

Environment, Food and Rural Affairs Committee

Oral evidence: Future flood prevention

HC 775

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Written evidence from witnesses:

- [Lord Krebs, Chair of the Adaptation Sub-Committee, and Daniel Johns, Head of Adaptation, Committee on Climate Change](#)
- [Professor Dame Julia Slingo, Chief Scientist and Paul Davies, Chief Meteorologist, Met Office](#)
- [Sir James Bevan, Chief Executive and John Curtin, Executive Director of Flood and Coastal Risk Management, Environment Agency](#)
- [Alan Law, Chief Officer, Strategy Reform and Rob Cooke, Director, Terrestrial Biodiversity, Natural England](#)

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Members present: Neil Parish (Chair); Chris Davis; Simon Hart; Dr Paul Monaghan; Rebecca Pow; Ms Margaret Ritchie; David Simpson; Angela Smith; Rishi Sunak

Questions 1-124

Examination of Witnesses

Witnesses: **Lord Krebs**, Chair of the Adaptation Sub-Committee, Committee on Climate Change, **Daniel Johns**, Head of Adaptation, Committee on Climate Change, **Professor Dame Julia Slingo**, Chief Scientist, Met Office, and **Paul Davies**, Chief Meteorologist, Met Office, gave evidence.

Chair: Welcome, and thank you very much for coming along at the start of our inquiry into floods and flood resilience. Starting with ladies first, if you would like to

introduce yourselves briefly and then we will start our questions. Thank you all very much for coming.

Professor Dame Julia Slingo: I am Julia Slingo, the chief scientist for the Met Office, and I am responsible for all our R and D, the development of our weather forecasting systems and of course our climate predictions and climate change projections.

Paul Davies: Good afternoon. My name is Paul Davies and I am the chief meteorologist at the Met Office. My responsibility is the provision of operational weather forecast.

Lord Krebs: I am John Krebs. I am a member of the Committee on Climate Change and chair of the Adaptation Sub-Committee. Our role is twofold: first to advise the Government on the risks that will arise as a result of climate change; secondly, to report to Parliament every two years on the progress the Government is making in adapting to climate change and preparing for climate change.

Daniel Johns: I am Daniel Johns. I am head of adaptation for the Committee on Climate Change and I support the work of the Adaptation Sub-Committee.

Q1 Chair: First, I have a question for all of you. The winter floods in Cumbria, Yorkshire, Scotland and elsewhere in the UK were unprecedented, but some people have told us that they were to be expected. How confident are you that your forecast can be reliable and that you can predict these types of extreme rainfall events? It is quite easy for people to say after the event that this should have been forecasted.

Professor Dame Julia Slingo: The first thing to say about that is that they certainly were unprecedented within the existing records we have, which go back 100 years for rainfall. Whether they are unprecedented in a longer record if we had it is unclear. In terms of forecasting, there are two questions. The first is the degree to which we gave early enough warning of that particular impending weather event, and there I will allow the Chief Meteorologist to comment on that. The second of course is about how well we understand the risks we now face from weather and climate. That is first from the natural variability of our weather and climate, and in the UK we face a particularly high risk, just from where we sit in the world's geography. It is then, of course, about how that risk is potentially changing as the world warms due to anthropogenic climate change. That second one is much more challenging—knowing what the bands of the risks we face are from our naturally varying weather and climate, but also in the context of that whether we can detect yet changes going on, particularly in our rainfall patterns and our rainfall intensity and duration. If we can detect those, whether it is possible to attribute some of that change to global warming and for that area, the science is very challenging. We are making really good progress but there is so much more to say on that. That is the big challenge for us going forward.

Chair: Paul, do you want to comment?

Paul Davies: It is just worth saying that what we can do now we could not do five years ago. I am sure in the next five years we will be making far more improvements. One of the big challenges in the events we saw over Christmas was the locality of the rainfall and its position. However, with the investment in samples and high resolution models we will be

ever equipped to deal with the record-breaking rainfall that we saw over the Christmas period.

Q2 Chair: With my farming background, I know that for quite a long time you have been able to predict rain, but I think it is the amount of rain that comes and exactly where it falls; you seem to be getting much more accurate at that. Do you believe you will become more and more accurate with that? I know the wind can change and things can happen. I suppose it is still that longer-term weather forecasting that is still quite difficult.

Paul Davies: Yes, from our perspective we are ever becoming more accurate. As you alluded to, the atmosphere is inherently chaotic anyway. What we are able to develop is a system that captures the uncertainty of the atmosphere and then is able to translate that to a service that people understand. Julia may be able to expand further on that.

Professor Dame Julia Slingo: Yes, just think about the Boxing Day floods, which was a very good case example. Five days before those floods our global models were already saying that there was an elevated risk somewhere in the north-west of England. That was for really quite large amounts of rainfall and we were talking about 100mm accumulations from a global system. We then drill down as we get nearer to the event; we are drilling down now though these models that are looking at the kilometre scale—literally just where we live. The sort of rainfall amounts coming out of that system are now getting remarkably close to exactly what we observed. The question for us is still: is it in my back garden or is it in the neighbouring village's back garden? The atmosphere is such that that will always be uncertain. What we are now developing are systems that tell us about whether it is more likely in my back garden or in the next village down the road, which then allows us to take a risk assessment. I keep coming back to the word “risk”, because at the heart of this is always how we use all of the evidence that we have in combination to understand our level of risk and then what an appropriate response should be. That is the same whether we are talking about forecasting the weather two to five days ahead or whether we are talking about our longer-term exposure from weather and climate risk.

Chair: Lord Krebs would you like to say anything?

Lord Krebs: Thank you, Chairman. When we are producing the climate change risk assessment, which we are due to publish in July and which will set out the evidence underpinning assessment of risk for the UK, we rely very much on the Met Office Hadley Centre for climate projections for the UK in order to assess what we think the likely risks are going to be. The last comprehensive set of projections was published in 2009. Julia's team is working on a new set of projections to be published in 2018. In the meantime, we have used an update from the Met Office of the 2009 projections, and those projections show that in the decades ahead, on top of the natural variability that Julia talked about, there is a climate signal that suggests that there will be more rainfall, possibly in more intensive bursts, particularly in the winter and in some parts of the country. That is the kind of background to our risk assessments, but we rely very much on and defer to the Met Office's expertise.

Daniel Johns: The language of flood risk in the UK is widely misunderstood. We talk about a certain event as a one-in-100 flood or a one-in-1,000 flood but that just refers to the chance of that specific event happening in that particular place. The chance of a one-in-100 flood happening somewhere each year is much higher somewhere in England.

Chair: We will drill down on that question in a minute. I understand. I just do not want to pinch other people's questions. It is a fair point.

Daniel Johns: It is almost to be expected that there should be a significant flood event almost every other year somewhere in England.

Q3 Chair: Let me just finish off these questions. To the Met Office in particular, do you have sufficient computing capacity and skills to remain world-leading in this field? I take it you are getting a new computer down in Exeter, or you are about to be getting that?

Professor Dame Julia Slingo: The answer to that is undoubtedly yes. We are halfway through the installation of our new supercomputer. Next year once it is all complete we will have, almost certainly, the biggest supercomputer available for weather and climate science and services in the world. We have very well developed plans now on how to exploit that. The UKCP18 will be one of the first demonstrators of that. In terms of scientific capability, there is an important point to make here that over the time that I have been chief scientist I have really pushed hard for the Met Office to be both a facilitator and an integrator of the much wider science base that the UK has. One thing that the UK does have is world-class science across this whole area of environmental risk. One of the really important things about the new supercomputer and what it represents is that it will allow us over the next few years to really harness the UK's broader capabilities in environmental risk. I am keen to see that happen.

Q4 Chair: Are you confident that you have sufficient funding for new technology and for more research than you have already done? Do you think there is enough in place?

Professor Dame Julia Slingo: Again, at the Met Office we are very clear that we cannot do it all by ourselves. The challenges of the science and the inter-disciplinarity of the science, even in flood risk, is more than we can do. What I need to make sure of is that we harness all the funding that the UK puts into this whole area of environmental risk and use it most effectively. As I say, the fact that the Government invested £97 million in our new supercomputing system was an amazing step up for this country in terms of capability. I can build on that with my scientists and with the operations that we have, but more especially this enables a whole range of science to go on in the academic community, which is of direct relevance to the sort of issues that you are concerned about.

Q5 Chair: Models predict that extreme floods will become more commonplace in the UK as climate change warms the atmosphere. How confident are you that the data about climate change is fully reflected in tests that are to determine if floods risks measures will remain adequate in future years and decades? Also, as far as the Met Office is concerned hopefully you can predict when the weather is coming, but how can you predict that years hence? We can perhaps predict levels of rainfall. Have you got any method that will allow you to look into the future as to where that rainfall will fall?

Professor Dame Julia Slingo: The first thing to say is that the models we use to forecast the weather and the models we use to talk about future climate are exactly the same. At the end of the day they are founded in fundamental physics. I sometimes describe them as flight simulators. They simulate the weather. When we forecast the weather, we know where we are starting from in terms of today's weather, and that determines to quite a

large degree what tomorrow's weather will be like. When we do a climate prediction, it is actually the same simulation problem but then we are actually saying, "What are the whole types of weather that we might see in 20 years' time? What is the range of possibilities of how the weather might set itself up in 20 years' time?" It is the same physics.

Q6 Chair: Two years ago Somerset flooded and this year the north of England flooded. Surely you are never going to be able to get into a position where you can say, "In two years' time Birmingham is going to flood."

Professor Dame Julia Slingo: No.

Chair: Can we get that precise? Probably not.

Professor Dame Julia Slingo: No. What you will get from climate models is that you will know the likelihood of how often Somerset will get a winter of the sort that we saw two years ago and how often the lower Thames might be put under the sort of pressure that we saw two years ago. What the climate models give you is the statistics of the weather from which you can draw from it the likelihood of extreme weather over a 10-year period, across the country. That is the essence of how you do risk assessment. It is all around the likelihood of certain things happening. That is what we do. At the moment the granularity and the local detail in those models where we look forward into the next 10, 20, 30 years' time is not as high as the granularity of the models that we use for making the weather forecasts. It is much more difficult at the moment for us to say, "Is it Birmingham or is it Manchester where the probabilities will change?" Instead, we can talk about the northern part of England. The new supercomputer will allow us to drive forward and actually start to really give that granularity across the country. What it will tell us is what the likelihood and probability is of events like two years ago becoming more frequent. That is really what we need to know.

Q7 Chair: The new supercomputer should not only predict levels of rainfall but monitor what actually happens. As you make your predictions and as the years go by, it will be interesting to see how closely what is predicted actually happens and vice versa.

Professor Dame Julia Slingo: Yes. The other thing that the supercomputer allows us to do is that we do not make just one realisation of the path of future weather and where the rain might happen; we make literally hundreds of realisations. That is so that we can actually talk about probabilities and likelihoods for Birmingham or for Manchester. The extra power allows us to explore in much more depth the range of likelihoods, as well as giving us the local granularity. Those are the two elements that allow us to get a better handle on risk.

Chair: Does anybody else want to add anything on this question?

Lord Krebs: Perhaps I will add something just very briefly. From our perspective, taking the outputs of the Met Office Hadley Centre models, where we start from is about building resilience in the future in the face of uncertainty. As Julia has said, we can only have probabilistic estimates. We start by asking, "Where are we at risk now? Where is our infrastructure? Where are our assets vulnerable now, and how might that vulnerability change in the future and what actions might we want to take to manage that increasing risk and vulnerability?" The probabilistic nature and the uncertainty has to be factored in to

both the risk assessment and the Government's response, and the response of other people as well.

Q8 Ms Ritchie: This is to all of you. Many witnesses consider that current descriptions on maps do not convey effectively the level of flood risk to people's homes, businesses and farms. Does the one-in-100-years flood risk formulation give people a false sense of security, which leaves them unprepared for floods? Maybe I will start with Lord Krebs.

Lord Krebs: My colleague Daniel has already alluded to this.

Chair: We will let him give a fuller answer; I just knew it was the next question.

Lord Krebs: I will answer very briefly and Daniel can maybe elaborate a bit. I will just say two things. The first is to reiterate what Daniel said earlier. One in 100 might refer to a particular place, but if there are 100 such places around the country then it becomes statistically likely that one of those places will flood each year. I agree that one in 100 could give people a misleading impression that it is not going to be their turn, so to speak.

The other point I make is that there is a lot of psychological research on how people interpret probabilities, percentages and frequencies. The general conclusion of that is that if you give people a figure like 5% they do not have a good idea of what it means, but if you use one in 20, which is the same as 5%, people are more likely to be able to interpret that. Whilst the one in 100 can be misleading because people think it applies to them, whereas if you add it up for the whole country they would get a different answer, we should not necessarily move away from thinking in terms of frequencies to thinking in terms of probabilities or percentages, because people have more difficulty interpreting those.

Daniel Johns: I will just reiterate that the one-in-100 language applies only at the local level. At the national level, if we are thinking about where and how often a severe flood might take place, it is probably to be expected almost every other year or so. Depending on where you draw the line, there have been about 12 significant flood events somewhere in England since 2000. The question is not if these kinds of events will re-occur; it is a question of when and where. As an example, the 2007 floods, which were the most severe floods we have had in the last 15 years, were described at the time as a one-in-200-year event, but the chance of a flood of that magnitude happening somewhere is more like one in 20 or one in 25. When we are communicating flood risk to the public, there is a danger of using that kind of language. At the time it may be useful to provide some kind of sense that people were just unlucky on that occasion, but the chance of somebody else suffering a similar event in a relatively short period of time is quite high.

Q9 Ms Ritchie: Do you think there needs to be a better definition? I will come to the professor, and then back to yourselves.

Professor Dame Julia Slingo: Yes, I do. There are a number of issues with using a one-in-100-years. Somebody thinks, "Oh, I have had it this year so I cannot possibly have it next year because I have got to go another 100 years before it is my turn again." You have to keep emphasising that every year you face the same level of risk; it is a very important point. I also think that in this whole area there are uncertainties. What I am keen to see is that we express those uncertainties more clearly in the way that we communicate risk.

When I look at what comes out of our forecasting systems and I look at the range of possible outcomes, one of the reasons why we have used the traffic light system is because actually it is very hard to say the chance is 1% or 3% or 10%. What you want to say is the risk is very high or medium or low, and things like that. There is something in here about perhaps moving away from very precise numbers to expressing it in a way that communicates the urgency or the need for the level of investment in the response.

Q10 Rishi Sunak: Thank you for clearing this up; it was very helpful. Given the psychology of how people react to statistics, what is your suggestion as to what we should be saying? I understand everything you have said and it makes perfect sense. We have to deal with the psychology of the average person on the street who does not understand statistics, but what should we be saying? What should the Government be saying, either to people nationally or in individual areas that we know are at risk, to help them think about this?

Chair: If I can add to that, naturally enough if you say “one-in-100-year flood” to people they are going to quite simplistically say, “I have had the flood this year so for 99 years I am not going to have it.” That is not the case, is it? Should we actually just stop talking about that and just say, “You live in a high-risk area.” It is also about getting people to concentrate on the resources and doing something about it. The trouble is, if you have a one-in-100-year flood, they will think, “Oh I am alright now. I should be alright for 99 years so why bother.” I am being simplistic, but do you think we have got that wrong? Should we just scrap the idea of a one-in-100 flood or what?

Lord Krebs: You have a point. I know you are going to take evidence from the Environment Agency later on, so I hope I am not misquoting any of their work and they will correct me if I have got it wrong. Fewer than 10% of people who live in areas of risk accept that they are at risk. To pick up your point, there may be a simpler message—rather than trying to use “one in 100” or “one in 200” and instead saying, “You live in an area where you are at risk of flooding and you are part of the answer to that. You have a personal responsibility as well as the Environment Agency, the national Government and local government.” It could be that the first step is to communicate much more simply and that perhaps relates to Julia’s point about traffic lights: “You have a red card.” You make a really good point there: that might be a good starting point rather than trying to get into the next level of detail.

Q11 Chair: Would you agree with that, Julia?

Professor Dame Julia Slingo: I just note that as part of looking at what has happened in the last winter, we do have an end-to-end review going on, which is being led by DSTL. That is really looking at this whole communication aspect. In this case it is in the forecasting context, but actually I think we can learn a lot from taking the forecasting context and how people receive the message and act upon it to think how we might communicate on the changing landscape of risk on longer timescales. It will be interesting to see what that review says.

Q12 Ms Ritchie: I suppose it is then the whole area of communication strategy—how you communicate that information to the general public and particularly to the rest of us who are

non-specialists in the field, so that we understand and the wider farming, rural and urban community understand that they are at risk.

Professor Dame Julia Slingo: Absolutely.

Q13 Chair: Is that why you thought of a traffic light system? You thought that might be a better system.

Paul Davies: Yes. The Met Office is a customer-focused organisation so a large part of our activity is translating science into services. One of our key services is a national severe weather warning service. Prior to 2011 we benchmarked that against the needs of the public and the emergency response community. What we found is that people wanted to know what the impact was and what it meant for them when an event occurred. Through that dialogue, we realised that what people wanted to know was what the likelihood of an event was and how that was mapped against the impact, from which we then derived the traffic lights that has already been discussed. We still continue to learn and develop that, but certainly from independent evidence that we are getting from Ipsos MORI, it shows that people do understand that and do appreciate the value of that service.

Q14 Chris Davies: Before we move on from this topic, Mr Johns very correctly mentioned that language is misunderstood. We have gathered that now. What we are seeing is great and experienced witnesses telling MPs the situation. It is up to this Committee, I am sure, to come forward with a recommendation to Government, but we have not formed a way forward on this. Who should be leading on telling the Government and telling the public in simplistic terms that difference in language and the way we should be going forward? Should it be the Met Office? Should it be the Committee on Climate Change? Should it be the Environment Agency? Should it be local authorities? Who would you suggest takes this language forward?

Daniel Johns: First of all, to follow up on the previous question, any communication to the public needs to focus on the difference between national and local risk and combine the two to say, “The kind of event we are experiencing or have just experienced can be expected on a relatively frequent basis somewhere.” The question is where it will take place, rather than if it will. It is about where and when, rather than if. Within the local area you are either at a high, medium or a low risk of you being part of the next flood event.

As regards to who might communicate that risk, the Environment Agency already has that role, working in partnership with local authorities and other flood risk authorities. They have a role to communicate to the public. Despite their best efforts, as Lord Krebs says, there is still a relatively low level of awareness even amongst people who live in flood risk areas. About half of people might recognise some level of risk, or at least they recognise that they have been told they live in a flood risk area. Only 10% of people actually accept that they do live in an area of flood risk. Clearly there is more work to do and part of it is trying to communicate that there are things that you can do about it to try to prevent people just seeing flood risk as somebody else’s problem. Steps need to be taken by households. We might talk about flood insurance later, but the Flood Re scheme that has come in is a temporary scheme. In the long term, households will need to take steps to make their property more flood-resilient because otherwise flood insurance will inevitably become more expensive.

Chair: Can we just keep the answers a little bit tighter, because I am conscious of time. Could I just have one spokesperson from each side when we answer the questions? Can you get on with your questions please, Chris? I am not being too blunt there.

Q15 Chris Davies: He puts us in our place as well. Thank you Chairman. I did want to come back on that but I will move on. Lord Krebs, last October the Government rejected your recommendation for a comprehensive strategy to address the anticipated increase in the number of homes in areas at risk of flooding. Since that time, how have you worked to convince Ministers to change their minds, particularly in the light of last winter's floods?

Lord Krebs: To some extent there has been a wakeup call from the winter floods because we have the two reviews: on the one hand, Oliver Letwin's review, which was looking at flood resilience; and on the other hand Rory Stewart's review, which focused on Cumbria and the Cumbria Floods Partnership but also with national implications for catchment scale management of floods. In a way, events have happened to help us to get our message across. We have also pressed and will continue to press the relevant Departments, Defra and DCLG in particular, on the fact that they rejected our recommendations. We scored nought out of six in our recommendations in terms of acceptance in this area, which is not a terribly good batting average but there you go. The next opportunity for us will be when we produce our Parliament report in 2017. We will be able to look again at whether the Government have actually done anything to move the agenda forward on these key areas; if not we will reiterate our points. We have not achieved a dramatic change since last summer but we are pushing and I think events themselves have helped us.

Q16 Chris Davies: With regards to those events, what do you think are the missing elements from the current policies that the Government have in place?

Lord Krebs: We may come to some of those a bit later on but if you think of the three kinds of flooding, there is coastal flooding, there is rivers overflowing their banks, which is fluvial flooding, and then there is flash flooding or surface water flooding.

Chair: We will deal with catchment flooding in a minute.

Lord Krebs: Regarding surface water flooding, we made the recommendation that in new developments developers should not have the automatic right to connect to existing sewerage systems. That would really force this sustainable urban drainage. The Government did not accept that in the Housing and Planning Bill that is going through the Lords at the moment, slowly. I have an amendment to try to force the issue through the Housing and Planning Bill to make it mandatory by removing the automatic right to connect and to incentivise developers to adopt sustainable urban drainage. At the committee stage the Government rejected it but there is still the report stage next week. On development in the flood plain, which is the other major area, again the Government's view is that because the Environment Agency is a statutory consultee that will be taken care of.

Chair: Yes we will be dealing with that in a minute. Simon, did you have anything to say?

Q17 Simon Hart: I just have a quick question on language and communications. You mentioned the “high, medium and low” message; do you agree as a panel that some people who think they are in a high-risk area think that is a risk of a more devastating flood than those in a low-risk area? Do you think that we need to make sure that people in the low-risk areas know they can still suffer from a devastating flooding event? Is that part of the comms thinking?

Lord Krebs: I would agree: magnitude and probability both contribute to risk.

Chair: Whatever language you use, if you are not careful you lull some people into a false sense of security do you not? Or else you perhaps putting them into too high a risk; it is not easy.

Q18 David Simpson: You are all very welcome. I want to deal with some of the local priorities and specifically funding. Many witnesses that we have had in front of us have raised concerns about the allocation of funds in relation to funding. Specifically to Lord Krebs and to Daniel, do the Government need to rethink their centralised grant funding model so that schemes better reflect local priorities?

Lord Krebs: Perhaps if I can kick off and then hand over to Daniel, what we have seen in the last few years is reactive allocation of funding. When there were the floods in Somerset, £20 million was given to Somerset; there was then a chunk of money given to Cumbria. That is all well and good, particularly to put right the damage that is done to properties and flood defences in those situations. However, overall we need a national strategic allocation of resources to achieve the highest cost-benefit ratio. That really is the job of the Environment Agency, as I understand it, to assess where you get the most bangs per buck. Local responses or reactive funding should not displace a more strategic prioritisation of bangs per buck at national level.

Daniel Johns: Obviously there should be local choice and influence, and there should be involvement in the schemes that are being developed, but that does not mean you should step away from a fair and equal means to allocate the constrained amount of money that is available each year to individual projects. Though partnership funding, there is a way in which local schemes and contributions can come forward to influence what gets done in each part of the country. That is appropriate.

Q19 David Simpson: I will follow on quickly and briefly. What are the pros and cons of pooling central and local flood risk management funds at a local level for spend within river catchment areas?

Daniel Johns: Allocating funds to catchments makes sense on the basis of the risks and on the basis of the benefits of managing that risk in various ways. That does make sense as long as, at a national level, that does not diminish overall what can be achieved with the amount of funding that is available.

Q20 Rebecca Pow: Panel, my questions are going to be particularly about natural catchment areas. We have heard from witnesses before in some detail about these. My first point I would like to put to Lord Krebs. What is the Committee on Climate Change’s assessment of the contribution that these natural catchment plans and methods are making now—I do not believe there are that many of them—and also what difference can they make in the future?

Lord Krebs: They are not making a big contribution at the moment because we have tended to think of engineering our way out of the problem rather than working with the grain of nature. What role do they have? That will often be site-specific and there could be a whole range of measures that could be implemented. We have heard quite a lot about tree planting and rewilding as a way of holding water back on the hills rather than allowing it to rush into the valleys. In our report we have particularly emphasised the importance of restoring peat lands so that upland peat acts as a sponge, which it is designed to do, rather than being drained and allowing the water to run off.

Perhaps one area that has not been looked at so closely, which Daniel may wish to elaborate on with some numbers, is the use of farmland in valleys adjacent to rivers as flood plain. Instead of protecting the farmland and allowing the water to flow into towns, villages and cities and flood properties, it is possible that future revisions of the common agricultural policy could be set up in such a way that farmers are actually paid to have flood meadows rather than defending the flood meadows and using them for farmland.

Q21 Rebecca Pow: We do that to a degree on the Somerset Levels at the moment. The fact is it took ages to feed through via the CAP system, and Professor Slingsby has told us we are going to expect more of these severe incidents. How quickly do you think we need to be addressing these things?

Lord Krebs: Maybe Daniel could give you some numbers that would emphasise the need to do it quickly.

Daniel Johns: Part of it is to step away from thinking natural flood risk management is about planting trees in certain places and putting a few woody dams in watercourses. You need to think about how you can manage the catchments at the landscape scale to avoid or to minimise the amount of flood damage. A hectare of agricultural land that floods causes about £425 of damage per hectare. The same size area of land in an urban area causes £2.5 million worth of damage. The questions are: are we allocating flood risk areas? Are we using the flood plain that exists already to the best effect in order to minimise long-term flood damage? You could argue that given that 42% of watercourses are now cut off from their natural flood plain, and obviously that is mainly in rural areas because of farmland being protected, we are getting larger flood damage than is necessary because in some parts of the country agricultural land is too well protected?

Rebecca Pow: Is it too well protected by our designations? By what?

Chair: Not all farmers would necessarily agree with you on that.

Daniel Johns: No, too well protected by flood walls and embankments.

Q22 Rebecca Pow: You mean protected by physical barriers? Like the Parrett dam that they want?

Daniel Johns: Rivers run within walls along the side of agricultural land in order to maximise the land available for agriculture, which in itself is a noble thing to attempt. At the same time that channels the water into smaller spaces and avoids the flood plain being used for what it is naturally there to do, which is to avoid flood risk in general.

Q23 Rebecca Pow: Who is talking to who about this? It sounds serious.

Daniel Johns: What we are trying to say is that when you are looking at catchment scale approaches, which the Rory Stewart review is now doing for some pilot catchments, think about where the water is going at the moment and where it could go if you take more of a strategic approach at the catchment scale. If you can substitute a hectare of flooded land in urban areas for a hectare of flooded land in agricultural areas you save £2.5 million worth of damage. If you can do that by relatively small amounts of investment to channel where that water goes in those flood events, you can dramatically change the nature and scale of flood damage in this country.

Q24 Rebecca Pow: Do you mean substitute it so that the water still comes from the farms through the channels and then you hold it in the urban area? How does that work?

Daniel Johns: No, you slow the water in the uplands; you channel it into places where it will cause least damage. Woody dams, tree planting and rewilding are parts of the answer but it is not the full part of the answer. Part of it, as it is with the Pickering scheme, is about engineered approaches for flood storage in part of the catchment where it will cause the least damage.

Lord Krebs: One possible opportunity for the Government to set this out would be the 25-year environment strategy that Rory Stewart is working on.

Q25 Rebecca Pow: Do you think enough funding is going into looking into this area, because it is obviously going to be a serious part of us solving the problems?

Daniel Johns: It is not yet clear what the costs and benefits of the pilots that are going on will be. The right approach, which is what is currently being progressed, is looking at these pilot catchments, particularly in the north of England, to see what the options are and what the costs and benefits of the different options are. You would then expect funding to flow to pay for some of those measures where they can be shown to be effective. It is too early to say whether or not there is enough funding going into this area.

Q26 Rebecca Pow: Lord Krebs, do you think we are getting the balance right between this defending side and catchment side? Do you think there is too much emphasis on suddenly pooling the water and saying, “Let’s build more defences,” at the moment?

Lord Krebs: What we have said in our report to parliament on the Government’s national adaptation programme is that in the longer run, if indeed it is the case that these kinds of flooding events are going to become more common, you need a radical rethink. The current policy, which is essentially build and defend—build houses and properties in flood plains and then build hard defences to protect those properties—may not be tenable and the balance may have to be shifted towards thinking of natural catchment management. As I said, the Rory Stewart review has really taken that message on board. One hopes very much that the Government is going to rethink the longer term implications of the current policy.

Q27 Chair: Would you accept that farmers are more likely to take water in a flash flood situation as long as that water is not going to remain on that land for a great deal of time?

What you have got to accept—and it is a very simplistic view that you have put forward—is if you take out more farmland, you can actually destroy what a farmer is trying to do. If you say to them, “You store that water for 24, 36 or 48 hours,” in many cases they can probably carry on farming that land in the right way. We have got to be careful when we put forward some of these solutions that we do not frighten the horses too much because I accept your arguments, but you have also got to say to farmers, “If you manage that water in a way, we will pay you a certain amount.” It will not cost much money to do and it will also maintain food production as well. Some of the language is what worries some people.

Lord Krebs: I recognise there is a trade-off with using farmland for flood management and food production; there are also farmers’ livelihoods. Maybe we are painting a slightly simplistic picture and there would need to be detail worked out. I agree.

Q28 Rebecca Pow: Similarly on that note, if you are holding water for a long time, do you think that is going to affect the soil erosion more or less than getting the water off quickly or not? That is another really important aspect that we are going to have to consider in the future for the sustainability of land in order to increase our food production, which is what the Government actually want us to do.

Lord Krebs: Certainly loss of soil is a major factor affecting future food production. Equally, as you will be aware from the River Parrett situation, loss of soil can lead to silting up of rivers and therefore flood damage that is consequent from blocking river flow. The use of land and the way that the land is farmed is a crucial element of this. Quite a lot of flood plain land is kept as pasture so the soil erosion issue would not be as important as in areas that were kept as arable land. There are implications for farming practice.

Chair: It is interesting in the Parrett where the silt comes from. Some of the silt actually comes from the land but other parts come in from the Bristol Channel as well with the tide. It depends on which part of the Parrett you are on but we will not have a big argument as both Rebecca and I are not experts but know quite a bit about the Parrett. Thank you for that.

Q29 Dr Monaghan: Good afternoon. I have a question for Mr Johns and Lord Krebs. Gentlemen, what changes would you like to see to the Flood Re scheme, to provide incentives to homeowners to install resilient measures before or after they are flooded?

Lord Krebs: I will let Daniel lead on that.

Daniel Johns: As I said, I would play my cards early. You have to recognise that Flood Re is not a free lunch. It is a £180 million tax on home insurance more generally. It provides about a £50 million subsidy to high-risk households. In economic terms it delivers about £10 of economic benefit. It is a temporary scheme. It achieves very poor value for money because it does not actually address the core problem, which is too much flood risk in many parts of the country that has not yet been effectively managed. The only long-term sustainable approach is for flood risk to reduce and households have to start to take some responsibility in making that happen. There needs to be a partnership between Government, local authorities and also households so that they recognise that flood risk in many parts of the country will not go away and potentially will get worse with climate change. However, there are steps that can be taken. If those steps are taken about making

things more resilient and trying to alleviate the potential for having to make claims, then flooding insurance will remain affordable in the long term.

Q30 Dr Monaghan: Let us go back to the question, which was about what changes you would like to see to the Flood Re scheme.

Daniel Johns: We have been giving advice for a number of years now to the Secretary of State and then to Brendan McCafferty, the Chief Executive of Flood Re. The advice has been about five simple ways in which the Flood Re scheme can be improved. Part of it is about information to households, making sure that people actually know that they are being subsidised and know they are being subsidised only for a temporary, limited period. There is now about 23 years left of the 25-year scheme because the clock started ticking when the Water Act received royal assent. It is information for households and also knowledge of what they can expect to happen to household insurance bills as the scheme is withdrawn, because all other factors being equal, insurance bills will just start to gradually increase in areas of high flood risk.

There is also a question about incentives, subsidies and rewards for people who do take the right steps to protect their properties, so some kind of grant schemes or some kind of reward through future insurance bills for people who do fit property level measures and do make their homes more resilient. There is also a big question about the level of subsidy that is actually on offer, because the Government's own impact assessment says that in the worst-case scenario of Flood Re not being in existence, there might be about 16,000 households that might struggle to afford insurance. We now have a scheme that is giving a £180 million subsidy to 350,000 people. Therefore, there is a question as to whether the scheme, as it is currently designed, is proportionate to the scale of the problem. I guess that you could say that because of the level of subsidy, again that does undermine the incentive for people to start to take the steps that they could take for properties to be better protected. Finally, there is a question about risk-sharing. At the moment Flood Re means that insurance companies concede all risk to this pool and do not accept any risk themselves in managing the costs of claims. Again, households have no incentive to manage the cost of claims because they have all paid a very small excess. Therefore, there should be greater risk-sharing between households with insurance companies and also potentially with the Government, so that everybody has a share of the risk, has skin in the game, and works together over this remaining 23-year period to manage the core problem here, which is about flood risk.

Dr Monaghan: Did you want to add something?

Lord Krebs: I do not have much to add. It is only that, regarding the way it is set up at the moment, Flood Re has no direct contact with the individual householder. Brendan McCafferty does not actually have a method of saying to people, "You are in a subsidised scheme." That really has to come through the insurance companies. Whoever is insuring your house has to have a way of saying to you, "If you are in a flood risk area, you will get a cheap deal at the moment because everybody else around you is paying for it. That is not going to last forever."

The final point to make is to do with what is called the transition plan where Flood Re describes how it will make itself redundant over the 25-year period. There is a concept of betterment. When houses are refurbished after a flood event, they should be refurbished in

a way that is more resilient and therefore the bill will be lower next time, but that transition plan has been delayed. It was due to be published earlier but now it has been delayed until next year or the year after.

Daniel Johns: The transition plan itself has been published. The aspect of it which was about betterment and encouraging people to take the steps they will need to take in the long term has been postponed for the next two years.

Q31 Dr Monaghan: I will just pick up on the point around Flood Re being a temporary scheme that runs out in 23 years' time. What changes should we be working on now to make sure that in 23 years' time there is an adequate and affordable insurance scheme available to all?

Daniel Johns: Again it is about looking back to different parts of the country, because the Government's investment programme will be delivering better protection to hundreds of thousands of homes but within that there will be some parts of the country that just will not be protected because community level defences will not be economic in some parts of the country. Those people do not yet know who they are, so if there is nothing else that gets delivered thorough Flood Re it is much better awareness amongst householders that we talked about earlier, which involves them knowing that they are at risk of flooding, knowing that they are being subsidised at other people's expense, and that there are steps that can be taken to address that over the 25-year period so that insurance can remain affordable but that property will still be worth the same if not more than it was when the scheme started.

Q32 Dr Monaghan: Would you say that for some people, in the longer term, there will be no commercial insurance available without it being subsidised?

Daniel Johns: Personally I think there will always be an insurance product if people take the steps that they need to take to protect their properties.

Q33 Dr Monaghan: Affordability is the question.

Daniel Johns: Affordability is the question. If you talk to the British Insurance Brokers' Association, they have said that their members can offer cover at relatively affordable rates. Of course "affordable" is a subjective term, but the problem is really to do with how much people might need to spend on their properties to protect them to a sufficient degree so that insurance remains available. Certainly, the numbers of cases where no insurer will touch them under any circumstances are very few indeed.

Q34 Dr Monaghan: But they do exist.

Daniel Johns: As I say, there are even specialist brokers looking into targeting homes at high flood risk to offer them products, which combined flood protection with ongoing insurance. Unfortunately because of Flood Re, that market has disappeared.

Q35 Chair: I do not altogether agree with you here. Surely the whole idea of bringing in Flood Re was because there was a market failure. You are trying to say that Flood Re caused the market failure. No, it did not. There were lots of people out there who could not get

insurance. A lot of insurance companies were not recognising the resilience measures that householders were putting in and thousands of people could not get insurance. The Government did not step up to the mark and put this tax on people just for the fun of it. I am sorry but you are painting a very simplistic picture here. The market was failing. This Government and many other governments will not march into the marketplace and then put these schemes in place because there is no failure.

Daniel Johns: Expensive insurance in high-risk areas is not a market failure. That is just the market pricing the risk in the same way that the market prices young drivers and gives them more expensive policies than older, more experienced drivers. It was not a market failure.

Q36 Chair: You are just saying that people should pay whatever that premium should be—thousands of pounds with larger excesses because they live in that particular property, and the Government should do nothing about it. Is that what you are saying?

Daniel Johns: No, I am saying that there should be a transition.

Chair: A transition will only work if you have got insurance companies that will pick up that risk. Although insurance companies are out there to take risk, in the end they are adverse to risks. Therefore, if the market will not pick it up, there are not insurance companies and there were not insurance companies out there that were prepared to pick it up. I am not out there to protect insurance companies in any way, but I am out there to highlight that for people who live in properties that flood, it is not necessarily their fault. Therefore, what you are saying is because you live in that property and because it has flooded, all the risk is yours. I would argue that that is not the case, although I am now prolonging the whole thing.

Q37 Rebecca Pow: I gather that 30,000 homes have been built since 2008 and 10% of those have been built in flood risk areas. Who carries the can for that? Surely the Met Office should have been giving guidance to say, “Actually this is too risky. You should not be building there.” This may sound simplistic as well but is it a surprise that they got flooded and is it a surprise that they put in insurance claims? Who carries the can?

Lord Krebs: Of course, Flood Re does not cover newly built properties; it stops at properties built after 1 January 2009. If I could just offer one thought about that, it is about 4,600 homes a year that are being built in medium or high flood risk areas. Another attempt to amend the Housing and Planning Bill that I made at the committee stage was to suggest that developers should retain some liability, on the grounds that developers carry out the flood risk assessment. Admittedly the planning authority has to accept the flood risk assessment but if developers are sticking up homes, just as you have an NHBC 10-year guarantee on your house, why should you not have an element of guarantee against flooding for a fixed period of time? That was one possible solution.

The distinction between the Chairman and my colleague Daniel is partly about the long and short term. We all agree that in the short term the Government had to find a fix as the agreement with the insurance industry ran out in 2013. There had to be a way of allowing people who through no fault of their own live in a flood risk area to insure their house. In the longer run, Flood Re has to make itself redundant and therefore people have to face up to the reality of the market.

Chair: Making itself redundant I agree with. I would argue that the argument that there was no need for it in the first place I do not necessarily accept.

Dr Monaghan: Can I suggest, Chair, that this issue of affordability is a crucial one for the future? It is something that the Committee should return to and have some time to consider it fully, at a future meeting perhaps.

Chair: Yes, we are going to have Flood Re here, so naturally we will have their side of the argument. It is quite good to have another side of the argument to be able to put to them, so I shall be just as robust with them, do not worry.

Q38 Rishi Sunak: I have a very quick question for Lord Krebs. Do you mind elaborating on the other amendment that you had suggested about removing the automatic right of connection to sewerage? Can you just explain that a little bit more for the Committee: how that would work and how that would improve things?

Lord Krebs: As I understand it, when a developer comes in to put up large or small developments wherever, they are automatically entitled to connect the drainage of that development into the existing sewerage system. This is despite the fact that we know many sewerage systems are already overloaded. I am not saying in this amendment that they should never have the right to do that but they should not automatically have the right to do that. Therefore if the water company responsible for maintaining the sewerage system said, “Actually we cannot cope with 100 new houses draining into our sewers,” then the developer would have to think carefully about where the water is going to go. The whole point of sustainable urban drainage is that instead of it rushing down the drain into the sewer, it stays in little ponds and soft surfaces where it soaks into the ground and gradually disappears. That is the thought behind the amendment. Does that make sense?

Rishi Sunak: Yes, that is very helpful.

Chair: That is a very sensible idea. Thank you all very much. I am sorry we kept you a little longer but that was some good evidence. Thank you very much.

Witnesses: **Sir James Bevan**, Chief Executive, Environment Agency, **John Curtin**, Executive Director of Flood and Coastal Risk, Environment Agency, **Alan Law**, Chief Officer, Strategy Reform, Natural England, and **Rob Cooke**, Director, Terrestrial Biodiversity, Natural England, gave evidence.

Chair: Good afternoon, gentlemen. If you would like to start introducing yourselves from John, we will get straight into business.

John Curtin: Good afternoon. I am John Curtin. I am the Director of Flood and Coastal Risk Management at the Environment Agency.

Sir James Bevan: I am James Bevan. I am the Chief Executive of the Environment Agency. Good afternoon.

Alan Law: Hello. I am Alan Law. I am Natural England's Chief Officer for Strategy Reform.

Rob Cooke: Good afternoon. I am Rob Cooke. I am Natural England's Director for Terrestrial Biodiversity, which includes freshwater.

Q39 Chair: My first question is for the Environment Agency. This winter's floods overwhelmed defences in many places in England and such rainfall levels could become the new norm with climate change. How well does the Environment Agency's flood management strategy take into account evidence of the impact of climate change on rainfall and flood risk?

Sir James Bevan: As you rightly said, the first thing to say is that there were over 20,000 properties that flooded in December and every one of those was a personal tragedy. It is important to remember that even in that extreme weather event, there were many thousands of properties that did not flood because of flood defence arrangements. My first point is that flood defence works if it is done right. There is not ever a 100% guarantee against flooding but our aim is to ensure the best possible protection.

Regarding your question on how well we build in future risks, that is obviously one of the central questions of the national flood resilience review that Oliver Letwin is chairing and that we are discussing right now. My sense is that we are pretty good at predicting short-term risk and providing the right predications and warnings; you heard the Met Office talking about that. My experience in December was that a week or so out you already know what is likely to come. We have good procedures for alerting ourselves and the rest of Government and local authorities. When you are a day or so out, you have a very clear sense of what is coming and then it just depends on precisely how much rain falls on precisely what grid reference. It can make a lot of difference in the last couple of hours whether the rain falls to one side or the other of a particular watershed. For those short-term, immediate predictions, the system works pretty well. Even in December, before some places had flooded we were able to say, "We are pretty sure, based on what we now see, that in certain places, like Keswick, overtopping will occur," and we took the necessary decisions.

We should not be complacent but in the short term the predictions and the models work pretty well. The obvious question is: what about the long term? It is clear, although we do bake climate change predictions into our existing modelling and designs for flood defence arrangements, that after what we saw in December, it is right to sit down and ask whether those models and predictions work. That is what we are focusing on right now.

Q40 Chair: That leads me on to the second part of the question. The Met Office is saying that monthly rainfall could be up to 20% higher than previously thought. How are you able to put that into your predictions and modelling? Are you giving that due consideration or is that over-egging the pudding? Where are we on that?

Sir James Bevan: It is not over-egging the pudding. What we are doing right now, in the context of the Oliver Letwin resilience review is, with the Met Office, modelling some very extreme scenarios where we add 20% or 30% extra rain to the kind of extreme rainfall that we saw in the north in December. We have done similar modelling where we add significant percentages of extra rain to extreme weather events that we have seen in

relation to the Thames and to extreme coastal events. We are modelling what the effect is of those so far not yet seen but still conceivable very extreme events.

The initial conclusions—and this is still a work in progress, Mr Chairman—is that when you do that, the result of which bits of territory of England flood is that, even with those extra levels of extreme weather, all the significant flooding is still predicted to take place within what we call the extreme flood outline. That is part of the national map of England that is available online, the limits of which define the territory of England and Wales where there is equal to or more than a 0.1% chance of flooding within any year. In old money that is a one-in-1,000-year risk. The point of this is that what the modelling is showing at the moment is that even if you have significantly more extreme weather events than we have already experienced, it is a reasonable working assumption for planning that there is a particular area, which we have already identified—the extreme flood outline—where we should be focusing our efforts. As Julia from the Met Office was saying, we need to reality check that and we need to validate it with further external advice. That is an initial emerging conclusion from the review.

Chair: We will be talking about old money and new money in a minute about predictions—how we predict and how we tell people about those predictions.

Q41 Ms Ritchie: My question is about communication. Many witnesses consider that current descriptions on maps do not convey effectively the level of flood risk to people's homes, businesses and farms. Does the one-in-100-years flood risk formulation give people a false sense of security that leaves them unprepared for the flood?

Sir James Bevan: My answer is yes and yes. One in 100 is discredited. As I have said to the Committee already, nobody understands it. It may not even be right, given the future extreme weather. The challenge is to find other ways to describe risk.

Q42 Ms Ritchie: Has the Environment Agency been looking at other ways of description and characterisation and other ways to describe it?

Sir James Bevan: We have, and John may want to add something in a minute. I agree with everything I heard your previous panellists say in terms of the need to find different language that helps people understand their flood risk. The three things that are really important—and John may want to talk about this because there is some scientific evidence behind it—is that people are not very interested or aware of the consequences of a one-in-100 figure or percentage. What they need and want to know is whether they are at risk; that they are primarily the person responsible for managing that risk, although the Environment Agency, Government and local authorities also have a duty; and what to do if they are at risk. The debate is how we best convey that information to people in ways that they can use it.

John Curtin: I worked on a project under the Sciencewise brand, which is a BIS initiative to help work with the public on technical issues. They have done all sorts of things with GM crops and space weather. This was really interesting, because the Environment Agency and other partners like the Met Office and the National Flood Forum were working with six communities over a period of 18 months and working really intensely with them. That was three communities that had flooded and three that had not. There was one on the coast and one inland. It was a really interesting journey because we went into

that thinking, “What is the new language you would use to replace ‘one in 100 years’”, because, as James had said, it is not working. The clear view back from the public, which has been interesting hearing the debate in here earlier, was that as soon as you start adding anything like a traffic light or “one in 100” or a percentage, people are not sure if they are at risk. If I am amber, does that mean I am going to flood or not? A lesson from the public dialogue work was that the public just want to know whether they are at risk and if so what they should do.

Q43 Rebecca Pow: Can I just chip in? Do they not also want to know, if they are at risk, how bad that risk is? Is it going to be really bad or not really bad at all? That is what I would want to know: do you leave the furniture upstairs and get your wellies on and get the boat out or actually will you probably be okay?

John Curtin: We have kind of been stuck in this language of getting across when you are at risk and actually the conversation that people want to have is, “What do I do? Is this going to lap around my feet or do I have to get out of my house?” The public dialogue work, which I think we should share with you, is really interesting. The public said, “Do not give us maps.” Our flood warning service used to be a big map with lots of triangles on, and with the greatest respect to all the people that were living there, I live here and I actually want to know about here. Now, if you go to our flood warning service you are drawn in through your postcode and community. It tells you what warning there is and then it tells you what to do. There is a lot in that, and it is all down to not putting another barrier in the way by adding different colours or percentages.

Q44 Chair: What is interesting is that you are doing a lot on analysis. What are you going to come up with? What is it going to be? Is it going to be traffic lights, or is it going to be hundreds of years? What are you going to do about it?

Sir James Bevan: We are sharing where we are with you, Chairman. This is where our thinking has got to. This is a big part of the national flood resilience review: how do we communicate future flood risk? We have not come to conclusions within that review but we are sharing our initial thoughts with you.

Chair: You are sharing your thoughts and the dialogue that you have had with the public.

Q45 Ms Ritchie: Can we ask Natural England?

Alan Law: All I can say really is that we recognise the challenge around conveying to the public issues around risk, statistics and science, but we have not sought to engage around the issue of communications in relation to flood risk. It would be potentially confusing if we tried to do so with the agency having that responsibility.

Q46 Ms Ritchie: Has the agency got plans for better forms of communication and maps?

Sir James Bevan: Absolutely, the maps are very good. If you go online, as John said, you can put in your postcode and it will tell you what kind of risk it could be—a sea risk, a river risk or surface water flooding. The maps are good but they need to be improved and we are working to constantly improve them.

Q47 Angela Smith: I wanted to come in in response to Mr Curtin's comments in relation to people signing up to the Environment Agency flood warning system, which is a very good system. What percentage of households that you currently consider to be at risk are signed up? What is your IT capability in terms of taking 100% of those considered to be at risk?

John Curtin: Around 1.1 million people are signed up to the direct warning system and about 60% of those are high risk. I read the Age UK evidence quite carefully. The other bit from Sciencewise that we should not forget with the public dialogue is that it is not all digital. The public also said that you have to remember those that are not digitally connected. They gave us three places to give flood warnings that were not digitally connected; they were Post Office, corner shop and hairdresser. We need to look at how we connect with communities as well. Regarding the live direct warning, it is 1.1 million people, and the thing we need to embrace, which we are working on now, is how we use social media to get flood warnings out. We have started a system of Twitter alerts, so we now use Twitter to give severe flood warnings.

Q48 Angela Smith: On the assumption that all those at risk could access information digitally, do you have the capability to deal with that, in IT terms?

John Curtin: We are currently procuring a new flood warning system. The ambition of that was to be able to inform all those at risk. The biggest shift at the moment is actually people moving away from using landlines. Traditionally we have had addresses in a flood risk area and the phone number and you can then ring them. People are moving away from landlines, so one of the next big phases is working with a mobile phone company. We have just finished a project with EE mobile and the new flood warning system allows us to add other providers in so that mobile phones registered to at-risk houses can be contacted as well. It is kind of opening up all of these channels at the moment

Sir James Bevan: It is worth adding that, although we should use all channels including digital and online, there is no substitute for humans. I have learnt that where you have communities with active flood wardens—someone who lives in a community; we try to encourage those people to self-nominate—they are by far the most effective in getting the word out and making sure the community is prepared before, during and after.

Q49 Angela Smith: You could potentially work with neighbourhood watch schemes to develop that kind of capability, rather than replicating with flood watch schemes.

Sir James Bevan: Yes, you need to work with the local communities.

Q50 Chair: We are going to ask a few more questions. Before we pass on, can I just say something to Natural England? Are you actually going to re-look at this, as you have plans of coastal defences and in some places you have decided that you are no longer going to defend the coast? How much are you making people aware of this? Are you going to redraw your maps because it really does make it very difficult for some people that are managing businesses right by the sea?

Alan Law: Our role is essentially as an adviser here, so we would advise with the Environment Agency and local government around where there are issues associated with

coastal defence for the natural environment. However, we are not the decision maker around where coastal protection takes place or indeed the form of that.

Q51 Chair: I have a case in my own constituency where you are raising objection to some sea defences and so therefore you then send it to public inquiry and goodness knows what else, and that causes a huge amount of cost. That is where there is a problem.

Alan Law: I would like to understand more about the issue in your constituency.

Q52 Chair: I could talk all day on this particular issue but I have talked to your chairman about it. As I said, it just seems a nonsense sometimes with the huge amount of bureaucracy that is created, because all the organisations feed from one to another; that is the problem.

Sir James Bevan: If I could just add something on that, Chairman? You are right that it is also important for people to know what the plan is. This is where we are doing reasonably well in terms of public information. Again if you go online on the Environment Agency website and put in your postcode, there are maps of sea defences. What they do is tell you what the plan is: is it leave, is it managed retreat or is it build walls? This means people can at least find out what the planning is for the next few years.

Alan Law: The general point for us would be around early engagement where there is an issue that relates to coastal defence, because our experience is, provided that you have a long enough lead-in time to actually engage around, whether it is a particular development or other, you can usually find a strategic solution.

Chair: There has been plenty of engagement on this one, I can assure you. I will not keep the Committee on it, but I will talk to Andrew Sells again.

Q53 David Simpson: You might have heard my previous question to the other panel in relation to the concerns raised with allocating of funding. Do the Government need to rethink their centralised grant funding model so the schemes better reflect local priorities?

Sir James Bevan: I agree with what I heard Lord Krebs say, which is that you need to do both. You need a national strategic overview so that you can make sure that big decisions on big allocations to the most important projects go where the biggest need is. You can only achieve that with a degree of central oversight, which is what the role of the Environment Agency is in allocations. Also there is a key role for local decision making. About 30% of our capital budget that we receive from the Government in terms of grants for flood defence investment, is actually passed on to local authorities for them to use in the schemes. There is a local authority input there. All of our programmes across the country are agreed with the Regional Flood and Coastal Committees, so there is upward input from those committees into decisions that are made. Increasingly, the majority of our projects now are co-funded, so the Government and the Environment Agency will put in some money but we will look to local authorities and businesses in local communities. I think that is a good system. It means that you end up with collective design and delivery and funding for projects, and that is better than just local funding or just national funding.

Q54 David Simpson: When you are referring to the budget, does the current system properly allow for costings and benefits?

Sir James Bevan: There is a Government set procedure that we go through in terms of prioritising, based on legal obligations and then the highest priorities in terms of benefit-cost. We follow that and that is principally focused on protecting the maximum number of people. Where the use of that formula does not allow all the funding to come from Government, that is where there is scope for local authorities and businesses and partners to come in and provide some or all of the funding. Even if we are not a funding scheme we would obviously want to work with local partners to help design and deliver it.

Q55 David Simpson: So partnership is one of the key elements of this.

Sir James Bevan: Absolutely, and it is increasingly important.

Q56 David Simpson: John, do you have anything to say on this?

John Curtin: The important thing for me, which James briefly mentioned, is the oft forgotten group of regional flood and coastal committees. They are really important here because they do represent local authorities, water companies and other people. What is often forgotten is that there is a national programme put together from the strategic risk and then there is a process of local choices that goes through the RFCCs. That pulls together what the final programme is. They also match the national funding, not just with partnership funding that they can get locally but the local levy they raise. If there is one thing to remember, you should know who your RFCC chair is, because they are a real gem in the whole process and they are often forgotten.

Q57 Angela Smith: I just want to test this assumption that partnership working between local authorities, local partners and national agencies is necessarily equated to funding contributions. Local authorities find it very difficult nowadays to raise any kind of funding, capital and certainly revenue. The point I would make is that surely there is a risk of compromising the value of the local contribution to the design of the scheme because of the restraints that they face on funding. The local knowledge may design a scheme that is perfect for the area but local authorities may feel inhibited in terms of recommending certain solutions and the right solutions because they themselves face funding restraints. Surely that is a really significant risk?

Sir James Bevan: You are right. Local authorities are under funding constraints, and I have spent quite a lot of my time talking to local authorities, which is why increasingly the model for the future is not going to be anything totally funded by the Environment Agency or totally funded by a local authority. Instead it would be funded by partnership funding, which is not just about local authorities but can include and does need to include businesses, local communities, the Heritage Lottery Fund, some EU funding that we have been tapping for some of our projects.

Angela Smith: For now.

Sir James Bevan: The future is increasingly collective and one of the beauties and benign consequences of being challenged to find the right type of funding is that it does force conversations about what really works for the local community. For me a scheme that does not match the needs of the local community is a failed scheme. The fact that we are increasingly having to work together to fund and design schemes means we will end up with better schemes.

Q58 Angela Smith: There has really been kick-back from businesses in Sheffield at the notion of having to make a contribution towards the defence schemes there on the back of 2007.

Sir James Bevan: Yes. I was in Sheffield last week with Oliver Letwin talking to the council and it has some very good schemes already. They are talking about salmon returning to the river, so there is lots of good stuff going on in Sheffield. You are right that there are challenges about future funding, but it felt to me as if there was a good relationship and we as a committee are doing what we can to help those schemes go forward.

Q59 Angela Smith: Nevertheless, businesses are still not happy at having to contribute.

Sir James Bevan: First, businesses have an interest in contributing. They are being protected by these schemes and certainly if there is a flood risk to an area there is a risk that people will not invest, so not just the existing businesses will get damaged but the economic health of the city will get damaged, so businesses do have an interest.

Q60 Chris Davies: We have heard how well you are working with local authorities and coastal organisations. How well are you working with the devolved nations, because the rain and the rivers do not stop at the Welsh or Scottish border? Obviously there were funding agreements and various schemes in place or coming into place. What is your relationship with both organisations—with Wales and with Scotland?

Sir James Bevan: From our perspective, we have a good relationship with NRW. We share a lot of information. We have recently produced and published river basin management plans, two of which straddle a border between England and Wales so we have done that jointly. My experience is that there is a good working relationship between our organisations.

Q61 Chair: Is that with Scotland too?

John Curtin: More practically, winter events touched all nations in the UK. I am bringing together representatives from Northern Ireland, Wales, SEPA and we are going to Cumbria in July to see what happened and hear their stories. We will then go back to the national flood resilience review on how that might help there. I am very keen to bring us together, because these storms race across all of us, not just the individual organisations.

Q62 Chris Davies: Have you applied for any funding for any cross-border schemes?

John Curtin: Not that I can recall. I do know that we are in the middle of events, especially with yourselves and SEPA, making contact about mutual aid and support of each other's equipment and resources; as and when, it went to the north and gave us a bit of respite, and the same with Wales. There is that mutual aid discussion but off the top of my head I cannot think of any joint schemes.

Alan Law: We have a long history of good relations with predecessor bodies of NRW and now with NRW, and similarly with SNH and SEPA north of the border. We share work on science and evidence-gathering through our chief scientists' network and we work closely

around cross-border sites. There are some European funded schemes that we have been involved with cross-border, and sites like Fenn's and Whixall in the West Midlands.

Q63 Rebecca Pow: Regarding the funding issue, I wonder what your views were on bringing forward legislation to enable local authorities to put their precept on their people to get the money, because it has not gone through yet for Somerset. We have got a shadow precept for the first year and then we have to wait. What is the panel's view about that?

Sir James Bevan: My view and the view of the Environment Agency and indeed the Government is that we should be doing more to devolve decision-making powers and, where necessary, revenue-raising powers, to local authorities and other IDBs and bodies. The Somerset Rivers Authority, which I know you know very well, is a great example of everybody coming together and the Government, as you know, having granted the power of a shadow precept until such time as we have primary legislation. The Somerset Rivers Authority is now starting this year with a £2.7 million budget, which it has raised from local taxpayers. It does have the resources.

Q64 Rebecca Pow: To enable it to happen countrywide, we are going to have to have this legislation, are we not? They would share the cost?

Chair: Coupled with what Rebecca is saying, you have also got to make sure that if you are going to ask local people to pay more, that it is actually managed more locally as well and then you make greater use of your drainage boards and everything else. Otherwise, I think local people will say, "We are alright to fund it if we can actually see the money going to the purpose of what we are paying the rate for."

Sir James Bevan: I agree. We also have plans to de-main. There are some rivers that are classified as main rivers, as you know, Chair. The Environment Agency is responsible for managing the flood risk. Where there are local bodies or IDBs that have the will and capacity to take on ownership of some of those main rivers, then we believe it is right to devolve that responsibility to them. We have the power to do that. The EA board has the ability to decide to de-main.

Q65 Chair: I have asked you this before. It is all very well to de-main but not if all you are doing is taking away your responsibility. Are you going to give any money when you give away those responsibilities? It is easy to give away maintenance of rivers and the like if you are not going to give any money with it.

Sir James Bevan: You are right, Chair. There is a conversation to be had about the state in which we hand over bits of main river. It needs to be properly and well maintained. You cannot hand over an asset that needs lots of investment. There is a debate to be had with individual IDBs about the terms under which that transfer takes place and the money that is involved.

Q66 Chair: You are prepared to talk to them on those matters.

Sir James Bevan: We are, absolutely.

Q67 Rishi Sunak: I just have a couple of questions on maintenance spending. What evidence base do you use to assess how much money you will need to maintain assets? It is at or above the required condition; are you including when damage occurs during quite extreme events?

Sir James Bevan: I might ask John to talk in a second but I will just lead off on that. Clearly maintaining assets is just as important as building new ones. We had some hits in December because of the extreme flooding. That damaged several assets and many of our assets. We have just completed the inspections on nearly 20,000 assets and the challenge now is to get them into the necessary condition in time for winter. The good news is that the team is well ahead. John can talk about that. As you know the Government recently announced an additional £40 million a year for maintenance for the rest of this Parliament, which will be very helpful in terms of the maintenance programme.

John Curtin: If we go back to the winter storms, we did a rapid assessment of asset inspections. We tested the resources we had, so we trained up some military folk to come along who could use our kit and who also knew how to look at the assets, to get that picture quickly which then could help on the amount of budget we need. This amounted to something like 660 different projects to repair our assets for next winter. We are already well through that with the main priorities ones being done first. Of course for those that are damaged and we have not finished, we have contingency in place so that even if there was a storm now there would be a similar level of protection, albeit for the public, the sight of large sandbags holding the wall is not the same as fixing it. We are on to it, though, and have about 660 projects.

Q68 Rishi Sunak: Just to follow up, how do you get the balance right between capital expenditure and maintenance expenditure? Do you think a total expenditure approach would be helpful for you? Obviously there are government accounting constraints in how money comes to you, but if you could have a pot of money that was fungible between both categories, would that help you fund the right kind of projects?

Sir James Bevan: The longer term the envelope you have to plan the better. We do now have a long-term envelope. We have a six-year envelope and programme, and we have surety of what will be available in terms of maintenance funding for the lifetime of this parliament, so that in itself is helpful. We did an exercise on long-term investment strategies a couple of years ago and factored in climate change. Where we are now regarding the amount of money and the proportion between capital investment in new infrastructure and maintenance of existing infrastructure, in particular post the Chancellor's announcement in March, is pretty close in terms of the overall volumes and the proportion between capital expenditure and maintenance expenditure to what we predicted would be needed in that long-term investment strategy.

John Curtin: The key for me has been that we had the six-year capital programme and by locking in longer term on the maintenance we now have longer term for both, as James said. That allows us to build in efficiencies and work on some of the programmes and packaging work, rather than have lots of individual projects in different catchments, so it comes together. As James said, they both add up to where we said, and the long-term investment strategy said, we should be funding on flood risk over the next 50 years.

Q69 Rishi Sunak: I have a last question on this topic. When you were last here, Sir James, we talked a little bit about interacting with local agencies and getting as much benefit from local knowledge as possible. To what extent are you talking to local communities to get the benefit of their knowledge when you are determining strategies for dredging or channel maintenance? Do you think you are doing as good as job as you want to be on that? Is there room for improvement?

Sir James Bevan: We can always do a better job. One of the early learnings for me in this job is that it is not about concrete; it is about relationships. I have said that to our teams around the country and they know that. I was delighted to see, as I have come to learn about the way the Environment Agency works, that all of our area operatives, area managers and local workers understand that the most important thing they can do is develop, maintain and improve the relationships that they have with local actors, whether it is local authorities or business. We are constantly investing in those relationships and, as I was saying earlier in response to Ms Smith, those are increasingly shaping the decisions we take at a local level. That is not just regarding flood defence but also how we improve biodiversity or how we tackle a particular waste fire in a particular community.

Q70 Rishi Sunak: I am in danger of treading on the Chair and Rebecca's toes a little bit, but I am just wondering if you had done any impact or assessment of the dredging that was carried out in Somerset after the 2012-13 floods? I know there seems to be some evidence to suggest that has been helpful, successful and has saved money. I just wanted to get your thoughts on that.

Sir James Bevan: I have not seen specific analysis but John may have done. What I should tell you is that I believe in dredging, as you know. I have been clear publicly and to the agency that we will do it where it makes a difference, and it will in many places. That is also provided it is value for money and that it does not increase the flood risk to other people. If we do not do it, we will find alternative ways of addressing the flood risk in local areas. I believe that dredging has its place in what we do. We did about £9 million worth of dredging last year, in about 175 locations. Partly as a result of this additional money that was announced in March, we expect that we will be able to increase that substantially in this financial year. I do not have a figure for you as we are planning it, but it will be a significantly increased dredging programme for this financial year compared to the last financial year.

John Curtin: I have not seen a detailed Somerset report but I will just add something quickly on the maintenance issue. It is important that it is open. We publish our maintenance programme now. Where I would like it to improve is for it to become a bit more accessible. This year's was only published last week and for the maintenance programme you can search by parish and find out what is happening in your local parish and postcode or local authority. There is a bit further this can go to make it a bit more accessible, perhaps in terms of the language and what it actually means. It is really important that we get out there what we do, when and how.

Q71 Chair: I have made this point to you before, Sir James. It has taken the Environment Agency a long time to be converted on the road to Damascus. It was only when the Prime Minister came down twice that the Parrett was dredged. For years I had been saying that the

Parrett should be dredged and the Environment Agency—not you personally—was telling me that the capacity of the river did not matter. I remember those conversations were long and hard. Therefore we have got to be certain that the leopard has changed its spots, and I will keep repeating this because we want to be certain, because you have not really given us an answer as to whether you have monitored the situation in the Parrett as to whether it has been effective or not. I am just slightly fearful that you will go back to the same as before: you allowed the Parrett to silt up, you allowed the Tone to silt up, you allowed the tributaries to silt up, and then it flooded. It would have flooded anyway but it may not have flooded to the scale of flooding the railway and the roads. That is the issue. We have to be absolutely certain that you are prepared to put those resources in place.

Sir James Bevan: Thank you, Chair. It is for you to hold me to account. I hear exactly what you say. I have been to the Parrett and the Tone. I have seen the dredging that took place after those floods, and I have seen the effect of that. What I have not seen is a detailed analysis. I have said what I have said about my commitment.

Q72 Chair: You are doing an analysis, are you?

John Curtin: I am sure there is. I am going down in a few weeks.

Q73 Chair: Are you sure there is an analysis, or is there one?

John Curtin: I have not seen a detailed report. I am pretty sure there is some analysis. I am going down in a few weeks anyway.

Q74 Chair: We could perhaps have a written answer to that one. Just finally I have a question on the maintenance. When, say, internal drainage boards or others are quoting for work they very often have to quote a certain price for a certain length of river, rhyne or ditch. The Environment Agency does not necessarily provide those same costs when you are doing a project so that we can compare like with like. Are you going to do that in the future? Are you going to be more transparent? We all have to be transparent these days. One of these days you are going to be able to see right through me, but not for a long time while I keep eating my lunch. Seriously, there is an argument for transparency on your spending, so that we can compare the cost of maintenance work by the Environment Agency with drainage boards or local authorities.

Sir James Bevan: Yes, I agree with that. I am sure the information is available. It may already be out there somewhere. I just do not know. John may know.

John Curtin: It is a really good point. As we were saying earlier, we are trying to make what happens in your community, parish or postcode more and more transparent. We can pick that one up. I do not see why we cannot show the money we spend as well as the activities.

Q75 Chair: We are very keen to make sure you are genuinely devolving powers and work down from what you are doing to a local level, and where it can be done locally and more cost-efficiently and effectively. Also linked to my question, what are you doing when it comes to emergency response? Sometimes if it is a tree blocking a stream, a shopping trolley

in a culvert or all of those small things, then it would be useful if we had those powers devolved so that, in my part of my world, you do not have to come from Exeter or Bristol to sort it; it could be sorted locally. What are you doing about that as well?

John Curtin: That is absolutely part of the debate. When we last spoke I had just come back from visiting the Norfolk IDB, where we were looking at some of the devolution around maintenance. One of the key conversations we were having was what they could do in an emergency. We need to do some work on that, because we need to plug them in for when we get our heads up and warning. Some of the technology we have already done should help with that. These people know their rivers anyway and have the kit for it. I cannot see any obstacle for an IDB helping on emergency responses in the way you described.

Q76 Chair: You are saying the right words. It is not that I do not believe you, but in the past it has not happened and you hold on to your power. We are all inclined to want to hold onto our power, but you have to genuinely devolve this down to the local areas. That is what I am trying to drill down on, to see if it really is in your mindset or whether you are thinking, “That will do to tell the Select Committee and that will keep them happy”?

Sir James Bevan: My team get bored of me telling them that strategy is about choice. The Environment Agency needs to do fewer things better, and we should be focusing on the strategic maintenance and the strategic issues, where I do think there is a role for a national body. Everything else, as far as possible, should be devolved to local authorities or bodies.

Chair: Okay. We will hold you to account on those matters. Thank you for those answers.

Q77 Angela Smith: The next question is for Natural England. I have so far visited three natural flood catchment restoration schemes: Exmoor, which involved South West Water, and the Peak District involving United Utilities on the one hand and Moors for the Future and Yorkshire Water on the other. It is easy for someone like me to be impressed by what I see. I would like to hear the expert view, if you like, of the extent to which you think natural flood management schemes can play a part in flood risk reduction.

Alan Law: I will have a go at that and then I will pass on to Rob for more detail.

Angela Smith: What role have they got to play in flood risk reduction?

Alan Law: The evidence that we are getting from pilots like Pickering is that there is more potential—I am deliberately not quantifying it there—for natural flood risk management to play a part in flood risk management. We want to be a bit cautious about not overstating that potential, and similarly not conflating our environmental ambitions with ones that are conveniently superimposed onto flood risk management. The second thing I would like to say is around the role of countryside stewardship, which is our main delivery tool within that. We think that it has a role to play in contributing to it, albeit a limited one. You may wish to come back to that in due course. Rob, I will pass over to you.

Rob Cooke: Yes, natural flood management provides an opportunity for us to work with the grain of nature, if you like. It is about keeping water on the land for as long as possible. I am conscious of the earlier question. It does not mean keeping it on the land for

ages and forever, but it is reducing those peak flows. In some parts of the country and in some catchments it works very well. In others, frankly, we are less sure at the moment.

Q78 Angela Smith: Is there any particular reason why?

Rob Cooke: We just do not have the evidence.

Angela Smith: You just do not know.

Rob Cooke: There is no reason to suspect that it will not work just as well, but we simply do not know yet. We need to be prepared to take those actions that we think are regret-free in the absence of any evidence, because it will take a long time for some of these different land management options to take effect. For example, with tree planting we have fairly good evidence from the Pickering example that tree planting can intercept flows, and if you believe and accept its efficacy then you actually want your trees there now. To have them there now you needed to have planted them there some time ago.

Angela Smith: That is really interesting, because my second question is about the feasibility of taking the evidence from small-scale schemes and then applying them on a catchment scale, if you like. What you said is really interesting, of course, because it appears that we need to have a much more robust body of evidence before we start thinking much more grandly about these things.

Chair: We have to go from here to vote because we have to go to the other chamber. We will give you time to think about the question. We will be back in 15 minutes.

Sitting suspended for a Division in the House.

On resuming—

Q79 Chair: We were talking a little bit about schemes and monitoring the success of holding back water. There is a scheme in Belford in Northumberland, there is one at Pickering, there is one at Eddleston in Scotland and there is one down in Somerset. There are schemes now where there is different management and different styles of holding back water. To what degree are you monitoring those to see whether they are successful? Many of us are quite keen on these ideas, but in a way we have to see whether they are successful. It is interesting about Pickering because you have stuck your necks out, have you not? Somebody said it has worked and is wonderful. I do not think the amount of rainfall in Pickering was quite as high as in some of the other areas. Perhaps you would like to clarify where you are on monitoring schemes and these different management approaches, which I think we need. Are you monitoring them and grading them to see whether they are working?

Sir James Bevan: Mr Chairman, firstly, in terms of our overall approach natural flood management, we think it is an important component in our toolbox that should be used and should be used more. It should be utilised in the right places. There is a good deal of

evidence that it can help reduce flow height and speed of flow, and can have other benefits too. It can improve water quality and the right measures can act as carbon sinks, etc. Again, it needs to be part of our toolbox in the future. We try to be an evidence-based organisation, and so we do both research of our own and sponsor research by others into all kinds of flood risk management, including natural flood management. We are continuing to collate and assess the evidence. There is enough to say that this is the direction of travel we should continue with. There is not yet enough to say that in every scheme, “This effect has happened.”

In relation to Pickering—which, Chair, you and the Committee are likely to visit shortly—I have been there and one thing that is very powerful is the local commitment to that scheme, and the sense of local ownership. That is a very important and positive element. I have talked to many of the people involved and they clearly take the view that the flooding that they did not experience in December—though it flooded badly in 2007, Pickering did not flood in December—was down to the natural flood management scheme that they have put in place since 2007. As you said, if there had been a really extreme weather event in the wrong place you have to doubt whether that scheme would have prevented further flooding in Pickering. It is not a total answer to Pickering’s problem, or to anyone else’s problem.

The other point that I wanted to make about natural flood risk management, which you will see in Pickering, is that it is much more of a science than people think. It is not just about pushing trees into rivers in random spaces. You have to be quite precise about where you grow your trees and where you place your leaky dams. Where it works it is often underpinned by quite hard engineering. The Pickering scheme is a combination of upstream natural flood risk management and downstream hard engineered basin designed to accrete water.

Q80 Chair: The Belford scheme in Northumberland is more of a natural scheme, with fewer engineering works. Have you monitored that?

John Curtin: Natural England is going to be an important part of this. Let me give a potted history. Natural flood management is not new but Sir Michael Pitt’s review of the 2007 floods did put new energy into it. There were three demonstration projects funded: Pickering Slow the Flow, Moors for the Future, which we have mentioned and is in a different area, and then a third one down in Somerset at Holnicote, From Source to Sea. Those three have been brought together. I think the evidence has been out for a few months on what those three projects tell us. The two things I picked up from it, broadly, were that they play a part but do not replace traditional flood defences, and the key is that they will not stop something massive. They play a part in attenuating flows, but when there is something really significant, as we saw in Cumbria, they will not stop that happening. The second lesson is the scalability, which you might have been coming onto. They talk about it working between 10km up to maybe 100km on a catchment basis. When you bear in mind that Cumbria is nearly 7,000 km² what scalability is there and what part do they play? The key for me is actually that flood risk is a mosaic. It is all of these different bits coming together, including traditional defences. Natural England is probably a key part of this.

Q81 Chair: Just before we finish this and I hand back to Angela, one of the things is that we are inclined to come to the opinion that most solutions are local, and so they are quite different even in a small catchment area. You talk about the local schemes and the local partnership schemes, but there is a massive amount of money that might go in to some schemes, for example £25 million into the Leeds scheme, but there is very little money that then goes to any partnership schemes. This is reiterating my previous comment. It is good to talk about having these partnership schemes, but are you going to find some funds?

Sir James Bevan: As I said, Chair, the first point is that 30% of our overall grant-in-aid from Government does go to local partners for them to deliver schemes in partnership with us. There is already quite a significant transfer, and that will happen throughout the six-year period.

Q82 Chair: Coupled with my previous question, though, there is an argument that some of the work you would have done you then transfer to a local partner to do, but you transfer some funds with it. Surely there is more that they could do?

Sir James Bevan: What we are looking for, Chair, is the maximum amount of funding and the maximum amount of partnership behind that. It is right that the Government should provide significant funding, and that a part of that should be devolved directly to local authorities and others. If we are going to really deal with the flood risk that we face in the future, then Government funding alone is not enough. That is why we have to encourage funding from businesses, local authorities and other partners.

Q83 Chair: That is not my argument. The partnership should be a partnership with what is said. What I am not necessarily seeing from yourselves is you stepping up with part of that partnership funding. It is more a talk about the partnership but not the funding. I am sorry to be repetitive about it, but if you look at most of the partnership schemes not much money comes from the Environment Agency.

Sir James Bevan: I am not sure about that. I think we need to look at the figures. Certainly within the £2.3 billion investment programme that we have for the next five to six years—

Chair: I tell you what, then, I will give you some homework to do. You can give us some written evidence on how much you are funding and where you are funding particular partnership schemes. That would be quite interesting for us. I am conscious of time now and I am hogging it. Alan you wanted to come in, and then I will hand back.

Alan Law: It is a small example of the partnership schemes. We have a thing under the countryside stewardship scheme called the facilitation fund, which offers a few million to local partnerships. In the figures this year we got something like 50 applications, of which 34 related to water options and 28 included measures for flood risk. These are monies for local partnerships to develop local projects. It is small, but there is money going in that direction.

Chair: Angela, please, we had better get back to your question.

Q84 Angela Smith: I was interested in the scalability question.

Rob Cooke: Your question was, “Is it scalable?” In theory, absolutely. In practice, there are some complications, and a couple of key ones. One is that the bigger the scale the more interactions you get, so that is difficult to account for. The other one is really that on small scale catchments you are able to control or manage directly much more, so it is far easier to, say, plant trees on 10% of a small catchment than it is on a very big one. There are practical issues. The theory is equally applicable. It is just that the variables are much more difficult to manage.

Q85 Angela Smith: It is not all about planting trees, is it? It is quite irritating that is always about planting trees.

Rob Cooke: Yes, it is a whole range of measures, and different measures have different applicability in different situations.

Q86 Angela Smith: You made that point about evidence. How confident are you that the evidence is coming together even at the small scale to make it worth investing in larger-scale projects?

Alan Law: It is difficult to quantify how confident we are. I would go back to the first answer that we gave, which was that we have confidence in the evidence to say we should be doing more of this. There is enough evidence to say this should play a stronger part in the toolkit. The one thing I just wanted to add on scalability is around targeting as well. It is all very well to identify catchments where there is a high potential for these measures to be put in place, but we need to differentiate between catchments for those where the margin that this plays is significant around peak flows. The two where there is the highest potential may not be the same where the margin is most important.

Angela Smith: I take that point. I am looking forward to the assessment of Moors for the Future particularly.

Rob Cooke: If I could just come back on the evidence point, the evidence is accruing. All the evidence that I have seen suggests that natural flood management is a good thing to do. I have not seen any evidence that suggests it makes things worse.

Q87 Angela Smith: That is worth knowing. Thank you very much. Can I move on with the next question to the Environment Agency? John, you mentioned this point about the mosaic of flood risk management. Can I ask whether your current models have an inbuilt bias towards traditional solutions, such as hard flood defences, which undervalue the role of natural management? If it is a mosaic, is it a model which nevertheless overplays a value of some parts of that mosaic at the expense of other parts?

John Curtin: I sometimes see a misconception about traditional flood risk management and engineering. When we look at a community, when we need to invest, using the £2.3 billion, with partners, there is an options appraisal, which sometimes comes up with lots of things that are not walls. Flood storage areas play a really important role in solutions we put in place for communities. If you walk past flood storage areas with your dog, they will look like a lovely bit of the environment once they have been left there for a while. From some studies we did recently, I can say that about 1,000 flood storage areas have been put in as part of flood schemes. There are meandering rivers, such as the River

Quaggy in south London, where you take out a culvert and put in meandering rivers. Even though we use traditional methods to identify how to reduce flood risk in a community, it is not the default position that it is a wall. It can be a number of these other things.

Sir James Bevan: If I could just add to that, there are two things that are relatively new. First, John and I are clear that in future when we, as the Environment Agency, are looking at future options for flood risk schemes, we need to consider for each of those whether and, if so, how natural flood management can play a part. We will ask that question when we look at future schemes. Secondly, as we were saying earlier, I want what we deliver to be led by the local communities. The first question we will ask is, “What does the local community want?” Often they will tell you that they do not want a wall. They would prefer some kind of natural flood risk management. We then need to have a conversation with them to design something that delivers the effect but also works for the community.

Q88 Angela Smith: We have £2.3 billion of investment planned over the life of this Parliament. I take the point that hard engineering schemes are not necessarily always the way that we describe them. I take that point. We need to understand, as a Committee, how far over this period you are moving away from the division between the two to a more integrated approach, as you seem to be describing. How best would a committee like this monitor the progress that you are making on that?

Sir James Bevan: We first need to give you evidence of what we have been doing over the last couple of years in support of natural flood management, and we can do that. There are lots of schemes, some of which we have cited today and some that we have not. I suggest that we need to walk you through what we are proposing over the next five to six years, and identify where within those schemes there are options that we are actively considering or have already elected to favour that involve natural flood management. I would be very happy to send you a note about that.

Chair: Yes, that would be useful.

Q89 Angela Smith: There should be—and I am sure there will be and you will confirm that there is—a commitment to an evidence-based approach rather than just doing what local people want you to do. This is the dredging thing, at the risk of incurring the wrath of the Chair.

Sir James Bevan: We also have internal guidance to our own staff about natural flood management and principles we should be applying, do we not, John? Again, we would be very happy to make that available to the Committee so that you can see the principles that we are working to.

John Curtin: The other key feature, which has certainly been touched on once, is the second national review going on, which is the Cumbria partnership. It is really important how that can bring people together, bring the mosaic together and, for me, how that can ripple out to other catchments. How much is it Cumbria-specific? How much of it is transferable elsewhere? We are working closely on that.

Sir James Bevan: To link to the point you made, Chairman, about money, which is important, sometimes the most important intervention we can make in support of natural

flood management is not money, although it may be money sometimes. It can be expertise. It can also be lending somebody to help a scheme acquire the money it needs. I think you have seen the Moors for the Future project. It is fantastic. It is an example where one of the main things the Environment Agency has done is loan an officer to the partnership, whose primary job has been to fundraise, including from European funding. As a result of allowing one of our people to work for that collective, huge amounts of money have been unlocked. Money is important, but also the lending and support of our staff is effective.

Q90 Chair: Without getting boring on the subject, we as a Committee have to be certain that the Environment Agency is actually changing its attitudes. Traditionally, you have always had the hard engineering projects. I am not saying they are wrong. You are actually moving to natural flood management over a catchment area, and are also working with local partners. Anything you can do to reassure us of that is of benefit. I am sure you are changing, but the Chairman is a little sceptical. You have probably worked that out by now. Seriously, that is what we want to see. It is a change in outlook and change of direction. Yes, you are nodding.

Sir James Bevan: I am nodding. To be clear, we are not saying that everything now on for us is about natural flood management. We are saying that it needs to be a core part of our armoury when we think about how we deal with each situation. Also, if there ever was a culture in the Environment Agency that, “We will tell you what you need. We will build it for you and fund it,” then that is over. Under my leadership, it is about partnership, listening to local communities and co-designing projects that work for the local communities.

Chair: That is all very much noted down. Thank you very much. We look forward to working with you.

Q91 Chris Davies: Briefly before we get off of this point, as far as forestry and tree planting are concerned, Natural England have been accused in the past of stopping larger scale forestry planting due to visual impact, et cetera. Do I assume correctly that you have relaxed on that, and in fact you would be encouraging rather than discouraging it in certain places? To the Environment Agency, do I assume correctly that you may be looking, with the support of Natural England, to see forestry planting go ahead and therefore you may even make grants available under funding schemes?

Alan Law: First, we would support government policy around forestry and planting trees in the right place. Part of being the right place would be that they serve as a function that is valuable to society, such as natural flood risk management. That would certainly be a factor that we would take into account in our advice around tree planting. We have statutory duties in relation to landscape, of course. That would be another factor that we would consider.

Q92 Chair: Which is paramount—landscape or stopping flooding?

Alan Law: To return to my earlier reply around casework, provided you have adequate time to lead into individual sites and individual issues, you can usually find a solution that works for people. The example described here around engaging with communities and finding out what they want and think is usually instructive in terms of coming out with what a solution looks like.

Sir James Bevan: We work very closely with Natural England. It is a good, constructive relationship, including on the tree-planting issue. As for the Environment Agency itself, we are always looking for win-wins. If we are doing a flood risk project we can also enhance biodiversity, which might involve tree planting or other measures that make the environment better as well as having benefits for flood risk. There will be projects where we can be involved in supporting tree planting. The Moors for the Future one, which we have talked about before, is a good example of where we have supported, in various ways, a local initiative that has tree planting for various benefits as one of its central elements.

Q93 Chris Davies: Just before I finish on this, would you be taking into consideration that there is a need in the forestry and commercial sectors for tree planting, and you would plant the right type of trees that would fit in?

Sir James Bevan: Yes.

Q94 Chris Davies: How are the Environment Agency and Natural England joining up their environmental and flood risk work to get the best synergies between the two areas and the two organisations?

Sir James Bevan: The Secretary of State has been clear that the environment is an integrated system and is not in bureaucratic silos. Therefore, if we are going to be effective in managing and improving the environment we need to not operate in bureaucratic silos. She is very keen on a joined-up approach, which is not just between the Environment Agency and Natural England but the whole of the Defra group, and indeed other stakeholders beyond the Defra group. We all agree that that is the right approach. That is how we operate. Some of the schemes that we have been talking about today are good examples of what happens when you work together in a collective.

Q95 Chris Davies: I have one last question, if I may, Chairman. This is to you, Sir James. We questioned you several months ago and we were very interested in your responses. We are very pleased with the work that you are doing. You are the Chief Executive of the Environment Agency. There is a likelihood you will shortly have a new chairman. Whether, as in other organisations, that candidate will come in front of us, Chairman, I am not quite sure.

Chair: I think our role is to scrutinise the choice. I do not think we actually state who becomes the chairman. It is just that they come before us for us to see them, usually.

Chris Davies: You have outlined today your proposals and your direction for the Environment Agency. Forgive me; I am not sure if this chairman will come in and be towering over you as far as his or her position would be, and therefore possibly have the opportunity to change the direction, if it was his or her wish to do so. Am I clear on that and will you have any problems with that?

Sir James Bevan: Thank you. We have a very active acting chairman, Emma Howard Boyd. There is a process going on to recruit a permanent chairman. I am sure the constitutional processes will be followed with respect to the Committee. What I am saying to you about the future direction of the Environment Agency is not just from me. It is something that I have discussed with my current chair and my board, and I am confident

that what I am telling you about the direction of travel has the backing of the Environment Agency board.

Chris Davies: I am glad to hear that. Thank you.

Q96 Rebecca Pow: We have heard from some previous witnesses that storing water on farmland could potentially help the flood risk element. I would like to first of all ask you, Natural England, what estimates you have made of the impact that this could make in controlling flood risk, but also how you are going to pay farmers to store the water on their land.

Rob Cooke: Taking the second part first, we are looking at a modification to the countryside stewardship scheme at the moment with Defra, which would pay farmers for an inundation option. We would pay land managers and landowners to store water as part of the scheme options. It would be a voluntary scheme, so there would be no element of compunction in there. That is something we are looking at. If we can clear the necessary hurdles then that should be available from 2018.

Rebecca Pow: That is working through the EU scheme that translates down to us?

Rob Cooke: Yes, that is working through countryside stewardship, which is pillar 2 of the common agricultural policy, so the agri-environment schemes.

Q97 Rebecca Pow: Is it possible to do that relatively quickly or is it going to take ages to unravel it all?

Rob Cooke: No, it is possible to do it quickly because, as far as I understand it, that is within the control of Defra.

Q98 Rebecca Pow: What does “quickly” mean?

Rob Cooke: 2018.

Rebecca Pow: It is not that quickly then.

Chair: That is not too bad.

Q99 Rebecca Pow: I suppose that is not too bad. Is that in pillar 2 of the countryside stewardship scheme?

Rob Cooke: It is in pillar 2, yes.

Q100 Rebecca Pow: At the moment, it is not based on income forgone, is it? No, it is on income forgone, but not payment for services. This would be a service. Is that right?

Rob Cooke: Yes, the payment rates are based on income forgone, but pillar 2 is about payment for eco-system services. It is for public goods. The public good here would be flood storage. In other schemes, the public good is biodiversity. There are existing options under countryside stewardship that contribute to natural flood risk management.

Q101 Rebecca Pow: It is interesting, is it not, because years and years ago—and our Chairman will remember this—on the Somerset Levels we were trying to persuade them to pay to flood their land for the birds' habitat. Now we are thinking of still doing that, but paying for the flood risk element as well.

Rob Cooke: Of course, there will be a whole range of benefits, but the driver here would be inundation. There would be payment for inundation as part of natural flood risk management.

Q102 Chair: Are you looking at any particular rates? Go back to my old argument. If you are asking farmers to take water for a short period of time, then the compensation they would need is not too great. If you are asking farmers to keep water for a very long time, there is probably little else you can do with that land. Are you looking at various tiers and schemes? How are you doing it? Have you come up with any per hectare costs yet?

Rob Cooke: Not yet, no. Clearly, that is a factor. There is no point having a scheme if it is not attractive for people to use.

Q103 Rebecca Pow: Do you see this being done on a one-by-one farm basis, or on a wider approach where you get a whole block of farms to amalgamate together?

Rob Cooke: It could certainly be used through the facilitation funds. The way that pillar 2 of countryside stewardship works at the moment for the higher tier options is it is a competitive scheme. Farmers and land managers apply for the scheme on the basis of how many points they score, which is on the basis of public goods.

Q104 Rebecca Pow: At the moment there have potentially not been quite as many farmers getting into that scheme as might have hoped to, and even as under the current system. If you want this to work, they have to be able to accumulate enough points, have they not? How can we ensure that that will happen? Otherwise it will be yet another of these complicated tools that in fact only five farmers get into.

Rob Cooke: Yes, it is the first year of the new scheme, so people are getting used to it, both ourselves, who are operating it, and applicants. We are looking at improvements. We have made a lot of changes these last few months to simplify it. At the moment, an awful lot of the monies associated with pillar 2 are bound up in the existing schemes: the old high-level scheme and entry-level scheme. As farmers come out of those agreements we are optimistic that they will apply to come into the new pillar 2 schemes.

Q105 Rebecca Pow: In some of the current schemes they are penalised for putting in things like woodland strips, which in fact would be useful, would they not?

Rob Cooke: That is part of the relationship with the pillar 1 scheme, which is where farmers receive a subsidy, and in order to receive that subsidy the land has to have the potential to be used for agriculture. If you are planting trees, that land then cannot be used for agriculture, and therefore it is not eligible for the subsidy payment.

Q106 Rebecca Pow: You would have to try to include things like that in your new flood control schemes.

Rob Cooke: Yes.

Q107 Rebecca Pow: Is it simple?

Rob Cooke: It is becoming simpler.

Q108 Rebecca Pow: Are you optimistic it could make a difference?

Rob Cooke: Yes, absolutely.

Alan Law: I have two things to add. You were touching on the importance of policy alignment with pillar 1 expenditure in order to be financially competitive, because the last thing you want is a scheme that is effectively competing with another incentive scheme. We have to get the payment rates right and ensure that there is policy alignment.

The other one is around your question, Chairman on, whether we are looking at short periods of time or longer periods of time. When you start looking at longer periods of time and effectively almost buying out farmers, there is a question then of whether countryside stewardship is the right tool. It goes back to the question around alternative funding and local decisions where there is local funding of local beneficiaries. You might be looking at alternative tools to countryside stewardship.

Q109 Rebecca Pow: I know Angela wants to come in, but quickly I want to ask whether you see it as very important that the Government's 25-year environmental plan ties up with the food plan? Do you need to just look at a map and work out which bits are going to be for which scheme and they have to work together?

Alan Law: They have to join up and they have to find the right balance between national budgets, national programmes and local accountability to join up, which is why pilots are so important.

Q110 Chair: That is important. There is work going on to make sure that both plans do tie together.

Alan Law: Indeed.

Q111 Angela Smith: I was really interested in what Alan just had to say about countryside stewardship and it potentially not always being the right way of funding some of the work we have to do on investment in flood management. I have two questions really. I would like to elaborate on that a little and, secondly, does there come a point where the priorities of countryside stewardship itself are skewed if we start relying on it as a key source of funding for this? Will it eventually lead to demands for an even greater proportion of the common agricultural policy resource to be given to pillar 2 rather than pillar 1?

Alan Law: There are a lot of questions in there. At the moment the budget is £3.1 billion for the programme. £900 million of that, as Rob said, is in countryside stewardship. It is a relatively small pot.

Q112 Angela Smith: Is that over five years?

Alan Law: It is over a seven-year period. The schemes are typically five years. Of the overall pot, some 70% is allocated to biodiversity outcomes, of which 20% should also be delivering water benefits. There is an overlap between that. There is a finite proportion of what is already a finite budget that is available for water options, which includes both water quality and potentially water resource management. If countryside stewardship was to be deemed to be a very significant tool in the toolkit you would either be looking at potentially a shift in the balance of the funding between different outcomes, or you might say, “Is a case being made there for a higher level of modulation and an increase in pillar 2?”

Q113 Chair: In extreme cases it could be a capital buyout of a particular area, because sometimes you actually want to take the management of that land and totally change it. Some farmers may not actually be interested in farming it, so therefore there might be need to also look at capital schemes, because they might be cheaper in the long run than other schemes, by buying out that land and managing it just for water management.

Alan Law: That is absolutely right. The question would be: if you were funding such an arrangement, would that be sensible for countryside stewardship, which is a scheme that is set up for farming, or would that be the agency’s budget or some local payment system?

Q114 Chair: We have talked a lot about Somerset, so I do not want to ask the whole question, but there was one part of question 20 that I do not think we have quite covered. Should day-to-day management of flood risk be separated away from delivery of capital and maintenance programmes? If that is the case, who should be responsible for each? You touched on it, Sir James, did you not?

Sir James Bevan: Yes, my answer is that the day-to-day management of strategic flood risk, such as arises from major rivers and in relation to major population centres, should be the responsibility of the Environment Agency. That is what we were set up to do. The management of local flood risk for non-main rivers and other areas at flood risk should be devolved to IDBs, local authorities or other risk management authorities.

Q115 Chair: Are you putting that into action?

Sir James Bevan: That is the Government’s policy, which I happen to believe is the right approach. As I said earlier, we are looking for opportunities to put it into practice in terms of de-manning and helping to establish other organisations like the Somerset Rivers Authority so they can have greater local ownership and management of their flood risk.

Q116 Chair: Additionally, you are working more with internal drainage boards.

Sir James Bevan: Yes.

Q117 Ms Ritchie: On planning, Sir James and the Environment Agency, much of the evidence we have received points to deficiencies in the planning process that are said to lead to inappropriate developments in flood risk areas. Do you agree with that point?

Sir James Bevan: First, we all know that there is huge pressure to build more houses, and it is probably unrealistic to think that we can avoid any building on the flood plain because 10% of England, and large parts of most of our major cities, happen to sit in flood plains. For me, the issue is how you manage the risk and how you seek to deter, as far as possible, building on flood plains. We have a national planning framework established by the Government, which is very clear that the default is that you should not be doing development in areas of flood risk, and that if you do want to proceed with development in areas that are subject to flood risk then it has to be necessary, safe and you have to show that it is resilient and demonstrate that it is not going to increase somebody else's flood risk. That is a sound framework.

As you know, it is for local authorities to take decisions. We are statutory consultees on most of those decisions. We will object if we think that there is a significant flood risk in terms of what is proposed. In 2014-15 we initially objected to something like 3,000 planning applications. They are all up online so people can see what we objected to and why. What usually happens is that there is then a process of discussion and debate between the Environment Agency, the developers and the local authorities. Actually, that is a good process that mostly ends up finally with an agreement on a way forward that we all feel comfortable with. Either the development does not happen or it happens with the measures that we have advised that will reduce flood risk, either by physically lifting buildings up, building greater resilience into them or sometimes hard flood defences around the development. The statistic that I quoted to you last time, Chairman, is that ultimately, as a result of this process, in 2014-15 98% of planning decisions on new homes were in line with our advice. It is working. It is not perfect. In my view, ultimately it is right that the local authorities, who after all are democratically elected and democratically accountable, and know the local requirements and local conditions, take the final decisions.

Q118 Ms Ritchie: Do you agree with those such as Wildfowl & Wetlands Trust that ultimately the taxpayer is bearing a disproportionate cost for this, which should in fact be borne by the developers, and should maybe be a developer cost?

Sir James Bevan: We have to avoid a situation where disproportionate cost is being borne by the taxpayer, and that is one of the reasons why we have this dialogue with developers as we want to make sure that flood development does not take place in high risk areas.

Q119 Ms Ritchie: What about developer-led contribution?

Sir James Bevan: As part of our regular dialogue with developers and businesses, the default would be to say, "If we are going to do development in this area and we can find a way to make it sufficiently resilient so that it can go forward, what can the developer contribute to ensure that happens?"

Q120 Chair: I have one final point on this. As we move much more to a catchment based approach—and I have asked you this before—is there a need from a local government point of view to allow you to put in observations on planning applications that are taking place above the flood plain? If you build a housing estate you can actually build enough water resilience, either through water tanks or some sort of holding of that water so that in times of flash-flooding you hold the water. It is a pet subject of mine. The water that floods many low lying areas does not start in the low lying area; it starts from above. You can say, “Yes, do not build there in the flood plain,” but if you build beyond the flood plain you are just as likely to flood the flood plain again. How can we deal with it not to stop the building but to make sure the houses built with all of those things put in place can hold that water from that estate of houses long enough not to flood somebody further downstream? At the moment, if you are outside of a flood plain, you, the Environment Agency, cannot say or do much about it. Is that the case?

Sir James Bevan: Yes, we are statutory consultees on all new developments wherever they happen, but we do not get consulted on all types of development. We are not statutorily consulted on small applications within the flood plain. There is a potential gap. That is important for the reason that you have identified. We have to calibrate a response quite carefully because, as I said earlier, strategy is about choice. If we are going to be good at focusing on the really threatening potential developments, giving the right advice, support and engagement to get the right outcome, then if we are concentrating on too many other minor issues, or issues that may not result in floor risk, then we risk not being as effective as we need to be. A balance needs to be struck. I do not at moment feel that we need new powers.

Q121 Chair: What about extending the area where you have—

Sir James Bevan: The way that I would put it, Chair, is that we have some very good people in our areas. We have very good area managers whose business it is to know what is going on in their areas. I am pretty confident that if they saw plans for development anywhere in their areas, including well outside flood plains, but that might have a future threatening effect, they would be aware of that and would want to have conversations with the local authorities about that. My suspicion—and I would need to reality check this—is that informally there is probably already a process where we monitor and address the kind of proposals that you have identified outside the flood plain. I am reluctant to impose a formal duty on my people, because I want them to focus on the really big issues.

Chair: It is probably a point I will raise with Oliver Letwin when he comes, because in a way it is a local government issue as well, as you would have to extend the planning controls, and where you as the Environment Agency would be able to put in an objection.

Alan Law: This feels like a place where strategic planning is the more appropriate route. We both have statutory consultee roles around strategic plans, rather than necessarily picking it up piecemeal through individual developments. The other thing to say is of course you are absolutely right in your analysis around the area outside being the source. We have access through existing agreements to something like 70% of the land. Again, there is a balance between land management and what you would want to affect through development. The strategic plan would be the route to go through.

Q122 Angela Smith: One of the issues in relation to planning is not just whether or not approval is given, but whether or not developers adhere to the conditions given alongside consent. Enforcement is probably the weakest aspect of the planning function. There are problems in my local authority, which I could read you chapter and verse on. Do either Natural England or the Environment Agency monitor the impact of building development, and in particular where the planning consent has not been adhered to and developers have gone ahead and done things that are likely to produce flooding situations anyway?

Sir James Bevan: My answer is that we do monitor, yes, to the extent that we are informed by the local authorities of decisions in cases where we have objected in the past. There is an injunction in the national planning guidance to local authorities to inform us in those circumstances. Where they do we log it, monitor it and take account of it. Where they do not, we do not, as it were, go out and check, which I think is the point you are making.

Q123 Angela Smith: It is the point I am making, because that is far more likely to be the situation.

Sir James Bevan: Yes, I think there is a risk. Again, my answer is like that I gave to the previous question. We could go out and check, but that would divert resources from doing other things that are important to local communities.

Q124 Angela Smith: Do you have any sense of how prevalent this problem is?

Sir James Bevan: I could not give you an accurate figure.

Rob Cooke: It is difficult to measure but what is happening around monitoring does keep coming up. We do not have a statutory role with respect to flood risk, but we have it in relation to other parts of our role that we give advice on to planning authorities, particularly around licensing. Where the conditions of licensing are not met then we will certainly look into it. We do not proactively monitor it, but quite often we are informed about it.

John Curtin: For the ones where we are notified about 96.5% apply with our guidance. That is for the ones we are notified of.

Chair: Okay, thank you, gentlemen. It is exactly 5 o'clock. I appreciate the extra time you have given us this afternoon. Thank you very much for your evidence. It will very much be part of our inquiry. Thank you very much.