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Future flood prevention

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The Environment, Food and Rural Affairs Committee

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Summary

Some five million people in England are at risk of flooding. Winter 2015–16 broke rainfall records and Storms Desmond, Eva and Frank disrupted communities across northern parts of the UK. Storm Desmond alone cost the UK more than £5 billion.[1] More frequent, more intense storms resulting from climate change will in future put more people at risk and increase flood impacts. The Government has increased budgets for flood risk management, but this level of funding is unlikely to deliver sufficient protection in future decades. The Government must publish by the end of 2017 its 25-year ambition for flood risk reduction, and the cost of securing this, against different climate change scenarios.

A new model for managing flood risk

Current flood risk management structures are fragmented, inefficient and ineffective, and although there are many examples of successful local partnerships, current arrangements do not encourage widespread use of catchment scale approaches. The Government's National Flood Resilience Review's limited solutions will not rectify fundamental structural problems: we propose a new governance model which the Government must consider as part of a root and branch review of how it manages England's flood risk. Our model gives a strong focus to joined-up, efficient action to improve flood protection by:

- Establishing a new **National Floods Commissioner for England**, to be accountable for delivery of strategic, long-term flood risk reduction outcomes agreed with Government. Delivery would be via:
  - New **Regional Flood and Coastal Boards** to coordinate regional delivery of national plans, in partnership with local stakeholders. These Boards would take on current Lead Local Flood Authority and Regional Flood and Coastal Committee roles;
  - A new **English Rivers and Coastal Authority**, taking on current Environment Agency roles to focus on efficient delivery of national flood risk management plans.

This model would streamline roles and pool capacity and expertise to allow bodies to deliver their unique roles, with funding firmly linked to outcomes. The Commissioner would hold the English Rivers and Coastal Authority to account on whether it spends its budgets in the most efficient manner, whether by directly undertaking work or by commissioning projects from catchment partnerships for example. The Regional Boards would enable a close link between national plans and local aims. We also propose an extension to current Water and Sewerage Companies' roles: as **Water and Drainage Companies** their remit would include the land drainage responsibilities currently held by local authorities, fostering a more holistic approach to flooding and water supply management.

1 KPMG estimated Storm Desmond costs to be in the range of £5–5.8 billion, 28 December 2015

In advance of major reform, we make recommendations on specific flood management problems:

Catchment measures need to be adopted on a much wider scale:

- The Department for Environment, Food and Rural Affairs (Defra) should commission by July 2017 a large-catchment trial of the effectiveness of natural flood risk management approaches such as installation of leaky dams, tree planting and improved soil management, alongside other measures;
- Farmland should be used in some places to store flood water: the National Farmers' Union and Defra must develop storage approaches with low impact on farm productivity and appropriate incentives to recompense farmers.

Flood risk communications must be simplified: current descriptions of a '1 in x year' flood risk are confusing to the public. The Environment Agency and the Met Office must develop clearer methods by the end of this year, including maps showing all sources of flooding in one place.

Resilience must be improved: it is impossible to protect all properties from flooding at all times so the Government must improve help for communities and individuals to cope with and recover from flooding:

- The Government must make developers who fail to comply with planning requirements liable for the costs of flooding;
- Water companies should be made statutory consultees on planning applications, and the right to connect surface water to a sewerage system should be removed;
- Unless a voluntary code is finalised this year, the Government must amend Building Regulations to make use of flood resistant materials in new buildings mandatory;
- The Government should develop by the end of 2017 a grant scheme to support those small businesses unable to secure affordable insurance to install resilience measures.

1 Our inquiry

1. Flooding is one of the major threats to the economy and wellbeing of five million people living and working in communities across England.[2] More people are likely to be at risk in future as climate change affects weather patterns and sea levels. Rainfall is predicted to become more frequent and more intense: peak river flows could be more than twice current levels in some English regions by 2070.[3] Changing weather patterns are already having an impact. Winter 2015–16 broke rainfall records: over Christmas and New Year Storms Desmond, Eva and Frank disrupted communities across northern parts of the UK. Storm Desmond alone cost more than £5 billion.[4] The Committee on Climate Change warns that "severe flooding somewhere in England in any given year is almost to be expected".[5]

2. In January 2016, we launched our inquiry to consider how England can better prevent such flooding and improve communities' resilience when it does flood.[6] In addition to receiving written and oral evidence, we undertook visits to the Somerset Levels in April, to the Netherlands in June, to the Moors for the Future Project near Sheffield in July, and to Pickering and York in August. We took evidence on where and how to improve government and public agencies' ability to:

- apply the most effective range of measures to reduce flooding (Chapter 2);
- predict and communicate flood risk (Chapter 3);
- increase community resilience (Chapter 4);
- tackle strategic, governance and funding deficiencies in flood risk management (Chapter 5).

3. In addition to making recommendations on specific issues, we set out in this report a possible model to improve overall national and local governance of flood risk management. We are grateful to all those who provided evidence and to our Special Advisers, Professor David Balmforth and Dr Paul Quinn. We would also like to thank those involved in our UK and Dutch visits, in particular Henk Ovink, Special Envoy for International Water Affairs for the Kingdom of the Netherlands. Finally, we wish to record how impressed we have been by the commitment and hard work of those involved in managing flooding, in particular those on the front-line responding to challenging flood events.

2 Environment Agency, *Flooding in England: A National Assessment of Flood Risk*, 2009
3 Defra Flood Risk Assessment webpages. Figure refers to the high estimate for South East England in the 2080s.
4 KPMG estimated Storm Desmond costs to be in the range of £5–5.8 billion, 28 December 2015
5 Committee on Climate Change Adaptation Sub-Committee (FFP 110)
6 In this inquiry we considered fluvial flood risk (ie from rivers) and pluvial risk (ie from rain falling directly onto land leading to surface water flooding). We did not consider coastal flood risk due to limited time but recognise this is a key issue for coastal communities which we may wish to inquire into at a future date.

2 Catchment measures to reduce flood risk

Why does it flood?

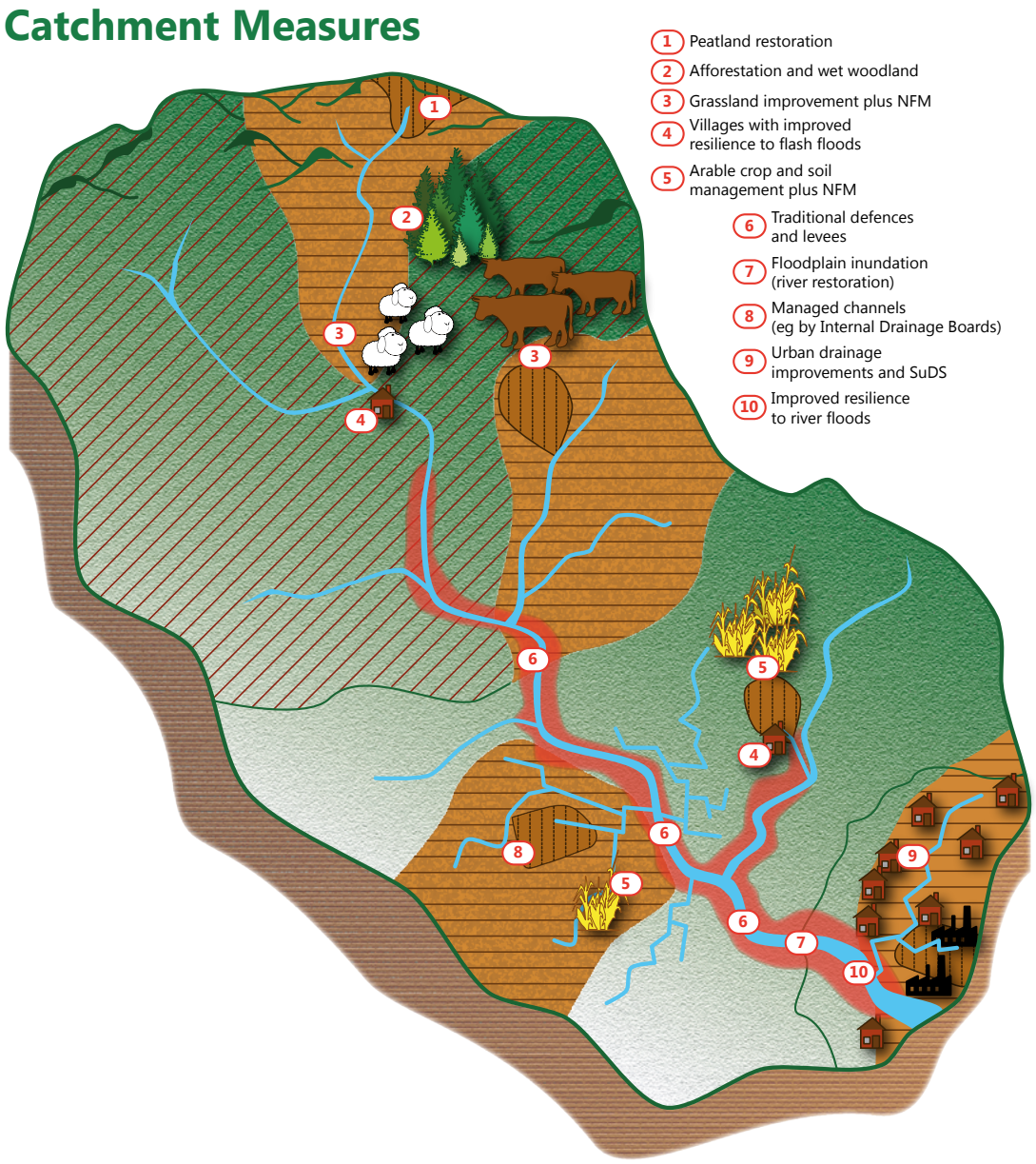
4. Flood risk is determined by rainfall duration and intensity, combined with what happens to that rainwater once it hits the ground. Unless evaporated or intercepted by vegetation, rainwater will move downstream under the force of gravity, ultimately to the sea. This can happen by water flowing over ground or by percolating much more slowly down through soil and rocks. The geology and geography of river basins—including the type of soil and rock and the steepness of slopes and land use—determine how much water is absorbed and how much flows off and at what speed. Over millions of years, run-off creates natural stream and river channels: these can overflow during large storms, creating natural flood plains. Flood plains are important for storing and conveying the additional flow. In exceptional, extreme rain events, water will progress beyond the extent of the natural flood plain.

5. Over the centuries, human activities have altered these natural processes and increased flood risk in many instances. Artificial land drainage, deforestation and urban development have increased the amount of water that runs off the land into rivers. Urban development has encroached upon flood plains, and river channels have been narrowed and straightened. Farming methods have had particular impact: currently around 70% of UK land is used for agriculture,[7] and some farming practices can reduce soils' ability to store and drain water. Changing land management practices combined with increased rainfall mean that the likelihood of flooding is now at an all-time high and will continue to increase.

7 Defra, Department of Agriculture and Rural Development Northern Ireland, Scottish Government, Welsh Assembly Government, *Agriculture in the United Kingdom*, 2012

Holistic flood risk reduction

Figure 1: Catchment measures



Source: Dr Paul Quinn

6. As the graphic above shows, a range of natural measures can be can be used to reduce the risk of flooding across a river catchment: from sites upstream close to the source of run-off, through to defences and river flood storage schemes installed along river channel pathways, down to measures in settlements to make communities more flood resilient.

7. Flood management has evolved in recent years to include examples of such 'catchment scale' management, in many instances driven by other imperatives such as the needs: to

protect water quality for drinking, to lower agricultural pollution, to improve habitat, or to restore landscapes that store carbon. Initiatives by Natural England and the catchment sensitive farming project in areas across the UK have played a key role in improving farming practices in order to deliver such multiple benefits. The Environment Agency (EA) has also encouraged this holistic concept of addressing water flows: its *Working with Natural Processes* project is one example.[8] The Agency is identifying opportunities to use a variety of natural measures such as tree planting and 'soft engineering' measures including bunds and dykes. These are deployed alongside more traditional hard engineering approaches, such as construction of concrete flood defences. The EA, Natural England and numerous Non-Governmental Organisations (NGOs) highlighted the benefits of catchment partnership work. Other flood risk management bodies such as Regional Flood and Coastal Committees (RFCCs) are also promoting holistic approaches: the Chair of the Thames RFCC considered both the RFCCs and the EA to be "well placed" to support a catchment approach.[9]

Trialling catchment scale management

8. In response to Sir Michael Pitt's report into the 2007 floods, agencies have set up projects to investigate how catchment scale approaches might reduce flood risk. Numerous small scale studies have shown the positive impacts from these types of natural flood management (NFM) measures. Examples include the Pickering 'Slowing the Flow' and the Pennines/Peak District Moors for the Future project and schemes in Stroud, Holnicote and Belford. The Department for Environment, Food and Rural Affairs (Defra) has also stepped up its trials of catchment approaches in the wake of the 2015–16 floods as part of its Cumbrian Flood Action Plan, in order to improve understanding of the best approaches and to highlight any constraints.[10]

9. These trials have focussed on a key type of flooding which has significant consequences for settlements—so called 'muddy floods' which happen when sudden storms cause large volumes of water to flow rapidly down rivers to pinch-points where the river might overflow and inundate local properties and land. Slowing down the rate of water flow, including by storing it in fields or reservoirs or using natural measures such as bunds and leaky dams, can reduce this type of flood risk. Natural downstream measures (sustainable drainage schemes (SUDs) and green infrastructure) can be effective across catchments, including in urban areas where installing ponds and swales for example can soak away water to prevent surface water flooding.

10. For this inquiry we visited two of the key projects which provide examples of upstream natural flood management:

- the 'Moors for the Future' project in the Pennines which is improving the moorland by, for example, restoring peat areas so that they can absorb more rainfall and reduce run-off; and

8 See Environment Agency Working with Natural Processes to Reduce Flood Risk webpages [accessed 10 October 2016]

9 Amanda Nobbs, Chair of Thames Regional Flood and Coastal Committee (FFP 155)

10 Environment Agency, *Reducing Flood Risk from Source to Sea,* June 2016

- the Slowing the Flow project which also uses a range of natural catchment measures to reduce peak river flows and protect the communities of Pickering and Sinnington in Yorkshire.

Both projects demonstrate the effective catchment partnerships of a range of local organisations and land managers in developing NFM approaches to help cut flood risk and deliver other environmental improvements. The Slowing the Flow project told us that the chance of Pickering flooding in any one year has been reduced. Jeremy Walker, project co-ordinator, told us that the success of the project had led to a number of national initiatives to extend the approaches to other places.[11]

Figure 2

PICKERING: 'SLOWING THE FLOW'

This partnership project set up in 2008 seeks to demonstrate how better land management can help tackle the flooding problem faced by Pickering in North Yorkshire.

It is funded by Defra and led by the Forestry Commission, supported by many bodies including the Environment Agency, the North York Moors National Park, Durham University, Natural England and local communities.

The project demonstrates how water flows can be slowed by using natural measures such as:

- Low-level bunds
- Storage of water on farmland at Newtondale
- Planting more trees
- Restoring woody debris dams in small streams
- Restoring wetlands

The project leaders consider it has clearly demonstrated how a strong partnership approach can succeed in delivering an integrated set of land management measures to reduce flood risk at the catchment scale, as well as provide wider multiple benefits for local communities.

Expanding catchment approaches

11. Despite the current trials, some witnesses still considered that the EA relied too much on constructing defences at the point a flood impacts such as town centres: the Agency did not give adequate consideration to preventing flood waters building up at source and along the river path.[12] We have published on our website evidence from a range of bodies holding this view. They include the Wildfowl and Wetlands Trust, the Blueprint for Water Coalition, Rewilding Britain and the National Trust. The Blueprint for Water Coalition considered the UK lacked "ambition for large scale natural flood management which

11 Slowing the Flow, Pickering (FFP 153)
12 See for example, United Utilities (FFP 48) para 2.1

could deliver huge benefits".[13] The Government's own advisory bodies, the Adaptation Sub-Committee of the Committee on Climate Change (CCC) and Natural England, also told us that downstream flood prevention and resilience measures must be accompanied by action upstream.[14] Natural England considered this needed to form part of a "larger toolkit of engineered flood defence and resilience measures".[15]

12. However, other witnesses while broadly endorsing the logic of catchment approaches urged caution over interpreting limited evidence as to the effectiveness of these measures. The National Farmers' Union (NFU) considered natural flood management measures were not a "panacea": they could not mitigate against extreme rainfall events, such as those of winter 2015–16.[16] The Centre for Ecology and Hydrology cautioned that evidence was limited that natural flood management measures would mitigate flooding from "very extreme events" on a large catchment scale.[17] Defra itself had reservations, conceding there were opportunities to "make more use of natural flood measures in the context of whole catchment planning",[18] but as long as such approaches also provided "other benefits".[19]

Developing an evidence base

13. The EA welcomed innovative NFM proposals which, if "properly accounted for" could provide a cost-effective solution.[20] However, it is difficult to quantify the benefits of NFM approaches since these have been trialled only across small-scale catchments. There are as yet no plans to trial approaches on a larger, city scale. Whilst many witnesses claim that studies on small-scale catchments have yielded positive results, a number of others told us that more definitive data was needed, both on the contribution made by specific measures and on the potential to expand the models to large-scale catchments:

- Natural England noted that evidence could be "difficult to collect" and other factors might "confound direct cause and effect analyses";[21]
- The Pickering 'Slowing the Flow' project considered that monitoring needed to continue to compile a longer run of data on the impact of measures;[22]
- Rewilding Britain told us that although the Belford catchment scheme in Northumberland cost only £200,000 compared to an estimated £2.5 million for a 'conventional' scheme, the evidence as to its impact was not definitive.[23] The Belford scheme itself reported that it was extremely difficult to quantify the impact of adding a dense network of leaky ponds to the catchment: although it believed that the approach had been shown to work, with each pond adding storage capacity and slowing flows across the catchment.

13 Wildlife and Countryside Link/Blueprint for Water Coalition (FFP 45)
14 Committee on Climate Change Adaptation Sub-Committee (FFP 110)
15 Natural England (FFP 127) para 4.3
16 National Farmers' Union (FFP 120)
17 Centre for Ecology and Hydrology (FFP 50) paras 12 & 13
18 Department for Environment, Food and Rural Affairs and Department for Communities and Local Government (FFP 129) para 35
19 Department for Environment, Food and Rural Affairs and Department for Communities and Local Government (FFP 129) paras 34 & 35
20 Environment Agency (FFP 128) paras 4.7 & 4.8
21 Environment Agency (FFP 128) para 4.2
22 Slowing the Flow, Pickering (FFP 153)
23 Rewilding Britain (FFP 80) para 2.3

14. Defra said it was important to have an effective framework for deciding on the optimal deployment of measures and the funding packages required to implement them. The Department told us:

> The challenge is being able to identify where in catchments land management measures can reduce the risk and impact of floods—normally in conjunction with traditional flood defences—and the extent of land management change that is required to have a worthwhile effect.

15. The Pickering project told us that there was an "urgent need for a user-friendly" model to help quantify the potential contribution of a wide range of upstream measures to flood risk management. In the view of witnesses such as the Blueprint for Water Coalition, frameworks needed to be improved to incorporate "the full range" of wider environmental and social benefits from approaches such as 'slow the flow' and SUDs.[24] This is to some extent now being addressed by the recent publication of documents such as the NFM Handbook by the Scottish Environmental Protection Agency (SEPA),[25] and resources published online by the EA and other bodies.[26] Natural England considered that although planning tools to deploy such measures were "relatively immature", this should not delay the adoption of approaches.[27] The EA concluded that although the evidence of outcomes was not there for every scheme, there was "enough to say that this is the direction of travel we should continue with",[28] and whilst "not everything now on for us is about natural flood management", NFM needed to be a "core part of our armoury".[29]

16. In September, after we concluded evidence gathering, the Government published its National Flood Resilience Review (NFRR) report.[30] This referred to the benefits of natural flood management in places such as Pickering and acknowledged that engineered hard flood defences could "only ever be part of the solution". The NFRR said that the Government's 25-year plan for the environment would look at bringing together local partners to integrate flood management with water planning at catchment level. Catchment leaders would coordinate planning, with natural flood management valued as part of natural capital accounting. Furthermore, the Government would continue to base its funding for flood management on "reduction in risk rather than type of intervention" to ensure that new approaches, such as land management to slow the flow, could compete on an equal value for money basis with conventional engineered defences.[31] But this aspect of flood management is not the focus of the NFRR. There are only brief references to it in the 140 page document. We are still awaiting publication of the 25-year plan: in its absence we cannot comment on whether Defra will translate these good intentions into effective action.

17. **Managing water flows from the top to bottom of river catchments helps to reduce flood risk, in many cases more cost-effectively than simply building flood defences in cities, towns and villages. Early results of trials are encouraging for smaller river**

24 Wildlife and Countryside Link/Blueprint for Water Coalition (FFP 45) para 2.2
25 Scottish Environment Protection Agency, *Natural Flood Management Handbook*
26 See for example Natural Water Retention Measures webpages [accessed 10 October 2016] and the Environment Agency/Defra report, *How to model and map catchment processes*, March 2016
27 Natural England (FFP 127) para 5.3
28 Q79
29 Q90
30 HM Government, *National Flood Resilience Review*, September 2016
31 As above

catchments: there is sufficient evidence to roll-out 'catchment scale' approaches for a far greater number of small river basins. Agencies need more evidence, however, on how effective these measures might be at a larger scale. ***The Environment Agency must work with academics and with other flood risk management bodies including Internal Drainage Boards and local catchment partnerships to fill this evidence gap: we recommend that Defra commission by July 2017 a trial on a large catchment of 100–200 km². Defra should also set out clearly the auxillary benefits it requires when adopting catchment approaches.***

Storing water and land management

18. As part of our consideration of wider catchment approaches, we took evidence on the potential for storing water on land, including farmland, either upstream or lower down on flood plains. This can be a cost-effective approach: the CCC told us that, per hectare, the costs incurred from a flood which affected urban land were £2.5 million higher than one affecting agricultural land.[32] Countries such as the Netherlands adopt storage on a widespread scale: during our June visit to see Dutch flood risk management projects, we discussed with a farmer from Boxtell how he allows a river across his land to flood in order to save built-up local land. His water charges were reduced to reflect the cost savings to his local community. In urban and peri-urban areas water can be stored temporarily in green spaces such as parkland and recreation areas, enabling the capacity of a catchment to be increased as more such land is used for this purpose. Tree planting in these areas can enhance storage capacity in these areas.

19. Some English schemes, such as those in Pickering, Morpeth and Clifton Ings in York, incorporate large-scale flood water storage, which has helped reduce flood risk to communities. But several witnesses considered that far more was required. The CCC said that further steps were needed to manage the flooding of agricultural land in recognition that some of the most productive farmland is, in practice, a functional floodplain: "how such land is managed can either heighten downstream flood impacts or can help alleviate problems by temporarily storing flood water where it can do least damage". However, the Government's response to the CCC in 2015 was that "enough is being done in this area".[33]

20. Other witnesses, such as the National Trust, told us of their reservations about the long-term appropriateness of incentives. The Trust welcomed efforts to compensate farmers for their "short-term, uninsured recovery costs" but in the long-term it was important to manage land more sustainably.[34] A number of other witnesses also highlighted the need for land managers to use sustainable practices as a matter of course.[35]

21. We were particularly interested to hear the views of farmer and land manager representatives, given the impact on their members' livelihoods. The NFU expressed general support for the concept of storing water on farmland, provided schemes worked well financially with the farming system. But the NFU was not able to provide any detailed views on the potential structure of any incentive scheme. Minette Batters, NFU Deputy

32 Q23
33 Committee on Climate Change Adaptation Sub-Committee (FFP 110), para 3c
34 National Trust (FFP 65) para 3.2.1
35 Blueprint for Water Coalition/Wildlife and Countryside Link (FFP 45)

President, referred to challenges in developing schemes, including a "lack of recognition of the value of agricultural land".[36] If these matters could be resolved then the role of farmers in flood prevention could be expanded.

22. The NFU later told us of a farm flood storage scheme in Wales, the Dyffryn Conwy Flood Alleviation Scheme, which had delivered tangible benefits for the community. Paul Williams, a farmer participating in the scheme, told us that its success was attributable to close working between scheme organisers and farmers. Farmers' initial scepticism was overcome by legally binding easements with significant incentives attached. However, farmers had borne costs beyond the level of these incentives from flooding in recent years. Mr Williams recommended that a more accurate system for calculating costs be adopted, including index-linking payments over the 20-year period of any agreement.[37] We note that developing a robust payment scheme requires an accurate assessment of both the costs to farmers of submerging their land, whether for long or short periods, and the value of benefits from reduced damage to downstream land and property.

23. We took oral evidence before the European Union referendum on 23 June. We therefore considered incentive schemes within the context of the EU rules on Common Agricultural Policy (CAP) payments and their impact on the construction of English agri-environment schemes (Countryside Stewardship Schemes). Defra told us its policy was to target agri-environment payments on activities where there were "also flood reduction benefits".[38] Witnesses noted constraints in the use of such funds to support flood management measures: a scheme that relies on voluntary uptake by farmers makes it hard to coordinate across a catchment; the short-term nature of CAP funding rules normally limits schemes to five years;[39] and incentives cannot be provided beyond the income foregone from farming. Since the referendum Defra has said it will examine how to provide support for farmers in general terms after 2020, with current support applying until then and environmental agreements honoured for their duration if signed before the Autumn Statement.[40]

24. **Storing water on farmland can provide a cost-effective means of reducing flood risk, but farmers are naturally wary of allowing their land to be out of production for long periods.** ***Defra should put flood risk management at the centre of any new support schemes for farmers which replace the Common Agricultural Policy (CAP) framework. The Department must consult by July 2017 on an incentive scheme to pay farmers to allow short-term or long-term storage of flood water on appropriate land. As a precursor to this, the National Farmers' Union should work with farmers to develop by the end of 2016 a detailed model for calculating the value to communities of land management that reduces flood risk. This model must demonstrate how storage methods can be used which have a low impact on farm productivity***

25. ***As part of work to develop farming policies outside the European Union, Defra must link support to sustainable land management practices, including in regard to flood management.***

36 Q190
37 Paul Williams (FFP 151)
38 Department for Environment, Food and Rural Affairs and Department for Communities and Local Government (FFP 129)
39 Natural England (FFP 127) para 6.4
40 Andrea Leadsom, Secretary of State for Environment, Food and Rural Affairs, *speech* to Conservative Party Conference, September 2016

Sustainable drainage systems (SUDs)

26. SUDs can be used as part of integrated catchment management to reduce surface water flooding. Spatial plans can include SUDs schemes for individual or small developments, or more widely within green infrastructure areas which can be designed to include ponds and swales. [See resilience chapter below for how SUDs can form part of improved community resilience to extreme weather.]

27. Witnesses expressed strong concerns about problems with planning requirements for SUDs in new developments: in their view current regulatory approaches lack teeth. The Woodland Trust told us that fewer than 15% of planning applications in flood risk areas included SUDs measures.[41] The CCC and a number of other witnesses recommended that provisions in the Flood and Water Management Act (FWMA) 2010 be commenced as this would strengthen policy.[42] The Royal Town Planning Institute (RTPI) noted that the failure to commence these provisions meant that there was no clear pathway for SUDs to be adopted by an appropriate body.[43] Witnesses noted that arrangements in Scotland and Wales were tougher: in Scotland SUDs had been a statutory requirement since 2005.[44]

28. A requirement for developers to use sustainable drainage rather than require their developments to connect to hard infrastructure, was supported by a number of Water and Sewerage Companies since new buildings can strain their drainage systems and, in some instances, lead to flooding. Currently, water companies are not statutory consultees in new development planning applications, but are legally obliged to accept new connections to their sewerage infrastructure. Many supported the ending of this right. Anglian Water told us that there was no statutory provision to allow water and sewerage companies to suggest alternative options for the location of developments based on infrastructure capacity and flood risk.[45]

29. However, developer representatives considered that the current English approach to waste water connections and SUDs was correct. Steve Wielebski from the Home Builders Federation noted that the industry had used SUDs for some decades but that site characteristics and scheme type determined whether hard or soft engineering was used.[46] Home building company, Barratt Developments Ltd, told us that SUDs use was in effect already mandatory as only developments which did not increase pre-development run-off levels were permitted.[47] Developer representatives also told us that companies paid significant charges—some £2.6 billion since 1989—for investment in waste water infrastructure but that this money was not ring-fenced to require water companies to make these investments.[48]

41 Woodland Trust (FFP 67) para 25

42 Schedule 3 of the Flood and Water Management Act provides for the establishment of a SUDS Approving Body (SAB) within lead local flood authorities (LLFAs). The Act requires SAB approval of all new drainage systems for new and redeveloped sites and highways to be obtained before construction can commence. It also requires that the proposed drainage system meets new National Standards for Sustainable Drainage, concerned with the design, construction, operation and maintenance of SUDS.

43 Royal Town Planning Institute (FFP 96)

44 Q532, Dr Pirie

45 For example, Severn Trent Water (FFP 82) Northumbrian Water (FFP 14)

46 Q236

47 Q238

48 Q265

30. Defra noted that in April 2015 requirements were strengthened so that the installation of SUDs must be considered for all new developments of more than 10 dwellings and for all major commercial developments.[49] During the passage of the Housing and Planning Act 2016, the Government rejected amendments which would have further strengthened SUDs provisions, instead committing to conduct a review. This is despite Defra and the Department for Communities and Local Government stating that SUDS are generally cheaper to build and "maintaining them will be cheaper than traditional pipework".[50]

31. **All flood risk management bodies must understand better the contribution that sustainable drainage systems (SUDs) and green infrastructure such as ponds and swales can make to protecting communities from flooding.** ***We recommend that, in its response to this report, Defra set out how the Government's review of sustainable drainage regulations will ensure that SUDs are deployed to maximum effect in all new English developments. We make recommendations below on changes which would enable water and sewerage companies to take a wider role in local drainage, including responsibility for adopting SUDs: the Government's review should assess how this might incentivise the more effective use of sustainable drainage. The review must also set out, if measures in the Flood and Water Management Act 2010 on SUDs are not to be commenced, what alternative measures at least equal in strength will be adopted.***

Maintenance and dredging

32. The Government has committed a budget of over £1 billion for flood maintenance work this Parliament.[51] Maintaining river channels effectively requires clearance of vegetation, debris and rocks as well as management of silt build-up. Those managing water flows, including the EA and Internal Drainage Boards (IDBs) must take decisions on when and where it is appropriate to dredge river channels. A balance needs to be struck: dredging can clear channels to prevent rivers being over-topped and lower local flood risk in some instances. We received evidence from those such as the Flood Prevention Society who criticised the Environment Agency for giving inadequate consideration to dredging.[52] However, flood risk can be increased in some places when water is moved more quickly downstream. Further, in some circumstances dredging may not be effective in speeding up water flows: for example, Aviva told us that dredging generally had "little or no benefit" for flood risk.[53] Our Special Advisers also cautioned that dredging natural rivers is unlikely to prove beneficial as a river will return to its natural state over time: however, it can be effective in artificial rivers such as the Tone and Parrett in Somerset.

33. The current permitting system is seen by some witnesses as creating a barrier to dredging, even where it would be the most effective option. For example, the classification of dredged material as waste adds to the complexity of gaining permission. The Somerset Drainage Boards Consortium told us that systems needed to be streamlined to allow

49 Department for Environment, Food and Rural Affairs and Department for Communities and Local Government (FFP 129)

50 Department for Environment, Food and Rural Affairs and Department for Communities and Local Government, *Delivering Sustainable Drainage Systems*, September 2014

51 HM Government, *National Flood Resilience Review*, September 2016

52 Flood Prevention Society (FFP 51)

53 Aviva (FFP 140)

the more efficient permitting of dredging.[54] Channel maintenance such as cutting back vegetation and removal of material deposited in rivers during flood events, such as large boulders and stones, is also important to maintain river channel capacity.

34. ***The Environment Agency, Internal Drainage Boards and local authorities must ensure that their operational plans include adequate provision for river channel maintenance. Plans must also evaluate where dredging can provide an effective solution in reducing flood risk, taking account of impacts both near to the dredged site and downstream. The Environment Agency must by July 2017 streamline its permit system to allow those who need to dredge to gain the appropriate permissions quickly without requiring multiple applications.***

54 M Stevens, Somerset Drainage Boards Consortium (FFP 132)

3 Predicting and communicating flood risk

Climate and weather forecasting

35. Effective responses to flood risk require an accurate understanding of both short-term weather patterns and long-term climate trends. English flood management agencies have access to world-leading expertise in both these areas. Witnesses told us that the Met Office provided the "most accurate national weather forecasting service in the world". Today's four-day weather forecasts are as accurate as one-day forecasts were 30 years ago and rainfall forecasts are 10% more accurate than they were two years ago.[55] Never the less, the Public Weather Service Customer Group, which independently assesses the Met Office service, continues to press for more accuracy in severe weather forecasts and for greater local detail: it told us that Met Office investment in supercomputing capacity was helpful but future improvement depended on continued government funding.[56]

36. The Met Office is also considered to be a world leader on climate change science. Its projections help inform long-term resilience and associated investment decisions such as the Environment Agency's Long Term Investment Scenarios. Met Office data is being used to update 2009 climate change scenarios, with more refined models to be published in 2018.[57] However, significant uncertainties remain in predicting climate change trends and the impact on rainfall and flooding.[58] The NFRR published in September, after we finished taking evidence, has reduced some uncertainties. It concluded that, based on Met Office modelling, it was plausible that rainfall between 20 and 30% higher than normal could be experienced over the next ten years. The Review noted that flooding under these predicted rainfall scenarios would remain "overwhelmingly" within areas defined by the EA as expected flood areas under its Extreme Flood Outlines.[59] Some 12% of England lies within these areas.[60] Furthermore the NFRR notes that flooding is "impossible to forecast precisely" and the possibility of floods outside the EA-defined areas could not be excluded.[61]

Flood warnings

37. Translating data into useful flood warnings requires co-ordination between the Met Office and other agencies, principally the EA. Weaknesses identified by the Pitt Review, set up in the aftermath of the 2007 floods, have largely been addressed by measures such as the establishment of a joint EA/Met Office Flood Forecasting Centre.[62] Witnesses considered this to be an effective approach. However, some were concerned that the EA's local flood risk maps contained limited information and failed to indicate, for example, depth of flooding. The next generation of such maps will include not only current but

55 Dr Wyn Williams, Chairman of the Public Weather Service Customer Group (FFP 32) para 3
56 As above
57 Met Office (FFP 46) para 8
58 South West Water (FFP 49) para 1.5
59 HM Government, *National Flood Resilience Review*, September 2016, Executive Summary
60 HM Government, *National Flood Resilience Review*, September 2016, para 1.3.1
61 HM Government, *National Flood Resilience Review*, September 2016, para 1.4.3
62 Sir Michael Pitt, *Learning lessons from the 2007 floods,* June 2008, recommendation 4.70

also future risk, accounting for climate change.[63] During our visit to Somerset the EA demonstrated a new IT system which feeds real-time monitoring data from river gauges into the systems used by staff operating flood incident rooms to collate and issue flood warnings for communities.

38. **The Environment Agency and the Met Office are working effectively to improve flood warning systems, including developing innovative ways of using real-time data in some places. However data sets need to be improved and new systems need to be used in catchments across the country.** ***We recommend that the Environment Agency report by July 2017 on how it can work with the Met Office to collect more detailed real-time data on rainfall and river levels. We further recommend that systems such as those being developed in Somerset to feed real-time data into live flood forecast warnings are deployed across England at the earliest opportunity.***

Public understanding of flood risk

39. Public acceptance of the need for individual, local and national action on flooding requires an understanding of the level of threat. Communities which have recently flooded are all too well aware of the risk to their homes and livelihoods. We heard during our visit to Somerset how effective local flood wardens were in communicating flood risk to their communities. But in advance of a flood, public awareness can be low: the EA told us that although nearly half the population surveyed in recent research reported being aware of a local flood risk, only 7% felt this risk applied to their own property.[64]

40. Part of the lack of awareness stems from the way in which flood risk is communicated. Evidence to this inquiry on the issue was almost universal in criticising the use of the current formulation of explaining flood risk to the general population. Although flood risk professionals understand it, the "1 in 100" year formulation is not effective in communicating flood risk to the general public. The NFRR notes that this formulation is likely to be misinterpreted.[65] However, witnesses also saw alternative statistical methods (such as citing a percentage risk) as flawed.[66] In general, witnesses preferred the use of a simpler approach such as a traffic light system, with red indicating a high flood risk, or a broad categorisation such as 'high flood risk' or 'low flood risk', but no one formulation can offer the perfect answer. Natural Resources Wales noted that "in raising awareness of flood risk [it is important that] we focus on communicating that there is a risk (rather than specifying exactly the level of risk) and crucially what can be done about it".[67]

41. Defra's Parliamentary Under-Secretary of State, Dr Therese Coffey, conceded that there was a "communication challenge" to address, noting that although the EA had expanded flood warnings to some 1.3 million people, some of the language needed to change so that risk was "readily understandable". She noted that the EA was piloting new approaches.[68]

63 Environment Agency (FFP 128) para 2.3
64 Environment Agency (FFP 128) para 1.4
65 HM Government, *National Flood Resilience Review*, September 2016
66 For example, Cyfoeth Nauturiol Cymru/Natural Resources Wales (FFP 149) para 2.3 and Scottish Environmental Protection Agency (FFP 148)
67 Cyfoeth Nauturiol Cymru/Natural Resources Wales (FFP 149) para 5.2
68 Q618

42. Current methods of describing flood risk using the 'one in x year' event formulation are confusing. It is hard to interpret from this information the risk of flooding for any particular home or community at any particular time: individuals may not therefore appreciate that they need to take steps to reduce their own risk.

43. A poor grasp of flood risk also hampers wider public acceptance of the inevitability that there will frequently be flooding somewhere in England. Without this, it will be difficult for flood risk bodies to gain acceptance for their plans: this acceptance is vital since the increasing risk of flooding means that tough decisions must be made about how much to spend on protecting communities from floods.

44. **Flood risk agencies must find clearer ways of explaining flood risk, to spur both householders and businesses to prepare effectively for floods and to inform public views on national and local flood risk strategies.** ***We recommend that the Met office and the Environment Agency set out by the end of 2016 a simpler system for explaining flood risk. The EA should also publish maps which include not only whether a place is at risk of flooding but also the likely depth of flood water and duration. These maps should show risk from all types of flooding and be available at one website address.***

4 Improving resilience

45. Witnesses asserted that it was "impractical and unaffordable" to "continually" extend flood defences.[69] Further work is needed on improving resilience to floods, particularly if communities are to prepare effectively for the increased impacts of climate change. Resilience can be increased by better preparation, and planning and building capacity to resist floods or to reduce the impacts and help communities recover when they are flooded. The NFRR states that Defra will consider the balance between "protection and resilience".[70] Flood resilience can be developed at individual property level and at community level, including through spatial planning policies and building standards.

Integrating flood management and spatial planning

46. We received conflicting evidence on whether planning rules on mitigating flood risk were effective. Some witnesses considered that local decision-makers did not take flood risk sufficiently into account when approving new development. The CCC noted that new floodplain development added to long-term flood risk and the costs of flood prevention. More than 30,000 new homes have been built since 2008 in areas with a 10% or greater chance of flooding in the next ten years. The CCC told us that the Government had rejected its recommendation to assess the long-term consequences of this.[71] Hampshire County Council considered powers given to Lead Local Flood Authorities (LLFAs—ie Unitary and County Councils) to be insufficient to ensure that new developments were not sited in areas of flood risk: planners should be able to consider whole catchment impacts, not just local effects, when granting planning permission.[72]

47. In contrast, the EA and Defra told us that spatial planning rules were designed to allow effective consideration of the flood risk from new developments. The EA noted that the National Planning Policy Framework (NPPF) incorporated the aim of protecting people and property from flooding and that the Agency had a statutory consultee role to give planners advice on whether new build would pose a flood risk to others or to the development itself.[73] The RTPI noted that with 96.4% of all planning decisions, and 99% of those for new homes, made in line with EA advice "very little new development is now approved in areas at high risk of flooding".[74] None the less, insurance company Aviva told us that people needed to discuss flood risk more directly when buying homes. Planning decisions including EA advice are published which should help people to make informed decisions on individual purchases. However there is no centralised register of decisions made against EA advice which could inform more strategic considerations as to whether new developments across a wider area are impacting on flood risk.

48. **Home buyers and the wider community must be assured that new development does not increase flood risk, either at the development site or further afield. Statistics show that planning decisions for developments in high flood risk areas are overwhelmingly being made in line with Environment Agency advice. However, there**

69 South West Water (FFP 49) para 2.3
70 HM Government, *National Flood Resilience Review*, September 2016, para 4.7
71 Committee on Climate Change Adaptation Sub-Committee (FFP 110), para 3d
72 Hampshire County Council (FFP 27)
73 Environment Agency (FFP 128)
74 Royal Town Planning Institute (FFP 96) (FFP 146)

are exceptions. ***We recommend that from 2017 each local planning authority publish an annual summary of planning decisions taken against Environment Agency advice and the action it has taken to monitor flood risk impacts of all developments.***

49. A further concern is that statistics on compliance with EA advice do not show the whole picture. The EA may advise that planning consent be given dependent on conditions being met by the developer as to how buildings are constructed. However, buyers do not have an easy means of ensuring that such measures have been fully adopted. Furthermore, sanctions cannot easily be imposed on developers whose properties subsequently flood or are considered to have contributed to flooding elsewhere. The RTPI noted that planning legislation does not "provide the necessary sanctions and powers to act as a deterrent for developments in breach of planning controls [for SUDs]; nor do they require that remedial action is taken".[75]

50. With the assistance of our Special Advisers we have drawn up proposals for a method to ensure developers are made liable for the costs of flooding associated with their developments. Those with surface water management responsibilities would collectively produce a single set of guidelines so that planning authorities can attach standard conditions to each application, modified if necessary to suit particular circumstances. These would specify high level requirements to be met in order to receive planning approval on various criteria such as flow control (which could be met for example through the installation of SUDs). These bodies would also develop a simple inspection and post-construction certification process to ensure that what had been built would meet the performance required.

51. ***We are concerned that, where flooding linked to new building occurs, those affected find it difficult to seek redress from developers. We recommend that the Government impose by the end of 2017 a statutory liability on developers to meet the costs of flooding where their development fails to comply with planning requirements and increases flood risk, whether to a property sited on the new development or further afield. The Government's commitment to build more affordable homes should not be achieved at the expense of flood resilience of new residential properties. Regulations must provide for developers to avoid such liability where they comply with planning conditions: local planning authorities should be required to issue as part of planning processes a drainage certificate to confirm compliance.***

52. ***To facilitate this, we recommend that bodies with a responsibility for managing the effects of developments on surface water flows, including water and sewerage companies, become statutory consultees for planning applications.***

Building regulations

53. Building regulations do not require flood resilience measures to be installed in new buildings. The Home Builders Federation questioned whether, with average rainfall increasing by 6 to 8% since the 1960s, design criteria were "sufficiently robust".[76] Some witnesses, such as Mary Dhonau, a Community Flood Consultant, recommended that building regulations be amended to ensure that all new builds are "flood resilient compliant" (for example, by requiring all airbricks used to be kitemarked as being of an

75 Royal Town Planning Institute (FFP 96)
76 Q229, Steve Wielebski

automatic flood-closure type).[77] The Local Government Association (LGA) also called for building regulations to require anti-flood measures such as raised electrical sockets and fuse boxes and controls, wiring above floor level, ventilation brick covers, sealed floors and raised damp proof courses.[78]

54. Professional planning and engineering institutions are working to develop a voluntary code on flood resilience measures that should be used in any new developments.[79] In September, after we finished taking evidence, Defra published a *Property Flood Resilience Action Plan* following a Roundtable chaired by Dr Peter Bonfield.[80] This recommended that the Government further explore whether building regulations could be better used to encourage flood resistant and resilient building construction.

55. **We support voluntary approaches which will improve the use of flood resilience measures in new buildings and a new code should be finalised as soon as possible. *Should a voluntary code not be agreed with key stakeholders by the end of 2016, then the Government must amend building regulations by the end of 2017 to require such measures to be used in all newly built properties.***

Flooding insurance

56. The Government introduced in April the Flood Re scheme in response to concerns that many householders in areas of high flood risk were unable to obtain affordable insurance. The scheme was in its early weeks of operation when we took oral evidence and, only a few months on, there is little detailed information on its impact. There is anecdotal evidence that many homeowners are being quoted significantly reduced premiums, but some people have found it hard to secure lower quotes. In addition, a small number of people may have lost out because, although their homes were built by the 2009 deadline, their properties were not fully registered in time.

57. We considered the impact of Flood Re on individual and community resilience and preparedness for floods since many witnesses considered the scheme blunted signals which could spur householders to take responsibility for protecting their own property. The ESRC and the Grantham Institute considered that "there are no direct levers for Flood Re to influence flood resilience and the scheme will not impact the behaviour […] of homeowners, national and local governments, developers and insurance companies".[81] The scheme was "invisible" to households: policy documentation should tell those receiving a subsidy clearly how much they were benefitting by and highlight their responsibility for improving their property's resilience.[82] Flood Re told us that it was required to produce transition plans periodically to ease the shift towards the open market when Flood Re expires in 23 years' time. The plans would set out how the scheme could incentivise householders and insurers to take the most effective measures to protect homes against

77 Mary Dhonau Associations (FFP 26)
78 Local Government Association (FFP 134)
79 This work is being led by the Chartered Institution of Water and Environmental Management, the Institute of Civil Engineers and the Royal Institution of Chartered Surveyors
80 Defra, Dr Peter Bonfield, *The Property Flood Resilience Action Plan*, September 2016
81 ESRC Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment (FFP 75) para 16
82 ESRC Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment (FFP 75) para 19

flooding.[83] The Bonfield report on resilience also recommended that Flood Re should provide an evidence base to understand how the scheme could incentivise households and insurers to manage the risk of flooding and reduce the cost of claims through resilience and other measures.[84]

58. Insurance company Zurich told us that "building back better" approaches were needed so that every flood loss was used as an opportunity to "learn and increase flood resistance and resilience in the future".[85] However, brokers surveyed for the Bonfield review stated that a third of insurers would not allow a more resilient repair to be made following a flood, even if cost neutral. Instead claimants could only make repairs to put them back in the position they were in prior to the flood.[86] During our visit to Somerset, we were told that flooded homes had been restored to pre-flood standards rather than being made more resilient, in many instances because of restrictive insurance policy conditions.

59. **Flood Re appears to be allowing many households previously unable to do so to obtain affordable flood insurance cover. However the scheme is intended to provide a transition to an open market in insurance provision: it is therefore vital that Flood Re and insurance companies provide policy holders in flood risk areas with easily understandable information about the subsidy they are receiving so that they fully understand the need to improve their property's resilience. *We recommend that Defra report by January 2017 on how clearer information can be provided to policy holders on the subsidy provided by Flood Re.***

60. **In addition, flood insurance policy terms should allow for 'building back better' so that repairs to a flooded property can proactively deploy the full range of resilient materials and products. *The Government should also review with the insurance industry how policy terms might incentivise the use of flood resilience measures by householders and businesses and report on this by January 2017.***

Business insurance

61. We were told that business flood insurance was unaffordable for many businesses, particularly for Small and Medium Sized Enterprises (SMEs). The British Insurance Brokers' Association (BIBA) reported that 85% of brokers considered it had become harder to place business flood cover in recent years. Federation of Small Businesses' (FSB) research found that 9% of small businesses at risk of flooding had difficulty finding insurance, 3% considered cover to be unaffordable and 6% had been refused flood insurance cover.[87]

62. However Defra does not consider there to be a market failure in provision of appropriate business insurance for those located in flood risk areas.[88] Hence Flood Re was designed only to cover households. Many witnesses endorsed the exclusion of businesses from the scheme. The Association of British Insurers (ABI),[89] and Flood Re argued that it would be wrong for homeowners to subsidise the operating costs of businesses. There are however circumstances where primarily residential properties are excluded from Flood

83 Flood Re (FFP 126) para 20
84 Defra, Dr Peter Bonfield, *The Property Flood Resilience Action Plan*, September 2016
85 Zurich Insurance plc (FFP 77) para 4.4
86 Defra, Dr Peter Bonfield, *The Property Flood Resilience Action Plan*, September 2016
87 British Association of Insurance Brokers (FFP 112) paras 1.2 & 1.3
88 Defra, *Affordability and Availability of Flood Insurance*, July 2015
89 Association of British Insurers (FFP 111)

Re as they are defined as business premises because they have mixed use. Flood Re told us that where there were local examples of businesses finding it hard to get affordable insurance, stakeholders should "work together on a solution".[90] Indeed BIBA told us that it was working on a commercial insurance solution for launch later this year that would offer cover to "the vast majority of businesses that have struggled in the past".[91]

63. However, some witnesses, such as the FSB, argued that either Flood Re should be extended to cover businesses or the Government should consider adopting alternative schemes for businesses.[92] The ABI suggested that for the minority of premises unable to obtain appropriate cover a 'parametric cover' scheme should be considered. This entails the covered business paying a capped, one-off payment if a flood occurs with any excess costs being picked up by a Government-backed scheme (similar to the UK Export Finance Insurance Policy offer). A business would need to prove it was unable to obtain commercial cover before becoming eligible for such a scheme. Aviva told us they would welcome an independent study into affordability and accessibility of insurance cover for SMEs.[93]

64. Many witnesses emphasised the role of improved resilience in reducing business insurance costs. The FSB's research found a "very low level of preparedness for severe weather" among the UK business community.[94] The ABI urged a raising of business awareness on flood risk mitigating actions, with business rate or corporation tax discounts to support affected businesses.[95]

65. **Some flood-hit businesses are understandably concerned that they may find it hard to obtain appropriate flood insurance in future. We welcome the insurance industry's progress in developing commercial solutions for many such businesses. However the market may not be able to provide affordable cover for all businesses, particularly small businesses. *We recommend that the Government develops by the end of 2017 a grant scheme to support small businesses to undertake resilience measures. This scheme should be reviewed by the end of 2019 to assess whether there is need for further direct support for small businesses in the form of a Government-backed insurance scheme.***

Emergency response

66. We did not consider emergency responses to flooding in detail in this inquiry, except with respect to the role of the Fire and Rescue Service. The Fire Brigades Union noted that in the 2015–16 winter floods the fire service was the primary emergency responder: firefighters responded to some 1,400 flood incidents across the North West of England, 450 in Yorkshire, 350 in Scotland, 200 in Wales and 100 in Northern Ireland.[96] The Fire and Rescue Service provided 70% of boats used in the winter floods 2015–16. Many witnesses praised the firefighters for their bravery and commitment. However, there are 8,000 fewer frontline firefighter jobs now than in 2007 and boat teams have been cut by a quarter. The FBU criticised a lack of appropriate kit such as service water suits for firefighters to use during flood responses.[97] The CCC noted that it was not known what

90 Flood Re (FFP 126) para 16
91 British Association of Insurance Brokers (FFP 112) para 1.5
92 Federation of Small Businesses (FFP 42) paras 3.6 & 3.7
93 Aviva (FFP 140)
94 Federation of Small Businesses (FFP 42)
95 Association of British Insurers (FFP 111)
96 Fire Brigades Union (FFP 20)
97 As above

scale of event emergency services were resourced to cope with because the necessary data were not collected.[98] In September, the NFRR committed an additional £0.75 million to provide grants to enable nationally deployable flood rescue teams to maintain their equipment, including boats.[99] This appears to be a one-off commitment. The Fire Brigades Union submitted strong evidence to the effect that only by placing a statutory duty on the fire service to respond to flood events would appropriate, ongoing resources be assured. A duty would also ensure the Service's plans were integrated with response strategies prepared by other bodies including the EA and local authorities. Such a duty is in place in Scotland and Northern Ireland.

67. **Firefighters provided a vital and much valued first-line service to flooded communities in recent flood events. While we welcome the September National Flood Resilience Review commitment to increase funding to maintain equipment, we are concerned that continued pressure on resources could jeopardise the Fire and Rescue Service's ability to deliver a high standard of service in future.** ***We recommend that the Government places a statutory duty on the Fire and Rescue Service in England and Wales to provide an emergency response to flood events and commits the necessary additional funding and staff resources to support delivery of this responsibility. The Government must consult by the end of 2016 on methods of imposing and funding this duty.***

98 Committee on Climate Change Adaptation Sub-Committee (FFP 110) para 3f

99 HM Government, *National Flood Resilience Review*, September 2016, para 4.2

5 Strategic, governance and resource issues

68. The previous chapters considered problems in responding to specific aspects of flood risk. These problems are symptomatic of wider issues with the manner in which England administers flood risk management, and the fundamental tensions inherent in delivery structures. We received evidence from a range of sources identifying deep-rooted deficiencies in current flood risk management approaches: some of these concerns were also submitted to the Environmental Audit Committee's (EAC) recent inquiry into flooding.[100]

Strategic problems

69. The key strategic problems include:

(1) **Lack of a robust national strategy**: the CCC criticised the Government for failing to accept the need for a comprehensive strategy to tackle the increase in the number of homes at high risk of flooding;[101]

(2) **Too short-term a focus**: the EAC criticised the Government for responding to specific flood events reactively, rather than proactively developing plans adequate to respond to rising flood risk: the Committee said that communities "deserve more certainty that they will be protected from floods".[102] The EAC also criticised the Government for establishing a series of reviews after flood events but failing to follow through with consistent funding.[103]

Governance problems

70. Governance problems include:

(1) **Poor clarity in roles and responsibilities** for flood management. The EA has a dual role, both developing strategies and delivering flood risk management schemes (in addition to other, non-flood roles). The Chair of the Thames RFCC noted that the EA wore two hats and was "well placed" to fulfil both roles but that greater clarity was needed as to which hat was being worn in different circumstances;[104]

(2) **A lack of transparency and accountability in national decision making:** South West Water considered that whilst a great deal had been done to improve the transparency of decision-making, local governance remained "opaque" to the

100 Environmental Audit Committee, Flooding: Cooperation across Government, Second Report of Session 2016–17, HC 183

101 Committee on Climate Change Adaptation Sub-Committee (FFP 110)

102 Environmental Audit Committee, Flooding: Cooperation across Government, Second Report of Session 2016–17, HC 183, para 48

103 Environmental Audit Committee, Flooding: Cooperation across Government, Second Report of Session 2016–17, HC 183

104 Amanda Nobbs, Chair of Thames Regional Flood and Coastal Committee (FFP 155) para 7

general public.[105] The Association of Drainage Authorities (ADA) considered the national model needed "significant overhaul" to be able to respond to local choices;[106]

(3) **A proliferation of flood risk management bodies:** co-ordinating these diverse bodies diverts funds and energy. The Government has set up new arrangements such as the Somerset Rivers Authority and the Cumbrian Flood Partnership in the wake of recent floods to promote effective joined-up action across catchments, indicating that current local 'business as usual' arrangements are sub-optimal.

Resources and capacity

71. Resource and capacity issues include:

(1) **Lack of capacity and capability to deliver.** LLFAs are failing to deliver consistently: some 38 of 152 LLFAs have failed to produce strategies required by the Flood and Water Management Act 2010.[107] The LGA considered it vital that councils be sufficiently resourced to lead local flood protection.[108] Devolution of some funding and powers to regional level may exacerbate already patchy local authority delivery. The Chair of the Thames RFCC, Amanda Nobbs, told us that whilst some were "making exemplary progress" other local authorities were "still on the starting blocks".[109] Moving some roles from the EA to LLFAs has meant the loss of some skills and knowledge and slowed the production of plans. In Scotland, local authorities play a more direct role in flood management, taking local responsibilities for flood defences which in England are undertaken by the EA. Groups of Scottish authorities work together to improve capacity and co-ordinate action.[110] In Wales, the Environment Act (Wales) 2016 established a Flood and Coastal Erosion Committee to advise the Welsh Government on a holistic approach, "whatever the source [of flooding] and whoever the responsible organisation is".[111]

(2) **Fluctuating funding:** Funding fluctuated over previous Parliaments, with unpredictable flood events requiring budgets to be topped-up above planned levels. The 2016 Budget committed an additional £700 million in response to the winter 2014–15 floods. The EAC criticised this for being a "political calculation".[112] Some £2.5 billion has been committed up to 2021 for 1,500 schemes to better protect some 300,000 homes.[113] Maintenance spend will be £1 billion over this Parliament.[114] These levels of spend are unlikely to be enough in the medium

105 South West Water Ltd (FFP 49)
106 Association of Drainage Authorities (FFP 115) para 3.01
107 Environmental Audit Committee, Government Response to Flooding: Cooperation across Government, Second Special Report of Session 2016–17, HC 645
108 Local Government Association (FFP 73)
109 Amanda Nobbs, Chair of Thames Regional Flood and Coastal Committee (FFP 155), para 5
110 Q518
111 National Resources Wales (FFP 143) para 2.10
112 Environmental Audit Committee, Flooding: Cooperation across Government, Second Report of Session 2016–17, HC 183
113 Defra, Dr Peter Bonfield, *The Property Flood Resilience Action Plan*, September 2016
114 Andrea Leadsom, Secretary of State for Environment, Food and Rural Affairs, *speech* to Conservative Party Conference, September 2016

term: the EA's Long Term Investment Scenarios concluded that some £850–900 million a year would be required by the 2020–40s to achieve optimum investment plans.[115]

(3) **Complex local funding arrangements**: currently local funding is raised through IDB and local authority levies, with RFCCs overseeing priorities. This leads to complex, opaque arrangements. The Somerset Rivers Authority has also raised additional funds through one-off levies collected via general council tax bills but the Government is to legislate for a specific levy in due course.[116] This will not, however, address problems across England. Furthermore, although we found evidence in Somerset that affected communities were willing to pay, not all those living in wider areas were content. Some people also expressed the view that as memories of floods receded, so would willingness to pay an ongoing levy.

(4) **Maintenance funding is less secure and can be inefficiently spent**: the Government has committed to five years of resource funding for maintenance. However, longer-term certainty is needed on maintenance, to keep pace with a rising capital spend on assets that need upkeep. The EAC reported on inefficiencies in maintenance spend identified in the Worsfold Review, finding the EA less efficient than regulated water companies in their use of data, for example.[117]

Government views

72. Ministers rebutted a number of these concerns, particularly about inconsistent long-term strategy and funding. Dr Coffey considered flood strategies did in fact take a longer-term view; for example, the EA's Long Term Investment Scenarios set out in 2014 scenarios for investment up to 2065. She referred to funding commitments of £2.3 billion of Exchequer funding up to 2021, with £1 billion in addition of maintenance funding over this Parliament.[118] The EA also cites successes from current approaches:

> since 2003–04 capital investment in flood risk management schemes has provided better protection for over 500,000 homes in England. Since 2012–13 260,000 hectares of agricultural land have benefitted from reduced flood risk and the six year capital programme to 2021 will better protect 300,000 homes. This investment will bring benefits to the environment, businesses, infrastructure, agriculture and the economy of an estimated £30 billion.[119]

115 Environment Agency, *Flood and Coastal Erosion Risk Management Long Term Investment Scenarios, 2014*
116 Defra (FFP 156)
117 Environmental Audit Committee, Flooding: Cooperation across Government, Second Report of Session 2016–17, HC 183
118 Qq653,664
119 Environment Agency (FFP 128) para 3.3

73. Defra is making changes to its delivery body structures with the EA and Natural England aligning their area boundaries and merging funding and support structures. The previous Secretary of State, Liz Truss, announced in February that Defra's 34 organisations are to be structured around river catchments and landscapes, with joined-up delivery plans and a 25-year plan for the environment due to be published later this year.[120]

74. The Government set up the NFRR, led by Cabinet Office Minister, Oliver Letwin, following last winter's floods to assess the preparedness of infrastructure to cope with future floods. Mr Letwin left Government in the July reshuffle. In addition, the then floods minister, Rory Stewart, moved to a new post outside Defra. New floods Minister, Dr Therese Coffey, giving evidence to us in her first week in office, told us that she was at that time not clear on the future arrangements for Cabinet Office work but that ultimately the responsibility for flood work fell on Defra.[121] Her evidence to us covered a wide range of flood management issues, displaying her in-depth knowledge of many areas and an openness to learn quickly about other areas.

75. In September, after we finished taking evidence, the Government published its NFRR report. This set out how Agencies would improve work in a number of respects including: modelling future rainfall and climate scenarios and impact on flood risk; protecting key infrastructure including by use of temporary defences; improving incident response and resilience of local infrastructure and developing a long-term (post 2021) strategy. Further work is in train to progress various strands in the NFRR including communicating flood risk better and improving emergency responses. The NFRR relates to flood risk over the next 10 years but it promises to build upon improvements after 2021 with a "rolling government commitment to driving down flood risk".[122]

76. **We welcome the Government's commitment in the National Flood Resilience Review to implement improvements to flood risk management in a number of distinct areas such as the deployment of temporary barriers and the communication of risk. However, work on these separate strands will, on its own, be insufficient to deliver a holistic approach to flood prevention. It is vital that the Government continues to join-up action across departments and that ministerial changes do not interrupt momentum. *We recommend that Defra and the Cabinet Office set out in the response to this report how the Departments will coordinate joined-up flood management across Whitehall.***

77. **More fundamentally, ministers must take a fresh look at the governance and delivery of flood risk management and develop plans for a robust, long-term approach. Despite Government assurances as to the adequacy of its policies, we consider national flood management to be fragmented, inefficient and ineffective in meeting the level of threat that flood risk poses to communities across England. With climate change increasing the likelihood of more frequent, more severe flood events it is imperative that the Government undertakes a root and branch review of national and local flood risk management. We make suggestions below on potential new approaches: there are many examples of good practice and plentiful instances of good will in partnerships across England to build on.**

120 Rt Hon Liz Truss MP, *Speech on Reforming Defra to the Institute for Government*, 1 February 2016
121 Q629
122 HM Government, *National Flood Resilience Review*, September 2016

78. ***We recommend that Defra publishes by the end of 2017 its 25-year ambition for flood risk reduction for communities in England against scenarios for different climate change outcomes. This must be accompanied by an analysis of the necessary funding levels to secure this reduction, including for maintenance of existing and new assets.***

79. ***To secure continued funding for local approaches whilst alternative governance models are being developed, the Government must ensure appropriate legislation is passed to enable local community projects, such as the Somerset Rivers Authority, to raise local levies.***

New governance model

80. We visited the Netherlands in June to investigate the effectiveness of Dutch approaches to flood management. The annual spend there is some 7.1 billion euros a year to protect a country in which around half the 17 million population is at risk from flooding. We were impressed by the integration of flood management with approaches to land management, spatial planning and water management: all are facilitated by a Dutch system built around local, democratically accountable water boards and complemented by a long-term strategy overseen independently at national level. The Dutch system benefits from the country's long history of managing water holistically: the threat from the sea and rivers to settlements in this low-lying country meant that from the 13th century onwards local government and water/flood management went hand in hand. Hence, local governance of water fits well with the geography of the Netherlands as well as being well integrated with local community priorities. At national level there is a clear set of accountabilities and a long-term vision for integrating water and flood management and for achieving consistent, high-level protection. The OECD commends the Netherlands for its system which has managed to "keep Dutch feet dry" in a country where 55% of the territory is below sea level or flood prone.[123]

123 OECD Studies on Water, Water governance in the Netherlands: Fit for the Future? June 2014

Figure 3

WATER AND FLOOD MANAGEMENT IN THE NETHERLANDS

Key elements:

- State is responsible for flood risk management on coasts and main river systems.
- 24 Regional Water Authorities (water boards) are responsible for regional flood protection, including managing extensive system of dykes. Boards work with Municipalities and Provinces as well as other stakeholders to develop plans.
- Standards of flood protection are set at national level. Different standards apply to different places—varying from 1 in 250 year flood risk to 1 in 10,000 year flood risk.
- Delta Commissioner oversees programme established by Delta Act 2012. Key advisory figure for national programmes.

The Netherlands has a long history of taking action on flood risk:

- Local engagement with water management dates back centuries: Regional water authorities (water boards) created in 13th century—set up dykes and pumping systems, in liaison with local communities. Consolidated into 24 Boards in recent decades.
- National Water Act 2009 and Delta Act 2012 underpin response to current and future challenges for water safety and freshwater supply.
- Major floods in 1953 triggered Delta Works, traditional engineered approaches. More recently new approaches such as "Room for the River" have been adopted, working with nature.

81. We considered how the Dutch approach could inform the development of new approaches for the governance of national and local English flood management. We set out below possible models for reform which would address the key problems we identify above including a fragmentation of roles and the lack of clear accountability at national level. Our suggested models aim to develop structures and roles that deliver:

- Impartial, long-term national strategic oversight;
- Co-ordinated effort across bodies, and joined-up delivery of local priorities;
- Improved accountability (nationally and locally);
- Simplified, joined-up funding;
- Greater efficiencies with more benefits from integrated water management;
- A wider approach which recognises the potential of effective integrated land-use planning; and

- A better balance between protection and resilience, recognising that increasing flood risk, unpredictable in location, means that it is not possible to protect all communities at all times.

Proposed new governance model

82. With thanks to our Special Advisers for their assistance, we have developed a new model for governance. It should be noted that some witnesses, such as Amanda Nobbs, Chair of the Thames Regional Flood and Coastal Committee cautioned against the temptation to develop new structures, particularly as a reaction to immediate flood events. She considered that structures needed to be sufficiently flexible to cope with "enormous variation" across the country and that the concept of "lead" local risk management authorities working in partnerships was "sound". She warned that if all catchment-related functions were brought together in one structure either "flood risk management would not get the focus it requires […] or that other catchment objectives would get squeezed out".[124] Ms Nobbs recommended changes to improve current arrangements, including clearer targets for LLFAs and more support for them via the EA and RFCCs. RFCCs in her view would also benefit from a greater recognition of their catalytic role in making schemes happen at a catchment scale. We have taken these concerns into account but remain of the view that current structures do not work. The model we propose below would, we believe, enhance flood focus and allow for variation in local circumstances whilst also providing nationally co-ordinated oversight. It would not add costs but make savings by reducing the duplication inherent in current approaches, including in the roles played by LLFAs and RFCCs. The model would enable increased co-ordination between bodies, and strengthen links between water and flood management and between spatial planning and flood management.

83. **New NATIONAL elements of the model are:**

(1) **Establishment of a new National Floods Commissioner**: a key new, permanent role to ensure an objective and balanced, long-term view is taken of flood risk:

- The Commissioner's remit would be to agree with Ministers a rolling 25-year, flood risk management strategy for England, and associated national funding;
- Both strategy and funding would be reviewed every five years;
- The Commissioner would be accountable to, but operationally independent of, a Cabinet Office Minister, to give a cross-government focus;
- The Commissioner would make an annual report to Parliament to ensure full accountability and transparency of delivery by the full range of national flood risk management (FRM) bodies;
- S/he would have a regulatory role with powers to require FRM bodies to produce five year and annual plans in line with national strategy and to hold them accountable for performance.

124 Amanda Nobbs, Chair of Thames Regional Flood and Coastal Committee (FFP 155), para 2

(2) **Establishment of an English Rivers and Coastal Authority (ERCA)**: taking on EA flood risk management roles in support of the Commissioner:

- Separating out flood roles from EA environmental regulatory roles would allow a strong delivery culture to be developed for river and coastal defences;
- Liaison with local stakeholders would ensure a 'whole catchment' and 'whole coastline' approach and allow for catchment partnerships to deliver schemes;
- The Commissioner would fund the Authority on a five year cycle to deliver agreed plans.

Key ERCA responsibilities would be:

- Publishing main river and coastal flood risk plans;
- Delivering main river and national coastal flood defence works and maintaining them;
- Providing a flood forecasting service in conjunction with the Met Office and Water and Drainage Companies (see below);
- Local shoreline management would remain with local authorities.

84. **New REGIONAL elements of the model are:**

(1) **Establishment of Regional Flood and Coastal Boards:** taking on LLFA and RFCC roles (and staff) as new regional flood risk management planning bodies:

- Boards would provide a regional tier of planning and policy direction, supporting the Commissioner, and funded and staffed through her/his office but based locally;
- Boards would be responsible, in collaboration with the ERCA and the local water and drainage companies (see below), for drawing up five year flood risk management plans (thus subsuming the LLFA's current surface water roles);
- Regional plans would reflect national plans and be signed off on a five yearly cycle;
- In order to ensure local accountability, an Advisory Committee of elected local representatives (elected either directly or via local councils) would provide oversight of strategic direction;
- Boundaries would broadly coincide with current Water and Sewerage company boundaries;
- Boards would support catchment partnerships, including by co-funding and co-ordinating multiple partners including farmers and IDBs;
- IDBs would be retained and drainage of highways and the rail network would remain unchanged.

(2) **Establishment of integrated Water and Drainage Companies**, by extending Water and Sewerage Company remits to cover local drainage:

- On a catchment and thus broadly regional basis, these bodies would take on land drainage and local river management functions from local authorities (district councils). This would allow the integrated management of water and flood management—a key factor in the ability of the Dutch system to deliver efficient approaches;
- Water company regulation would remain with Ofwat but the Floods Commissioner, with advice from the Regional Boards, would agree a forward programme of measures with Ofwat as part of the 5 year business planning process. This arrangement is similar to how the EA engages with Ofwat in delivering the National Environmental Plan;
- Water bills would increase to cover the new responsibilities but local levies would be removed to make the proposal broadly cost-neutral for consumers. In the longer-term, regulatory pressure and the efficiencies of combining water and flood management should drive costs down;
- Spatial planning remains a district/unitary council responsibility and flood risk management could also become a specific aspect of local plans;
- Water and Drainage Companies would become statutory consultees for new development as well as potentially taking on the role of SUDs adopting authority.

85. The model would give a strong focus to delivering long-term, strategic plans for improving flood protection by:

- Making it crystal clear who is accountable for delivering strategic outcomes: the new National Floods Commissioner will set direction and the ERCA will be responsible for ensuring delivery; the regional boards will direct regional delivery in partnership with local stakeholders;
- Capacity and expertise will be matched to the responsibilities of the different bodies—planning within the Commissioner's Office and Regional Boards, and delivery with the ERCA and the Water and Drainage Companies—rather than being dispersed across many disparate bodies as at present;
- Funding will be firmly linked to outcomes: the ERCA will be held accountable for spending its budgets in the most efficient manner, whether by directly undertaking work or by commissioning catchment partnerships for example. The Regional Boards will enable a close link between local aims and national plans;
- Water management and flood risk management will be better integrated: water and drainage companies' plans will address both, enabling more efficient use of a full range of approaches;
- Spatial planning will take better account of water management to ensure built-up areas can cope with increased surface water flooding for example.

86. The box below summarises the key elements of the proposed model:

Figure 4: A proposed new model for English Flood Risk Management

A. GOVERNANCE

NATIONAL LEVEL: a new **National Floods Commissioner for England**

National planner and co-ordinator for all flood risk management (FRM) bodies in England. Responsible for overseeing delivery of national plan agreed with government.

REGIONAL/LOCAL LEVEL: new **Regional Flood and Coastal Boards**

- Co-ordinate 5 year regional/catchment plans with all FRM bodies including Water and Drainage Companies, Internal Drainage Boards and catchment partnerships. Adopt Lead Local Flood Authority roles for planning regional management.
- Report directly to the Commissioner and hold delivery bodies accountable. Oversee combined funding pots for catchment/regional work.

B. DELIVERY

NATIONAL LEVEL: **English Rivers and Coastal Authority:**

- Delivery body for national and main river FRM planning in support of Commissioner. Adopts EA's FRM roles. Undertakes programmed work directly, or in collaboration with other bodies including catchment partnerships, Somerset Rivers Authority, Cumbrian partnerships, Water and Drainage Companies etc.

REGIONAL/LOCAL LEVEL: **Water and Drainage Companies**

- New role for Water and Sewerage Companies: become Water and Drainage Companies, taking on district council drainage responsibilities including management of surface water management and non-main rivers.
- Internal Drainage Board and local authority roles in local coastline management continue as at present.

87. ***We recommend that Defra consult by 2017 on new governance arrangements and changes to delivery body roles to allow the development of coherent, long-term flood risk management plans which can better meet the increasing challenge of protecting communities from flooding. Key objectives in this consultation must be to develop outcomes that:***

- ***ensure long-term plans are developed with adequate funding for delivery;***
- ***increase impartiality, transparency and accountability in planning and delivery of national and local flood risk management;***

- ***streamline delivery by removing the need to co-ordinate a plethora of flood risk management bodies, whilst enabling bodies such as Internal Drainage Boards and water companies to deliver their unique roles more effectively;***
- ***integrate spatial planning and flood risk planning to develop flood resilient communities;***
- ***tackle inefficiencies in Environment Agency and other flood risk management delivery bodies.***

88. ***Defra must set out in its response to this report its views on our proposed new model, including the key elements of establishing:***

- ***a new National Floods Commissioner for England; supported by Regional Flood and Coastal Boards;***
- ***a new national English Rivers and Coastal Authority; and***
- ***Water and Drainage Companies with local drainage remits.***

6 Conclusion

89. Evidence to this inquiry has highlighted a number of specific issues which need to be addressed to improve flood risk management. However, at a time of increasing flood risk, we need solutions which address not only these specific problems but also remove wider tensions within current flood risk management governance and administration. Governance arrangements must be streamlined and clarified to free up agencies to do what they do best, with better mechanisms to hold them to account for their delivery. It is also imperative that the underpinning structures for delivering flood management more closely mirror the physical challenges: new roles must facilitate whole-catchment management.

90. Our report sets out in preceding chapters what we think the Government needs to change: Ministers must calculate the balance between the short-term costs of new arrangements and the longer-term pay-offs. The timing and phasing will require careful consideration but we conclude that the benefits of making these changes will outweigh the costs in the medium to long-term.

91. We recognise the contribution of the many agencies working at national and local level to protect communities: this report's recommendations aim to allow bodies to deliver what they can each deliver uniquely, avoiding duplications of effort and competing priorities. There is strong evidence of many parties' willingness to try new methods of working, including embracing catchment approaches and partnerships. Such approaches can build capacity within organisations and communities as well as physically within river basins to hold and store water. We hope that Defra will take forward the recommendations in this report in close discussion with all interested parties.

92. Table 1 below sets out the deadlines for action on the recommendations in this report.

Table 1: Recommendation deadlines

Recommendation	Delivery body	Deadline	Comments
1. Commission a large-scale (100–200 km²) trial of catchment approaches. (Para 17)	Defra/ Environment Agency	July 2017	In collaboration with Internal Drainage Boards, local catchment partnerships
2. Consultation on payment scheme for flooding farmland. Development of model to value benefits. (Para 24)	Defra National Farmers' Union/Defra	July 2017 End of 2016	
3. Farming policies must link to sustainable land management practices. (Para 25)	Defra	Ongoing	

Recommendation	Delivery body	Deadline	Comments
4. Set out how SUDS will be deployed in new developments, with measures at least as strong as in the Flood and Water Management Act 2010. (Para 31)	Defra	January 2017	Response to this report to consider how proposed new governance model would encourage SUDS
5. Plans to include provision for channel maintenance and evaluation of where it is appropriate to dredge. Streamline dredging permit system. (Para 34)	Environment Agency/Internal Drainage Boards/ Local authorities Environment Agency	July 2017	
6. Report on collaboration to collect more real-time rainfall and river level data. Deployment of real-time data for use in flood warning systems. (Para 38)	Environment Agency/Met Office Environment Agency	July 2017 Earliest opportunity	
7. Set out simpler system for explaining flood risk. Publish maps on one website showing flood risk from all sources, including depth and duration likelihood. (Para 44)	Environment Agency/Met Office	End of 2016	
8. Publish annual summary of planning decisions taken against EA advice and action taken to monitor impact of development on flood risk. (Para 48)	Local planning authorities	Annually, from 2017	
9. Place statutory liability on developers to meet costs of flooding where development fails to comply with planning conditions. Certificates to be issued to confirm compliance to enable developers to avoid liability. (Para 51)	Government Local planning authorities	End of 2017	
10. Water and Sewerage Companies to become statutory planning consultees. (Para 52)	Government		

Recommendation	Delivery body	Deadline	Comments
11. Amend Building Regulations to require use of flood resilient materials/products if voluntary code not agreed by end of 2016. (Para 55)	Government	End of 2017	
12. Report on provision of clearer information to insurance policy holders on Flood Re subsidy. (Para 59)	Defra	January 2017	
13. Review potential of insurance policies to incentivise household and business use of property resilience measures. (Para 60)	Government/ Insurance industry	January 2017	
14. Develop a grant scheme to support small businesses undertake resilience measures. (Para 65)	Government	End of 2017	Review scheme by end of 2019 to assess if further direct support needed via Government-backed insurance scheme.
15. Place a statutory duty on Fire and Rescue Service in England and Wales to provide an emergency response to flood events. (Para 67)	Government	Consult by end of 2016 on methods of imposing duty and funding for it.	
16. Set out how Government departments will co-ordinate flood management across Whitehall. (Para 76)	Defra, Cabinet Office	January 2017	
17. Root and branch review of flood risk management (Para 77)	Government		
18. Publish 25-year ambition for flood risk reduction, and funding analysis. (Para 78)	Defra	End of 2017	
19. Legislate for bodies such as the Somerset Rivers Authority to raise local levies. (Para 79)	Defra		

Recommendation	Delivery body	Deadline	Comments
20. Consult on new governance model for flood risk management. (Para 87)	Defra	Consult by 2017	
21. Set out views on this report's proposed model for: – new National Floods Commissioner for England – new English Rivers and Coastal Authority – Water and Drainage Companies. (Para 88)	Defra	January 2017	

Conclusions and recommendations

Trialling catchment scale management

1. Managing water flows from the top to bottom of river catchments helps to reduce flood risk, in many cases more cost-effectively than simply building flood defences in cities, towns and villages. Early results of trials are encouraging for smaller river catchments: there is sufficient evidence to roll-out 'catchment scale' approaches for a far greater number of small river basins. Agencies need more evidence, however, on how effective these measures might be at a larger scale. *Agencies need more evidence, however, on how effective these measures might be at a larger scale. The Environment Agency must work with academics and with other flood risk management bodies including Internal Drainage Boards and local catchment partnerships to fill this evidence gap: we recommend that Defra commission by July 2017 a trial on a large catchment of 100–200 km². Defra should also set out clearly the auxillary benefits it requires when adopting catchment approaches.* (Paragraph 17)

Storing water and land management

2. Storing water on farmland can provide a cost-effective means of reducing flood risk, but farmers are naturally wary of allowing their land to be out of production for long periods. *Defra should put flood risk management at the centre of any new support schemes for farmers which replace the Common Agricultural Policy (CAP) framework. The Department must consult by July 2017 on an incentive scheme to pay farmers to allow short-term or long-term storage of flood water on appropriate land. As a precursor to this, the National Farmers' Union should work with farmers to develop by the end of 2016 a detailed model for calculating the value to communities of land management that reduces flood risk. This model must demonstrate how storage methods can be used which have a low impact on farm productivity* (Paragraph 24)

3. *As part of work to develop farming policies outside the European Union, Defra must link support to sustainable land management practices, including in regard to flood management.* (Paragraph 25)

Sustainable drainage systems

4. All flood risk management bodies must understand better the contribution that sustainable drainage systems (SUDs) and green infrastructure such as ponds and swales can make to protecting communities from flooding. *We recommend that, in its response to this report, Defra set out how the Government's review of sustainable drainage regulations will ensure that SUDs are deployed to maximum effect in all new English developments. We make recommendations below on changes which would enable water and sewerage companies to take a wider role in local drainage, including responsibility for adopting SUDs: the Government's review should assess how this might incentivise the more effective use of sustainable drainage. The review must also set out, if measures in the Flood and Water Management Act 2010 on SUDs are not to be commenced, what alternative measures at least equal in strength will be adopted.* (Paragraph 31)

Maintenance and dredging

5. *The Environment Agency, Internal Drainage Boards and local authorities must ensure that their operational plans include adequate provision for river channel maintenance. Plans must also evaluate where dredging can provide an effective solution in reducing flood risk, taking account of impacts both near to the dredged site and downstream. The Environment Agency must by July 2017 streamline its permit system to allow those who need to dredge to gain the appropriate permissions quickly without requiring multiple applications.* (Paragraph 34)

Flood warnings

6. The Environment Agency and the Met Office are working effectively to improve flood warning systems, including developing innovative ways of using real-time data in some places. However data sets need to be improved and new systems need to be used in catchments across the country. *We recommend that the Environment Agency report by July 2017 on how it can work with the Met Office to collect more detailed real-time data on rainfall and river levels. We further recommend that systems such as those being developed in Somerset to feed real-time data into live flood forecast warnings are deployed across England at the earliest opportunity.* (Paragraph 38)

Public understanding of flood risk

7. Flood risk agencies must find clearer ways of explaining flood risk, to spur both householders and businesses to prepare effectively for floods and to inform public views on national and local flood risk strategies. *We recommend that the Met office and the Environment Agency set out by the end of 2016 a simpler system for explaining flood risk. The EA should also publish maps which include not only whether a place is at risk of flooding but also the likely depth of flood water and duration. These maps should show risk from all types of flooding and be available at one website address.* (Paragraph 44)

Integrating flood management and spatial planning

8. Home buyers and the wider community must be assured that new development does not increase flood risk, either at the development site or further afield. Statistics show that planning decisions for developments in high flood risk areas are overwhelmingly being made in line with Environment Agency advice. However, there are exceptions. *We recommend that from 2017 each local planning authority publish an annual summary of planning decisions taken against Environment Agency advice and the action it has taken to monitor flood risk impacts of all developments.* (Paragraph 48)

9. *We are concerned that, where flooding linked to new building occurs, those affected find it difficult to seek redress from developers. We recommend that the Government impose by the end of 2017 a statutory liability on developers to meet the costs of flooding where their development fails to comply with planning requirements and increases flood risk, whether to a property sited on the new development or further afield. The Government's commitment to build more affordable homes should not be*

achieved at the expense of flood resilience of new residential properties. Regulations must provide for developers to avoid such liability where they comply with planning conditions: local planning authorities should be required to issue as part of planning processes a drainage certificate to confirm compliance. (Paragraph 51)

10. *To facilitate this, we recommend that bodies with a responsibility for managing the effects of developments on surface water flows, including water and sewerage companies, become statutory consultees for planning applications.* (Paragraph 52)

Building regulations

11. We support voluntary approaches which will improve the use of flood resilience measures in new buildings and a new code should be finalised as soon as possible. *Should a voluntary code not be agreed with key stakeholders by the end of 2016, then the Government must amend building regulations by the end of 2017 to require such measures to be used in all newly built properties.* (Paragraph 55)

Flooding insurance

12. Flood Re appears to be allowing many households previously unable to do so to obtain affordable flood insurance cover. However the scheme is intended to provide a transition to an open market in insurance provision: it is therefore vital that Flood Re and insurance companies provide policy holders in flood risk areas with easily understandable information about the subsidy they are receiving so that they fully understand the need to improve their property's resilience. *We recommend that Defra report by January 2017 on how clearer information can be provided to policy holders on the subsidy provided by Flood Re.* (Paragraph 59)

13. In addition, flood insurance policy terms should allow for 'building back better' so that repairs to a flooded property can proactively deploy the full range of resilient materials and products. *The Government should also review with the insurance industry how policy terms might incentivise the use of flood resilience measures by householders and businesses and report on this by January 2017.* (Paragraph 60)

Business insurance

14. Some flood-hit businesses are understandably concerned that they may find it hard to obtain appropriate flood insurance in future. We welcome the insurance industry's progress in developing commercial solutions for many such businesses. However the market may not be able to provide affordable cover for all businesses, particularly small businesses. *We recommend that the Government develops by the end of 2017 a grant scheme to support small businesses to undertake resilience measures. This scheme should be reviewed by the end of 2019 to assess whether there is need for further direct support for small businesses in the form of a Government-backed insurance scheme.* (Paragraph 65)

Emergency response

15. Firefighters provided a vital and much valued first-line service to flooded communities in recent flood events. While we welcome the September National Flood Resilience Review commitment to increase funding to maintain equipment, we are concerned that continued pressure on resources could jeopardise the Fire and Rescue Service's ability to deliver a high standard of service in future. *We recommend that the Government places a statutory duty on the Fire and Rescue Service in England and Wales to provide an emergency response to flood events and commits the necessary additional funding and staff resources to support delivery of this responsibility. The Government must consult by the end of 2016 on methods of imposing and funding this duty.* (Paragraph 67)

Government views

16. We welcome the Government's commitment in the National Flood Resilience Review to implement improvements to flood risk management in a number of distinct areas such as the deployment of temporary barriers and the communication of risk. However, work on these separate strands will, on its own, be insufficient to deliver a holistic approach to flood prevention. It is vital that the Government continues to join-up action across departments and that ministerial changes do not interrupt momentum. *We recommend that Defra and the Cabinet Office set out in the response to this report how the Departments will coordinate joined-up flood management across Whitehall.* (Paragraph 76)

17. More fundamentally, ministers must take a fresh look at the governance and delivery of flood risk management and develop plans for a robust, long-term approach. Despite Government assurances as to the adequacy of its policies, we consider national flood management to be fragmented, inefficient and ineffective in meeting the level of threat that flood risk poses to communities across England. With climate change increasing the likelihood of more frequent, more severe flood events it is imperative that the Government undertakes a root and branch review of national and local flood risk management. We make suggestions below on potential new approaches: there are many examples of good practice and plentiful instances of good will in partnerships across England to build on. (Paragraph 77)

18. *We recommend that Defra publishes by the end of 2017 its 25-year ambition for flood risk reduction for communities in England against scenarios for different climate change outcomes. This must be accompanied by an analysis of the necessary funding levels to secure this reduction, including for maintenance of existing and new assets.* (Paragraph 78)

19. *To secure continued funding for local approaches whilst alternative governance models are being developed, the Government must ensure appropriate legislation is passed to enable local community projects, such as the Somerset Rivers Authority, to raise local levies.* (Paragraph 79)

Proposed new governance model

20. *We recommend that Defra consult by 2017 on new governance arrangements and changes to delivery body roles to allow the development of coherent, long-term flood risk management plans which can better meet the increasing challenge of protecting communities from flooding. Key objectives in this consultation must be to develop outcomes that:*

    - *ensure long-term plans are developed with adequate funding for delivery;*
    - *increase impartiality, transparency and accountability in planning and delivery of national and local flood risk management;*
    - *streamline delivery by removing the need to co-ordinate a plethora of flood risk management bodies, whilst enabling bodies such as Internal Drainage Boards and water companies to deliver their unique roles more effectively;*
    - *integrate spatial planning and flood risk planning to develop flood resilient communities;*
    - *tackle inefficiencies in Environment Agency and other flood risk management delivery bodies.* (Paragraph 87)

21. *Defra must set out in its response to this report its views on our proposed new model, including the key elements of establishing:*

    - *a new National Floods Commissioner for England; supported by Regional Flood and Coastal Boards;*
    - *a new national English Rivers and Coastal Authority; and*
    - *Water and Drainage Companies with local drainage remits. (Paragraph 88)*

Formal Minutes

Wednesday 26 October 2016

Members present:

Neil Parish, in the Chair

Chris Davies	David Simpson
Jim Fitzpatrick	Ms Margaret Ritchie
Dr Paul Monaghan	Angela Smith
Rebecca Pow	

Draft Report (Future flood prevention), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 92 read and agreed to.

Resolved, That the Report be the Second Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[Adjourned till Wednesday 2 November at 2.00 pm

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the inquiry publications page of the Committee's website.

Wednesday 13 April 2016	*Question number*
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	Q1–38
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	Q39–124
Wednesday 27 April 2016	
Innes Thomson, Chief Executive, Association of Drainage Authorities, and **Councillor Mark Hawthorne,** Chairman, People and Places Board, Leader of Gloucestershire County Council, Local Government Association	Q125–185
Minette Batters, Deputy President, National Farmers' Union, **Ross Murray, President**, Country Land and Business Association, and **Kevin Peberdy,** Director, Wetland Experience and Creation, Wildfowl and Wetlands Trust, Blueprint for Water Coalition	Q186–210
Wednesday 25 May 2016	
Philip Barnes, Director for Land and Planning, Barratt Developments Plc, **James Harris,** Policy and Networks Manager, Royal Town Planning Institute, and **Steve Wielebski,** Technical Adviser, Home Builders Federation	Q211–325
Wednesday 15 June 2016	
Brendan McCafferty, Chief Executive Officer, Flood Re, and **Mark Hoban,** Chairman of the Board of Directors, Flood Re	Q326–424
Huw Evans, Director General, Association of British Insurers (ABI), and **Iain Hamilton,** Head of Pricing and Underwriting, UK General Insurance for Personal Lines, Aviva	Q425–472
Wednesday 29 June 2016	
Dr David Pirie, Executive Director, SEPA, **David Porter**, Chief Executive, Rivers Agency, DAERA, and **Jeremy Parr**, Head of Operational Risk Management, NRW	Q473–545

Peter Simpson, Chief Executive, Anglian Water, **Dr Stephen Bird,** Managing Director, South West Water, **Jo Harrison,** Asset Management Director, United Utilities, and **Dr Adam Comerford,** National Hydrology Manager, Canal & River Trust — Q546–594

Wednesday 20 July 2016

Matt Wrack, General Secretary, Fire Brigades Union — Q595–615

Dr Thérèse Coffey MP, Parliamentary Under-Secretary of State, Department for Environment, Food and Rural Affairs, and **Neil Hornby,** Deputy Director, Flood Risk Management, Department for Environment, Food and Rural Affairs — Q616–708

Published written evidence

The following written evidence was received and can be viewed on the inquiry publications page of the Committee's website.

FFP numbers are generated by the evidence processing system and so may not be complete.

1 Age UK (FFP0076)

2 Anglian Water (FFP0083)

3 Animal Aid (FFP0030)

4 Association of British Insurers (FFP0111)

5 Association of Drainage Authorities (FFP0115)

6 Aviva (FFP0140)

7 AXA UK (FFP0098)

8 Ban Bloodsports on Ilkley Moor (FFP0059)

9 Barratt Development Plc (FFP0138)

10 Barratt Developments Plc (FFP0145)

11 British Insurance Brokers' Association (FFP0112)

12 Brompton Flood Prevention Group (FFP0064)

13 Centre for Ecology & Hydrology (FFP0050)

14 Centre for Floods, Communities and Resilience, UWE, BRISTOL (FFP0089)

15 Churchtown Flood Defence Group (FFP0069)

16 CIWEM (FFP0103)

17 Climate Vision (FFP0130)

18 Committee on Climate Change (FFP0110)

19 Confor: Promoting forestry and wood (FFP0114)

20 Construction Industry Council (FFP0087)

21 Cornwall Community Flood Forum (FFP0125)

22 Council of Mortgage Lenders (FFP0081)

23 Country Land & Business Association (CLA) (FFP0006)

24 Country Land and Business Association (FFP0137)

25 Countryside Alliance (FFP0113)

26 Countryside and Community Research institute (FFP0074)

27 Cumbria Branch British Holiday Home Parks Association (FFP0095)

28 Daphne Kelly (FFP0157)

29 Department for Environment, Food and Rural Affairs (FFP0156)

30 Department for Environment, Food and Rural Affairs and the Department for Communities and Local Government (FFP0129)

31 Dr Rod Everett (FFP0013)

32 Dr Rod Everett (FFP0025)

33 Environment Agency (FFP0128)

34 Environment Agency (FFP0136)
35 Environment Agency (FFP0144)
36 ESI Consulting (FFP0158)
37 ESI Limited (FFP0107)
38 Essex County Council (FFP0092)
39 Essex County Council (FFP0093)
40 Essex County Council (FFP0094)
41 Federation of Small Businesses (FSB) (FFP0042)
42 Fire Brigades Union (FFP0020)
43 Flood Prevention Society (FFP0051)
44 Flood Re (FFP0126)
45 Forestry Commission (England) (FFP0039)
46 Grantham Research Institute on Climate Change and the Environment, London School of Economics (FFP0075)
47 Hampshire County Council (FFP0027)
48 Home Builders Federation (FFP0090)
49 J Arnold (FFP0124)
50 Jenny Radford (FFP0024)
51 Jeremy Chamberlayne (FFP0005)
52 Jeremy Walker (FFP0152)
53 Jim Asquith (FFP0100)
54 Jim Penfold (FFP0133)
55 Keswick Flood Action Group (FFP0033)
56 Landscape Institute (FFP0091)
57 Leader—National Flood Prevention Party Ewan Larcombe (FFP0078)
58 Little Stour & Nailbourne River Management Group (FFP0036)
59 Local Government Association (FFP0073)
60 Local Government Association (FFP0134)
61 Loddon Valley Residents Association (FFP0021)
62 London Councils (FFP0041)
63 Mary Dhonau Associates (FFP0026)
64 Met Office (FFP0046)
65 Miss Laura Makeating (FFP0086)
66 Mr Daniel Scharf (FFP0002)
67 Mr John D Anderson (FFP0047)
68 Mr John Watson (FFP0009)
69 Mr John Williams (FFP0061)
70 Mr Mark Yorke (FFP0118)

71 Mr Michael Wood (FFP0058)
72 Mr Mike Potter (FFP0031)
73 Mr Paul Scully (FFP0004)
74 Mr Richard Farnsworth (FFP0015)
75 Mr Stuart Bradshaw (FFP0018)
76 Mr Tony Norman (FFP0001)
77 Mrs Barbara Stevens (FFP0038)
78 Mrs Carol Moss (FFP0040)
79 Mrs Gillian Telford (FFP0019)
80 Mrs Samantha Boocock (FFP0104)
81 Mrs Sarah Chaplin-Brice (FFP0037)
82 Ms Janice Johnson (FFP0016)
83 National Farmers' Union (FFP0135)
84 National Farmers' Union (FFP0120)
85 National Farmers' Union (FFP0150)
86 National Flood Forum (FFP0105)
87 National Flood Forum (FFP0131)
88 National Flood Forum (FFP0147)
89 National Trust (FFP0065)
90 Natural England (FFP0127)
91 Natural Resources Wales (FFP0143)
92 Natural Resources Wales (FFP0149)
93 Northumbrian Water (FFP0014)
94 Ordnance Survey (FFP0034)
95 Paul Williams (FFP0151)
96 Professor Donald Longmore OBE (FFP0017)
97 Professor Colin Green (FFP0007)
98 Public Weather Service Customer Group (FFP0032)
99 Radcliffe Residents (Bury) Flood Action Group (FFP0012)
100 Residential Landlords Association (FFP0079)
101 Rewilding Britain (FFP0080)
102 River Severn Management (FFP0160)
103 Roger Fell (FFP0043)
104 Royal Horticultural Society (FFP0121)
105 Royal Town Planning Institute (FFP0096)
106 Royal Town Planning Institute (FFP0146)
107 RSPB (FFP0084)
108 Saltney Town Council (FFP0072)

109 Science and Technology Facilities Council (FFP0116)
110 Scottish Environment Protection Agency (FFP0142)
111 Scottish Environmental Protection Agency (FFP0148)
112 Scottish Flood Forum (FFP0097)
113 Severn Trent (FFP0082)
114 Sheffield Water Centre (FFP0044)
115 Simon Tattersall (FFP0029)
116 Slowing the Flow (FFP0153)
117 Somerset Drainage Boards Consortium (FFP0132)
118 Somerset Drainage Boards Consortium (FFP0141)
119 South Tyneside Council (FFP0057)
120 South West Water Limited (FFP0049)
121 Southwell Flood Forum (FFP0123)
122 Steve Trowbridge (FFP0154)
123 Thames Regional Flood and Coastal Committee (FFP0155)
124 The Geological Society (FFP0070)
125 The Royal Society (FFP0119)
126 The Upper Calder Valley Flood Prevention Group (FFP0159)
127 The Upper Calder Valley Flood Prevention Group (UCVFPG) (FFP0055)
128 The Woodland Trust (FFP0067)
129 Tone Murison (FFP0117)
130 United Utilities (FFP0048)
131 University of Exeter (FFP0022)
132 University of Exeter (FFP0109)
133 University of Oxford (FFP0106)
134 University of Reading (FFP0071)
135 Wanborough Anti-Flood Group (FFP0028)
136 WeatherAction—The Long Range Weather & Climate forecasters (FFP0108)
137 West Sussex Flood Action Group Forum (FFP0035)
138 Westcountry Rivers Trust (FFP0008)
139 Wildfowl & Wetlands Trust (FFP0088)
140 Wildfowl and Wetlands Trust (FFP0139)
141 Wildlife and Countryside Link (FFP0045)
142 WWF-UK (FFP0102)
143 Zurich Insurance plc (FFP0077)

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the publications page of the Committee's website.

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

Session 2015–16

First Report	Defra performance in 2015–16	HC 443 (HC 894)
Second Report	Greyhound welfare	HC 478 (HC 133)
Third Report	Farmgate prices	HC 474 (HC 561)
Fourth Report	Air quality	HC 479 (HC 665)
Fifth Report	Common Agricultural Policy: payments to farmers	HC 405–i (HC 664)
First Special Report	Defra performance in 2014–15: Government response to the Committee's First Report of Session 2015–16	HC 894
Second Special Report	Farmgate prices: Government response to the Committee's Third Report of Session 2015–16	HC 561

Session 2016–17

First Report	Appointment of the Chair of the Environment Agency	HC 649
First Special Report	Greyhound welfare: Government response to the Committee's Second Report of Session 2015–16	HC 133
Second Special Report	Government response to the Committee's Fifth Report of Session 2015–16: Common Agricultural Policy: payments to farmers	HC 664
Third Special Report	Government response to the Committee's Fourth Report of Session 2015–16: Air quality	HC 665