



OFFICIAL REPORT
AITHISG OIFIGEIL

Environment, Climate Change and Land Reform Committee

Tuesday 11 June 2019

Session 5



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ENVIRONMENT, CLIMATE CHANGE AND LAND REFORM COMMITTEE
20th Meeting 2019, Session 5

CONVENER

*Gillian Martin (Aberdeenshire East) (SNP)

DEPUTY CONVENER

*John Scott (Ayr) (Con)

COMMITTEE MEMBERS

*Claudia Beamish (South Scotland) (Lab)

*Finlay Carson (Galloway and West Dumfries) (Con)

*Angus MacDonald (Falkirk East) (SNP)

*Mark Ruskell (Mid Scotland and Fife) (Green)

*Stewart Stevenson (Banffshire and Buchan Coast) (SNP)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Professor John Baxter

Annie Breaden (Crown Estate Scotland)

Professor Michael T Burrows (Scottish Association for Marine Science)

Katie Gillham (Scottish Natural Heritage)

Patricia Hawthorn (Scottish Renewables)

Charles Nathan (RSPB Scotland)

Linda Rosborough (Scottish Wildlife Trust)

CLERK TO THE COMMITTEE

Lynn Tullis

LOCATION

The Robert Burns Room (CR1)

Scottish Parliament

Environment, Climate Change and Land Reform Committee

Tuesday 11 June 2019

[The Convener opened the meeting at 09:31]

Decision on Taking Business in Private

The Convener (Gillian Martin): Good morning and welcome to the 20th meeting in 2019 of the Environment, Climate Change and Land Reform Committee. Before we move to the first item on the agenda, I remind everyone to switch off their mobile phones or to put them on silent mode, because they might affect the broadcasting system.

Agenda item 1 is to make a decision on taking business in private. Does the committee agree to take in private item 3 on today's agenda, and consideration of all future evidence on our marine inquiry?

Members *indicated agreement.*

Marine Inquiry

09:31

The Convener: Agenda item 2 is an evidence-taking session for our marine inquiry. This morning, we will hear from two panels, the first of which will focus on the current health of Scotland's marine environment. I am delighted to welcome to the meeting Katie Gillham, the team manager for marine ecosystems at Scottish Natural Heritage; Professor John Baxter, who is appearing in a personal capacity; and Professor Michael Burrows, from the Scottish Association for Marine Science.

First, what progress has been made towards achieving good environmental status in Scotland's marine environment?

Katie Gillham (Scottish Natural Heritage): There is a consultation out at the moment that gives an overview of where the United Kingdom thinks it has got to in achieving good environmental status. You have probably seen it already, so I will not go into lots of detail about it, but perhaps I should highlight some key points.

First, the consensus is that we have not yet achieved good environmental status for everything that we want it for. We have done better on some things than others. For example, we are looking at achieving good environmental status in water quality in terms of contaminants and so on, but there are other big areas of uncertainty, such as whales, dolphins and porpoises and underwater noise. In those cases, we are trying to collect enough data and to develop assessment methodologies that will enable us to draw conclusions. It is also fair to say that we are not meeting targets for good environmental status in respect of seabirds, as has been set out quite clearly in the consultation paper.

Professor John Baxter: I agree with Katie Gillham. Establishing whether we are achieving good environmental status is a big challenge. There are other areas that Katie did not mention, including seals—particularly harbour seals, which are showing significant decline—in which we are clearly not meeting the targets.

One of the biggest challenges is the benthos sea-bed habitats, on many of which we have only limited data. There are huge challenges in recording and surveying the marine environment. We are getting better at it, but it is extremely expensive and very challenging, and there are certainly areas on which we still need to gather more data.

I am sure that the committee is aware of the on-going work to revise "Scotland's Marine Atlas:

Information for the national marine plan”, which was published about a decade ago, with further assessments being carried out of all the different features of Scotland’s marine environment. We hope that that work will be completed sometime next year, although there is, at the moment, no date set for that.

Professor Michael T Burrows (Scottish Association for Marine Science): As an ecologist, I should say that my primary interest is the number or abundance of marine organisms. Defining good environmental status requires an understanding of how the abundance of species relates to what we would expect from an environment that is in good condition. Such definition becomes very difficult with environments and populations that might already be degraded in some way, because there is a shifting baseline. Therefore, it can still be questioned whether we have achieved good environmental status.

The other main issue is that the baselines will, with climate change, continue to shift, regardless of our efforts to protect our environment. An area of active research for me is about getting a better handle on objective criteria in order to say whether we have achieved good environmental status.

The Convener: Gaps in data have been mentioned. Where are the gaps, and how might that situation be addressed?

Professor Baxter: I mentioned data first, so I will answer that question first.

There are many gaps. Scientists always say, “We don’t know enough” or “We need to know more”, but it is important that we do not get trapped in that way of thinking and do nothing until we know more. We already know a lot, and we should act on what we know.

However, we still lack data on simple things—for example, the distribution and extent of many benthic habitats in Scottish waters. A lot of mapping has been done in recent years, and techniques that allow us to map the sea bed are improving all the time, but we are trying to cover a huge area, so there will be huge gaps. It is, therefore, really important that we employ the most efficient ways of gathering such data.

There is also a lot of data out there that we are not aware of, so we need to mine other sources—industry and so on. Such sources are getting better at sharing data, but there are still gaps.

The Convener: I was going to ask about that. After all, many people and sectors operate in the marine environment, and they will have their own data. Is it not a case of all of you coming together and realising that everyone shares the marine environment?

Professor Baxter: Exactly: greater effort needs to be made to bring people together. Things are undoubtedly getting better. I am long enough in the tooth to remember when data was just not shared: people had their own data, and that was that.

We also need greater understanding—as Mike Burrows mentioned—of climate change and the various factors that are associated with it. For example, we need better understanding of what a rise in sea temperature will mean for many organisms in Scottish waters. Up to now, the focus has largely been on temperature, but we must not ignore other major drivers such as ocean acidification, which is becoming a greater issue around the world. At the moment, Scotland is fairly free of it, but it is coming our way.

The other issue that is of great concern, and which is still very much left field, is ocean deoxygenation; huge dead zones are appearing. That has not yet happened in Scottish waters, but there is the potential for such zones to occur in some of our deeper sea lochs and more offshore marine areas. That would be very detrimental to all life in the ocean.

The Convener: Have the causes of that been identified?

Professor Baxter: Yes. As the sea warms up, it is able to hold less oxygen—the warmer the water, the lower the amount of gases that can be held in the oceans. Eutrophication and pollution also cause dead zones. There was a report on television yesterday about a huge deoxygenated zone in the Red Sea, which is the result of fertiliser run-off from the surrounding countries having created eutrophication. We understand the physics and chemistry, but we do not yet fully understand the biological implications of such things.

Stewart Stevenson (Banffshire and Buchan Coast) (SNP): I do not want to open up a huge debate, but we have identified that there are significant gaps in our data—I am not sure that we know which matter most—and we have a quarter of Europe’s seas, so what do we know about how our neighbours are doing in relation to the data that they have and rely on? I am looking for a subjective high-level answer on that. Are we doing better or worse than our neighbours?

Katie Gillham: Shall I have a go at that one, first?

Professor Baxter: On you go.

Katie Gillham: We are in a relatively good position compared to other countries in Europe, which reflects the importance that we place on our seas culturally, economically and socially. Our

seas are of great importance to us in all sorts of ways.

There are programmes of work across Europe on identifying bycatch and issues around that. Although there are still gaps in our data in terms of understanding bycatch and what it means for dolphins, porpoises and whales, we already have a monitoring programme that covers the whole UK and is more comprehensive than other countries' programmes.

However, it is important to emphasise that, in some areas, we are trying to collaborate on a much broader scale. The OSPAR convention—the Convention for the Protection of the Marine Environment of the North-East Atlantic—is extremely important in such work. A lot of information is being collected by other countries. Some of the work that has come about through the marine strategy framework directive over the past few years has placed more emphasis on working collaboratively through regional seas conventions, and on developing a series of common indicators, so that we can pool data from other countries and start to make assessments on a broader scale. That is very important in the marine environment, because the scale at which issues occur and at which a management response is needed are often much bigger than the Scottish scale—they might be across Europe or across the north Atlantic.

To go back to what Mr Stevenson asked about, I say that we are getting better at collaborating with other organisations. However, we are, in terms of data, in a relatively good position compared with some other countries.

Professor Burrows: I broadly agree with that in relation to fish, birds and marine mammals. For other habitats, however, we do not do as well as other countries.

Stewart Stevenson: I was really thinking about static species and things such as maerl beds and corals, rather than mobile parts of the biology of the seas.

Professor Burrows: I know that Norway is interested in its kelp forests and does an awful lot of research into their extent and how their status changes over time. We managed to map ours—or, at least, we got some good survey data from them—back in the 1990s. It is fair to say that that activity has not continued on a par with what is going on elsewhere. We might be doing okay for some parts of the ecosystem, but we are not doing well in others.

09:45

Professor Baxter: The focus will be on where the interests of individual researchers lie. As has

been said, a lot of work has been done in recent years on specific habitats. Mr Stevenson mentioned maerl beds: a great amount of work has been done on the biology of maerl beds. We still do not know where all the maerl beds are, because we cannot just stick our fingers in the air to find out. Work is going on to model where those habitats might be, so we can focus our survey work to check whether there are beds where the models say they should be.

We are very well served by the UK's and Scotland's great history of marine research. We have a good historical record of some of our habitats. We have studied for a long time those that we know, so we are in a good position to make some sort of assessment of how things have changed in specific areas over a longer period than is possible for our European neighbours.

Katie Gillham: I want to add something on the benefit side of things. There is a question of scale. If we look at a broad distribution of where sediments and rocky habitats are, we can see that we have good data and can use a combination of the data and prediction models to create broad distribution maps across our seas.

If we want to look on a finer scale, the most comprehensive information for benthic habitats is from the marine protected areas, particularly in relation to biogenic habitats, where the plant or animal creates the structure, such as maerl beds or horse mussel beds. The information in the MPA network is getting much better, but it is also getting older and there are fewer data points outside the MPA network. We are keen to address that.

Claudia Beamish (South Scotland) (Lab): You will be aware that this committee and the Rural Economy and Connectivity Committee have been scrutinising the way forward for the aquaculture industry. What research is being done on the effects of that industry on the sea bed and the wider marine environment? As we have only a short time, perhaps you could briefly draw our attention to the research or any gaps.

Professor Burrows: At SAMS, we have made an effort to model the settlement of fish-farm waste—fish faeces and excess food—on the sea bed. That additional load of organic material underneath fish farms is a real problem. We developed a model called DEPOMOD, which is currently being used by the Scottish Environment Protection Agency to establish what sort of footprint one should consider in looking at the sea bed.

It is pretty well understood how sea-bed organisms respond to that additional load of organic nutrients. At one end of the scale, the sea bed is almost completely without life—there is no oxygen and just a layer of blueish bacteria on the

sediment surface. The scale moves through to species that can tolerate low oxygen, to the other end of the scale, where the environment is perfectly undamaged. That response is well enough understood to allow us to regulate how long a fish farm should be in the same place and what the stocking density should be. That is a useful piece of science that helps us with the regulatory process. What is less well understood is how many fish farms can be put in a larger area and what the impact of that on the sea loch might be.

Mark Ruskell (Mid Scotland and Fife) (Green): Are there particular challenges in getting sectors to buy in to the process of collecting data and understanding impacts, such as the impact of noise on cetaceans? In the past, there has been a lot of controversy around Ministry of Defence operations in the seas. There is an obvious confidentiality issue in seeking to understand and assess the impact of naval operations on cetaceans. Is that an issue? Are there other sectors in which accessing data and getting buy-in is an issue?

Katie Gillham: Discussions about all sorts of activities relating to noise have been going on with the MOD for a long time, and a protocol has been established for dealing with those issues. MESAT—the maritime environmental and sustainability assessment tool—is used to assess risk and aid understanding of the mitigation measures that might need to be put in place for specific activities that the navy in particular would want to undertake. There has been a lot of progress, and there is on-going dialogue about mitigation on that side of things.

To give another example, there has been a lot of focus on underwater noise from the use of acoustic deterrent devices by the aquaculture industry. A programme of work is looking at that area; I know that Marine Scotland is doing work to better understand how many devices there are and how frequently they are being used. That will help us to get a better handle on what the impacts and risks might be, and to understand what management measures might need to be put in place. Those are a couple of examples; a lot of work is under way.

Professor Baxter: Another area in which noise has been a significant issue in recent years is marine renewable energy developments—for example, the noise that is generated during the piling activities that take place when wind farms are put in the sea. In my experience, that area has been well managed and regulated, and the industry understands that the issue needs to be addressed.

I do not know that we are quite at the point of fully understanding the long-term implications of

moving animals, and mobile species in particular, out of an area on a permanent or temporary basis. Even if they are moved out only temporarily, that might still be for a significant number of months. What implications does that have for their population? Work is under way to enable us to better understand all of that, but it is work in progress.

Professor Burrows: More broadly, it is really important that we get developers in the marine environment to engage in the collection of appropriate data. One of the best examples of such engagement is the Shetland oil terminal environmental advisory group. When the building of an oil terminal at Sullom Voe was proposed in the mid-1970s, an environmental monitoring programme was put in place.

That joint activity with the Sullom Voe Association and the operator of the oil terminals resulted in our having what is probably one of the best-understood environments in Scotland. There is a 40-year time series that shows how the sea bed, the coast and the birds in the area have changed. It is probably one of the best examples of an area where we have an understanding of the relative impacts of the oil terminal and of climate change. The advantage has been that we can see that most of the changes that have happened there have resulted from climate change rather than the operation of the oil terminal. There is a huge advantage in engaging early with potential users of the marine environment in that regard.

The Convener: There is no compulsion for people who operate in the marine environment to provide or share data or to get involved with the types of things that you have talked about.

Professor Burrows: The Sullom Voe arrangement is not voluntary. It is an on-going arrangement whereby the monitoring is funded, and it was put in place before the development of the oil terminal. There are all sorts of other examples of where the voluntary provision of data from vessels could be really useful.

One good and important example is the continuous plankton recorder survey, which covers some Scottish waters. It is basically a monitoring scheme; recording devices are put on to commercial ships, whose movement through the water is enough to sample the plankton.

Professor Baxter: That is another extremely long-term data set, which is really important. I do not think that there is any lack of willingness on the part of operators or shipping firms to put the nets on their vessels, but the challenge is to find the funding to analyse the data that are collected. The Sir Alister Hardy Foundation for Ocean Science, or SAHFOS, which is based in Plymouth and is the organisation that analyses these data

for the whole of the UK, is stretched for resources to analyse the samples and thereby get the data that will help us understand what is going on.

John Scott (Ayr) (Con): Notwithstanding the gaps in the data, does the UK marine strategy provide an effective framework for assessing and delivering GES? Does it need to be updated or revised, or are you content with it, notwithstanding its shortcomings and its lack of success in various areas thus far?

Katie Gillham: Since the marine strategy framework directive, which the UK marine strategy implements, has come into place, there has been a huge amount of progress. Notwithstanding the gaps that you mentioned, we have collected a lot more data and have improved our understanding.

What has been really helpful in the marine strategy and the directive more generally is, as I mentioned, our joint working through OSPAR, which has allowed us to focus on developing new assessment techniques. A series of new indicators has been developed and is now being used to bring all the existing data together and help us understand the impacts on the marine environment. That has been useful, but, as I said, we have not reached the point where we can say that we have fully achieved good environmental status, and there is definitely further work to do in that respect.

For example, on the benthic side of things, we have already discussed the fact that a variable amount of information is available on sea-bed habitats and species. So far, though, we have made good progress on what is called a sea-floor integrity indicator, which tells us about the pressure on and the sensitivity of sea-bed habitats. It is a really good step forward.

The current consultation also sets out the intention to do further work on more indicators. That is really important; after all, sea-bed habitats and species are a really good indicator of the health of our seas more generally, simply because they stay in the same place, integrate all the different pressures on the marine environment and allow you to see the results of that. It is really important that we understand the implications for sea-bed habitats and species, and the commitment to developing further indicators and finding a way of collating them in an integrated assessment of the sea bed will be a good thing in allowing us to set a future direction.

The Convener: Angus MacDonald has some questions on the OSPAR intermediate assessment.

Angus MacDonald (Falkirk East) (SNP): I want to delve a bit deeper into the assessment from 2017, which clearly highlights a number of areas of concern. For example, there has been a

20 per cent decline in the abundance of seabirds compared with levels observed 25 years ago. With regard to the sea-bed habitats that have just been mentioned, the OSPAR assessment of physical disturbance from bottom trawling concludes that 86 per cent of the assessed areas in the greater North Sea and the Celtic seas have been physically disturbed. There are also issues with marine mammals, marine litter and contaminants. However, I noticed some good news, with fish communities showing signs of recovery in some areas. What can you tell the committee about what you know of past and present trends in seabird, marine mammal and fish populations?

10:00

Professor Baxter: I will start. I can certainly talk about the marine mammals. We have two species of seal in the UK—the harbour seal and the grey seal. At the beginning of the 20th century, grey seals were almost extinct in the UK. It was estimated that there were less than 500 animals left, largely due to targeted hunting and fisheries control. We now have about 40 per cent of the world's population of grey seals—about 120,000 animals—in Scottish waters. The number of grey seals has increased dramatically as a result of legislation to control the hunting of seals—initially the Conservation of Seals Act 1970 and latterly the Marine (Scotland) Act 2010, which provided even greater protection measures.

The other reason why grey seals, in particular, have increased in numbers so much is the depopulation of many of the islands of Scotland where lighthouses became automated. It only took one or two people on an island to dissuade the seals from going there to breed. Now that we have so many islands with nobody living on them, the seals are very grateful and have returned. The Monach Isles on the west coast is a prime example; it is the largest grey seal breeding colony in the eastern Atlantic—that happened since the lighthouse was automated. Grey seals are doing well; some might say that they are doing too well.

Scotland was the stronghold in Europe for harbour seals, the smaller of the two seal species. We have about 40,000 harbour seals in Scotland. That is a minimum estimate, because they are very difficult to count. However, we are seeing a very strange phenomenon with harbour seals, in that on the east coast of Scotland and in the Northern Isles, the numbers are declining dramatically. In the past 12 years, Orkney, which was the stronghold for harbour seals, has seen a 90 per cent decline in the number of those seals, and the Firth of Tay has seen a 95 per cent decline.

Further south, in the Wash, which is another important area for harbour seals, the seals are

doing very well. It seems that the numbers are suffering and declining in the north-eastern part of Scotland. The west coast population is increasing, but we know that the seals from the east coast have not gone to the west coast, because we can tag them. Genetics work has also shown that there is very little exchange between the two coasts. We know that something is happening to the harbour seals in the east and north-east of Scotland. A huge amount of Scottish Government-funded research is being carried out by the sea mammal research unit at the University of St Andrews to understand what is going on and to see if anything can be done about it. At the moment, we do not have any concrete answers on the cause of that decline.

However, we now know what is not causing the decline—if you see what I mean. For instance, we know that killer whale predation is not significant, so that is not an issue. We know that disease is not an issue; no phocine distemper outbreaks have caused it. We have started to tick off what is not causing the decline, but we do not yet know what is causing it. There is on-going work on that.

One species of seal is doing very well; the other is doing well in some places but very badly in others.

Historical data are relatively limited, but, as far as we know, our cetacean populations are doing quite well. I guess that the best example is that of the bottlenose dolphin population on the east coast. When we were designating special areas of conservation, the focus was on the Moray Firth, which is a special area of conservation for bottlenose dolphins. That is where we thought the population was. We now know that more than 120 bottlenose dolphins regularly use the Firth of Tay as a habitat, and that there is some interchange with the Moray Firth, although not a huge amount. Over the past two or three years, we have had increased reports of sightings—almost on a daily basis—of bottlenose dolphins in the Firth of Forth, too. Their range is expanding, and it would also appear that their numbers are increasing. We are not seeing a decline in numbers in the Moray Firth; we are seeing more dolphins in more places. The bottlenose dolphin is a good-news story.

Those are the main points on cetaceans and marine mammals.

Katie Gillham: On the fish and bird side, there is still a positive story regarding the OSPAR intermediate assessment: even though the target has not been met on fish populations and fish stocks, we are getting closer to meeting it. We can see a long-term improvement, which is really welcome.

Going back to our earlier discussion about data sets, the quality of our data on commercial fish

stocks is excellent. That comes from a long-term time series, and it supports management decisions, which is a really good thing.

One thing to highlight, in contrast, is that we do not have good data for non-commercial species. Of particular interest for our understanding of how our ecosystem is functioning is the fact that we are lacking data on the prey species that are relevant to seabirds and marine mammals. If we have a better understanding of the prey species, we can, hopefully, better interpret the data on seabirds and marine mammals. That covers the fish side of things.

On the bird side of things, the picture in Scotland is very similar to the picture shown by the OSPAR intermediate assessment. We have a seabird breeding indicator, which measures two things. The first is the abundance of breeding birds. Over the period since the mid-1980s when the indicator has been running, there has been an overall decline in the number or abundance of breeding seabirds for the 12 species recorded. That is similar to the seal situation that John Baxter described, in that the overall decline hides a complex picture. Some seabirds, such as arctic terns and arctic skuas, have declined much more significantly, whereas other birds have experienced quite a big increase. That includes species such as gannets, which are more generalist and can feed with deeper diving. The birds that tend to feed on sand eels in shallower waters are doing more poorly at the moment.

The other aspect that we measure in relation to breeding seabirds is the success of breeding—the overall productivity. That has been measured since the 1980s, and we have been looking at 12 key species. That reveals a much more mixed picture, with an indicator that shows a line going up and down in relation to the target. At the moment we are slightly below the target, but there is quite a mixed picture among the different species.

John Scott: Professor Burrows, I am very concerned about what you said about climate change probably being the biggest influence on the changes in Sullom Voe. I suspect that climate change is the biggest influence of all, given the acidification, the deoxygenation, the moving food supplies for birds and fish, and so on. What worries me is whether your ability to measure can keep up with the speed of what is happening in relation to climate change. Can you keep up, given the speed of change?

Professor Burrows: Climate change happens over many decades, so, in order to attribute an effect or trend to climate change, we need to be able to discriminate it from all sorts of other, shorter-term perturbations of the environment, such as the weather. Where we have good data

and where species and habitats have been regularly monitored over a long period, we are able to see that species that have a normal distribution in colder waters than ours—species with an affinity for cold water—have tended to decline since the 1980s. Our seas have warmed by about 1°C since the 1980s. However, those species that have an affinity for warmer waters, such as Mediterranean species and those usually found off the coast of North Africa, have tended to increase.

There is an on-going shift in the balance and composition of our marine communities from cold-water forms to warm-water forms. We have tended to see that general shift everywhere we have looked: in plankton, fish, rocky shore invertebrates and seaweeds. That is not to say that the new species will not perform the same functions as their colder-water counterparts, but they are fundamentally, gradually altering the make-up of our marine ecosystems. The effects will sometimes be more dramatic, but there is certainly a gradual shift among the current players.

Claudia Beamish: Where are the gaps in the emerging international research on climate change? The committee has raised the issue of blue carbon. We worked across parties to ensure that peatlands were in the last-but-one report on proposals and policies, which is now known as the climate change plan. There was a box on blue carbon, but the argument was that the research was not detailed enough for it to be dealt with in that report. I am aware that there is international work on the issue and that work has been done by SNH. Can you shed any further light on the climate change issues and the issue of blue carbon specifically?

Professor Baxter: You are now getting close to my heart. One of the hats that I wear on behalf of the Scottish Government is that of the chairman of the Scottish blue carbon forum. The issue arose several years ago, when blue carbon was identified as an important sink for carbon. Originally, the focus was on mangroves, seagrass and salt marsh. We still have significant amounts of salt marsh, and we have seagrass beds in Scotland, but we do not yet have mangroves—although, with climate change, you never know. When we established research for the SNH reports that Mike Burrows contributed to, I was interested in expanding the envelope of habitats that might trap and store carbon in the marine environment.

The reports that were produced six or seven years ago identified and stimulated further research that is currently going on. It is being funded by SNH, through PhD studentships and through Scottish Government PhD support funding. That research is answering several key

questions. PhDs last for three or four years, so we have not yet got all the answers to the questions, but we are beginning to collect information that will help us to understand the true extent and importance of the different habitats in the marine environment.

10:15

In some cases, the amount of carbon that is stored in different marine habitats is orders of magnitude greater than what was estimated in the original reports, which were based on limited information. It is a startling fact that there is five times as much carbon stored in a unit area of sea loch sediment as there is in the equivalent area of peat bog. Again, the marine environment comes out as the best place for that—significant amounts of carbon are being stored and trapped.

That is not to say that those stores are not vulnerable. They are vulnerable to activities that disturb the sea bed and to ocean acidification. Much of the carbon is trapped in calcareous skeletons, and there is a danger that, in the future, it could be re-released into the atmosphere.

The Convener: That brings us nicely to questions from colleagues about the degradation of the sea bed. Does Angus MacDonald want to cover that area?

Claudia Beamish: I want to go back briefly to blue carbon, as Professor Baxter is an expert in that area. Is that all right, convener, or are we short of time?

The Convener: I am worried about the time. We can come back to that subject—I would like to move on to talk about degradation of the sea bed.

Angus MacDonald: Sticking with the OSPAR assessment of sea-bed habitats, let us go back to the statistics that I mentioned earlier. As I said, 86 per cent of the assessed area in the greater North Sea and the Celtic seas is physically disturbed, of which—worryingly—58 per cent is highly disturbed. Consistent fishing pressure occurs in 74 per cent of all the assessed areas. How do sea-bed habitats support the wider marine ecosystem? To what extent is human activity, in particular, causing degradation of the sea bed?

Katie Gillham: On the first part of your question, about how sea-bed habitats support the wider marine ecosystem, they are really important not only in their own right but because a lot of other species in the marine environment rely on them in some form or another—for shelter or rest, to escape from predators or for feeding. Sea-bed habitats play a number of different roles, which highlights the valuable role that they play overall in the marine environment.

The other part of your question was about how the sea bed has been disturbed. The indicator to which you referred relates to sea floor integrity and was developed recently through the OSPAR work. As I mentioned, we are looking at other indicators, and we hope to develop indicators around biogenic habitats. We have mentioned maerl beds, and the indicators would cover other biogenic habitats such as horse mussel beds and flame shell beds.

A lot of the biogenic habitats around Scotland have been included in the Scottish MPA network. We have been working with Marine Scotland to set up the MPA network, and Marine Scotland has led on putting fisheries management measures in place to ensure the protection of the most sensitive marine habitats. Marine Scotland is also leading on the review of priority marine features, which is looking at the most sensitive marine habitats outside the MPA network.

Marine Scotland is not saying that there should be widespread controls on the fishing industry to protect the benthic habitats. However, in some areas they are relatively exposed and there are coarse sediments, which means that those are good areas for fishing activity. The review is looking at areas such as the biogenic habitats that are most sensitive to such activity and at what we can do to protect those environments so that sustainable fishing can take place alongside that protection.

Stewart Stevenson: On human activity, the Joint Nature Conservation Committee says that stopping the dumping of sewage at sea and the introduction of the discards ban in the fishing industry are contributing to a decline in certain species of seabird. Is that a fair comment that is generally accepted? If so, how do we deal with the negative effect of what we think of as positive interventions?

Katie Gillham: The impact of the introduction of a discards ban on some species of seabird is inevitable. Some species—in particular, the more generalist species and the ones that would be described as scavengers—have done really well from the way that we have managed fisheries over the past few decades. If we put better fisheries management measures in place, there will be a knock-on impact on the species of seabird that have benefited most. We just have to accept that that is a consequence and not feel that we have to mitigate against it. Any management interventions that are put in place—in the marine or the terrestrial environment—will have knock-on effects. As long as we understand them and can make a decision about them, that is okay.

Professor Baxter: We must take great care not to be beguiled by the idea that the only good thing is for numbers of everything to go up. Nature

works in cycles, and organisms have peaks and troughs. We do not necessarily have the data on all those species to understand the length of their cycles. We have been enhancing the habitat for seabirds through discards, and they have done well. In a sense, we have created an abnormal situation, and the fact that their numbers are now declining is a reflection of that as much as of anything else. We must be careful not to create further conditions that artificially depress those populations. The fluctuation of their numbers should not, in itself, be a concern. If we understand the reason for that—the reason is the ban on discards—that is fine, but we need to be sure that we are not doing something else that is further depressing those populations.

Mark Ruskell: You say that we have less data on non-commercial species, but what about commercial species? No maximum sustainable yield has been set for the wrasse or razor clam fisheries. Are there still big gaps?

Katie Gillham: The long-term data sets that we have on the commercial species are fed into the large fish indicator that is being used. You are right in saying that there are other species in which there has been more recent commercial interest and on which we have much less data. Scottish Natural Heritage's position is that, if we are going to exploit a species, we should look to create a good baseline of environment data, including on the state of the stock itself. In that way, we could judge the impact of any harvesting of that stock, with the idea that we could understand it better and make decisions that would lead us to a more sustainable fishery in the future. If we do not have the information that provides us with a baseline, we have to make a lot more assumptions and be more precautionary in the way that we harvest that fishery.

The Convener: Let us move on to the evidence from recent studies on plastic pollution in marine ecosystems—if I can open up that very current and controversial part of our inquiry.

Professor Burrows: That is not my area of expertise, I am afraid. However, there is currently a lot of interest among the research community in the impact of plastics, and there is good evidence that the ingestion of large plastic items by the bigger organisms such as whales, turtles and seabirds has a tremendously damaging impact on them. It prevents them from eating their normal food items, and they often starve as a result.

Interesting results from a recent study at SAMS show that there have been plastic fragments in the oceans for a very long time. Deep-sea species that were collected from the Rockall trough in the 1970s show particle fragments. We have had the problem for a long time, but there is currently a lot of interest in it, particularly because of the media

exposure of the dangers of plastics. I guess that there is a strong positive message in that it seems to have increased people's awareness of their environment and the damage that they are doing to it. We hope that there will be some incredibly positive outcomes.

The Convener: The OSPAR report contains the very stark figure that 93 per cent of North Sea fulmars have plastic in their stomachs. That is horrific. What else are we finding, given the massive effect that plastic is having on that type of bird?

Professor Baxter: Fulmars have been a focus of research, which is why we have that really stark figure on them. You would probably find similar figures for many other species.

The Convener: It is an indication—

Professor Baxter: Yes. As Mike Burrows said, the plastics debate, if nothing else, has served as a wake-up call on conditions in the marine environment as a whole. We have abused the marine environment for too long.

My take on the issue is that it is important that we address the plastics issue as best we can. To an extent, the horse has bolted, but we can redress the issue to some degree. However, it should not cause us to lose sight of the bigger challenges that we face around climate change. If the oceans continue to warm, acidify and deoxygenate, it will not matter how much plastic is floating about in them, because there will be nothing left in them to be damaged by the plastic.

John Scott: Notwithstanding that, I am concerned about the ingestion of plastic by the fish species that we are increasingly being encouraged to eat. Has any work been done on the long-term implications for human health of the ingestion of plastic and the fact that, ultimately, it must end up being part of the fibre of the fish?

Professor Baxter: That is not my area of expertise. I think that it is an area that we have only recently become conscious of. We are talking about microplastics. I think that we are beginning to understand the loading of microplastics in our food species, but I am not qualified to say whether any research is going on in that area.

Professor Burrows: Me neither.

John Scott: Informed guesswork would do.

Professor Baxter: If research is not being done on that, it would seem to be a good area to get into, because it is important. There is some evidence that it could be a ticking time bomb for the future if we are all ingesting large amounts of microplastics. However, I am not an expert on that.

Professor Burrows: There are specific concerns about microplastics being a vehicle for the ingestion of other pollutants, which could potentially lead to disease. Some molecules will stick to plastic, and if the plastic is then ingested, those molecules will get inside people, where they may have a toxic effect and cause health-related issues. One of the problems that was thought of some while ago was that of endocrine disruptors: things that interfere with the natural hormone balance in the body. There seems to be evidence of some fish species becoming feminised, which is because the plastic-associated pollutants have oestrogen-like properties.

10:30

The Convener: Going back to another aspect of plastic pollution and pollution in general caused by human beings, how big is the scale of entanglement? I am referring to marine mammals and the debris that comes from fishing vessels.

Katie Gillham: There is a project called the Scottish entanglement alliance, which is a collaboration between various different organisations. The focus is not just on lost fishing gear or plastics; the project also concerns fishing gear that is being actively used at the moment, including creels and nets that are being set.

A lot of work has been done with fishing communities to understand what entanglements are happening, what kind of gear is involved and which species are affected. Over the next few months, that work will be written up, and we should be able to get a much better idea of what is actually happening—particularly on the west coast but also in other places. That is really important. If we can understand whether there are particular areas where that is happening more than in other areas, we can focus mitigation in those places. If we can understand whether there are particular gear types involved or whether there are ways in which the gear has been set that are problematic, we can start to consider that.

The importance of that project lies in the fact that a wide range of people are involved, who recognise that there is an issue. It is a matter of ensuring that we keep the collaboration going and get the understanding that the fishing industry and bodies such as Scotland's Rural College have gained from their work on the marine animal stranding scheme—which involves understanding the impact on the animals concerned—so that we can identify jointly what the solutions might be.

John Scott: The report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services—the IPBES report—makes for pretty horrific reading. What is the relevance of the findings of the report to

Scotland? How has Scotland contributed to the report? Is there anything positive to say, or is it all negative, as it appears to be?

Katie Gillham: The report is relevant to Scotland. It is really useful to have a report that draws together so much information at a global scale, because it allows us to put what is happening in Scotland within a broader context. It is useful for the report to set out the key drivers that affect the terrestrial and the marine environments, which apply equally in Scotland. Climate change, pollution and changes in land and sea use are equally applicable.

There are also key messages from the report that are fairly depressing regarding the area of our seas that has been changed by human activities and the impacts that those activities have had. Those things apply in Scotland, too.

On a slightly more positive note, the solutions that are presented in the report in relation to the marine environment—for example, ensuring that we have an ecosystem-based approach to fisheries management, using spatial planning and using marine protected areas—are all things on which we have made significant progress since the introduction of the Marine (Scotland) Act 2010.

There are some real issues that we should be aware of, but there are things that we can do about them. The action that we take on climate change perhaps requires a more significant transformation in how we manage our seas than some of the management interventions that have been made in the past.

John Scott: I hear what you say, Ms Gillham, but spatial planning and ecosystem planning will not in themselves solve the problem—although I appreciate that they may be a precursor to solutions. Are there solutions out there? The feeling that I am getting from this morning's discussion is that everything is being driven by climate change, regrettably—although there are other incidental factors.

Katie Gillham: Yes. I agree with what John Baxter said earlier. If we do not really tackle climate change—as we know, a climate emergency has been declared—

John Scott: Nothing else matters.

Katie Gillham: —the other things are more incidental. We still need to keep working on the other things, but if we do not start to tackle climate change more seriously, we will have serious issues.

Professor Baxter: I would not say that nothing else matters. It will take us time even to begin to tackle climate change. We must work to ensure that, if we get some of the issues under control or better understood, we still have habitats and

species there to benefit from that. Climate change is the big issue, but that is not to say that we should ignore all the other issues that are affecting the marine environment.

Katie Gillham: I echo what Professor Baxter has said. To go back to what we were saying earlier, if we can understand what the impacts of climate change and other activities will be, that will allow us to ensure that we do not put additional pressure on the marine environment on top of climate change and that we will still have a marine environment that we can depend on for all the goods and services that it currently provides.

Professor Burrows: Climate change means that we will inevitably lose many of the species that we currently care about, but we will gain many others that we will want to protect in the future. We need to look after our environment for the changing biota that is about to arrive. Some things will, in turn, be lost from the tropics. It is a massively rapidly changing world, but we still need to look after it as much as we can. If regulating how we use and develop the ocean is important, we should continue to do that as much as we can. The message is not one of complete despair, but we should still be looking after what we will have in the future; it is just that it will be different.

The Convener: Claudia Beamish has a question on blue carbon.

Claudia Beamish: I would like to hear Michael Burrows's views on blue carbon. Is there a likelihood that, in the next climate change plan—not the revised climate change plan, following the passing of the Climate Change (Emissions Reduction Targets) (Scotland) Bill—we might be able to start to develop actions on blue carbon?

Professor Burrows: We are at an earlyish stage of understanding blue carbon and how carbon in the marine environment is locked away effectively for ever—how we can remove excess carbon dioxide from the atmosphere and bury it in coastal sediments. We think that we know what all the parts of the system are: plants fix carbon dioxide from the water, they turn it into solid stuff and that stuff gets buried in the sediment. However, there are still a lot of real uncertainties. How much of that plant material is actually locked away for ever, and how much of it is just respired away?

The projects that have been started under Scotland's blue carbon forum—an initiative that is funded by Marine Scotland and the Scottish Government—are going some way towards addressing some of the uncertainties. We know that blue carbon is going to be important, and we need to look ahead to the time when we have more accurate information. There are still broad uncertainties there.

Professor Baxter: Another project that is under way is the blue carbon audit of the Orkney marine region. That will report later this month, hopefully.

Professor Burrows: Yes.

Professor Baxter: That has never been attempted anywhere else, as far as we are aware. That report will give us information to help inform management of the marine environment in local areas of that sort. It will not come up with absolute numbers, as we do not have all the information that we need, but I think that it is an important first step in getting blue carbon engagement at a marine regional planning level and finding out whether it can be taken into account when we are talking about the full range of management at any scale. That report will take us a good bit forward in understanding how well we can quantify the blue carbon resource in a region.

Mark Ruskell: What impact are invasive species having in the marine environment?

Katie Gillham: It varies, depending on the different aspects of the marine environment that you look at. I will start off, but Professor Burrows might have other comments to add.

Benthic habitats and species can be affected by invasive non-native species that would, for example, outcompete them for space or for nutrients. The carpet sea squirt on the west coast, which is an example of an invasive non-native species, carpets the marine life and literally smothers it. There have been well-publicised examples of mammalian predators on seabird islands, which have an impact on breeding seabird colonies.

There are a number of things that we can do in response to that. At the moment, the approach is to prevent invasive non-native species from arriving in Scotland in the first place. There are invasive non-native species in other parts of the UK that we hope are not transferred to Scotland. We want to prevent those species from being transferred in the first place. Failing that, we should control or contain them, if possible; in some cases, it might be possible to remove them. However, removal of invasive non-native species below the water is very difficult. Prevention is the first line of defence.

Professor Burrows: Most species in the marine environment are rare and only a few are common. The same goes for non-native species. Most of them are there in small quantities but, occasionally—as with the carpet sea squirt—they become common and, at that point, they will have a noticeable impact on the ecosystem.

Professor Baxter: The other challenge that we face is identifying what is a natural invasive or non-native species—in other words, one that has

arrived here as a result of climate change, independently of a human vector. What can we do about that? There is probably not a lot that we can do.

As Katie Gillham said, there are other measures that we can put in place to ensure that things that could not get here by themselves are prevented from doing so. We should do everything that we can in that regard, but it is a big challenge. Recreational boats visit from around the world and come into marinas. If one of those boats picks up something on its hull in the Mediterranean and that drops off, that could present us with a challenge.

There are big challenges. We need to distinguish between things that have got here under their own steam because the climate and the marine environment are changing, and things that have got here through human vectors.

The Convener: I am afraid that we have run out of time. I thank the witnesses for the evidence that they have given. I will briefly suspend the meeting to allow the panel members to change over.

10:43

Meeting suspended.

10:48

On resuming—

The Convener: Welcome back. We continue the discussion with our second panel, who will focus on the opportunities for marine planning and licensing systems to deliver more for the marine environment.

I am delighted to welcome Charles Nathan, marine conservation planner at RSPB Scotland; Annie Breaden, senior manager for policy and planning at Crown Estate Scotland; Linda Rosborough, the chair of the Scottish Wildlife Trust; and Patricia Hawthorn of Shepherd and Wedderburn, who is a director at Scottish Renewables. Good morning to you all.

Claudia Beamish: I will focus on the marine enhancement statutory duty. You will all know this, but for the public record, section 3 of the Marine (Scotland) Act 2010 places a general duty on the Scottish ministers and, I stress, on public authorities

“In exercising any function that affects the Scottish marine area”

to

“act in the way best calculated to further the achievement of sustainable development, including the protection and, where appropriate, enhancement of the health of that area, so far as is consistent with the proper exercise of that function.”

Many of us on this committee and on the previous committee in the fourth session of Parliament have highlighted the enhancement, as well as the recovery and protection of our marine environment. Could the panel members tell us what the priorities for delivering marine enhancement in Scotland are and who is best placed to deliver that?

Linda Rosborough (Scottish Wildlife Trust): That is quite a broad question. In terms of enhancement, we are looking for the recovery of the ecological diversity and health of Scotland's seas. The marine legislation and the marine protected area programme provide tools to enable enhancement, either through protecting the seas or preventing activities that could be damaging.

Beyond that—I know that you wish to go beyond that—people are thinking about restoration in relation to the sea. For example, the restoration of shellfish at Dornoch Firth is a very exciting project. Our firths would once have been rich with shellfish, but a number of problems have meant that those stocks have been hugely depleted. They once sustained large fisheries and captured carbon. That sort of vision of how the potential of an ecologically wealthy sea could be restored is beginning to happen, but it is still early days.

Claudia Beamish: Does anyone else on the panel want to comment on that?

Charles Nathan (RSPB Scotland): Enhancement and restoration are where we want to be with the national marine plan and the implementation of the planning system. We have it all in place, but we might fall into the trap of thinking that we can do the same offshore as we do in the terrestrial environment. There is quite a distinct difference. The marine environment is dynamic and there are dynamic and mobile species. That demands that those who are active within the marine environment in relation to different human activities must take a step back and be a bit more strategic. Unlike in the terrestrial environment, where you can deliver any mitigation or offsetting that you might require within your project site, you might not be able to do that in the marine environment—in some cases, you cannot.

There needs to be an understanding that the different sectors that are benefiting from the marine environment can contribute, potentially to enhancement, but certainly to all the other factors that we will probably come to, such as baseline monitoring and research. On a strategic level—it might not be related to their individual projects or activities—there needs to be a commitment from the different sectors to contribute to restoration. That will have to come through the guidance and strategic oversight that the national marine plan can offer.

Claudia Beamish: Before the other two panel members respond, my understanding is that restoration is not the same as enhancement; enhancement is about going beyond restoration. I may be wrong, but I thought that that was the case. There seems to be a little bit of confusion as to where we are with that. Can we clarify that, from your perspective?

Charles Nathan: Certainly, we would be in a good place if we could do enhancement, which, as you say, is about going beyond what is needed or going beyond meeting our targets. Certainly, there is a focus on restoration, which is required. You heard from the previous panel that the marine abundance of seabirds since the 1990s has been below target, which shows that there is a huge problem with the population of seabirds.

Patricia Hawthorn (Scottish Renewables): I am not a scientist; I listened to the end of the first evidence session and I suppose that I am trying to bring a business perspective to some of this discussion. The renewables sector would very much regard its business objectives as being aligned with net gain or enhancement, to use that terminology.

If the industry has a concern, it is about understanding what that means before it embarks on something, or is asked to embark on something. From the reading that I did before the meeting, I sense that we are not yet at the point of being able to define what we mean by net gain, particularly in the marine environment. Obviously, there is a better understanding of that in the terrestrial environment, so there is something that we can try to deliver. As an industry, we are engaged in a number of discussions in different for a to look at the issue. We very much want to participate in those discussions. The key thing for us is to understand what it is that we are trying to deliver.

Annie Breaden (Crown Estate Scotland): As you know, we are a very new organisation, whose objectives are different from those that we had as the Crown Estate. Our key goal is to promote sustainable development in all our work. We are still at the stage at which we are understanding the opportunities that are presented to us. We are finding our feet, and we are keen to work with all the stakeholders, Marine Scotland and colleagues around the table. The topic will be of great interest to us over the next couple of years. As we go forward, I hope that we will be able to come up with some firmer plans but, as yet, we are still looking at the opportunities that exist for us in this field.

Claudia Beamish: When it comes to delivering enhancement in the marine environment, do any of you see funding as the key barrier? Are there other barriers? Other members will cover the detail

of funding in their lines of questioning, so I am asking for a general view.

Charles Nathan: I come back to the need for a strategic focus. As Patricia Hawthorn said, to some degree, a sector just wants to be told where it lies, what it may or may not be able to contribute to and how it can make a positive input to the management of the marine environment. It is a question of looking at things from a strategic point of view and articulating that strategic view through the likes of the national marine plan and the forthcoming regional marine plans.

Mark Ruskell: A useful distinction has been made between restoration and enhancement. To what extent does the current consenting and licensing regime deliver enhancement? Is the delivery of enhancement hardwired into that regime? How is that done? If you could give some specific examples, that would be useful.

The Convener: I emphasise that not every witness has to answer every question.

Mark Ruskell: I was glancing at Linda Rosborough.

Linda Rosborough: I am not sure that that is an issue for the Scottish Wildlife Trust to have a view on. Patricia Hawthorn, as someone from the renewables sector, might be able to respond.

Patricia Hawthorn: I am happy to comment. At the moment, the marine planning context is where the concept of enhancement of the marine environment sits most comfortably. I am concerned about the concept being brought into licensing if we do not have clarity of purpose or a way of measuring whether what needs to be achieved is achieved. As a lawyer, I am mindful that a marine licence condition must be reasonable, enforceable and precise. We need to move the thinking on a bit further and make sure that any such licence condition is precise in nature and has a precise goal. It is important that we can measure whether it is achieved.

There is also a broader point to make about measuring net gain. As an industry, ultimately, we are tackling climate change. How do we measure that in the calculation?

Charles Nathan: I cannot give Mark Ruskell an answer or point to a specific example. When we are talking about licensing, it is incredibly difficult, at the project level, for a particular activity to contribute to an enhancement activity—or positive conservation measures, as I suppose one might call them.

11:00

It might not be realistic to require that of an individual project. The actual enhancement might

be required on the other coastline—on the west coast, for instance, or vice versa. It is definitely a tricky issue. There is a need for more information and a greater level of understanding. I am thinking of some of the basics around what marine planning can do to deliver the baseline monitoring that was discussed in the previous session and to deliver the research that is required to fill the knowledge gaps around our understanding of how activities impact on wildlife and habitats. The third element would be positive conservation measures. That is where we would identify what we could deliver to protect carbon stores or certain species and habitats.

Mark Ruskell: You have identified a big opportunity. Are there other opportunities? Are particular sectors addressing the need for enhancement more than other sectors are? Which sectors are really performing on marine enhancement?

The Convener: Anyone?

Mark Ruskell: Go on, give it a go.

Charles Nathan: We are working quite closely with the offshore wind industry, which is a major existing and potential sector in the Scottish marine environment, to try to answer some of those questions. There are on-going discussions, and there is a willingness there, as there will be in other sectors. However, they are not the experts—to some degree, they need to be guided on what they can and cannot contribute.

The Convener: In the previous session, we were told that there is a lot of data, but there is a shortfall in funding to analyse that data. Surely there is a gap there. I am thinking of the people who are applying for licences. If they are not asked to be the experts on any of that or do any of the work, you could just put in funding for the experts to analyse the data that is already there. Is that too simplistic?

Annie Breden: There is a lot of on-going research. Marine Scotland's extensive Scottish marine research—ScotMER—programme is looking at the effects of offshore energy on different sectors. The programme allows Marine Scotland to bring the data together and take a strategic overview. However, a lot of the research is still looking at understanding potential impacts rather than going a step further and looking at what industries can do on marine enhancement.

Charles Nathan: The convener is right—there are issues around the funding. As Annie Breden said, a lot of the research by the marine energy sector is about trying to get some certainty on what the potential impacts might be. However, we need to go the extra step, and there is, as I said, a willingness to contribute to other activities and areas of research to understand the data and to

get a bit more certainty about what might happen to certain habitats as a result of the effects of climate change or the intensive use of activities.

Mark Ruskell: What do you see as the role of the licensing regime in funding that type of research and funding marine enhancement?

Patricia Hawthorn: From my perspective, the licensing is about ensuring that we operate in the way that we say we are going to operate. As has been said, we do a huge amount of evidence gathering through the process of applying for a licence and then carrying out a development. The purpose of the licence is simply to ensure that we do what we are meant to do with that information.

The funding side of it is perhaps a bit of a conflation of issues. There is a huge willingness on the part of those in the renewables sector to be involved in these discussions, to put man hours into investigating these things, and to share information and data that they have produced and are paying for themselves.

Where it becomes more difficult in the licensing context is if you are just looking for an unconnected fund—something that does not relate to the development itself any more than delivering the development helps to tackle climate change in a general sense.

Mark Ruskell: Could the licensing regime be feeding into information which is then useful for the industry in relation to how you mitigate projects? I am thinking of international examples. In Norway, for example, they have a new licensing round for aquaculture, where only companies that strongly innovate and come up with what is, in effect, closed containment can go on to get a licence for an expanded site. Are there other, similar examples where there is feedback into industry innovation through licensing?

Charles Nathan: There is definitely an opportunity for planning and licensing to motivate innovation in an industry if there is a clear understanding of the impacts and how they can be mitigated through some sort of innovation. We are looking at the potential for floating renewables to be situated further from shore and in deeper waters. If we did that, it is likely that they would have less impact on the marine environment, particularly when we are thinking about seabirds. There is potential there. At a simplistic level, the planning system could support the roll-out of areas for floating renewables, for instance. That could be a long-term goal that would ultimately deliver more capacity with less environmental impact.

Stewart Stevenson: This question is probably for Scottish Renewables, although the other panel members may wish to comment.

Is it not time that we moved from viewing this simply from the point of view of how we mitigate the damage that is done to looking for opportunities to use development to improve?

I give an example that is not marine related. The consent for opencast mining in my colleague Finlay Carson's part of the country resulted in a substantial improvement in the quality of the water and the banks of the River Nith, which resulted in a dramatic rise in the number of salmon that were making it up the river to spawn. Improving the Nith was nothing to do with opencast mining but making that improvement was a condition of getting a licence to do opencast mining and what was done was clearly successful in a relatively short space of time.

Are we in a position in which we should be looking at authorising something that could have some associated negatives, conditional on there being associated substantial positives? Would that require changes in the law? I absolutely accept that the renewables industry is doing what it is currently being asked to do—I accept that. However, should we move beyond that?

Patricia Hawthorn: There is a place for that, but again, in the context of net gain, we must understand what we are trying to deliver and whether it is realistic to think that what we are focusing energy and resources on will deliver benefit at the end of the day.

If the industry is being asked to do something on the back of a project, it needs to understand how that is connected with their project beyond the wider goal of tackling climate change, which is a worthy goal in itself—

Stewart Stevenson: Sorry for intervening but I want to give you another example, although it is not a well-informed comment from me. When we put things in the sea bed, there is an opportunity to create reefs, which is an opportunity for fish breeding and refuge, which creates more food for seabirds—it goes all the way up the chain.

Are there not examples of what your industry and other industries—it is not just about renewables—could be doing or, in terms of public policy, being required to do, as a condition of being allowed into the environment?

Patricia Hawthorn: Again, I would say that there are such examples. There are valuable research programmes going on around most of the projects with which I am involved. As you said, they are largely voluntary from the sector at present, which is probably where they should sit.

As you know, there are other pressures on those industries. We always have to look at the balance between the cost to the consumer of providing energy and what developers are being

asked to pay for through their projects. It is about finding an appropriate balance. Well-directed funding is always looked at sympathetically.

Linda Rosborough: One of the best examples, which was referred to earlier, is the story of Shetland and the Zetland County Council Act 1974. Some very far-sighted people on the island took a long-term view at a time when not many people even believed that there was going to be a substantial industry and questioned how big it would be.

To the long-term benefit of Shetland, some of the resource that came in through the 1974 act has helped to pay for some of the work around the local management of inshore fisheries, through the Shetland College. There are examples of people being far-sighted and putting in tools early that mean that strategic choices can be made.

The industries that we deal with are often not in a particularly good financial state; that is certainly the case with some elements of the fishing industry. There are also issues around what can be done within the current legislative framework.

Norway looked at a wider set of requirements on investing businesses to do with research, local jobs and training—a whole set of different benefits—but I do not think that it went ahead with the proposals. There are challenges around what sort of package is available for investors who are looking at different places to invest. We have to look at the wider picture and work out what is possible. The essence of that is whether we can get a better way of developing and working in the sea. We must think more broadly to ensure that we get more rounded benefits. That is very good, and that is where we need to be.

The Convener: Before we move on to questions from—[*Interruption.*] Apologies; I see that Charles Nathan wants to come in.

I was just going to say that if anyone wants to answer a question, they should indicate to me—I am worried that I will miss you if I cannot see whether you want to come in. My colleagues can help things along a little: if members have a question for a particular panellist, it would be helpful if you could direct it to them.

Charles Nathan: I just wanted to respond to Stewart Stevenson's question. The broad, overarching principle is that the beneficiary pays. There are different sectors operating in the marine environment that benefit from a natural resource and a common good. It is only right that they should support the cost of the management—the good management—of that marine resource. That includes the natural marine environment, commercial stocks and whatever else. That could definitely be fed into the process more readily.

There are parallels with that through economic investment around the supply chain. From discussions that have been had with the offshore renewables industries over the past few weeks, it is clear that Scotland is looking to benefit more readily from those activities.

The Convener: We now move to questions that are directly about offshore wind. Finlay Carson will go first.

Finlay Carson (Galloway and West Dumfries) (Con): Most of my questions have already been asked and answered.

The Convener: Perhaps you want to sweep up what has not been asked.

Finlay Carson: The Scottish Government has promised to produce a seabird conservation strategy. Do the panel members have any views on what such a strategy needs to deliver and how the marine industries can support it?

The Convener: Whom would you like to ask?

Finlay Carson: I would have thought that RSPB Scotland would be a good starting point.

Charles Nathan: It is very welcome that that has been set out in the programme for government. It is about identifying what can be done to support the restoration and enhancement of seabird colonies where that is required, and seabird populations on a national scale. That the context in which there is a requirement for the strategic approach to be taken. As I said, an individual developer cannot necessarily do something on their site or within the grounds that they are acting on.

11:15

There is a definite requirement to make links and synergies, which would also improve efficiencies. It was said earlier that the renewables industry is putting a lot of effort and resources into understanding its environmental impacts. Could that be delivered in the round, in terms of the interactions with offshore wind, fisheries and aquaculture, because it is all interlinked? That is where the differences arise between the terrestrial and marine environments.

Finlay Carson: On that point, what issues for the marine environment would be associated with further expansion of offshore wind? We are potentially looking at the displacement of fisheries and scallop dredging, for example, and at additional fishing pressures in areas that do not have offshore wind farms.

Charles Nathan: The long-term view is that the national marine plan needs to set out what the Scottish marine environment will look like if we are to achieve net zero by 2050. That is likely to

include a large expansion of offshore renewables. When looking at the impacts, we need to look at what can be done to mitigate the pressures across the board. There are potential effects from the displacement of fishing grounds and on key foraging areas for seabirds where they find prey so that they can raise their chicks. There are also potential impacts on fisheries and migration along the cabling routes. Those all need to be considered in the round.

Annie Breaden: Offshore wind projects are now being constructed in Scotland, and the Beatrice wind farm is operational. Those will give us a great opportunity to understand the potential operational impacts of such projects on birds. Research projects have been run over the past few years, including a specific project on the south-east coast of England that is looking at whether birds stop using wind farm sites and whether there are any collision risk impacts. Although that project is in England, there have been valuable lessons from it.

Colleagues at the RSPB, SNH and other organisations are now keen to see research projects looking at operational wind farm projects in Scotland. We need to ensure that we get the right lessons from such projects for Marine Scotland to use to inform future plans for offshore wind development. There is obviously interest in developing more offshore wind in Scotland, but we need to learn from what has been built already and use that to understand where we can site more development.

Finlay Carson: Does the Wildlife Trust have any issues with the further expansion of offshore wind?

Linda Rosborough: We want it to be sustainable, and we want to be sure that we are managing our seabird interactions properly.

Finlay Carson: Do you foresee any issues?

Linda Rosborough: We work with partners across the environmental family. There are likely to be issues, depending on where developments are sited and what birds are there. We need more understanding, we need more research and evidence, we need very careful planning and we need to use proper evidence-based approaches to selecting new sites.

Finlay Carson: Is there not enough evidence to suggest that growth would cause a problem? Offshore wind is growing, which might be right or wrong, with regard to the impacts on habitats and species. Is there enough information?

Linda Rosborough: We have also heard a lot about climate change, and offshore wind has huge potential in relation to our climate change obligations. We are very mindful of that and of the issues around siting, including ensuring that

planning and implementation are done properly so that we minimise the impact on the environment and do not threaten protected species or put key populations at risk.

The Convener: Charles Nathan wants to come in.

Charles Nathan: To give the context, a scenario has been set out of up to 75 gigawatts of offshore wind in UK waters, in order to achieve net zero emissions by 2050. That is nearly 10 times more than comes from current operations, most of which are south of the border. The huge expansion that is taking place is an industrialisation of the seas, and there will undoubtedly be environmental risks with that. We need to balance that against the assessment in the IPBES report that was discussed earlier. In many respects, there is a biodiversity crisis. Grasping that and seeking opportunities to address the two conflicting issues is a challenge for and a significant demand on national marine planning in Scotland.

Finlay Carson: On renewables, what work is being done with the fishing sector, for example, to mitigate any impact on their sustainability?

Patricia Hawthorn: I am not directly involved in the groups that liaise with the fishing sector, but I know that the discussions are on-going at several levels. It starts with the industry group, and we participate in discussion forums with the fishing sector on strategic planning. We are usually involved in the same groups, looking at the marine plan and steering the work that goes into delivering new plans. Dropping down to project level, each developer will have its own set of discussions with the commercial fisheries that are impacted or potentially impacted by a project. There is a level of engagement across the board.

As Charles Nathan and others have said, it is about finding a balance between delivering the offshore wind potential that is there, and having the minimum impact on other sectors and the environment.

Stewart Stevenson: My central question is about the Crown Estate and money, to which Annie Breaden may find that it is largely down to her to respond. You are described as the policy and planning manager for Crown Estate Scotland. How do you determine your policies on fees and charges?

Annie Breaden: We have a different approach for different industries. With renewables, we take into account the state of the technology, whether it is on a commercial or a test-and-demonstration scale, the market conditions and other pressures on the developers. We are currently working up the approach for our planned offshore wind leasing round, which is due to launch later this

year. For other industries, we receive external advice.

We are looking to undertake a review of a number of aspects of our aquaculture operations over the next year or so. Rental income is one that will be considered. At the moment, for salmon, we charge £27.50 per tonne of gutted fish produced. We are very open about those prices, and over the next few years, we will look at pricing in the context of the new legislation under which we operate.

Given the increased cost of transport to market for operators, fish farming in the Western Isles and in Orkney and Shetland receives a 10 per cent discount on the rates. We have slightly different approaches for different industries, which we consider offer us the best value and take into account the market conditions in which the industries operate.

Stewart Stevenson: What you have said implies that you are prepared to invest in sunrise industries such as tidal energy—which is not yet operating at an even remotely commercial scale—in order to support them, because there is the prospect of a longer-term financial gain. Is that your approach?

Annie Breden: Yes, that is right.

Stewart Stevenson: That is fine.

Given that a quite substantial amount of the income that Crown Estate Scotland derives comes from the marine environment, to what extent are you required—by ministerial direction, legislation or otherwise—to turn some of that revenue back into investment in marine science, restitution of the environment and so on, or is there no connection between how you derive your income and how you have to spend it?

Annie Breden: We do not have a direct link such that we pay a percentage of our revenue into research for different areas. However, we do invest in research and development. Last year, we invested just over £100,000 in research and development in offshore energy in relation to aquaculture. We input into on-going research programmes and provide ad hoc funding for specific Marine Scotland research projects. At the moment, we are in discussions with Marine Scotland about how much revenue we should contribute to research.

Stewart Stevenson: Let me pick up on that point. Does Crown Estate Scotland make those decisions, or is it being directed to do so? I hasten to add that I am not objecting to your doing it; I am just asking the question.

Annie Breden: I will have to be completely honest. I am sorry—I do not know how such decisions are made.

The Convener: Mark Ruskell has a supplementary question on that area, then I will come back to Stewart Stevenson.

Mark Ruskell: My question is slightly tangential. Can Crown Estate Scotland leasing be used to require a proportion of Scottish manufactured content when it comes to offshore wind farms, for example?

Annie Breden: That is a hot topic at the moment.

Mark Ruskell: It is.

Annie Breden: We are currently working with colleagues from the Scottish Government and Marine Scotland to understand which levers and mechanisms we might be able to incorporate into our leasing. The process has not yet concluded, but we have come up with a number of options on which we are currently taking legal advice. We do not yet have an outcome, but we are looking at the issue to inform the new leasing that will come later this year.

Stewart Stevenson: I put to Scottish Renewables my question on the extent to which Crown Estate Scotland is regarded as open, transparent and, more fundamentally, predictable, given that its investments are relatively long term. How has that process evolved, and how would you want to see it evolve in the future?

Patricia Hawthorn: I am always wary of putting words in the industry's mouth. As far as I am aware, there is a very open and transparent relationship between our industry, the offshore wind sector, and Crown Estate Scotland as landlords. In the run-up to the new leasing rounds there has been a very open dialogue about how that round should be framed and conducted and what the elements of the process should be as regards option agreements. All those factors have been consulted on openly with the industry. I am not sure whether that answers your question.

Stewart Stevenson: That is absolutely fine. There is no right answer when I ask a genuine question.

Finally, I go back to Annie Breden. To what extent should you be investing in, protecting and enhancing the marine environment? One of the messages that we heard from the earlier panel—I think you were all sitting in the gallery to hear it—was that there is a need to do more in the marine environment, primarily, we are told, because of climate change but also because of other interventions. To what extent should Crown Estate Scotland be doing more than it is currently doing?

11:30

Annie Breden: There is definitely the opportunity for us to do more. As I said earlier, we are operating under new legislation that is still being implemented. Our organisation is still trying to work out what we can do and what we should be doing to fulfil our obligations under that legislation. We are looking to do more than we have done in the past. We are looking to be more proactive from the perspective of delivering sustainable development. How we operate as the new organisation will be different from how we operated as the previous organisation. We are looking to understand what we can do in that sphere.

Angus MacDonald: I turn to fiscal measures. We know that Seafish, the industry authority, collects and disburses a UK-wide seafood levy. There is a clear case for Scottish ministers to have the power to raise a Scottish seafood levy and have full autonomy to decide how seafood levies are best used in Scotland. How do the witnesses feel about the operation of the existing UK-wide seafood levy in terms of supporting sustainable development in the Scottish marine environment? Do you have a view on whether the seafood levy should be devolved?

Linda Rosborough: I should declare an interest, in that I am an independent member of the Seafish board, which is appointed by ministers from all four Governments. However, I am not here as a spokesperson for Seafish.

As Mr MacDonald says, the levy is UK-wide. It is a quite a political issue—it was raised in the House of Commons relatively recently.

By way of factual background, I have one point to add. The levy is levied on fish that are landed into the UK and fish that are imported for processing, so a lot of the levy goes into the coffers through the processors in the north-east of England.

However, given my role, I cannot really say anything. It is a very political issue.

I can add something to what was said earlier. The Crown Estate revenues are probably the closest that we have in Scotland to an environmental rent. Although Scotland does not have levy-raising powers, the Crown Estate revenues are fully devolved and you can charge those on the amount of finfish grown or electricity generated, for example. It is an ability to charge something like an environmental rent, which is quite interesting in the context of the earlier discussion.

Angus MacDonald: Notwithstanding your position on the Seafish board, the committee would appreciate having the view of the SWT.

Perhaps you could arrange for that to be submitted at some point.

Linda Rosborough: I will do.

Charles Nathan: I do not work directly on fisheries policy and suchlike. The levy certainly goes back to the beneficiary pays principle, where someone who is accruing a benefit from the marine environment should rightly contribute to the cost of the management of that environment that is borne by the Government and others.

Angus MacDonald: For the record, do you think the power to levy should be devolved?

Charles Nathan: I would not like to say.

Angus MacDonald: Does anyone else on the panel want to comment on that?

It seems not.

The Sustainable Inshore Fisheries Trust has proposed a landings tax on fisheries in Scotland as a sustainable means of cost recovery and investment in ecological sustainability. Should a landings tax be introduced?

Charles Nathan: RSPB would support a mechanism that would deliver funding for management of the natural marine environment. I cannot offer detail on the specifics.

Angus MacDonald: Okay. It is unfortunate that we do not—although not through lack of trying, I think—have representatives here from the sea fishing industry to answer these questions.

Have you identified any other fiscal measures that could be used in other marine industries to deliver more for our marine environment?

Linda Rosborough: The Scottish Wildlife Trust has proposed that decommissioning be looked at, which might be helpful in generating revenues. It is quite a controversial topic. There is a proposal that, rather than decommissioning some installations and removing everything from the sea, the inert structures could remain and there might be some environmental benefits from that. Our view is that, in general, there should be a presumption that such structures will be removed, but in some circumstances—only after detailed environmental examination—it might be to the overall benefit of the environment for structures to be left in situ, where they have been providing an environment and a little ecosystem for some time.

Research has been done at the University of Edinburgh on that. It is a controversial topic. We gave evidence on it to the Scottish Affairs Committee, and recommended that the regulator look at the matter in more detail.

Angus MacDonald: Okay. It will be good to see how that develops.

Charles Nathan: I am not sure that the legislation supports or enables setting of conditions that would require funds to be attributed to a particular cause. There are, in current offshore wind farm licences, conditions that ask for contributions to regional advisory group activities. The Moray Firth and the Firth of Forth both have such groups, which were established as part of the conditions of licensing. The wind farms are required to be active participants in them, and they conduct some research. However, to go back to the point about articulating what could or should be done, I note that the conditions in that respect are quite broad; they are not specific about what should or must be delivered.

Linda Rosborough: In relation to environmental harm or damage being caused, for example from escapes from fish farms, spillages or other damage, it would be good to work to ensure that the polluter pays, and that there is a way of recouping revenue that can then be used for environmental benefit. We do not have such provision fully in place at present.

Angus MacDonald: Are you aware of examples of countries that use levies or taxes to fund marine enhancement, and from which Scotland could learn?

The Convener: Does anyone want to comment on that?

Angus MacDonald: It seems not. We have some information regarding fisheries charges being used in Iceland, Australia, New Zealand and the US. Are witnesses aware of those examples?

Linda Rosborough: An example is the rig-to-reef programme in the Gulf of Mexico. There are payments to the state authorities in relation to some activities there.

Angus MacDonald: That might be something that we can look at in the future.

The Convener: As Angus MacDonald suggested, we invited representatives from the fishing industry to give evidence, but they were unable to come.

John Scott: To go back to what Stewart Stevenson said earlier about marine enhancement, I am interested in the concept of marine planning gain. Planning gain is a well-established concept for developers who are building on land. I am not certain that the renewables industry would necessarily welcome marine planning gain. How well developed is the concept? That is perhaps a question for Patricia Hawthorn and Annie Breaden.

Patricia Hawthorn: I am not aware of planning gain being developed as a concept, beyond what we regard as the very constructive process of understanding the environment in which we are

about to place developments and learning from that all the way along the line. The offshore renewables sector's delivery of a lot of information about the marine environment has, to an extent, been viewed as a contribution. However, I am not aware of any specific proposals.

John Scott: This is the concept. We might ask a developer who is building 500 houses to put in a new roundabout or build a road to the site. Everyone on the land would have to deliver an environmental impact assessment. The offshore renewables industry would do that, too. Do you or Annie Breaden have any views on that with regard to enhancing the marine environment?

Annie Breaden: I am not aware that the concept is currently being considered. From the Crown Estate's perspective, that is not something that we would ever seek to incorporate into a lease, or whatever. We would wait to see what came out of a licence or consent. If there was a wish to do something like that, we could help to deliver it, but at present I do not think that the concept is under discussion.

John Scott: I will move on. A dominant theme in the discussion around agricultural funding post exit from the European Union has been the idea of public money for public goods. Is that concept also relevant to the marine environment? If so, what would it mean in practice, in terms of Government support?

Linda Rosborough: On land, we would be talking about farm payments being used to purchase landscape that people enjoy and which has wider societal benefits. The first point is that the scale of the subsidy for farming is substantial. In comparison, the European maritime and fisheries fund is much more modest and limited in its purposes. It does not underpin day-to-day fishing in the way that the common agricultural policy underpins day-to-day farming. There is a difference in context.

John Scott: The risk notwithstanding—

Linda Rosborough: I am sorry—I am wrestling with the concept to see where it takes us. The European fisheries fund became the European maritime and fisheries fund, and the intention was to ensure that it is not focused purely on fisheries but has a wider marine objective through the way in which it is administered. That movement has started.

Charles Nathan: Can I just take a step back to comment on planning gain? I did not manage to touch on that a moment ago. As far as I am aware, there is not really a mechanism to deliver that concept in the marine environment. It is certainly something that we would support through securing funding to deliver what is required. The problem is connecting licences that are granted to work that

needs to be done. In the marine environment, those sites may not be in the same place.

For example, we have been involved in island invasive-species eradication for seabird colonies that are located on the north-west coast and the northern isles. Such work might not be applicable to activity on the west, south-west or east coast. We are, however, certainly having discussions with the renewables sector on means to deliver benefit from that sector.

11:45

John Scott: Is Brexit having an impact on Scotland's ability to fund and deliver enhancement in the marine environment?

Linda Rosborough: Yes.

Charles Nathan: Yes. Our main concern is the governance gap—the potential weakening, or loss of, environmental protections and the mechanisms to enforce them. Governments might have greater discretion without the European Court of Justice, but we really welcome Scottish ministers' commitment to meeting or exceeding the existing environmental protections. Key to what we are looking for is an environment watchdog that would effectively replace the European Court of Justice, and would be able to enforce environmental protection legislation.

Linda Rosborough: I agree very much with Charles Nathan. In addition, there is a risk of losing the core money for data and compliance from the European Commission. That chunk of money helps to buy services for shared data collection and compliance across Europe, which is important in ensuring that we are following best practice. Those dedicated funding streams have been significant.

There is also local funding, through which local people can bid for the coastal element of maritime funding. That has been significant in respect of people's relationship with the changes in the sea. Exciting local projects have been happening in many small coastal communities. Such things are often lost during a time of change.

John Scott: Is it possible to restore the marine environment by using a project-by-project approach, or is a more strategic approach required? To what extent is Scotland's current approach to marine enhancement strategic, or sufficient?

Charles Nathan: I have touched on that already. Enhancement cannot be done by project-by-project staged delivery. We definitely need a more strategic approach, which needs to be articulated in the national marine plan. We need to go from the point that we have reached, with all the policy framework and the requirements for

delivering enhancement in place, and articulate that approach. We will do that through creating protected areas, protecting blue carbon sources and biogenic reefs, and looking at the basic fundamental system in the environment that supports the species that we have.

Linda Rosborough: I agree. We need to have high level objectives and to work out what they mean in terms of change management, changed priorities and funding, and we need the strategic grasp to make changes that move the environment in a positive way. That is the big challenge for the next phase in marine planning.

John Scott: I do not want to contradict you, but I am surprised that you do not think that there is also value in a project-by-project approach. It is all very well to have a high-level approach, but actually doing and achieving things will usually be project by project.

Linda Rosborough: It is often helpful to test things out at project level and then to apply them more widely. For example, the Scottish Wildlife Trust is running a number of projects in health and education, but only when the approach is applied nationally will we see a big change.

We are building our evidence base on the marine environment, and are starting to understand what the real problems are. The next step is to develop a vision that is bigger than just a small project.

John Scott: Thank you for putting me in my place.

The Convener: My final question is directed at Linda Rosborough. The Scottish Wildlife Trust has argued that there is an opportunity, through oil and gas decommissioning, to create a marine stewardship fund. The oil and gas industry has reaped a lot of benefits from the marine environment; now that it is coming to the decommissioning stage, there is an opportunity for it to pay a little bit back. Do you have a view on that?

Linda Rosborough: As I mentioned earlier, we put forward that idea a few years ago, and we recently gave evidence on it to the Scottish Affairs Committee. It is a controversial notion—a number of environmental organisations believe strongly that all the structures should be removed. There are arguments both ways. Some of the science says that in a small number of cases there would be benefit in not removing the structures. That would mean a financial saving for the industry: a substantial proportion of that money could be put to good environmental uses. That is the fundamental idea. As I said, it is fairly controversial, but there is research evidence behind it.

The Convener: Is the idea controversial because of the counterintuitive nature of, in effect, leaving litter on the sea bed, or because the industry is not on board with your suggestion that it should use the saving that it would make from not removing the structures?

Linda Rosborough: The idea is particularly controversial for environmental groups because of the history of the North Sea.

The Convener: That is about the Brent Spar argument.

Linda Rosborough: The idea is also controversial for fishing interests, which would expect structures to be removed in order to free up fishing grounds again. The idea is controversial in a number of different places.

However, the costs of decommissioning are very high, so we are simply highlighting the fact that it is good to consider such issues. The matter would have to be looked at extremely carefully, because there are risks. There are concerns about whether we could trust that nothing noxious was left inside structures, and whether sampling is good enough. There would be all sorts of questions. We simply suggest that the idea merits consideration and that there could be benefits.

Charles Nathan: It is certainly worth exploring the idea of leaving structures in situ. With regard to the moneys that might be available, it is worth noting that the industry is subsidised to deliver decommissioning, so that money is not currently sitting on one side—it is money that is to be spent in the future, so it is almost non-existent, in that context. It would depend on what we decided to do: if a decision was made to leave a facility in situ, we must consider that the moneys that might be saved by not removing it would be coming from the UK taxpayer.

The Convener: Has decommissioning not been built into the costs? When the industry was applying for licences for developing those fields, decommissioning had to be factored in as a cost as part of the long-term business plan.

Charles Nathan: There is certainly a requirement for a decommissioning plan to be in place and to be reviewed as the development progresses in age. However, some of the earlier facilities that were installed are of such scale and size that the technology to remove them from the water does not exist. There are structures that were installed before the 1990s, and structures that have been put in place since then.

I do not know about actual expenditure. We would have to ask an industry representative to detail the costs that were foreseen in planning the decommissioning.

The Convener: My wider question is about a marine stewardship fund. Should the oil and gas industry, as it makes decisions around decommissioning—whatever it decides to do—be putting moneys into a marine stewardship fund?

Charles Nathan: We would certainly support that: it is an opportunity that is worth exploring.

The Convener: The final question is from John Scott.

John Scott: Who is liable, after 20 or 50 years, for structures that are left on the sea bed?

Charles Nathan: As I understand the situation, the companies that own them are liable in perpetuity.

John Scott: Would that be the case even if the idea that we are discussing was a Government suggestion?

Linda Rosborough: That would have to be sorted out. I mentioned the example from the Gulf of Mexico, where some moneys changed hands in order for liability to be accepted by another party, which was, I think, the state government.

Charles Nathan: Obviously there would be risks. A well would have to be plugged, and the plug would have to be strong and robust enough to exist for 100 or 200 years. Who would check it in 50 years? All those costs are associated with the idea, so it is not straightforward.

John Scott: Does Patricia Hawthorn, as an industry representative, want to comment on that? Are you happy with liability in perpetuity?

Patricia Hawthorn: From a renewables perspective, all our decommissioning plans are predicated on and priced including removal of kit. The point of undertaking an environmental impact assessment at the time is to ensure that removal will be done in the best possible way. If there is a good reason for leaving something there, that discussion can be had at the appropriate time.

To come back to the point about building in marine enhancement, one of the challenges in such projects is in trying to anticipate decommissioning costs—the decommissioning costs that we know about, for taking away the infrastructure. To try to build in something to do with enhancement, which we cannot define 25 years before the event, could mean companies paying for something that, at the end of the day, is not relevant. We need to be careful about how we expand that concept. As far as I am aware, decommissioning is currently predicated on everything being removed.

The Convener: I thank you all for your time. That concludes the public part of the meeting. At the committee's next meeting on 18 June, we will consider amendments to the Climate Change (Emissions Reduction Targets) (Scotland) Bill at stage 2.

11:57

Meeting continued in private until 12:23.

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