all efforts in to fulfil memoranda of understanding, so this is a very valuable non-binding instrument in co-operation between states. For example, not a very long time ago, the UK entered into a memorandum of understanding with the International Council for the Exploration of the Sea, and this is a very common instrument in international environmental law as well.

Q51 Anna Gelderd: That is very helpful to hear. We have heard some of the advantages of these instruments, but are there any commitments made under these instruments that would be better implemented through legally binding treaties?

Professor Webb: Going back to the contrast that I mentioned between the majority of states in the advisory opinions before ITLOS and the ICJ, who took the position that the Paris agreement, the UNFCCC and nationally determined contributions were not enough—not sufficient and not even necessary—and that there had to be reference to other obligations under international law and more binding obligations, the danger with non-binding instruments is that we stay at the blueprint stage because that is comfortable; we stay at the starting point. I think they work well bilaterally and maybe when the approach or the solutions are uncertain, but with the urgency of climate change, it seems that we should be looking towards more robust instruments where we can achieve them politically.

Professor Barnes: I do not like the idea of it being a binary either/or. I think they often work in partnership, as Professor Malgosia indicated there. They must also be used for the right purpose. A good example of something is the Sargasso Sea Commission, which is based on the Hamilton declaration, a non-binding instrument. It has done a lot of good work to build scientific consensus to establish memoranda of understanding with existing bodies. That, in a sense, is preparing the groundwork for what could be the adoption of a stronger marine protected area with binding management measures and provisions.

So they are part of a continuum, and they can be complementary rather than being an either/or. But I agree that if you are looking, for example, for the implementation of very precise technical standards and provisions, they are not suitable at all.

Professor Fitzmaurice: In relation to non-binding instruments, there is the very important role of so-called soft law in the protection of the environment and the marine environment. For example, I have mentioned land-based pollution a few times. There is no general global agreement on protection against land-based pollution—80% of pollution of the marine environment—due to state sovereignty. Basically, land-based pollution comes from a land base, a territory, so it is under the sovereignty of a state. There are also very different levels of economic development and objectives in different states of the world. It is very difficult, and probably impossible, to have a global treaty on combatting land-based pollution.



However, in 1995, the United Nations Environment Programme came up with a global programme of action for the protection of the marine environment from land-based pollution. This is a very extensive document that instructs states on how to deal with land-based pollution within a domestic jurisdiction. There are offices, there is even an obligation of reporting, and there is co-operation within this programme, so it is formulated and constructed like a binding treaty, but it is not a treaty.

In areas that it is not feasible to be covered by the global treaty, soft law documents play a very important and significant role to bring states together.

Q52 Anna Gelderd: Thank you. Those are really useful and interesting examples. Finally, speaking of long documents, is the trade and co-operation agreement with the EU, as drafted, sufficiently robust to allow the UK to manage marine protected areas and fish stocks as the UK's legislation and the scientific advice requires in respect of EU vessel activities? I am not sure which of you might want to offer a view on that. We would be very interested to hear from any or all of you on that point.

Professor Barnes: I made a reference earlier to the sand eels dispute, and I think that is going to be a critical test of how the trade and co-operation agreement is going to work. As you are probably aware, the UK effectively banned exploitation of sand eels within its waters, and that mostly affected European vessels, so there was a disagreement about whether that was a proportionate measure, whether it was consistent with the obligations to permit access to our waters, but also, and I think this is critical, whether it was based upon the best available scientific evidence. Part of the dispute is that the UK has relied upon evidence from its own agencies and provided through a consultation process, whereas the EU is saying that it should be doing things much more collaboratively and particularly through the International Council for the Exploration of the Sea. That dispute is pending, and I would expect something to probably come from that in the next few months. That will indicate the extent to which the UK has latitude to unilaterally implement environmental protection measures that impact on fisheries.

That is critical, because one of the key criticisms of EU environmental policy, fisheries policy, is that it was not particularly good at dealing with environmental issues. All decisions impacting on fisheries had to be dealt with through a particular process, and states were reluctant to use that in a way that would restrict fishing. Coming out of the EU, that was one of the potential benefits—that we could adopt much more stringent environmental protection measures. The question then is, will we be able to make use of that power? I will leave it there.

Chair: Thank you very much. Thank you, Professor Barnes, Professor Fitzmaurice and Professor Webb for joining us today and for the evidence that you have provided. This sitting is adjourned.



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