



Response to public consultation on 'Securing the future availability and affordability of home insurance in areas of flood risk'

Swenja Surminski, Florence Crick, Jillian Eldridge
and Bob Ward

August 2013

Centre for Climate Change Economics and Policy
Grantham Research Institute on Climate Change and
the Environment

The Centre for Climate Change Economics and Policy (CCCEP) was established in 2008 to advance public and private action on climate change through rigorous, innovative research. The Centre is hosted jointly by the University of Leeds and the London School of Economics and Political Science. It is funded by the UK Economic and Social Research Council and Munich Re. More information about the Centre for Climate Change Economics and Policy can be found at: <http://www.cccep.ac.uk>

The Grantham Research Institute on Climate Change and the Environment was established in 2008 at the London School of Economics and Political Science. The Institute brings together international expertise on economics, as well as finance, geography, the environment, international development and political economy to establish a world-leading centre for policy-relevant research, teaching and training in climate change and the environment. It is funded by the Grantham Foundation for the Protection of the Environment, which also funds the Grantham Institute for Climate Change at Imperial College London. More information about the Grantham Research Institute can be found at: <http://www.lse.ac.uk/grantham/>

This policy paper is intended to inform decision-makers in the public, private and third sectors. It has been reviewed by at least two internal referees before publication. The views expressed in this paper represent those of the author(s) and do not necessarily represent those of the host institutions or funders.

Summary of key points

- Flooding is the biggest natural disaster risk in England. Flood risk is expected to increase due to climate change and continued development of floodplains for residential and commercial property, which increases the exposure of homes and businesses. Addressing the causes and consequences of flooding is very important and we welcome the recent efforts by the Government and the insurance industry to reform the approach to flood insurance in England.
- The proposed new scheme, Flood Re, offers some promising, innovative approaches for dealing with affordability and availability, but it has fundamental shortcomings.
- The design of the Flood Re scheme, which is expected to last until at least 2035, has not taken into account adequately, if at all, how flood risk is being affected by climate change. For this reason, it is likely to be put under increasing pressure and may prove to be unsustainable because the number of properties in future that will be at moderate and high probability of flooding has been significantly underestimated.
- The Flood Re scheme also does not offer integrated mechanisms for flood insurance to play its part in climate change adaptation. This means that it is unlikely to provide a long-term solution to the growing problem of uninsurable properties.
- The design and operation of an insurance scheme should have good risk management behaviour in mind, not just by the insured, but also by the Government and local communities. Private flood insurance will only have a future if it is embedded in a comprehensive risk management programme that responds to changes in risk over time, which would also have clear advantages beyond the issue of insurance.
- Not enough consideration has been given to how the proposed Flood Re system will complement Government action on flood risk

management. The existing scheme, governed by the Statement of Principles on the Provision on Flood Insurance, with all its limitations, did provide links between flood insurance and spending on flood defences, improvements in planning regulations, and access to flood risk information. It is not clear whether the new Memorandum of Understanding between the Government and insurance industry will strengthen these links.

- We welcome the recognition of risk-based pricing as a guiding principle for flood insurance, but it remains unclear whether the Government and insurance industry has taken into account the consequences for affordability of a continued rise in flood risk for many properties.
- There needs to be more consideration of the roles that other stakeholders, such as developers and mortgage providers, can play. Flood insurance provides significant benefits for these stakeholders, potentially creating moral hazard, while their role in promoting risk reduction is not formalised. If the Government is moving into a new era of flood insurance, as claimed by the consultation document, then this important aspect should be considered.

Introduction

The Grantham Research Institute on Climate Change and the Environment (<http://www.lse.ac.uk/grantham>) and the Centre for Climate Change Economics and Policy (<http://www.cccep.ac.uk>) at London School of Economics and Political Science welcomes the opportunity to respond to this consultation on 'Securing the future availability and affordability of home insurance in areas of flood risk'.

The Centre for Climate Change Economics and Policy at London School of Economics and Political Science and the University of Leeds has investigated the role of insurance in climate change over the last five years through its programme on 'Evaluating the economics of climate risks and opportunities in

the insurance sector', which has been funded by the Munich Reinsurance Company. It is a comprehensive research programme that focuses on the assessment of the risks from climate change and on the appropriate responses, to inform decision-making in the private and public sectors. A number of activities are being carried out as part of the programme, including the publication of technical papers and industry briefings, symposia, business roundtables and workshops. The programme is due to be completed at the end of September 2013.

The Grantham Research Institute on Climate Change and the Environment at London School of Economics and Political Science has joined the Enhancing Risk Management Partnerships for Catastrophic Natural Disasters in Europe (ENHANCE) research consortium to lead work on insurance and flood risk. The main goal of the ENHANCE project, funded by the European Union's Framework Programme 7, is to develop and analyse new ways to enhance society's resilience to catastrophic natural hazard impacts, by providing new scenarios and information in selected cases, in close collaboration with stakeholders, and by contributing to the development of new multi-sector partnerships to reduce or redistribute risk. The Grantham Research Institute leads the insurance component of the ENHANCE project.

Insurance is just one tool amongst the many that are required for a holistic strategy on disaster risk management. It is important to remember that insurance is intended to cover unexpected losses, and does not prevent a flood from occurring. Compensation for financial losses is important, but the consequences of a flood are much greater, disrupting lives and livelihoods, causing stress and health problems, and resulting in other so-called 'non-economic' losses.

The existing and proposed schemes for flood insurance in England have some remarkable features, namely that coverage is widely available from the private insurance industry, without direct liabilities for the Government. We

also observe some clear shortcomings, most importantly that insurance alone, without complementary risk reduction efforts, is not a sustainable solution, particularly in the context of climate change adaptation.

It is apparent that the design of the new flood insurance arrangements, which are expected to last until at least 2035, has not taken into account adequately, if at all, how flood risk is being affected by climate change. For this reason, the Flood Re scheme is likely to be put under increasing pressure and may prove to be unsustainable because the number of properties in future that will be at moderate (1 in 200 to 1 in 75) and high (1 in 75 or higher) probability of flooding has been significantly underestimated.

In view of the current inadequacies of flood risk management policy in England, it is important to consider how the provision of flood insurance either supports or possibly hampers flood risk management. The effectiveness of this provision relies heavily on the underlying measures to prevent and control flood damage. If risks are unmitigated, insurance may become unavailable, particularly that offered by the private sector. In this context, declining insurability or increasing costs of insurance are indicators of a lack of adequate risk management. Therefore, the design and operation of a flood insurance scheme should have good risk management behaviour in mind, and should be designed to avoid moral hazard, particularly for the Government and local communities. The proposed new Flood Re scheme does not address this sufficiently and therefore lacks the long-term relevance claimed by the Government and insurance industry.

Response to selected questions

Q1. Do you have any evidence of small businesses experiencing difficulty with the availability and affordability of property insurance due to the risk of flooding?

We question the decision to exclude small and medium enterprises (SMEs) from the proposals outlined in the consultation document. SMEs play a key

role in driving a community's economy, so their ability to access flood insurance, and therefore remain solvent and trading, has wider economic implications.

Only anecdotal evidence is available about barriers businesses face to accessing flood insurance. For example, at a flood conference held in York in May 2013 (City of York Council, 2013), the Shadow Secretary of State for Environment, Food and Rural Affairs, Mary Creagh MP, gave examples of insurance excess increases for two businesses in Calderdale: one business had its excess increased from £2500 to £25,000, while another business first saw its insurance excess increase from £500 to £250,000, but was then told by its insurance company that it was no longer willing to provide flood insurance.

Q2. Do you agree with the Government's policy objective for flood insurance?

At the beginning of the recent negotiations between the insurance industry and the Government, a set of principles (see Box 1) was announced by the Department for the Environment, Food and Rural Affairs (DEFRA, 2011) to guide the development of the new Flood Re insurance scheme.

Box 1:

Principles

1. Insurance cover for flooding should be widely available.
2. Flood insurance premiums and excesses should reflect the risk of flood damage to the property insured, taking into account any resistance or resilience measures.
3. The provision of flood insurance should be equitable.
4. The model should not distort competition between insurance firms.
5. Any new model should be practical and deliverable.
6. Any new model should encourage the take up of flood insurance, especially by low-income households.
7. Where economically viable, affordable and technically possible, investment in flood risk management activity, including resilience and other measures to reduce flood risk, should be encouraged. This includes, but is not limited to, direct Government investment.
8. Any new model should be sustainable in the long run, affordable to the public purse and offer value for money to the taxpayer.

It is very challenging to find a solution that adheres to all of these principles, particularly for a private market scheme, which will also need to be commercially viable.

The consultation document states the Government's policy objective is: "to ensure that domestic property insurance continues to be widely available and affordable in areas of flood risk without placing unsustainable costs on wider policyholders or the taxpayer. Over time there should be a gradual transition towards more risk-reflective prices, based on robust evidence of local risk, to increase the incentives for flood risk to be managed whilst allowing time for choices to be made and appropriate action to be taken. The Government envisages this transition taking place over the next 20-25 years" (DEFRA, 2013a, p.17). This objective has a somewhat narrower focus than the principles in Box 1 and while the Government is right to frame the flood insurance issue as a choice between approaches based on principle, fairness and solidarity versus risk, the Government's policy objective misses the main challenge that is driving the need for reform: flood risk is rising and losses are increasing.

Concerns about the affordability and availability of flood insurance are symptomatic, rather than the cause, of the need to reform arrangements for cover. The policy objective makes no reference to the need to maintain and enhance the link between flood insurance and risk reduction, but this is particularly necessary considering the risks of moral hazard and the need to incentivise risk reduction by both the insured and the Government.

The Government's recognition of the need to move to risk based pricing should be welcomed, with the Government aiming for "a gradual transition towards more risk-reflective prices, based on robust evidence of local risk, to increase the incentives for flood risk to be managed whilst allowing time for choices to be made and appropriate action to be taken" (DEFRA, 2013a, p.17). However, it remains unclear how this transition will occur and how flood

risk will be reduced within 20 to 25 years to ensure that flood insurance remains affordable, especially for the poorest households. This uncertainty also threatens the Government's aim to provide "certainty and peace of mind to high risk households" (DEFRA, 2013a, p.29), which would be, in any case, the wrong signal to send when risk levels are rising.

Some have argued that, for insurance against floods and other natural disasters, "the insurance industry can act as a bridge between the public and private sectors in addressing risk awareness, physical resilience and financial preparedness" (World Economic Forum, 2011). We note a broad agreement in the literature about the theoretical potential for insurance to reduce flood risk, but the evidence of how this is can be achieved and its level of effectiveness is very limited. The situation in England, where efforts to foster property-level resilience measures have not been as successful as anticipated, seems typical. Promoting risk-reduction behaviour through insurance works well for larger commercial risks, but has some clear limitations in relation to residential flood insurance. Efforts to encourage greater risk reduction need to focus on the role of Government and communities and should be directly linked to flood insurance provision. Making this work will require innovation and a willingness to learn from examples elsewhere in the world. For instance, there are examples from other countries, such as Finland, where risk reduction measures at the Government and/or community level are conditions for insurance being made available. This is a complex but important area, where more innovation by industry and wider stakeholders, including property developers and planners, will be needed.

Q3. Do you agree with the approach taken to analysing the different potential solutions in the Impact Assessment?

The Impact Assessment (DEFRA, 2013b) captures many relevant aspects, but does not consider rising flood risk levels due to climate change, or the

extent to which insurance can contribute to overall risk reduction efforts. As insurance affordability and availability are indicators of the underlying risks – even in the current system of cross-subsidisation – this needs to be taken into account when assessing the costs and benefits of proposed schemes. There is little mention in the Impact Assessment of wider flood risk management measures and the importance of incentivising their use alongside insurance provision, even though this should be considered an integral issue, particularly as it is likely to impact the costs of insurance provision, when aiming for a long-term solution. This particularly applies when considering the implications for Government policy. The new Flood Re scheme does not reflect on the need to tie action by the Government on flood risk management to the provision of flood insurance.

Q4. Do you agree with the evidence presented in the Impact Assessment?

The Impact Assessment (DEFRA, 2013b) notes that the Government may be contributing financially to Options 2 (Subsidised reinsurance pool for high flood risk households (“Flood Re”)) and 3 (Directly subsidising insurance premiums). However, the consultation document states that there will be no financial aid from the Government in the final scheme. Hence, it is not clear whether the true impacts on the insurance industry have been fully accounted for in the Impact Assessment (DEFRA, 2013b).

Q5. Do you have any further evidence which has not been considered in the Impact Assessment?

It is significant that none of the documents published for this consultation about the future availability and affordability of home insurance in areas of flood risk take into account the impact of climate change on future flood risk. Indeed, the Impact Assessment (DEFRA, 2013b) published alongside the

consultation compares policy options against a baseline that explicitly does not take account of “changing flood risk due to deterioration of existing flood defences, climate change or development in flood risk areas”. None of the policy options explicitly mentions climate change.

The consultation document (DEFRA, 2013a) indicates that there are currently about 250,000 households in the UK at significant probability of flooding and insured. It estimates that about 500,000 properties will be included in the new Flood Re scheme. As these documents have not taken into account how climate change is affecting flood risk, and ignored information provided in the Climate Change Risk Assessment (Ramsbottom *et al.*, 2012), they are likely to under-estimate the number of properties at high or moderate flood risk in the future. Some relevant evidence about the impact of climate change on flood risk follows.

The Climate Change Risk Assessment (Ramsbottom *et al.*, 2012) estimated that the total number of properties in England at risk from flooding is 5.2 million, with 2.4 million exposed to coastal and river flooding (2008 figures), and 3.8 million threatened by surface water. About 370,000 residential properties in England and Wales are exposed to a significant probability (1.3 per cent or 1 in 75) of coastal or river flood. No information is available about the number of properties that are exposed to a significant probability of surface water flooding. The expected annual damage to residential properties in England and Wales from coastal and river flooding is estimated to be £640 million. Using projections of future climate change from the UK Climate Impacts Project 2009, the Assessment (Ramsbottom *et al.*, 2012) indicated that the number of residential properties in England and Wales exposed to a significant risk of coastal or river flooding could increase from 370,000 in 2008 to between 450,000 and 800,000 by the 2020s (assuming no new buildings), and between 500,000 and 1.5 million by the 2050s. The Assessment did not estimate how many properties could be exposed to surface water flooding in the future. The Assessment estimated that the expected annual damage to

residential properties in England and Wales from coastal and river flooding would rise to between £1.0 billion and £3.8 billion by the 2050s.

The Climate Change Risk Assessment (Ramsbottom *et al.*, 2012) assumed that no new properties would be built that are exposed to flood risk, but the current evidence suggests that is over-optimistic. The Adaptation Sub-Committee of the Committee on Climate Change (2012) pointed out that development in the floodplain in England increased by 12 per cent over the ten years after 2002, compared with a 7 per cent increase outside the floodplain. About 21,000 residential and non-residential properties were built in the floodplain every year over that period. One in five properties built in the floodplain are exposed to a significant probability of flooding.

The Sub-Committee (2012) also noted an Environment Agency estimate that investment in flood defences needs to increase by £20 million above inflation every year to “keep risk levels constant in the face of climate change and deterioration of flood defence assets”. It warned that “[i]f current investment plans for flood defence continue into the future, the country will be faced with an increasing risk of flooding from climate change”.

In June 2013, the Government announced further expenditure on flood defences as a result of the Spending Round. However, the Adaptation Sub-Committee (2013) concluded that expenditure “remains below the amount the Environment Agency estimated in their 2009 Long-Term Investment Strategy would be required to keep pace with climate change”.

The latest scientific evidence indicates that climate change is already affecting flood risk in England and the rest of the UK. Global sea level is currently rising due to global warming at more than 3 millimetres per year (University of Colorado Sea Level Research Group, 2013), increasing the risk of coastal flooding in the UK and around the world. Patterns of rainfall in the UK are shifting and increasing the risk of inland river and surface water flooding. The

Met Office (2013) pointed out that four of the five wettest years since records began in 1910 have all occurred since 2000, and long-term averages of 30-year periods show an increase in annual rainfall of about 5 per cent between 1961-1990 and 1981-2010. In addition, a preliminary analysis by the Met Office (2013) also indicates that 1 in 100 day extreme rainfall events may have become more frequent since 1960. Jones *et al.* (2013) found evidence of increases in extreme rainfall in many UK regions between 1961 and 2010. In 2012, the second wettest year in the UK since records began in 1910, insurance companies paid out £1.19 billion in claims for losses from flooding, according to the Association of British Insurers (2013). In 2007, insurers paid out a record £3 billion after severe flood damage across parts of England.

It should also be noted that the National Adaptation Programme for England (Her Majesty's Government, 2013), which was published by the Government in July 2013, included a commitment to "ensuring the continued availability and affordability of flood insurance to high risk households and the Water Bill is the obvious vehicle to achieve this". However, it provided no details of how this will be achieved. The programme also lacked any detailed long-term plans for managing future flood risk to residential properties.

In addition, although data sharing is explicitly noted in the Memorandum of Understanding (DEFRA, 2013c), it is not mentioned in the consultation document. To increase overall transparency we recommend that information is shared as far as is possible. The significance of asymmetries of information is mentioned. For example, in Option 2: Subsidised reinsurance pool for high flood risk households ("Flood Re"), it is acknowledged that information held by insurers may not be the same as information held by the Flood Re pool. The benefits of data sharing should be made clear for all the potential options. The potential benefits could be large if commercial issues can be resolved. The lack of transparency needs to be overcome, with open-source flood risk data being made accessible to all, clear explanations about flood insurance

premiums and claims, and strong indicators for monitoring the effectiveness of the Government's flood risk management policy.

Q6. Do you support the Government's proposed approach?

No. The Government's proposed approach ignores the consequences of climate change for future flood risk and does not appear to have been integrated into the National Adaptation Programme for England (Her Majesty's Government, 2013). Finding a suitable solution to address availability, affordability, commercial viability, cost-effectiveness and longevity of a new flood insurance scheme is very challenging and there is no proven best-practice template that could be applied. The Flood Re proposal contains some very interesting suggestions in response to concerns about the current system – particularly regarding the availability and affordability of cover, and for this reason, Flood Re appears to be the most promising of the four proposals. But it does not address the main underlying problem of rising flood risk levels due to climate change.

In addition, there are no mechanisms that tie the Government's policy on flood risk management to the provision of insurance. It therefore remains unclear how those measures that were explicitly linked to previous versions of the Statement of Principles for the Provision of Flood Insurance (Association of British Insurers, 2008) scheme, such as an improvement in the sharing of flood risk information between industry and the Government and a greater focus on planning and flood defence spending, will continue. The Memorandum of Understanding (DEFRA, 2013c) lays out some important commitments by the Government and industry, which are consistent with the spirit of the Statement of Principles (Association of British Insurers, 2008). But these commitments on risk reduction are not directly linked to Flood Re – and adherence to the Memorandum (DEFRA, 2013c) will be difficult to monitor and evaluate.

While the consultation document makes some welcome references to broader efforts to reduce flood risk (new property development policy, support for property level defences, development of a flood report), it remains unclear how effective these are and how insurance provision should complement them. This means that important opportunities for integration may have been missed.

The planned levy to fund insurance for those at moderate and high probability of flooding could be a potential lever to put pressure on the Government to reduce overall flood risk levels. However if the level of the levy is negotiated between industry and the Government, it is likely that this will not become the objective risk indicator that it should be to encouraging greater risk reduction efforts. This is a potential shortcoming of the Government's approach.

The proposed register of domestic properties at high risk of flooding should be implemented, but it should also include the promised insurance claims data. It is unclear why the proposal does not explicitly mention this, even though the Memorandum of Understanding (DEFRA, 2013c) does. These data have been previously collated by the industry and sharing this at post code level with those responsible for managing flood risk would be lead to a significant improvement in the understanding of flood risk impacts.

While there is clearly a role for the Government in ensuring that risk management efforts reflect increasing hazard, exposure and vulnerability, there is also a need to think more creatively about the role that the insurance industry can play. While there have been significant changes to the way risk is assessed, there has been very little innovation in how flood insurance is structured, packaged and designed. The industry has argued that the Statement of Principles for the Provision of Flood Insurance (Association of British Insurers, 2008) prevented such innovation, and Flood Re is a new approach, but there should be scope for further experiments, particularly in

relation to fostering flood risk management action by the Government and local communities. An assessment should be made of options that are usually not deemed feasible under a free market system, such as requiring all properties covered by Flood Re to undergo 'flood resilient' repairs in the event of a flood. The additional costs of this would need to be reflected in the levy and premium calculation.

Q14. Do you think a levy equating to around £10.50 per UK household, which the ABI estimate is equivalent to the current cross-subsidy, is acceptable to help address the problem of securing affordable flood insurance for high risk households?

The feasibility of this approach depends heavily on an agreement about risk and eligibility thresholds. Surface water flood risk needs to be included in the considerations, as well as the projected increases in risk due to climate change, and the impact of risk management measures. Experience in other countries shows that these issues can become highly politicised, with the potential to distort the whole scheme.

Q15. Do you agree that Flood Re will secure the availability and affordability of household flood insurance in the UK?

It is apparent that the design of the new flood insurance arrangements, which are expected to last until at least 2035, has not taken into account adequately, if at all, how flood risk is being affected by climate change. For this reason, the Flood Re scheme is likely to be put under increasing pressure and may prove to be unsustainable because the number of properties in future that will be at moderate (1 in 200 to 1 in 75) and high (1 in 75 or higher) probability of flooding has been significantly underestimated.

While the Flood Re proposal may secure the availability and affordability of household flood insurance in the short- to medium- term, we do not believe that Flood Re will secure the long-term availability and affordability of household flood insurance in the UK, as it does not take into account rising risk levels due to climate change, and does not address some of the fundamental problems that the current system faces, such as a lack of incentives for flood risk reduction. In addition, the transition process towards a completely free market after 20 to 25 years, when Flood Re will be phased out, is not described. It is very unclear why it is assumed that insurance prices will remain affordable and available to all households after this period.

References

Adaptation Sub-Committee, 2012. *Climate change – is the UK preparing for flooding and water scarcity. Adaptation Sub-Committee Progress Report 2012*. [pdf] London: Committee on Climate Change. Available at: http://archive.theccc.org.uk/aws/ASC/CCC_ASC_2012_bookmarked_2.pdf [Accessed 31 July 2012].

Adaptation Sub-Committee, 2012. *Managing the land in a changing climate. Adaptation Sub-Committee Progress Report 2013*. [pdf] London: Committee on Climate Change. Available at: http://www.theccc.org.uk/wp-content/uploads/2013/07/ASC-2013-Book-singles_2.pdf [Accessed 31 July 2012].

Association of British Insurers, 2008. *Revised Statement of Principles on the Provision of Flood Insurance*. [pdf]. Available at: https://www.abi.org.uk/Insurance-and-savings/Topics-and-issues/Flooding/~/_media/B609E13E50DD40E79C1D18A59FFE6592.ashx [Accessed 31 July 2013].

Association of British Insurers, 2013. *Over 1,300 customers helped everyday by insurers to recover from extreme weather in 2012*. News release, 15 February 2013. Available at: <https://www.abi.org.uk/News/News-releases/2013/02/Over-1300-Customers-Helped-Everyday-By-Insurers-To-Recover-From-Extreme-Weather-In-2012> [Accessed 31 July 2013].

City of York Council, 2013. *Flood Conference*. York, United Kingdom, 10 May 2013.

Department for Environment, Food and Rural Affairs, 2011. *Flood risk and insurance: A roadmap to 2013 and beyond. Final report of the flood insurance working groups*. [pdf] London: Department for Environment, Food and Rural Affairs. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69467/pb13684-flood-risk-insurance.pdf [Accessed 31 July 2013].

Department for Environment, Food and Rural Affairs, 2013a. *Securing the future availability and affordability of home insurance in areas of flood risk*. [pdf] London: Department for Environment, Food and Rural Affairs. Available at: https://consult.defra.gov.uk/flooding/floodinsurance/supporting_documents/20130626%20FINAL%20Future%20of%20Flood%20Insurance%20%20consultation%20document.pdf [Accessed 31 July 2013].

Department for Environment, Food and Rural Affairs, 2013b. *Managing the future financial risk of flooding. Impact Assessment*. [pdf] London: Department for Environment, Food and Rural Affairs. Available at: https://consult.defra.gov.uk/flooding/floodinsurance/supporting_documents/20130627%20FINAL%20Flood%20Ins%20%20consultation%20stage%20IA.pdf [Accessed 31 July 2013].

Department for Environment, Food and Rural Affairs, 2013c. *Flood Re Proposal: memorandum of Understanding*. [pdf] London: Department for Environment, Food and Rural Affairs. Available at: https://consult.defra.gov.uk/flooding/floodinsurance/supporting_documents/20130626%20Flood%20Insurance%20MOU%20June%202013%20unprotected.pdf [Accessed 31 July 2013].

Her Majesty's Government, 2013. *The National Adaptation Programme: Making the country resilient to a changing climate*. [pdf] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/209866/pb13942-nap-20130701.pdf [Accessed 31 July 2013].

Jones, M.R., Blenkinsop, S., Fowler, H.J., & Kilsby, C.G., 2013. Objective classification of extreme rainfall regions for the UK and updated estimates of trends in regional extreme rainfall. *International Journal of Climatology*, DOI: 10.1002/joc.3720

Met Office, 2013. *Statistics for December and 2012 - is the UK getting wetter?* News release, 3 January 2013. Available at: <http://www.metoffice.gov.uk/news/releases/archive/2013/2012-weather-statistics> [Accessed 31 July 2013].

Ramsbottom, D., Sayers, P., & Panzeri, M., 2012. *Climate Change Risk assessment for the Floods and Coastal Erosion Sector*. [pdf] London: Department for Environment, Food and Rural Affairs. Available at: http://randd.defra.gov.uk/Document.aspx?Document=10075_CCRAfortheFloodsandCoastalErosionSector16July2012.pdf [Accessed 31 July 2013].

University of Colorado Sea Level Research Group, 2013. *Global Mean Sea Level Time Series (seasonal signals removed)*. Available at: <http://sealevel.colorado.edu/content/2013rel5-global-mean-sea-level-time-series-seasonal-signals-removed> [Accessed 31 July 2013].

World Economic Forum, 2011. *A Vision for Managing Natural Disaster Risk
Proposals for public/private stakeholder solutions*. [pdf] Cologne/Geneva:

World Economic Forum. Available at:

http://www3.weforum.org/docs/WEF_VisionManagingNaturalDisaster_Proposal_2011.pdf [Accessed 31 July 2013].