Department for Environment Food & Rural Affairs

Llywodraeth Cymru Welsh Government

Cyfoeth Naturiol Cymru Natural Resources Wales

Environment Agency

delivering benefits through evidence

Community engagement on climate adaptation – an evidence review

From the project: Working together to adapt to a changing climate: flood and coast

FRS17192

Flood and Coastal Erosion Risk Management Research and Development Programme

We are the Environment Agency. We protect and improve the environment.

Acting to reduce the impacts of a changing climate on people and wildlife is at the heart of everything we do.

We reduce the risks to people, properties and businesses from flooding and coastal erosion.

We protect and improve the quality of water, making sure there is enough for people, businesses, agriculture and the environment. Our work helps to ensure people can enjoy the water environment through angling and navigation.

We look after land quality, promote sustainable land management and help protect and enhance wildlife habitats. And we work closely with businesses to help them comply with environmental regulations.

We can't do this alone. We work with government, local councils, businesses, civil society groups and communities to make our environment a better place for people and wildlife.

Published by:
Environment Agency, Horizon House, Deanery Road, Bristol, BS1 5AH

http://www.gov.uk/government/organisations/environment-agency

ISBN: 978-1-84911-429-5

© Environment Agency – August 2019

All rights reserved. This document may be reproduced with prior permission of the Environment Agency.

Email: fcerm.evidence@environment-agency.gov.uk

Further copies of this report are available from our publications catalogue:
http://www.gov.uk/government/publications

or our National Customer Contact Centre:
T: 03708 506506

Email: enquiries@environment-agency.gov.uk

Author(s):
Rhys Kelly and Ute Kelly

Dissemination status:
Publicly available

Keywords:
Engagement; flood; coastal erosion; climate change; climate adaptation; community; resilience.

Research contractors:
Icarus Collective Ltd. Email: info@icarus.uk.net.
Phone: 0800 044 8146

Environment Agency's Project Manager:
Kate Kipling, FCRM Directorate

Theme Manager:
Jacqui Cotton, FCRM directorate

Project number:
FRS17192

Evidence at the Environment Agency

Scientific research and analysis underpins everything the Environment Agency does. It helps us to understand and manage the environment effectively. Our own experts work with leading scientific organisations, universities and other parts of the Defra group to bring the best knowledge to bear on the environmental problems that we face now and in the future. Our scientific work is published as summaries and reports, freely available to all.

This report is the result of research commissioned and funded by the Joint Flood and Coastal Erosion Risk Management Research and Development Programme. The Joint Programme is jointly overseen by Defra, the Environment Agency, Natural Resources Wales and the Welsh Government on behalf of all Risk Management Authorities in England and Wales: http://evidence.environment-agency.gov.uk/FCERM/en/Default/FCRM.aspx.

You can find out more about our current science programmes at: https://www.gov.uk/government/organisations/environment-agency/about/research.

If you have any comments or questions about this report or the Environment Agency's other scientific work, please contact research@environment-agency.gov.uk.

Professor Doug Wilson
Director, Research, Analysis and Evaluation

Executive summary

This evidence review was commissioned as part of the Joint Research Programme project 'Working Together to Adapt to a Changing Climate: Flood and Coast' (2018 to 2021). The project is a response to concerns about the increasing likelihood of flooding and coastal erosion as a result of climate change and the possibility that some places will not be protected in the longer term. Adapting to climate change is at the heart of the new Flood and Coastal Erosion Risk Management Strategy for England. Evidence from the project will contribute towards its aim of creating climate resilient places.

The project aims to produce new learning about, and enhanced guidance for, community engagement practice in situations where engagement might be particularly challenging. This review of evidence was commissioned primarily to inform the design and delivery in the next phase of the project of an innovative community engagement programme in 2 locations facing difficult adaptation choices. However, it is also intended to be useful to practitioners, policymakers and academics working on flood and coastal erosion risk management (FCERM) and/or climate adaptation.

This report reviews what is known about engagement practice in situations where long-term protection may not be feasible. It first considers the existing body of research and guidance on engagement produced by risk management authorities to establish whether, or to what extent, this already provides insight into 'tricky engagement'. It was found that there is considerable knowledge in general about the characteristics of good engagement practice and about common challenges or barriers to engagement. Risk management authorities have produced limited, but still useful, evidence relating to cases involving difficult and longer term adaptation choices. The key questions are how risk management authorities are using the knowledge they already have about engagement practice, and where there might be gaps in dissemination and training.

The report then considers the significant interdisciplinary and international research literature related to FCERM, climate adaptation and community engagement. This supports the exploration of issues that are either under-represented or under-developed within the risk management authority literature base, including research on place attachment, the emotional aspects of living with environmental change, and the politics of knowledge in FCERM policy and practice. Key conclusions here include:

- a need to consider 'readiness' within a community and among stakeholders. To what extent are people ready and able to participate constructively in the advanced and difficult stages of planning and decision-making processes, especially those related to more long-term adaptation choices associated with climate change?
- a need for care in how issues, options and people are 'framed' in FCERM language, policy and practice. Engagement can be complicated by the different ways in which stakeholders perceive or understand issues such as flood and coastal erosion risk, or the nature of choices for adaptation or change, linked to identity, experience and position. Greater transparency in communication and efforts to make underlying assumptions more explicit might facilitate better understanding.
- a need to recognise that responses to information about flood and coastal erosion risk – or about options for managing this risk – can be influenced by complex feelings associated with prior experiences of flooding and recovery, connection to place and knowledge of future risks. The importance of considering emotion and mental health in relation to 'difficult knowledge' about climate change and its implications is highlighted.
- a need to acknowledge the political and power issues that influence relationships between risk management authorities and communities, and to make conscious and

transparent choices about practices of knowledge production in light of this recognition.

The report also explores a number of engagement approaches and practices that are considered particularly responsive to the needs and challenges identified above. These are illustrated with examples of approaches that are less common or familiar, and which aim to build understanding of climate challenges, develop capacity for decision-making around adaptation options, and enable exploration of how people understand and value the places they live in. These practices include:

- role play simulations
- tools that help stakeholders and the wider public to visualise future scenarios for their areas, giving them a clearer sense of the challenges and potential responses
- approaches based on the recognition of the roles that narratives and stories play in the lives of individuals and communities
- conflict analysis tools that could be used to deepen an understanding of actual and potential conflict dynamics
- a spectrum of approaches to the politics of knowledge surrounding community participation in adaptation research and decision-making from public education to public debate to full co-production of knowledge

Recommendations for the next phase of the project and related FCERM initiatives

- **A co-production methodology**: establishing an interdisciplinary team of researchers, engagement/conflict resolution practitioners, technical experts, artists and local residents to co-develop and implement engagement strategies appropriate to the specific challenges identified in the evidence review and in the specific communities involved in the project.
- **Careful attention to local needs and conditions**: assessing 'readiness' as a first step in engagement around difficult adaptation choices. This should identify what is needed to support constructive and collaborative engagement in decision-making later on and take account of the specific characteristics, needs or dynamics in a given context, including the psychological and emotional dimensions of climate change adaptation.
- **Clear, contextual and realistic engagement objectives**: developing clarity and shared understanding about what engagement is for in a given context, with realistic expectations about what a specific approach or initiative can achieve in the project timeframe and with the resources available.
- **Prioritising places, partners and approaches that indicate potential to generate new learning:** validating the knowledge that already exists in relation to engagement practice and seeking to extend or deepen this through innovation.
- **Creating mechanisms through which learning will be shared effectively:** acknowledging that, despite the existence of significant evidence about good engagement practice, this does not always feed through into policy and practice.

Contents

List of tables and figures

1 Introduction

1.1 Background

This evidence review was commissioned as part of the Joint Research Programme project 'Working Together to Adapt to a Changing Climate: Flood and Coast' (2018 to 2021). The project is a response to concerns about the impacts of climate change and the likelihood of significantly higher levels of risk to communities due to increased flooding (including inland) or coastal erosion. It aims to produce new learning about, and enhanced guidance for, community engagement practice in situations where this might be particularly challenging, for example, in situations where there is a low likelihood of building or maintaining flood defences in the medium to long term.

The project will also provide evidence for the implementation of the new Flood and Coastal Erosion Risk Management Strategy for England. The Strategy aims to help create climate resilient places. Frontrunner places will be identified, with the help of this project, to pilot the generation of adaptive approaches with local partners. This will lead to the development of a national framework to identify steps and decisions needed to take an adaptive approach to flooding and coastal erosion. Learning generated by the project will feed in to this national framework.

The main part of the project (starting in April 2019) will involve designing an appropriate and innovative community engagement programme for 2 communities (inland or coastal, in England or Wales). This work will be carried out as a form of action research, documenting learning from the process of designing and implementing an engagement programme over 18 months. Learning from the project is intended to inform and support collaborative decision-making in other contexts where it may be complex and contentious.

The project starts with the following assumptions.

- It is recognised that, for some places, existing interventions to protect communities or enhance resilience may be unsustainable or unsuitable in the long term. Not all communities can be protected from all flood and coastal erosion risk, especially if more serious projections of climate change do materialise. Indeed, 'an economic assessment of the options for flood and coastal erosion risk management in the period 2015 to 2065, states that it will never be cost-effective for Government investment to protect everyone' (Twigger-Ross et al. 2015, p. 9). Current government funding formulas for flood defences, based on cost-benefit analyses, are already constricting the range of options available in some areas.
- Although some risks are not immediate and there is some uncertainty about the nature or levels of risk, it is necessary to start working with communities now to explore different options for adaptation, including those options such as managed retreat that can be contentious.
- Past experience shows that initiatives to promote adaptation and resilience face various barriers including:
    - legislation and planning regulations
    - lack of community awareness and understanding
    - difficulty managing public expectations
    - limited resources

    - lack of clarity over the roles and responsibilities of different risk management authorities

- There may be specific barriers to or challenges for engagement and decision-making in relation to climate adaptation, for example, relating to the complex and uncertain nature of environmental change, the long-term horizon for planning, and the high stakes, irreversible nature of some decisions (such as retreat).
- While the Environment Agency and Natural Resources Wales have extensive literature and guidance on community engagement, communicating uncertainty and initiating difficult conversations (discussed in Section 3), this mostly relates to more 'typical' situations of flood and coastal erosion risk management (FCERM).
- Action research with communities facing difficult choices – such as managed retreat – can help to generate learning about specific challenges in engagement, as well as methods and processes that support positive learning and action. In turn, this can inform the production of tailored or enhanced guidance for risk management authority staff (and communities).

1.2 Purpose of the evidence review

The evidence review was commissioned to support learning in the development of the engagement programme and to ensure that important decisions are informed by current research knowledge. The review's purpose was to:

- review the state of knowledge about engagement practice in specific (and 'tricky') situations of flood and coastal erosion risk (for example, where long-term protection of communities or assets may not be considered feasible, but where decision-making might relate to risks that could manifest over relatively long timescales), especially in the context of climate change
- generate learning to inform the selection of case studies for the second phase of the project
- identify questions and thinking that can inform the design/development of appropriate and innovative engagement approaches in the pilot locations (includes clarifying what engagement is for and what it is intended to achieve in relation to the needs of different stakeholders, at different points in time)
- contribute to learning and discussion within the wider community of practice associated with FCERM and engagement work

1.3 Scope of the evidence review

The initial project brief focused on evidence produced by the Environment Agency and Natural Resources Wales. Due to the 'cutting edge' nature of the project, early project meetings determined that a wider review of research (beyond the 'internal' body of evidence on engagement practice) was probably needed to help build understanding of any particular issues or challenges that arise in the context of severe flood and coastal erosion risk situations and/or climate change adaptation. It was also felt that a wider review would locate examples of interesting and/or innovative approaches to engagement that might be responsive to identified needs or challenges.

A significant body of research was collated and considered for this review. In addition to over 60 reports by the Environment Agency, Natural Resources Wales, Defra and other risk management authorities, a further 250+ academic papers were collected and considered. Most of this work was directly related to flooding and flood and coastal

erosion risk management (FCERM), with a particular focus on issues in or affecting engagement practice. A significant proportion of sources addressed the broader but strongly related topics of climate change adaptation and resilience.

The sample includes research from a wide range of disciplines. This reflects interest in the varied and complex dimensions of flood and coastal erosion risk and climate change adaptation from the natural and social sciences, as well as the humanities. The research considered is international in scope, but mainly from or about 'global north' contexts to ensure a reasonable level of comparative similarity (for example, in terms of systems of governance, characteristics of affected populations).

While the research base for this review is quite large, the intention was to identify points that are directly relevant for the broader project but which might be less familiar to staff working in this area (that is, those who may not have regular access to more recent academic research). As such, it is purposefully selective rather than comprehensive.

1.4 Limitations

The limitations of this report are common to rapid review processes, with trade-offs between breadth and depth. There was much more material than could be feasibly reviewed in detail within the time available, especially as the process of reading led to more sources. It was necessary to be selective and purposeful, especially in terms of more detailed reading and the discussion of sources.

There is perhaps a stronger emphasis on coastal flood risk in the report than on river-based flooding. This reflects an emphasis in the literature and may be explained by the clearer connection between climate change and coastal flooding.

Work on coastal flooding and climate adaptation coming out of the USA was found to be particularly interesting, but obviously there are important differences between contexts such as in the structure of governance. The limits of translating ideas or learning from context without proper discussion are acknowledged, but again time and space precluded this.

1.5 Structure of the report

Chapter 2 details the methodology and approach adopted for the evidence review, setting out the various steps followed.

Chapter 3 addresses the question of what is known generally about engagement practice by risk management authorities. It reviews key reports commissioned by these agencies to establish a baseline understanding of what good practice looks like, as well as common barriers to engagement. The review of a range of reports produced by the Environment Agency, Natural Resources Wales and others suggests that there is already a considerable body of knowledge and understanding about the elements of good engagement practice, and also about the characteristics and needs of places that are facing the possibility of managed retreat or limited protection against flooding in the future. The key questions here are, perhaps, who within the agencies is accessing and using that knowledge, and where might there be gaps in dissemination and training.

Chapter 4 focuses on what a wider interdisciplinary literature tells us about the specific contexts of 'tricky engagement', with particular consideration of the linkages between climate change and options for the management of flood and coastal erosion risk. Subsections focus in turn on:

- readiness – how prepared communities are to engage in collaborative decision-making for climate adaptation
- perceptions and framing of issues – how divergent interpretations of situations or information affect engagement practice
- the emotional dimensions of environmental change
- the significance of place attachment
- issues of politics and power in engagement and adaptation

Chapter 5 presents a number of engagement practices or approaches that appear in the literature and which were considered directly relevant in response to the issues raised. This includes examples of simulations, visualisation and methods for co-producing knowledge.

Chapter 6 summarises the main conclusions and considerations for the next phase of the project and makes some suggestions for what that next phase might look like. Overall, it is suggested that it is worth considering a co-production approach involving an interdisciplinary team of researchers, engagement/conflict resolution practitioners, technical experts, artists and local residents in developing engagement strategies appropriate to 2 specific 'tricky' locations. Such an approach would help to balance general and location-specific knowledge, and to feed different types of expertise into the process. It would also go a considerable way towards tackling some of the perennial challenges of engagement work (for example, 'us and them' mentalities, issues of trust, clashes of different forms of knowledge) and the conflict dynamics that arise in situations where decision-making processes need to weigh up different priorities, values, costs and benefits.

Throughout the report, the various thematic sections conclude with a set of questions. It is envisaged that these questions will be helpful in generating discussion around the possibilities and choices that will shape the next phase of this project. However, many of these questions do not have straightforward 'right' or 'wrong' answers as much depends on the context and purpose of particular engagement strategies. The aim therefore is to encourage research-informed reflection and discussion among risk management authority staff and the wider community of engagement practitioners, both in connection with this particular project and more widely, rather than to provide a set of guidelines to be followed.

Some sections include specific examples of interesting practice that help to illustrate relevant points and to convey an idea of what the more general observations might imply in real world contexts. As with the questions above, this does not answer the question of which particular method – or which combination of methods – is most likely to be effective in a particular context. Instead, it is hoped the examples will generate ideas and potentially new creative and innovative practices in response to the challenges of particular contexts.

An accompanying slide pack, which presents a summary of findings from the evidence review, is also available here: https://www.gov.uk/government/publications/community-engagement-on-climate-adaptation-to-flood-risk.

2 Methodology and approach

This was primarily a desk-based review of existing research and evidence. It examined 2 main bodies of literature:

- existing publications by the Environment Agency and Natural Resources Wales
- academic research collected through keyword and bibliography searches

The process also incorporated an academic peer review and feedback from engagement practitioners, which informed the final publication as well as providing opportunities for dissemination.

Elements of 'rapid review' methods (Twigger-Ross et al. 2014) were adopted to help make the review process systematic while staying within the short timescale allocated (approximately 20 working days). Rapid reviews are more commonly used in fields such as health or the natural sciences as a more streamlined and responsive approach to evidence review. This approach offered a logical series of steps relevant to the objectives and timescale for this project. These steps are explained in Table 2.1.

Table 2.1 Summary of the steps making up the evidence review

	Task
Step 1	**Initial scoping/clarification of objectives** A quick survey of reports provided by the Environment Agency was made to assess the need for a broader review of research.
Step 2	**Research questions** The following questions were formulated to guide this inquiry. • What is known about engagement practice for FCERM in situations where long-term protection may not be feasible or appropriate? • What is known generally about principles for, and approaches, to good practice in FCERM engagement? • What is known generally about obstacles to, or challenges in, FCERM engagement practice? • What is known about the particular characteristics, needs and interests of communities where long-term protection from flood and coastal erosion risk may not be feasible and/or desirable? • What does this imply for principles and approaches to engagement practice by risk management agencies in such contexts?
Step 3	**Systematic literature search and database creation** The first stage involved establishing whether any existing summary reviews existed in relation to key topics (for example, on stakeholder engagement practice or retreat/relocation). Looking at recent summary reviews would avoid duplication and save time. The second stage was to conduct keyword searches using Web of Science, guided by the research question and the thematic headings identified in the project proposal.

	Task
	The third stage was to search document databases maintained by Environment Agency and Natural Resources Wales for additional reports and case studies, as well as following up on relevant references within sources. The final stage was to incorporate all sources (including existing related research materials) into an Endnote digital bibliography, including all PDF source files.
Step 4	**Coding and screening of studies** The Endnote bibliography was imported into NVivo (a data analysis software programme) and organised into folders reflecting the broad themes/questions in the review. Sources were divided into 'Environment Agency' and 'Non-Environment Agency' evidence to enable distinctions to be made between the Environment Agency's own evidence or perspective, and a broader body of research. Paper abstracts and executive summaries were 'coded' to identify key themes and prioritise sources according to their potential relevance. Keyword searches were also carried out within the database to check for the presence (or not) of specific topics.
Step 5	**Narrative synthesis of key themes and findings** An initial plan for the report was produced, identifying key thematic sections and the organisation of material.
Step 6	**Interim review with project team** At the halfway point, a briefing was presented to the project team with a summary of work completed to date, some initial findings and a sample section from the report. Feedback from the project team informed the second stage of the review.
Step 7	**Production of report**
Step 8	**Feedback on report and peer review** The report was presented to the project team for feedback. It was also sent out for academic peer review and for feedback from relevant practitioners.
Step 9	**Workshop/stakeholder dialogue** The project team held a webinar with relevant stakeholders and practitioners to discuss issues emerging in the feedback.
Step 10	**Revision of report** The final stage involved revising the report in line with feedback from the project team, practitioners and the academic peer review.

The review was qualitative and exploratory in nature. It aimed to highlight, understand and develop questions around emerging issues in research relating to the project objectives and research questions specified above.

All the steps of collecting, coding and writing about research involved interpretive work – deciding search terms, categorising and applying codes, selecting themes and examples for inclusion in the report. It is acknowledged that experience of the report's authors (which includes living in an area that has experienced severe flooding), professional expertise (in peace and conflict studies) and other knowledge influenced what follows.

Overall, the report aims to identify issues, examples and questions that might prompt reflection and conversation among practitioners working in FCERM. Although it is a review of current research and evidence, it should be seen as a discussion document rather than a set of definitive findings. One of the overall conclusions is that there is a great deal of learning happening – and still necessary – in relation to FCERM in the context of climate change. The report aims to stimulate and contribute to that learning.

3 Review of risk management authority evidence

3.1 What do risk management authorities know about engagement – in general?

Risk management authorities have generated a substantial body of knowledge about a range of issues relevant to engagement in and around FCERM. The sample of material obtained for this review covered 60+ research reports, case studies and policy/guidance documentation produced or commissioned primarily by the Environment Agency, Natural Resources Wales and Defra, but also by some other authorities. Together, this represents a purposeful learning process over the past 20 years accompanying and informing a process to 'normalise' more inclusive forms of communication and decision-making, changing the way the Environment Agency and other risk management authorities relate to and work with communities.

Some reports already synthesise a range of evidence on engagement practice, including efforts to document and measure the financial as well as social benefits of community engagement initiatives. The following reports (all commissioned either by Defra or the Joint Research Programme) are highlighted as being relevant resources for engagement practitioners:

- 'Managing the Social Aspects of Flooding: Synthesis Report' (Twigger-Ross 2006)
- 'Improving Community and Citizen Engagement in Flood and Coastal Erosion Risk Management Decision Making, Delivery and Flood Response' (Speller 2005)
- 'Community-Focused Flood Engagement: Evaluation of best practice on behalf of the Environment Agency' (Environment Agency 2011)
- 'Public Dialogues on Flood and Coastal Erosion Risk Communication' (Environment Agency 2015)
- 'Flood Resilience Community Pathfinder Evaluation' (Twigger-Ross et al. 2015)

This evidence has fed into the production of policy and guidance for Environment Agency staff, most clearly in the 'Working with Others' framework, which stands as a clear and current representation of what is considered 'good practice' in engagement within the Environment Agency. In addition, the National Flood Forum website includes an 'engagement hub' containing many resources and case studies.[1] These provide Environment Agency staff with examples of practice that they could adapt to their own contexts.

Risk management authorities have also commissioned research and evaluations on many issues that are important for engagement practitioners to understand and account for in their work. This includes:

- ***Understanding the social justice dimensions of flooding*** – research showing the intersections between existing social and economic disadvantage and exposure

[1] https://nationalfloodforum.org.uk/working-together/community-engagement-hub/

to flood risk or flooding, and considering how inequalities can be addressed within schemes for managing flood and coastal erosion risk (Environment Agency 2006, Johnson et al. 2008, Zsamboky et al. 2011, Sayers et al. 2016)

- ***Understanding the multiple and interconnected characteristics of 'resilience' and how these can be cultivated or enhanced*** – research exploring what enables individuals and communities to prepare for and cope better with challenging experiences like flooding (Twigger-Ross and Colbourne 2009, Twigger-Ross et al. 2015)
- ***Trust in risk management authorities*** – understanding why and when people may lose trust in authorities and what can be done to maintain or improve trust (National Flood Forum and Collingwood Environmental Planning 2018, Singh Mehmi and Bailey 2018)
- ***Communication practice*** – understanding gaps in community knowledge, especially in relation to flood and coastal erosion risk, and identifying what approaches to communication can be most effective (Ipsos MORI 2012, Environment Agency 2012, Environment Agency 2015, Whatmore et al. 2017)

The project team concluded that there was little added value in producing a further detailed synthesis of existing reports by risk management authorities. Many elements of good engagement practice are generic and there is not a need to 'reinvent the wheel'. The specific task in this project is to consider what of this existing knowledge and guidance might translate to more challenging situations for engagement and decision-making, and to the extent possible (before Phase 2 of this project), what learning might be needed for ethical and effective practice in the future. This is the focus of Chapters 3 and 4.

Nevertheless, to provide a baseline reference point for this project, the next section briefly summarises ideas about 'good practice' (Section 3.2) and about 'barriers to and challenges in engagement' (Section 3.3) derived from the evidence base considered above.

Section 3.4 considers what risk management authorities know about engagement in situations with challenging adaptation choices. The chapter concludes with some questions to consider on this topic.

3.2 Good practice in engagement

3.2.1 General engagement principles

- ***Engage early and for long enough*** (Environment Agency 2016), recognising the 'recovery gap' in post-flooding situations, with challenges continuing well beyond the immediate event and response (Whittle et al. 2010), and understanding that stakeholders might be more or less engaged at different points (Fernández-Bilbao et al. 2009).
- ***Be flexible***. Recognise that different situations may require different levels of, or approaches to, engagement and decision-making; engagement planning should be responsive to the needs of each context and situation. (Straw and Colbourne 2009, Collingwood Environmental Planning 2016, Environment Agency 2016).
- ***Understand the context.*** Take time to listen to the concerns of communities so that their perspectives, experiences and needs are understood. Good engagement is planned from the bottom-up, starting with the community themselves (National Flood Forum and Collingwood Environmental Planning 2018).

- ***Work with others.*** Recognise and utilise the capabilities and capacities that exist within communities (Cabinet Office 2011) and remember that 'people in communities have the greatest vested interest in managing their flood risk' (National Flood Forum and Collingwood Environmental Planning 2018, p. 11). Build on existing structures and mechanisms (Twigger-Ross and Colbourne 2009, Pelling et al. 2015, Twigger-Ross et al. 2015, Deeming 2017). This may include engaging with special interest groups that are not directly related to flooding or climate change (Environment Agency 2008).
- ***Work with clarity and transparency about goals, processes and decision-making.*** Develop clear communication about governance and process, including the responsibilities of different stakeholders, options for intervention/response, and the parameters of engagement processes (Wilkinson and Wade 2005, National Flood Forum and Collingwood Environmental Planning 2018).
- ***Understand and respond to vulnerability, including the intersections of vulnerability and social disadvantage.*** Identify opportunities for 'multisolving' – addressing environmental and social priorities together and in mutually beneficial ways (Environment Agency 2006, Johnson et al. 2008, Fernández-Bilbao et al. 2009, Zsamboky et al. 2011, Sayers et al. 2016). Recognise opportunities for building social capital, particularly in deprived areas.
- ***See engagement as a learning process rather than an end in itself and recognise that process is as important as outcomes*** (Speller 2005, National Flood Forum and Collingwood Environmental Planning 2018).

3.2.2 Effective communication

- ***Effective communication is as much about listening as it is about talking.*** As the Sustainable Communities Pilot Study commissioned by Natural Resources Wales points out: '[l]istening to what people have to say and demonstrating that they have been heard is a starting point' (National Flood Forum and Collingwood Environmental Planning 2018, p. 10).
- ***It is important that those involved in engagement work***, in addition to being skilled at working with communities, also ***have sufficient knowledge of flood and coastal erosion risk issues*** to be able to communicate with confidence and credibility, and to ask difficult questions when needed (National Flood Forum and Collingwood Environmental Planning 2018).
- ***Understand the environmental, social and personal factors that shape perceptions of, and attitudes to, flood and coastal erosion risk***. This includes past experiences of flooding (which does not always translate into high awareness, concern or action), but also contextual, social and cultural factors (see Chapter 3) (Whatmore et al. 2017).
- ***Understand the different audiences for communication within a community***, recognising their different needs, levels of knowledge/expertise and concern/interest, and recognising the diversity within as well as across stakeholder groups. Do not assume ignorance. There is a need to design inclusive engagement processes, involving groups and individuals who are often excluded (Ipsos MORI 2012, Environment Agency 2015, Twigger-Ross et al. 2015, National Flood Forum and Collingwood Environmental Planning 2018).
- ***Be clear about the intended purpose of communication.*** For example, as listed in Environment Agency (2015, p. 7) whether communication is intended to:

  '1. Raise awareness.

2. Encourage protective behaviour.
3. Inform to build up knowledge on hazards and risks.
4. Inform to promote acceptance of risks and management measures.
5. Warn of and trigger action to impending and current events.
6. Reassure the audience (to reduce anxiety or manage outrage).
7. Improve relationships (build trust, cooperation, networks).
8. Enable mutual dialogue and understanding.
9. Involve actors in decision making.'

- ***Tailor communication strategies and messages according to the audience, need and purpose*** (Whatmore et al. 2017). Recognise that people may respond in different ways to the same communication (for example, risk information may provoke anxiety for some but not others).
- ***Provide accurate information and communicate it simply*** (National Flood Forum and Collingwood Environmental Planning 2018, Singh Mehmi and Bailey 2018). Images and other visuals can make information more 'real' and vivid (Ipsos MORI 2012, p. 10). Complex technical terminology and data can be barriers to understanding.
- ***Recognise the importance of trust for public acceptance of communications from risk management agencies*** (Whatmore et al. 2017, Singh Mehmi and Bailey 2018).
- ***Collaborate with appropriate partners and networks to extend capacity for communication***, including through linking flood and coastal erosion risk with other risks (for example, including flood and coastal erosion risk alongside other messages about property protection) (Ipsos MORI 2012, p. 9).

3.3 Barriers to and challenges in engagement

- ***The complexity, fragmentation and inefficiency of FCERM structures makes effective engagement, collaboration and decision-making more difficult*** (Cornell 2006, EFRAC 2016).
- It is recognised that ***engagement can be time and resource intensive, and that there is competition for resources within risk management authorities***. There may therefore be tensions between what is recognised as 'best practice' or what is needed in a given situation, and what is possible in terms of resourcing (Collingwood Environmental Planning 2016, National Flood Forum and Collingwood Environmental Planning 2018).
- ***Engagement challenges are not just features of the external contexts in which risk management authorities work***. As Twigger-Ross and Colbourne (2009) observed with reference to the Environment Agency, there are internal barriers to engagement, related to the size, complexity (many different roles) and culture(s) of the organisation, levels of skill and buy-in to engagement work.
- Although early engagement is seen as ideal in many circumstances, ***engagement is often responsive (that is, in crisis situations after a flood event) rather than anticipatory***. This can mean that there is insufficient time for analysis, planning and trust-building activities, with the potential that this makes engagement more challenging in the long run (Smith and Kelly 2017).
- ***Post-flooding situations present a particular set of challenges that can help or hinder engagement***: While they can generate high levels of interest in getting involved, they are also contexts in which emotions are heightened. Importantly,

these emotions can include a strengthened attachment to place and community (for example, in the Calder Valley following the 2015 floods), as well as heightened anxiety and trauma, as noted, for example, for Tremadog in Wales (National Flood Forum and Collingwood Environmental Planning 2018).

- ***There are barriers to inclusive engagement***. Different levels of knowledge, time, interest and capacity can impede meaningful participation by stakeholders in engagement processes (Environment Agency 2012, Demeritt and Nobert 2014, Environment Agency 2017b). Existing disadvantages or dimensions of social exclusion can impede participation (Sayers et al. 2016).
- ***Options for recovery or adaptation can be technically or legally complex (difficult to communicate or implement) and/or controversial***. Conflicts can be caused by different levels of knowledge, different 'frames' (perceptions and beliefs – see Section 4.2), or incompatible goals. Preventing or responding to conflict in constructive ways can be time-consuming and challenging (but it can also be necessary and beneficial) (Twigger-Ross 2005).
- ***There are challenges around the appropriate scale to engage at***. Flooding relates to entire catchments, rather than individual communities. There is increasing recognition of the benefits of catchment management for adaptation to flood risk within agencies, evident in approaches such as working with natural processes (Wentworth 2014, Environment Agency 2017a). However, applying whole catchment thinking to engagement with communities living within the catchment is more challenging.
- ***FCERM has many political dimensions*** relating to resource competition, the definition and framing of problems and solutions, issues of power and influence across institutional structures, as well as party political dynamics. Engagement practice itself can be caught up in these politics – for example, in relation to questions about the demonstrated value and effectiveness of engagement initiatives. At a local level, engagement initiatives may need to navigate political dynamics within and between communities (see also Section 4.5).
- ***Trust in risk management authorities can be affected by experiences of flooding or challenging decision-making processes***. The process of communicating risk can 'heighten anxieties and feelings of helplessness which in turn will increase the need to blame someone else' (Speller 2005, p. 5), including those perceived as being responsible for preventing flooding or dealing with its aftermath (National Flood Forum and Collingwood Environmental Planning 2018, Singh Mehmi and Bailey 2018).

3.4 What do risk management authorities know about engagement in situations with challenging adaptation choices?

The evidence generated by the Environment Agency, Natural Resources Wales and other authorities about FCERM engagement practice is derived from many different cases and situations. However, the conclusions that are drawn are often general in nature – as they are intended to inform policy and practice across the board.

Some studies do include references to, and analysis of, issues and challenges found in situations that are similar or analogous to those of interest in this project – that is, where adaptation choices are more challenging, uncertain or (potentially) contentious. These included:

- evaluations of projects from the Coastal Change Pathfinder programme that considered 'rollback' (Defra 2012a)
- reports on projects in Fairbourne and Pickering

On the whole, these reports reiterate or reinforce many of the general points about good engagement and barriers to engagement made in Sections 3.2 and 3.3 respectively.

3.4.1 Coastal Change Pathfinders that considered rollback

Defra's Coastal Change Pathfinder programme aimed to trial new approaches to planning for and managing coastal change. A total of 15 local authorities participated in the programme, which ran from December 2009 to March 2011. The local authorities were given funding to explore and implement measures to support community adaptation.

The main conclusions from an evaluation of the 5 main Coastal Change Pathfinder projects (Fenn et al. 2015) that considered rollback (retreat/managed realignment) as an option for managing flood and coastal erosion risk were as follows.

- ***Raised awareness of risk, due either to environmental changes or policy changes (for example, no active intervention) generates real impacts at community level*** including reduced property values/blight (or perceptions of), increases in complaints and pressure group activity, changes to community as people move, business decline and increased stress. Such impacts are (or should be) factored into cost-benefit calculations.
- ***Engagement can make a positive difference***:

  'In many areas there was initial opposition to the ideas of coastal adaptation and several residents were unwilling to entertain the idea, focussing instead on their desire for coastal defences. As the projects progressed and communities were involved in the planning and decision-making process, many became more willing to consider adaptation options and the feeling of many communities is more accepting of this approach' (Fenn et al. 2015, p. iv).

- ***The barriers encountered to undertaking rollback were varied, with some being specific to the Pathfinder area in which they were experienced***.

  'The most prevalent were problems associated with selecting land for rollback, a lack of community awareness or understanding of erosion and the rollback process and funding constraints' (Fenn et al. 2015, p. ii).

- ***Rollback, with the right policies and mechanisms in place, is a feasible adaptation option from 'the perspective of the Local Authority and the individuals at imminent risk of coastal erosion'*** (Fenn et al. 2015, p. vi). This suggests that difficult adaptation choices can in principle be worked through constructively with communities, especially with the right resources, institutional/political support and engagement processes.
- ***Specialist skills and knowledge are needed for 'investigating and implementing options for rollback'*** (Fenn et al. 2015, p. iii) across many different areas including planning, law, engineering, social services, geomorphology and engagement. The evaluation found that many of the necessary skills and expertise required were available within the local authorities, but that the full support of politicians and senior management was needed to make these available. It also found that other outside expertise was sometimes beneficial, including to ensure the independence and credibility of information.

- ***Financial considerations appeared to be critical to the viability of options like rollback*** (for example, the ability of homeowners or business to access financial support to enable relocation). The report highlighted:

  > 'concern among the Pathfinder authorities that Flood Defence Grant in Aid (FDGiA) does not offer funding for adaptation initiatives in areas identified as no active intervention in Shoreline Management Plans' (Fenn et al. 2015, p. iv).

However, these cases involved relatively small communities, with a limited number of properties at direct risk and considered for relocation – apart perhaps from Scratby near Great Yarmouth in Norfolk. Lessons might not transfer readily to other communities such as those in more densely populated or urban settings. Furthermore, the evaluation report by Fenn et al. (2015) does not include detailed information about the engagement processes used in these communities and why/how they enabled successful change.

The Pathfinder evaluation review also needs to be seen in the broader context of a still evolving (or inconsistent) policy framework around retreat and relocation. In short, there is no statutory right to protection from flooding or coastal erosion (Defra 2012a, 2012b). There is also no clear funding mechanism to facilitate relocation, resilience measures or compensation. This can prove a barrier to community engagement on adaptation, as some potential options are not fully legislated for or funded. Whatever has been tested to date may not generate reliable precedent for future cases, especially in a context of increasing risk across the UK.

3.4.2 Fairbourne and Pickering projects

Fairbourne in west Wales and Pickering in Yorkshire are 2 potentially important cases where communities have faced 'no protection' scenarios.

Pickering is discussed in some detail in the example at the end of Section 5.5 and so is not discussed here.

Fairbourne received some public attention due to controversy surrounding plans for managed retreat and the mobilisation of parts of the community against this decision. However, there are 3 reasons why some care is needed in writing about Fairbourne.

- It is an ongoing situation, with quite recent developments indicating some shifts from the initial plan.
- There are different narratives in play about what happened in the past.
- There is as yet limited independent research to draw on.

The Fairbourne Learning Project was established as part of a (late) engagement process in 2016 (JBA Consulting and Icarus 2016). It aimed to undertake an independent reflection and review of the effect and impact on the Fairbourne community of the second iteration of the Shoreline Management Plan for the west of Wales and related engagement activities. The project used surveys, interviews and focus group sessions to provide an analysis that supported a 'critical friend' role for the Fairbourne Moving Forward project stakeholders including the Welsh Government, local authorities and the community.

Based on (fairly limited) research, the Fairbourne Learning Project identified some learning points. Many of these points again reinforce known challenges and barriers in engagement work and decision-making in relation to FCERM. These include:

- the inherent complexity of shoreline planning

- different levels of knowledge and interest among stakeholders
- political factors
- a relatively top-down decision-making process
- issues of trust in agencies and government
- a lack of resources and support for early engagement

Perhaps most significantly, and anticipating points raised in Section 4.1 about 'readiness', the Fairbourne Learning Project report (JBA Consulting and Icarus 2016) makes a strong case for early engagement to enable communities to be more fully informed and involved in the development of plans and decisions – a similar point is made by Ledoux et al. (2005). Conflict and contention were very likely in a situation where 'no protection' was among the options under consideration, but could arguably have been mitigated or managed better through a different process. The report does not provide much detail on what kind of process might be needed, but some potentially relevant ideas follow below.

3.5 Conclusions

There is no doubt that the Environment Agency, Natural Resources Wales and other risk management authorities have made a significant commitment to the development of more inclusive approaches to planning and decision-making with communities. This has generated a useful body of work which highlights both necessary and recommended dimensions of engagement practice, as well as known barriers and challenges.

At the same time, and especially from the perspective of the wider academic literature, it is clear that FCERM continues to face familiar challenges and obstacles. For example, the study by Butler et al. (2016) of responses to the 2013 to 2014 floods highlights the political dimensions of FCERM interventions, persistent conflicts and mistrust between stakeholders (especially communities and decision-makers), the challenging legal and institutional responsibilities for managing flooding. This may simply reflect the complex and challenging nature of work in this area, but it implies that the development and embedding of 'good' engagement practice is an ongoing learning process and one that will have to respond to changing conditions – including an increase in the number of places that can no longer be protected, as well as changing social and economic circumstances.

Review of risk management authority evidence: Some questions to consider
• Where in the FCERM system does learning (still) need to happen? • What are possibilities for, and obstacles to, organisational learning to ensure that new evidence and thinking can inform practice in timely and effective ways? • In what ways does engagement practice need to evolve or change in response to known and emerging challenges in FCERM, including challenges associated with longer term trends such as climate change?

4 Understanding challenges for adaptation processes

This chapter considers a set of challenges that emerged from the evidence review. These contribute to understanding the specific needs of communities facing uncertain futures, focusing on issues that are less present or less fully developed in risk management authorities' own literature.

Section 4.1 looks at the concept of 'readiness', specifically in relation to climate change: What are the limits of current engagement with what might be radically different future trajectories, and what might be needed to enhance readiness to engage with these challenges? Part of the question here is about how different players – including risk management authorities themselves – understand and use key concepts and discourses.

Section 4.2 suggests that the analytical tool of 'frames' can aid reflection on these understandings and their implications.

Section 4.3 examines the emotional dimensions and mental health impacts of climate change. It argues that, in settings that are facing difficult choices in relation to adaptation, it is important to factor these dimensions into engagement processes, both for communities at risk and for risk management authority staff and engagement practitioners.

Section 4.4 considers emotional and cultural issues, this time with a focus on place and identity.

Section 4.5 discusses questions of power and politics. How and why are questions of authority and knowledge being contested? How does this affect how different players view themselves and each other?

Taken together, the observations in this chapter help to deepen understanding of the intellectual, political and emotional challenges facing communities that may not be protected against significant climate change impacts. The questions for consideration in the boxes at the end of each subsection are intended to provide some pointers for issues that bear on engagement practice and might help to guide analysis and reflection.

4.1 Readiness

The literature on flooding and climate adaptation implies that a first step in engagement planning should be an assessment of readiness. Do communities and stakeholders – including agency staff and engagement professionals – have the knowledge and capacities which are needed for collaborative decision-making around and action for the management of flood and coastal erosion risk, particularly in the face of changing future trajectories (Susskind and Rumore 2015)? This question links to the growing focus on building 'resilience' in communities at risk of flooding, where there are clear connections between risk awareness and action to prepare for flooding (see the comprehensive evidence review on flood resilience by Twigger-Ross et al. 2014).

Within the terms of working with communities facing difficult adaptation choices, readiness is likely to be something that has to be nurtured or developed. In particular, the literature suggests a need to take the specific challenges presented by climate change into account. The long-term nature of this risk requires a different learning

process to engagement focused on more immediate issues such as ongoing flooding incidents and recovery.

Key dimensions of readiness include:

- collective literacy about environmental issues, including anticipated trajectories and impacts of climate change and the realistic assessment of mitigation efforts
- collective awareness of local risks and the need for adaptation
- opportunities to identify and work through emotional and/or psychological responses to difficult knowledge
- capacity for an informed appraisal of different options for adaptation and their implications for different stakeholder groups
- capacity to collaborate with others in decision-making for their community
- trust in adaptation planning processes and the decisions resulting from them

- ***Many communities are not yet ready to face the implications of a changing climate, including the prospect of more frequent and severe flooding or coastal erosion***. There is, as yet, no widespread understanding or acceptance of the changes that might be needed to adapt to a less benign and stable climate, or that there may be socioeconomic, technical or environmental limits to adaptation (see Adger et al. 2008, Moser 2014, Stokke 2014). This includes but goes beyond the need to understand and adapt to flood and coastal erosion risk in the context of a changing climate.

  It is important not to generalise; some communities or members of communities may be more informed and motivated to take action (Fernández-Bilbao et al. 2009, Rumore 2015). However, literacy and concern about climate change is uneven across the population in general (see Taylor et al. 2014, van der Linden 2015).

  Even in situations where communities have experienced flooding, there is:

  > ‘clear evidence that the link between awareness of flood risk and taking action at the individual level is not straightforward and it cannot be assumed that people will take action because they ‘know’ about a flood risk’ (Twigger-Ross et al. 2014, p. 46).

  Nor can it be assumed that communities are making connections between experiences of flooding, assessments of flood and coastal erosion risk and climate change (or indeed between the causes of climate change and their own vulnerability). For example, research by a team at Exeter University suggested that, rather than attributing floods to the weather or climate, the public:

  > ‘more readily attributed the [2013 to 2014] floods to the social actions of institutions and individuals, including river and land maintenance, inappropriate development, specific decisions about water management during the flood event, and longer term prioritisation of other issues by authorities’ (Butler et al. 2016, p. 3).

  The researchers went on to say that although climate change:

  > ‘could be seen to generate conversations … about how things could be different (for example, ideas associated with catchment management, novel agricultural ideas for reducing flood risk, and more radical changes to housing such as building on raised platforms), these remained quite disjointed and were not

> reflected in the actions that were ultimately taken [in their communities]. … Rather, responses were dominated by notions of resilience as bounce back and return to normal' (Butler et al. 2016, p. 14).

This suggests that public expectations are still largely framed by expectations of 'business as usual', that is, that the state can and will protect them from risks. If climate change does proceed towards worst case scenarios, the impacts include but go well beyond heightened flood and coastal erosion risk, including prospects of greater social, economic and political instability – both globally and locally. These will affect capacities for adaptation at all scales.

- ***Fostering climate awareness and readiness for adaptation presents engagement challenges and dilemmas***. A research review by Taylor et al. (2014) on public perception of climate change and adaptation in the UK again highlighted the complex nature of linkages between climate awareness and willingness to take action. In particular, they highlighted the emotional dimensions of responses to information about climate change scenarios and the problem of communication strategies focused only on risks (Terpstra 2011).

  > 'Where fear-provoking climate change scenarios are presented without clear steps for mitigation and risk reduction, fatalism, helplessness and psychological distancing can be elicited' (Taylor et al. 2014, p. 12).

  There are specific studies and training on climate communication that could be relevant for the evolution of future engagement practice. Examples include The Handbook of Climate Change Communication (Filho et al., 2018) and the Yale Program on Climate Change Communication[2].

- ***National discourse and policy on climate change adaptation lacks consistency, making public education on climate change more difficult***. Susskind and Rumore (2015) have argued for 'mainstreaming' climate change into 'everyday planning decisions'. They suggested that planners need to be making decisions now which reflect, as far as possible, longer term considerations associated with anticipated environmental changes, and that this applied to all planning decisions – large and small. This has value not just in terms of ensuring that current decisions support adaptation over the long term, but because it could encourage public acceptance of environmental change and its implications.

  In the UK context, there are mechanisms to encourage the mainstreaming of climate adaptation into everyday planning (for example, via shoreline management plans and flood risk management plans), but there are still significant social, economic and political pressures to prioritise more immediate concerns.

- ***Radical options for adaptation like relocation are relatively uncommon***. In their review of 27 cases of managed retreat ('the strategic relocation of structures or abandonment of land to manage natural hazard risk') in 22 countries, researchers at Stanford University in California stated that managed retreat 'has been used only in limited fashion to date' as a response to increasing flood and coastal erosion risk (Hino et al. 2017). This is because of the 'social and psychological difficulties in displacing people from their homes' (see Section 4.3), because of the political contentions that surround it (see Section 4.4), and because past decisions to create defences encourage development in turn 'amplifying motivations' for protection (Hino et al. 2017, p. 364).

  Alternatives to retreat may be limited due to their technical complexity, high costs versus benefits, environmental impacts or alternative socioeconomic priorities. Hino et al. (2017) found that managed retreat requires political backing, a high cost-

[2] http://climatecommunication.yale.edu

benefit ratio, and a consensus that environmental risks are unacceptable and the retreat benefits wider society. Processes to build understanding of risks, to help communities imagine alternative futures, and to work through assessments of costs and benefits from different perspectives will be needed before this acceptance will exist; see also Alexander et al. (2012), King et al. (2014) and Gibbs (2016).

Figure 4.1 presents different scenarios relating to managed retreat found in the research review by Hino et al. (2017). The figure distinguishes between bottom-up, resident-led calls for retreat and top-down, government-led initiatives for retreat. Although the model is based on international cases, including developing countries with different conditions of risk, governance and resources, the 4 scenarios nevertheless remain plausible for the UK, given that levels of risk, governance and resources could change in the future.

- ***Retreat is not always negatively perceived***. Some communities have taken the initiative in pressing for relocation, indicating a need to take local conditions into account in order to understand when and why communities might actively pursue options like retreat. Furthermore, Hino et al. (2017) specified some of the benefits that can accompany retreat or relocation. For example, the minimal ongoing costs associated with changes in land use (compared with defences), or that retreat in one area often benefits other areas. Initiatives for retreat can be opportunities for 'multisolving' – using change processes to achieve linked social, economic and environmental benefits at different scales.
- ***Efforts to build readiness in or with communities need to be grounded in and tailored to local conditions – and will be more effective for doing so***. Although national and local government have very significant roles in supporting communities in FCERM and climate adaptation, Susskind and Rumore (2015) stated that local and regional entities will be on the frontline in terms of risk and impacts. Local communities may be able to do little to influence global environmental trends, but they can do things to minimise the effects on their own places. Furthermore, the possibilities for adaptation will be strongly influenced by local conditions. Geography, topography, social capital, the economy, and the nature and extent of vulnerability all are critical to the development and acceptability of adaptation options.

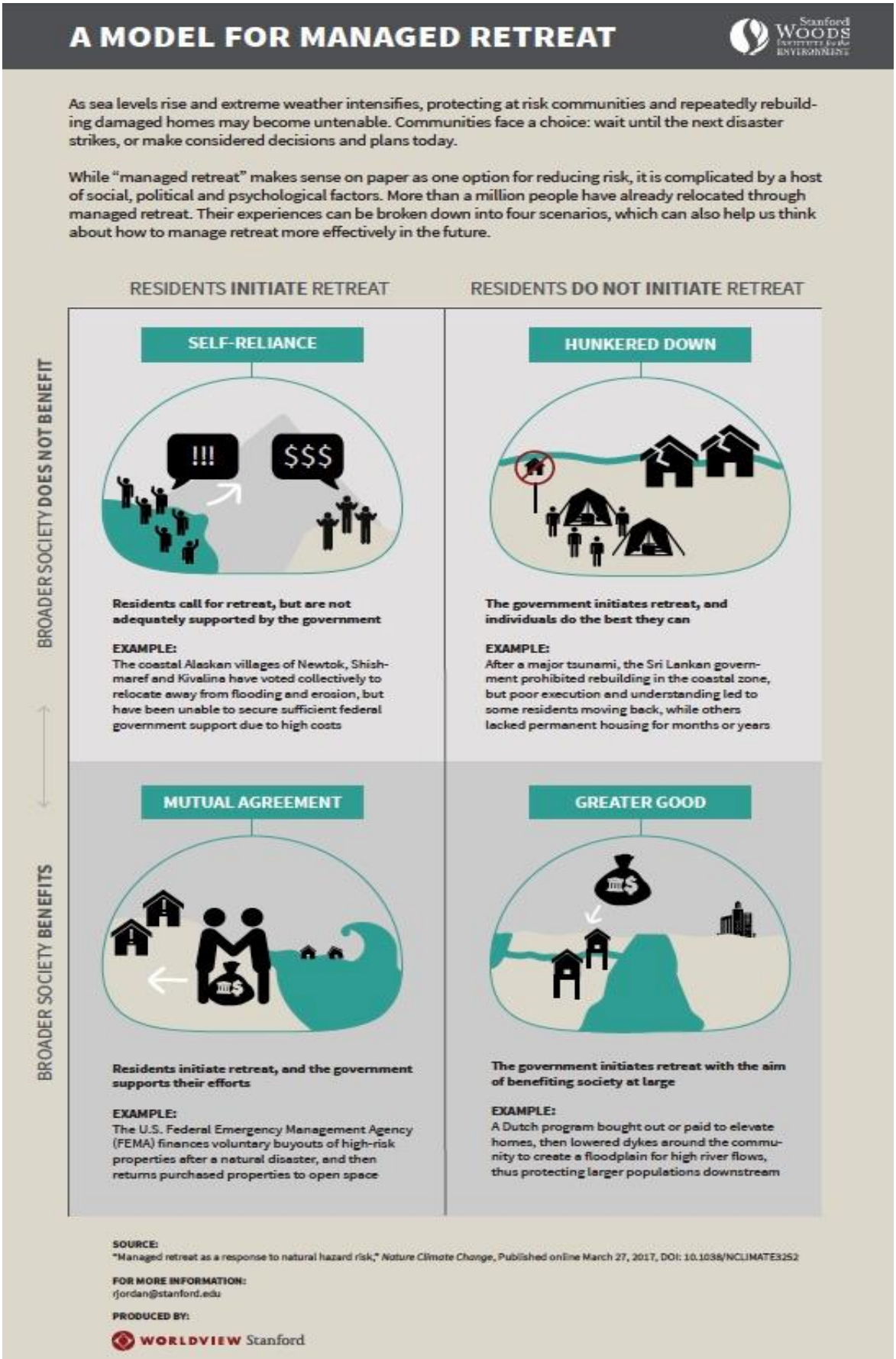

Figure 4.1 A model for managed retreat

Source: Hino et al. (2017)

- ***Levels of readiness among risk management authority staff, planners, experts and engagement professionals also need to be considered.*** Studies such as those by Lane et al. (2010) and the National Flood Forum and Collingwood Environmental Planning (2018) have suggested that, in situations that become conflictual, professionals can contribute to problematic patterns of interaction by:
  - coming in with preconceived notions of what is needed or possible
  - not respecting the inputs of community members
  - lacking appropriate skills or expertise

  In addition, climate change adaptation may pose new and unfamiliar challenges and require new information and ways of working (Tribbia and Moser 2008).

  Moreover, the emotional challenges of coming to terms with a future that may look very different to the present are likely to be as difficult for those who are working with local communities as for those communities themselves – and being the bearer of 'bad news' is an additional difficulty that should not be underestimated. As Moser (2015) puts it, for many of those involved in governance and planning, 'the difficult recognition and public articulation of just how big the coastal adaptation challenge is lies yet ahead'.

  This report therefore raises questions related to the readiness of professionals alongside looking at the challenges adaptation raises for communities and other stakeholders.

Readiness: Some questions to consider

- What methods/instruments exist to support the assessment of readiness?
- What are the particular ethical and practical challenges in efforts to promote awareness about and action for climate change and serious long-term flood and coastal erosion risk?
- What are the priority interventions for enhancing levels of readiness in particular places?
- In formulating national discourse and policy around longer term adaptation to climate change, how could the Environment Agency and Natural Resources Wales contribute to building readiness to engage with these challenges? What changes might be needed at higher levels (for example, by national governments) to support this?
- What mix of skills and expertise is needed to support communities in building readiness for collaborative decision-making on FCERM and climate adaptation? What does this suggest about additional training needs?
- What support needs might planners, engagement practitioners and other professionals involved in adaptation engagement, planning and decision-making have? How might professionals support each other in this difficult work?

4.2 The complexity of frames

The previous section suggests that communities need to have reliable and useable information to help them understand flood and coastal erosion risks in the context of

climate change and support deliberation and decision-making on options for adaptation, including considering options that might be difficult or contentious

At the same time, the evidence reviewed for this report shows that:

- information is rarely neutral or objective – it can reflect the interests or assumptions of those producing it
- information is received and interpreted differently by individuals and stakeholder groups due to pre-existing ways of thinking

It follows that it is necessary to understand more about the role of these subjective or perceptual factors and their (potential) relationship to engagement work and decision-making.

- ***The language of frames and framing provides a useful metaphor and analytic framework for thinking about the cultural and political dimensions of flood risk management***. As a metaphor, the concept of a frame is very simple. Frame theorists such as Erving Goffman and George Lakoff suggest that our implicit belief systems (our acquired knowledge, memories, beliefs and values) significantly influence how we perceive and interact with the world. Just as a window or a camera lens gives us a partial and very particular perspective, our ways and habits of thinking both filter and colour the information we receive. However, because these 'frames' are mostly unconscious, individuals are not always fully aware of how or why they see things the way that they do.
- It has been found that ***stakeholders use frames both interpretively and strategically***:

  > 'As interpretive lenses, frames help us make sense of complex situations in ways internally consistent with our worldviews, giving meaning to events in the context of life experience and understandings. As strategic tools, frames help rationalise self-interest, persuade broader audiences, build coalitions, or promote preferred outcomes' (Shmueli et al. 2006, p. 208).

  Frame analysis helps to make more visible these underlying 'interpretive schemes' and also some of the ways that individuals or organisations actively or strategically 'frame' issues and information.
- ***Frame analysis supports understanding of how and why perspectives on some issues might diverge or conflict, making collaborative and inclusive decision-making more difficult***. As suggested by Tebboth (2014):

  > 'frame analysis can be used as a means to understand these conflicts by making explicit the way in which different players communicate issues in an attempt to build consensus and support for "their" point of view'.

  It can also help us to understand why certain messages or ideas resonate and others do not, why some information is trusted or accepted (or rejected), why certain options for managing flood risk might be favoured over others, and so on. It helps show that challenges in communication are not always due to 'misconceptions' or a lack of information (though they can be), but connected with deeper habits or patterns of thought.
- ***Frames can be explicit or implicit in government policies***. Fünfgeld and McEvoy (2011, p. 5) argued that frames can be 'explicit in strategies, policy documents, or procedural guidelines [or] implicit in discussions, choices ... and processes'.

For example, the UK government radically 'reframed' policy on flooding in the early 2000s moving from an emphasis on 'holding back the water' to 'learning to live with floods' (Defra 2005). This change is directly reflected in terminology used by the Environment Agency and other risk management agencies – for example, in a shift from 'flood defence' to 'flood management', and in the use of terms like 'adaptation' and 'resilience'. Some aspects of this framing are explicit and clear, but the turn to 'management' also encompasses various assumptions and policy objectives that may not be obvious to others about:

  - the strengths/limits of engineered solutions to flooding
  - present and future levels of flood and coastal erosion risk in the UK
  - the distribution of roles and responsibilities in managing flooding
  - political and public support for expenditure on flooding

- ***The way in which problems like coastal erosion and flood risk are framed reveals deeper assumptions, discourses and (political) agendas***. For example, in his frame analysis relating to Happisburgh, Mark Tebboth of the Tyndall Centre for Climate Change Research highlighted a deep divergence between national and more local discourse on the causes of flood risk and coastal erosion. He argued that the 'primacy of natural causes' in national discourse on coastal erosion, and specifically the emphasis on causes (such as climate change) that are 'beyond the scope of Government to control' can be seen an attempt to counter 'any perceived responsibility the Government has for the abandonment of or failure to maintain the existing coastal defences (Tebboth 2014, pp. 227-228). In other words, national discourse appears to naturalise the problems of flood risk and coastal erosion (Wood 2015).

  In contrast, Tebboth (2014) demonstrated that local frames emphasise the social and political dimensions of risk such as perceptions by the Coastal Concern Action Group (CCAG) of under-investment in sea defences or the toleration/ encouragement of practices like dredging that are deemed by the coordinator of CCAG to be a significant contributing factors to coastal erosion. Tebboth mainly highlighted in his analysis how and why these frames are difficult to reconcile – in part because they reflect quite different beliefs about the primacy or fragility of nature, or values regarding the proper structure for governance and decision-making. However, he also indicated how these framings are socially and politically functional; for example, he linked the framing of flooding as natural and inevitable to the emergence of a more centralised and technocratic approach to decision-making.

  This is not the place to debate such claims, but it indicates a need to recognise that there might be more to think about in relation to (seemingly neutral) policy statements. Tebboth's arguments encouraged the authors of this report to consider how climate change frames this project and indeed what assumptions are being made in this report about it.

- ***How risk management authorities such as the Environment Agency and Natural Resources Wales talk about stakeholders frames relationships***. The Environment Agency is positioned within many reports in relation to the communities it is working for or with. This is conveyed in various ways including:

  - in language (for example, talking about customers)
  - in the articulation of organisational objectives

- in the analysis of issues (generally from the Environment Agency's perspective)

For example, Demeritt and Norbert (2014, p. 321) noted that 'an instrumental framing of risk dialogue is reflected in the very title of the 'Building Trust with Communities toolkit'[3] used by the Environment Agency to engage with communities, which encourages them to accept shared responsibility for flood risk.

The authors also highlighted a tension between the (genuine) intention to promote dialogic forms of engagement with communities, and other institutional priorities and/or approaches that treat communities as objects of (rather than agents in) engagement processes. The point here is simply to understand how and in what ways this positioning might influence relationships and be related to the analysis of barriers and challenges in engagement practice.

- ***Risk management authority frames may not necessarily reflect or resonate with public attitudes and moral commitments***. For example, Adger et al. (2017, p. 384) argued that 'risks are frequently, and often dominantly, framed in public talk as moral issues rather than issues of economic rationality, likelihood, or individual concern'. In other words, people think about climate change and adaptation mostly as issues of fairness and equitable treatment for the most vulnerable. Adger et al. (2017) concluded that:

  > 'vulnerability-based motivations … have high salience and are prevalent in public discourse. This suggests that the public is more likely than might be assumed to give support for policies that invest in marginal areas, even at higher cost'.

  Such attitudes, however, may change in response to wider social, economic and political trends. One implication of this research is that risk management authorities and engagement staff need to understand the moral assumptions that may underpin views on flood and coastal erosion risk and options for managing or adapting to it (see also Xue et al. 2014).

  Some research suggests that care is needed in highlighting climate change as a cause of flooding. Echoing Tebboth (2014) above, research by Butler et al. (2016) found that members of the public:

  > 'perceived expert knowledge relating to climate change as a political device that was used to facilitate transfers of responsibility or to suggest that citizens should have been better prepared [for flooding]' (Butler et al. 2016, p. 12).

- ***Specific words or terms may mean different things to different stakeholders, creating potential for misunderstanding and disagreement***. For example, Fernández-Bilbao et al (2009) highlighted how the word 'adaptation' can be interpreted as a synonym for specific options in FCERM, that is, as another way of saying 'managed retreat'.

  Whether correct or not, this simply indicates how the technical language used by professionals can frame conversations, not always in helpful ways. Likewise, the review paper by Suzanne Moser on communication about climate adaptation (Moser 2014) also showed how a term like 'adaptation' can have very specific meanings depending on:

  - the context (for example, within different scientific communities)
  - a user's intention or purpose (for example, to be provocative or encouraging)

[3] This has since moved onto the 'Working with Others' framework.

- historical/cultural associations (for example, Al Gore's critique that adaptation means giving up on the fight against climate change)

Her research suggests that substitute terms – such as readiness or resilience – may evoke more positive responses for some but be more contentious for others. Cloutier et al. (2014, p. 460) suggested that the broader the range of players or stakeholders, the more challenging it can be to establish common understanding.

In short, it cannot be assumed that a given term, however familiar or accepted within one context, will be understood or have the same effect somewhere else.

- ***Framing 'success' is a specific challenge for communities that are adapting to severe flood and coastal erosion risk***. The evidence review indicated that there is as yet no clarity or agreement about what 'success' means in climate adaptation, and indeed that this is an important consideration as adaptation efforts evolve.

  In their introduction to the book, 'Successful Adaptation to Climate Change', Moser and Boykoff (2013) suggested that the question of what success means:

  > 'has no easy scientific or political answers. Those who are just beginning to explicitly grapple with the adaptation question may not know where to begin to unravel the complexities involved that the question of success may entail. And even those already deeply engaged in adaptation often have little experience with how to set themselves up for long-term learning, evaluation, and ongoing adjustments to meet policy goals in an uncertain and rapidly changing environment'.

  This suggests that the nature of environmental change may disrupt existing frameworks for evaluation, or may require different ways of assessing the impacts of interventions to support communities adapting to significant flood and coastal erosion risk, especially within relatively long timeframes for adaptation.

  At the same time, it is obvious that success can be framed narrowly (for example, in terms of economic savings or the number of homes protected) or in more comprehensive ways, such as indications of enhanced readiness within a community as a result of engagement, or evidence of high participation in decision-making.

  Clearly, some aspects of 'success' will be more tangible and measurable than others (Wehn et al. 2017, p. 35), as are some costs such as the loss of cultural heritage in situations of retreat (Hino et al. 2017, p. 364).

  Perhaps most importantly, different stakeholders may have different conceptions of what success means or looks like, and because definitions find expression in policy and project objectives and in the allocation of resources, they may be the focus of contestation. As Moser and Boykoff (2013) put it:

  > 'the question then arises how to adjudicate among goals, how to assess and negotiate trade-offs, prioritize goals and strategies, and move a process along that may be socially and politically deeply contested'.

- ***Social identity is key to understanding why people accept or reject certain 'frames'***. Perspective is strongly connected to our sense of who we are, reflecting the complex influence of culture, experience, connections to places (see Section 4.4), ethical or religious values, political beliefs, social and professional roles that make up identity.

  Within environmental conflict resolution research and practice, the analysis of identity can generate insights not just about why people perceive a situation,

problem or solution in the way that they do, but also why people may react strongly to certain ideas or information. As Shmueli et al. (2006, p. 211) put it:

> 'challenges to one's sense of self [can] trigger opposition and may even deflect attention from issues and toward protection of one's identity. Typical responses to identity challenges – ignoring information and perspectives that threaten it, reinforcing affiliations with like-minded groups, and negatively characterizing outsiders – [can] impede subsequent agreements'.

This issue is explored further in Section 4.4 on place attachment and the psychological dimensions of flooding.

- ***Conflict is commonly framed as a problem***. In the evidence on engagement, conflict is often discussed as a costly problem to be minimised or avoided where possible (see Thaler and Levin-Keitel 2016). While it is obviously true that conflict can be very challenging (this being one of the reasons for engagement processes), this is not the whole story.

  A balanced view of conflict would recognise that it can also indicate the presence of legitimate concerns and/or be a stimulus for both individual and social learning; the presence of conflict is not inherently problematic (though it matters how it is expressed and handled). Furthermore, there may be different views on what constitutes conflict (are all forms of disagreement or contention to be framed as 'conflict') or about its causes and consequences. Is it due to legitimate differences between goals, beliefs or values? Are some people just 'troublemakers' or 'time wasters'? In terms of frame analysis, this suggests a need to consider who is doing the framing and why.

  These considerations link to the design of engagement and decision-making processes, that is, deliberative methodologies assume that disagreement can be productive and handled in a constructive way. Cloutier et al. (2014, p. 461) suggested that debates over the social and moral concerns at the heart of climate adaptation 'give them a greater depth and legitimacy', helping to 'build strong foundations for guiding community development and foster the expression of divergent views' and increasing the chance that 'values that are less often heard and upheld are taken into account'.

- ***The definition and classification of stakeholders can actively frame engagement practice***. Although the identification and categorisation of stakeholders appears to be relatively straightforward in practice guidance, there are noted risks in making assumptions about who has a 'stake' in the management of flood and coastal erosion risk or who is best placed to contribute to decision-making.

  For example, guidance issued by the National Oceanic and Atmospheric Administration in the USA cautions against stereotyping stakeholders, that is, treating members of groups as having undifferentiated interests or viewpoints (NOAA 2015).

  Wehn et al. (2017) argued, with regard to climate adaptation processes, that certain groups tend to be under-represented in stakeholder engagement processes suggesting, for example, that 'young people, local communities and the homeless are not frequently acknowledged as 'well-placed' stakeholder groups', meaning that they are not considered as important for inclusion' (Wehn et al. 2017, p. 36).

  In addition, a rigid or imposed definition of stakeholders may miss the ways in which individuals and groups actively claim a 'stake', including through framing their interests and positions in oppositional ways:

> ‘stakeholders actively construct, promote and defend their stake over time and can sometimes defend their stake and exert influence by not engaging in participatory processes’ (Wehn et al. 2017, p. 36).

As with many other issues discussed here (and below), there are questions of power in relation to the definition and framing of participants in engagement processes.

The complexity of frames: Some questions to consider

- To what extent are ‘frames’ visible or made visible within stakeholder analysis exercises or engagement processes, including implicit/explicit frames in government/agency policies and approaches?
- What are the risks or benefits in exploring the deeper beliefs, assumptions, values and identities that influence participation in decision-making around flood and coastal erosion risk? What depth of analysis is needed or helpful?
- How open are risk management authorities to having their ways of framing problems, solutions, conflicts and people questioned or challenged? What are the implications of either defending frames or opening them up for critical exploration?
- When is it legitimate and helpful to encourage reframing of stakeholders’/ communities’ ways of understanding issues?

4.3 Climate change, emotions and mental health

In contexts where changes in FCERM are driven – wholly or in part – by current or predicted climate change impacts, it is important to recognise the emotional challenges of engaging with climate change and the potential mental health impacts on individuals and communities. A recent study on climate change and mental health observed that ‘the risks and impacts of climate change on mental health are already rapidly accelerating, resulting in a number of direct, indirect, and overarching effects’ (Hayes et al. 2018).

Some of these effects are associated with major disruptions such as disasters (for example, major flooding events). Others arise as a result of incremental but significant changes such as rises in temperatures and sea levels.

In addition to specific effects observed in particular places, mental health impacts also include:

> ‘the long-term emotional distress caused by awareness of the threats and impacts of climate change on the current and future wellbeing of the earth and its inhabitants’ (Hayes et al. 2018).

This kind of distress does not have to be linked to direct experience of climate change impacts. As Lise van Susteren notes in a recent report from the American Psychological Association, people may experience:

> ‘pre-traumatic stress response (a before-the-fact version of classic PTSD [post-traumatic stress disorder]) because they know the world has not heard the warnings forcefully enough’ (Clayton et al. 2017, p. 57).

The increasing recognition that climate change impacts include emotional and psychological responses also has implications for adaptation. The most important observations in the relevant literature are discussed below.

- ***Although emotional distress and mental health impacts associated with climate change are not always readily apparent, it is worth considering how they can be factored into adaptation processes more explicitly.*** In a study of the perceptions of coastal stakeholders in the USA, Moser (2013) observed that 'emotional responses to climate change deeply color visions of a desirable future' (Moser 2012, p. 1), but that some focus group participants 'found the topic [of climate change] so emotionally distressing that they did not volunteer their fatalistic views until invited to speak to them' (Moser 2012, p. 6). Societal mechanisms of denial and avoidance, moreover, can leave people feeling alienated and isolated with their concerns, with further negative consequences for mental health. Conversely, Thomas Doherty writing in the American Psychological Association report mentioned above points out that acknowledging and talking about climate change with others can help 'maintain … creativity and motivation, avoid isolation, and find a sense of shared purpose with others' (Clayton et al. 2017, p. 28).
- ***The mental health impacts of climate change are exacerbated by (often justified) perceptions of a mismatch between the scale of the problem and suggested 'solutions'*** (Moser 2012, Bushell et al. 2017, Hayes et al. 2018). A sense that governments are not committed to serious national or international level strategies, the perception that many actors are self-interested rather than committed to a wider common good, and the mismatch between the scale of climate change and the agency that is possible at the scale of citizens contribute to feelings of frustration and despair (and for some, denial and avoidance). These are not conducive to effective adaptation.
- ***Communal responses to climate change impacts can help to foster a sense of agency, altruism and compassion 'as people band together to salvage, rebuild, and console amongst the chaos and loss of a changing climate'*** (Hayes et al. 2018). Often observed in the aftermath of disasters (including in major flooding events in the UK), a sense of local capacity, community and solidarity in the face of adversity positively affects mental health (Fritz 1996, Solnit 2009) and community resilience. Against this background, successful adaptation is also and importantly about strengthening collaboration, trust and civic engagement (Moser 2012).
- ***Like climate change impacts in general, many of the physical and mental health impacts associated with climate change fall disproportionately on marginalised groups of people, exacerbating existing inequalities and injustices*** (Hayes et al. 2018, Watts et al. 2018). Perceived or actual failures to address inequality and injustice also undermine the potential for the more positive responses discussed above. This is partly because inequalities can erode community solidarity, but also because people who are already stressed by the daily challenges of survival may perceive efforts to raise awareness about climate change or flood risks as an additional burden (National Flood Forum and Collingwood Environmental Planning 2018). Reducing disparities thus emerges as an important adaptation strategy in itself (Clayton et al. 2017).
- ***Within engagement processes, confronting inequality and injustice is also likely to be emotionally challenging and uncomfortable***. Issues of inequality are likely to arise at different levels, including in relationships between risk management authorities and local communities, but also in relation to dynamics within risk management authorities, within local communities and between different

localities. Serious engagement with these issues can be difficult work that needs to be approached with courage and with a good understanding of what processes might be helpful in particular contexts (Tschakert et al. 2016). It is also important to acknowledge that 'it is tricky to strike a balance between overly optimistic future visions (wishful thinking) and hopelessness due to long histories of social and political exclusion' (Tschakert et al. 2016, p. 190).

Climate change, emotions and mental health: Some questions to consider

- How might the emotional dimensions of engagement with climate change impacts be more explicitly factored into community engagement and adaptation planning? Might this include a need to make provision for emotional and mental health support alongside such processes?
- How do staff at the Environment Agency and Natural Resources Wales feel about engaging with the emotional dimensions of recognising climate change impacts, planning for adaptation and facing what is often irreversible loss? Are there opportunities for staff to work through some of these difficult questions for themselves? Would such opportunities be helpful?
- If a sense of powerlessness or lack of agency is one of the most important factors that exacerbate the negative mental health impacts of climate change, how can adaptation planning and engagement processes contribute to strengthening a genuine experience and sense of local capacity and efficacy?
- Which dimensions of inequality and injustice bear on particular contexts? How might engagement processes take account of these, and what might the political and emotional implications be? Is there a need for training of engagement staff on how to facilitate serious and respectful engagement with these issues?

4.4 Place attachment, culture and identity

There is considerable evidence that people's emotional connections to particular places shape their engagement with climate change impacts and planning for adaptation. As Moser (2012, p. 4) points out:

> 'the very human terrain of people living in affected coastal communities and having to change what they know … is political on the surface and personal – psychological, spiritual and cultural – deep underneath'.

In contexts 'where loss … is assured' and 'keeping what we've had' is not a realistic, long-term option', the question of what 'adaptation success' might look like is particularly challenging (Moser 2012, p. 4).

Studies of place attachment in different contexts are helpful in understanding the ways in which a sense of belonging to a particular place and community can affect engagement with (climate) change.

- ***In many cases, place attachment can be helpful in engaging communities in thinking through and adapting to climate change impacts***. For example, one recent review of 66 studies found a strong positive correlation in a majority of cases (74%) between 'the meanings, emotions, and bonds that individuals and groups have towards places' and engagement with the environment and climate change. This relationship was particularly evident in places that were experiencing significant climate change impacts, and stronger in studies that evaluated the

impact of relations to place on action than in those that focused on measuring concern (Nicolosi and Corbett 2017).

- ***In relation to flooding, it is worth noting that communities with long histories of flooding tend to develop a 'watery sense of place'***. Memories of living with water, coping with floods and community responses to flooding become part of local discourses, often in ways that strengthen community learning and resilience (McEwen et al. 2017). The presence or absence of such 'sustainable flood memories' will make a significant difference to how people respond to the prospect of future flooding, both emotionally and practically.

  It is important to acknowledge that ***strong emotional bonds to particular places or communities can exacerbate the sense of loss associated with climate change impacts and thus have a negative impact on mental health***. Solastalgia[4] caused by environmental changes that undermine positive relationships to a place is now recognised and studied as a mental health condition in its own right. In turn, this might also lead to denial or avoidance strategies that can mitigate against active engagement with the implications of climate change for a particular place or community. As Nicolosi and Corbett (2017, p. 92) pointed out:

  > '[w]hat studies of loss and emotion point to is the need to acknowledge the often-difficult feelings surrounding the loss of a loved place if one is to also promote engagement with climate change issues'.

- ***In places facing severe climate change impacts and thus potentially relocation, place detachment[5] may be needed to facilitate adaptation*** (Agyeman et al. 2009). The challenges associated with 'loosening' ties and forming attachments to an altered or completely different place is an aspect of climate change adaptation that deserves much further attention' (Quinn et al. 2015, p. 164).

- Studies of the interconnections between place, identity and adaptation to climate change impacts suggest that ***efforts to engage communities in decision-making and adaptation planning are likely to be better received and more successful if they are sensitive to the meaning and significance places can have for people's sense of identity and well-being*** (see, for example, Agyeman et al. 2009, Moser 2012, Adger 2016, Clarke et al. 2018). Adger et al. (2008, p. 348) suggested that 'undervaluing culture and place' risks 'ignoring certain limits to adaptation, which whilst subjective are real for those experiencing them'.

- ***People with strong attachments to place, and those whose identities are bound up with relationships to particular places, often have particularly strong feelings about decision-making processes that will affect their place*** (Agyeman et al. 2009, Mesch and Talmud 2010, Anton and Lawrence 2014, Quinn et al. 2015, O'Neill and Graham 2016). For good reason: studies suggest that solastalgia is exacerbated by a sense of powerlessness and lack of agency. As observed by Askland and Bunn (2018, p. 21), 'place based distress … is closely intertwined with matters of power and autonomy to determine the interpretation of the past and imagination of the future'.

- ***It should not be assumed that people who live in the same place have the same emotional links to this place, or that all places generate the same levels of positive place attachment.*** There are many dynamics – long-time residents vs. relative newcomers, people working in place vs. commuters, differences and

[4] 'the distress that is produced by environmental change impacting on people while they are directly connected to their home environment' (Albrecht et al. 2007, p. S95).

[5] 'the intentional dissolution of ties to place' (Nicolosi and Corbett 2017, p. 93)

inequalities across generational, class, gender and ethnic lines, personal biographies – that can affect both the intensity of emotional connections and their substance. Not all such connections will be experienced as positive. Similarly, some places may be associated with negative rather than positive emotions. The hope that adaptation might deliver 'something better than what we have' (Moser 2012, p. 5) can thus be an equally important driver for engagement than the desire to preserve what is there. Importantly, the emotional relationships (positive, negative or mixed) that people may have to a particular place should not be assumed but will need to be investigated on a case by case basis.

- ***While place attachment and identities clearly need to be given space in engagement processes, it is important to avoid 'fixed notions of what individuals perceive to be desirable or morally acceptable'*** (Quinn et al. 2015, p. 168). The same authors argued that:

  > 'such assumptions in policy are founded on a narrow view of the characteristics and influence of identity that may not be appropriate in relation to the adaptive challenge of climate change. Where people live, their recreation, and what they value are all much more dynamic than planned for in most policy interventions' (Quinn et al. 2015, p. 168).

  Similarly, Devine-Wright (2013, p. 65) made the point that 'attachments to place ebb and flow over time'. In this context, they noted that:

  > 'specific engagement strategies (for example in contexts of managed realignment of coastal areas) may promote anticipatory detachment from place in a non-threatening manner, lessening the likelihood that 'excessive' attachments to place lead to "NIMBY" type resistance to changes perceived to be imposed by institutions on individuals and communities'.

  Treating people as participants in a dynamic process is more likely to be successful than viewing them as recipients of information or publicity designed on the assumption that their emotions, identities and preferences are fixed.

- ***Engagement and decision-making processes that are seen to be inclusive and fair, and which acknowledge and respect the emotional dimensions of disturbances to place, can go a long way towards building trust, lessening conflict, benefitting from local knowledge, and enabling people to engage with difficult choices*** (Agyeman et al. 2009, Adger 2016, Clarke et al. 2018).

- Some commentators (for example, Devine-Wright 2013) have raised critical questions about the scales at which attachments to place are considered and experienced. ***Although there is a tendency in much of the literature to frame place attachment in relation to the local, place attachment can also be envisaged at regional, national and global scales***. Fostering emotional connections with 'place' at larger scales may be helpful in negotiating the challenges of gaining wider public support for adaptation planning that involves costs and trade-offs across scales.

Place attachment, culture and identity: Some questions to consider
• To what extent have the practices of the Environment Agency and others consciously attempted to incorporate place attachment, culture and identity into the design of community engagement plans? • How (much) do staff who are professionally involved in community engagement learn about community-based, often voluntary initiatives that may predate their involvement? What might positive ways of relating to such initiatives look like? Are

such local initiatives doing important things that outside organisations do not need to replicate?

- What might engagement that is sensitive to place, culture and identity look like in practice? What can be learnt from existing research and practice, particularly in places that face significant change?
- How might an existing 'watery sense of place' interact with climate change scenarios that predict different trajectories for the future? Might communities with a 'watery sense of place' and 'sustainable flood memories' be overconfident about their capacity to cope? What processes, in turn, might help to develop a 'watery sense of place' in communities that have not experienced much flooding but are likely to do so in the future?
- Within a local area, are there places in the built environment and/or the wider landscape that hold particular emotional relevance for local communities (for example, because they are associated with significant memories or cultural practices)? How might this be taken into account in adaptation planning?
- How might tensions between place attachment and detachment be experienced and negotiated in real world situations?
- What potential might there be in exploring the different scales at which place attachment can operate? Could this foster a sense of solidarity and public support for difficult adaptation and/or relocation decisions across different places within the UK, for example?

4.5 Questions of power and politics

Within the literature on climate change adaptation, questions of power and politics are increasingly being raised, both conceptually and with reference to case studies of particular adaptation processes around the world (see, for example, Tseng and Penning-Rowsell 2012, Tschakert et al. 2016, Nightingale 2017). These studies are conceptualising adaptation as political 'all the way through', observing that 'what counts as "adaptive" is always political and contested' (Eriksen et al. 2015, p. 523).

In these analyses, all players – including government agencies, scientists, stakeholder groups and communities – are operating within a political terrain, and their analyses, frames, assumptions and actions have outcomes that are neither neutral nor incontestable.

Eriksen et al. (2015) suggested analysing the politics of adaptation via the following key concepts and associated questions:

- **Authority**. How are different players claiming the legitimacy to shape adaptation decision-making? What are these claims based on, and how and by whom are they recognised or contested?
- **Knowledges**. Which and whose knowledges are considered valuable and important in climate change adaptation processes? Which kinds of knowledge are missing, and with what consequences? And how might contestations over what knowledge counts take adaptation processes into new directions?
- **Subjectivities**. How do the different social groups involved in adaptation processes see themselves, and how are they seen by others? Who, for example, is categorised as 'vulnerable' or 'resilient', and why? How do

existing identities, power relations and inequalities shape these processes? How do the ways in which different groups are perceived shape their ability to influence the outcomes of adaptation decision-making? How do the ways in which they see themselves impact on their sense of agency? How might the outcomes of decision-making processes confirm, challenge and reshape subjectivities?

Drawing on these concepts, Eriksen et al. (2015, p. 524) argued:

> 'for more empirical and analytical attention on the contexts within which authorities, knowledges and subjectivities come together to shape what counts as adaptation and for whom'.

Reflection on these questions is important for all those involved in adaptation planning and decision-making. Risk management authorities would benefit from carrying out these analyses not just in relation to stakeholders and communities, but also with respect to their own roles.

- As pointed out by Eriksen et al. (2015, p. 529) ***in the context of climate change adaptation, claims to authority are closely linked to questions of knowledge***:

  > 'Authority is legitimized, reinforced, and challenged through the use of knowledge; knowledge serves as a basis for challenging or asserting the legitimacy of authority'.

- In many of the contexts under consideration here, contests over authority and knowledge are about the question of whose knowledge/expertise is most relevant to adaptation decision-making. As documented by Autesserre (2014), ***organisations that work across a number of settings tend to prioritise thematic and technical expertise over in-depth knowledge of the characteristics of particular places***. Often, this means that the knowledge of people with formal training and qualifications – which in themselves prioritise technical/thematic expertise over local knowledge – is more valued than the detailed knowledge held by people who have lived in a place for a long time.

- ***This focus on thematic/technical expertise has some positive consequences.*** It makes it easier and more efficient, for instance, to transfer lessons on best practice and helpful insights between contexts. Bringing outsiders into settings in which difficult and potentially divisive decisions have to be made can also help to introduce some critical distance and avoid bias. For agencies that operate at a national level, it is also clearly important to be seen to work in accordance with fair policies and procedures across a range of particular places. As Autesserre (2014, p. 79) acknowledged: 'unified practices and procedures offer guidance to interveners in the form of policy directives, manuals, and indications of which issues to prioritize'.

- ***The prioritisation of thematic and technical knowledge, however, is both fuelled by and in turn reinforces an unequal distribution of resources***. It also has implications for how subjectivities are constructed and experienced. Autesserre (2014, p. 96) observed:

  > 'It is in part thanks to their financial, material, and symbolic resources that interveners have succeeded in constructing external expertise as more relevant and more useful than local knowledge. At the same time, valuing thematic knowledge over local expertise reinforces the socioeconomic and hierarchical differences between [outside] interveners and local populations, and it perpetuates the view of intended beneficiaries as helpless people'.

- ***While recognising that these larger patterns are important, the dynamics of power are often nuanced and complicated***. In relation to adaptation planning, issues of power are perhaps most often framed in relation to the power of various levels of government, government agencies and corporate players to make decisions and distribute resources. It is important to recognise, however, that questions of power and politics also arise within all of these bodies, between different stakeholders and within local communities – even 'in seemingly inclusive and empowering collective learning spaces' (Tschakert et al. 2016, p. 184). As Tseng and Penning-Rowsell (2012, p. 257) put it: 'power is everywhere and presents itself in social norms or customs practiced throughout society'.

  Analyses of power therefore need to balance an acknowledgement of macropolitical dynamics with efforts to understand the 'micropolitics' that shape how different players decide whether and how to take part in engagement processes (Tsenn and Penning-Rowsell 2012, Tschakert et al. 2016, Nightingale 2017). These micropolitics, moreover, are shaped by a 'messy sphere of political contestations' (Nightingale 2017, p. 13) that are not necessarily directly related to climate change or adaptation.

- ***The politics of whose authority is recognised is dynamic and in flux***. In UK flood risk management debates, for example, the question of what governance structures and mechanisms are most appropriate in addressing the challenges of future flood risk has been opened up for scrutiny (see, for example, EFRAC 2016). Similarly, increased engagement with stakeholders and/or local communities as part of planning processes, while often seen as a desirable way of promoting partnership and power-sharing, also has the potential to 'be seen as a threat that may undermine the role of elected representatives and their professional staff, since both can perceive their power as thereby diminished rather than strengthened' and can thus 'lead to conflict with existing power structures and political cultures' (Tseng and Penning-Rowsell 2012, p. 257).

- ***The question of which subjectivities are helpful or hindering in adaptation efforts is contested***. While some may question the recommendations of outside experts and government agencies, for example, others will press them for solutions and actions. Conversely, the idea that local communities need to take on greater responsibility for their own resilience will be welcomed by some and resisted by others (Tschakert et al. 2016). Within and across contexts, some players will be interested in preserving the status quo, while others may hope for more transformative approaches – ones that challenge existing inequalities and injustices, for example, or which question 'the delinking of climate change adaptation from the political economic processes through which climate change itself is produced (that is, carbon emissions)' (Eriksen et al. 2015, p. 525).

- ***Political contestations in one place can have an impact on how authority, knowledge and subjectivities are understood in other places*** (Eriksen et al. 2015). The perceptions and strategies of risk management authority staff, engagement professionals, organised stakeholder groups and local populations can all be influenced by experience and learning from other places. For example, the relatively high media profile given to Pickering in the Ryedale area of North Yorkshire in the aftermath of widespread flooding elsewhere in winter 2015 inspired people in the Calder Valley in West Yorkshire to invite some of the scientists and local people involved in the Ryedale Flood Research Group for public meetings. It also prompted and reinforced some critical questioning of the Environment Agency's authority and the forms of knowledge and expertise involved in shaping Environment Agency decision-making processes, while also strengthening the idea that local people should position themselves as important agents in the process of thinking through potential responses.

- ***Naming and exploring the politics of adaptation is itself controversial***. Social science researchers are making a strong case for the investigation of the political struggles and dynamics that shape adaptation decision-making. However, this is not reflected across all areas (Eriksen et al. 2015). Tschakert et al. (2016, p. 183) observed that:

  > 'a close examination of power relations that underline how knowledge sharing evolves and how policy processes unfold often remains regarded as "too controversial"'.

  Similar views are expressed by Nagoda and Nightingale (2017) in their discussion of vulnerability in good security programmes in Nepal. Against this background, efforts to recognise and reflect on the inevitably political nature of adaptation and engagement may open up 'greater possibilities for constructive outcomes from even the most contested change processes' (Eriksen et al. 2015, p. 530).

Questions of power and politics: Some questions to consider

- How do risk management authority staff understand their own authority, knowledge and subjectivity? How do they experience the power they have in adaptation planning? When do they feel they lack power (for example, the ability to influence wider policy frameworks or the conditions in which decision-making takes place, the power to meet local demands)? How might these experiences differ from the perceptions others have of them?
- Might it be possible to even out current imbalances between thematic and technical expert knowledge and in-depth knowledge of particular places? If both are recognised as important in successful adaptation planning, how might this translate into which individuals, groups and organisations are valued, engaged and resourced to take active roles in planning processes?
- To what extent do analyses of questions of authority, knowledges and subjectivities shape the design of engagement processes? Is there potential for these questions to be considered more explicitly, and might this be helpful?
- How might the dynamics of political contestation in one place impact on others? Are there opportunities to process the learning – and perhaps the associated 'baggage' – from one place before engaging with another?
- Are close examinations of the micropolitics of power too controversial, or is it possible to talk about and reflect on them? What might be the benefits of opening these micropolitics up for consideration, both within and between the different organisations and groups involved in engagement and decision-making processes? What new knowledges and subjectivities might this generate for all involved?

4.6 Summary

This chapter presents a review of academic research and practitioner reflections that add to the established guidelines currently active within the Environment Agency and Natural Resources Wales.

It starts by looking at different dimensions of 'readiness' in relation to climate change adaptation for the different parties involved and considers how the ways in which different players frame important issues for themselves and others might shape how they interact with adaptation processes and with each other.

The chapter then reviews studies on the mental health implications of climate change and adaptation. These are likely to become increasing salient as climate change impacts become more visible, particularly in the absence of strong and convincing higher level strategies for mitigation. The significant changes that are likely to come about as a result of climate change and/or adaptation decisions also have an impact on the relationships between individuals, communities and the places and landscapes within which they are embedded. Taken together, these 2 sections make a strong case for factoring the emotional dimensions of climate change adaptation into engagement strategies more explicitly.

Finally, the chapter examines the ways in which questions of authority, different forms of knowledge and subjectivities can be contested, particularly in situations of conflict. It is suggested that understanding the micropolitics of interactions between the different parties involved in engagement and decision-making can be beneficial in finding ways to respond appropriately.

Throughout the chapter, questions for consideration are identified which it is hoped will inform:

- the analysis of the contexts in which engagement takes place
- the communities and stakeholders with which risk management authorities and engagement practitioners work
- the ways in which professionals themselves are positioned vis-à-vis other players

Chapter 5 builds on these observations and questions. It looks at some ideas and examples of good practice from the literature on community engagement in the context of adaptation planning.

5 Appropriate practice: ideas and examples

This chapter reviews a range of potential approaches to tricky engagement challenges, with illustrative examples and questions for reflection. It looks at examples of interesting practice that emerge from a wider literature across different disciplines, from which it identifies sets of questions that might inform the design of appropriate engagement processes. These case studies and questions are presented in an order that broadly reflects the sequence of discussion in Chapter 4.

Section 5.1 looks at role plays and simulations – tools that have been developed to enhance readiness for adaptation planning.

Section 5.2 looks at the most important themes that come out of the case studies on the visualisation of changes that might affect landscapes and the built environment, with the intention of helping residents to engage with the prospects of changes and the need for adaptation.

Section 5.3 explains how stories and narratives matter in understanding the dynamics of place attachment, culture and identity and the emotional significance of both sudden and slow change.

Section 5.4 introduces approaches to conflict mapping that might help engagement designers and other players to understand conflict dynamics affecting particular processes.

Section 5.5 links back to the discussion of power and politics above and considers different responses to 'knowledge controversies' from public education (as in some of the examples considered in the previous sections) to fully participatory processes of co-production.

5.1 Role play simulations: serious games

There is growing interest in the potential of role plays and simulation exercises to support education and community engagement in and around climate adaptation. Role play simulations are commonly used as experiential learning methods in educational settings, enabling participants to explore issues and dynamics within imagined but realistic situations. The report's authors use role play and simulation in their own teaching at the University of Bradford to teach students about common behaviours and dynamics in conflict situations, and to teach skills for managing conflict constructively.

Interest in the use of role play simulations for climate adaptation planning reflects awareness of the particular challenges facing communities and decision-makers (echoing challenges in FCERM noted in Chapter 3 and 4) including:

- different levels of knowledge or concern about climate change
- scientific complexities or uncertainties surrounding the assessment of risk
- different ideas about risk management
- the 'wicked' and evolving nature of climate risks
- complex and political governance structures

As Rumore (2015) put it:

‘most communities – including municipalities, regions, nations, and organizations – are not ready to undertake the kinds of collective risk management that adaptation will require’.

Research by Rumore, Schenk and Susskind (2016) on the use of role play simulations in supporting community and stakeholder engagement in climate change adaptation contexts (conducted in the USA as part of the New England Climate Adaptation Project[6]), together with the experience of the report’s authors in conducting simulations, has produced a number of interesting findings. These are summarised below.

- ***In order to play a role or character effectively, participants often need to prepare thoroughly, learning about the conflict situation and their characters’ needs or interests*** – why they are in conflict with others and what they might seek in a process for resolution. This preparation can generate deeper knowledge about the complexities of a given scenario, often encouraging greater understanding of, and empathy for, different stakeholders.

- The role play simulation itself allows participants to experience a situation in real time (albeit in a simulated manner); for example, simulating a community meeting about local planning issues, with multiple stakeholders and agendas. ***This often generates new insights, particularly relating to the emotional aspects of conflict behaviour; for example, how it feels to be in conflict with others and how this influences thought and action.***

- ***The debriefing after a role play simulation allows participants to step out of character and more objectively analyse their experience***. This can be a very powerful tool for learning and personal development.

- ***Simulations can support adaptation literacy***. Simulations carried out as part of the New England Climate Adaptation Project ‘brought climate change risks and the need for collective adaptation action “home”’ (Rumore et al. 2016, p. 11) for participants, helping them to see how it would affect them locally and the kinds of actions that might be needed in response to increasing risk. According to the research, participants showed signs of significantly enriched understanding about the complexity of climate change and what adaptation will entail. This effect was, unsurprisingly, strongest among those with little or no previous understanding of climate change and associated risks.

- ***Simulations can support different stakeholders in recognising and understanding the benefits, challenges and trade-offs associated with adaptation options***. According to Rumore et al. (2016), role play and simulation may be particularly effective for shifting opinions among those who are ‘concerned’ and ‘cautious’.

- ***Simulation experiences can affect participants’ confidence in the prospects of adaptation***. For many participants, exposure to multiple perspectives and seeing that responsible agencies are taking the issue seriously increases confidence. For others, though, confidence decreases through realising the complexity of the challenge. Perhaps most interestingly, simulations can help participants ‘understand that adaptation needs to be mainstreamed into everyday local planning, rather than done separately or on top of day-to-day decision-making’ (Rumore et al. 2016, p. 12).

- ***Role play simulations can help generate ‘enhanced collaboration capacity’***, through highlighting the interdependency of stakeholders, increasing empathy for different perspectives, building support for collaborative decision-making, and

[6] https://necap.mit.edu/project-overview

introducing complementary tools and approaches. In the New England Climate Adaptation Project, respondents reported higher awareness of the need for and benefits of involving multiple stakeholders in both social learning and decision-making processes. Many respondents commented on the value of 'walking in someone else's shoes' – a key aspect of role play – in helping them to see issues from perspectives different to their own, and to see that there are other legitimate arguments or counter-arguments. Through the direct experience of a deliberative decision-making process within the simulation, participants recognised the need for processes that can effectively work through differences in a collaborative and respectful way.

- ***Simulations*** (and the wider process that surrounded their production and practice) ***can be a powerful tool for social learning***. Participants in the New England Climate Adaptation Project commented on the value of bringing diverse stakeholders together for conversation and mutual learning. Simulations can thus 'provide valuable 'safe spaces' for people to work through tough issues and learn together and from one another, including through post-exercise debriefings' (Rumore et al. 2016, p. 7).

- Rumore et al. (2016) cautioned that ***these tools should be understood as 'conversation starters' to be used as part of a toolkit of engagement strategies, and not as a standalone activity***. Their value is in building readiness for other elements of planning and decision-making through improved knowledge and relationship. Because simulations work best if they are tailored to local situations (important for realism and authenticity), they can require quite significant time and resources, as well as specialist skills. This is a clear limitation in many situations of engagement, especially those that are more urgent or where resources are limited. At the same time, it is often possible to adapt existing simulation resources to incorporate more local dimensions without too much work, and some general games can still be useful for starting conversations.

- ***A general issue with role play simulations, whether in education or community engagement work, is the presence of scepticism about 'games' and/or the fear about performing a role in front of others***. A certain level of trust and relationship is needed, as well as clear understanding of the purpose and potential benefits of the process. This may be more challenging in communities (as opposed to educational settings), where there is not an existing desire to learn.

- ***Simulations can also be quite unpredictable, since they rely almost wholly on the participants***. Many factors can hamper even the best designed simulations. These include poor preparation, an excess or lack of confidence, and existing tensions among participants. That said, for the most part, simulations can be highly engaging and sometimes quite profound experiences, even when (or perhaps especially when) they do not go exactly to plan. They are often valued highly by participants in retrospect. ***The main challenge is in assessing whether the right conditions exist or can be created.***

An example: role play simulations in the New England Climate Adaptation Project
In 2013 to 2014, the New England Climate Adaptation Project, led by Lawrence Susskind and colleagues from the Massachusetts Institute of Technology experimented with carefully designed and scientifically informed role play simulations specifically as tools for building readiness for climate adaptation, 'preparing stakeholders and the public to participate in the real collective risk management decisions facing their communities and organizations' (Rumore et al. 2016, p. 8).

Staff from the project worked with 4 communities all facing increasing flood and coastal erosion risk due to climate change. They developed place-specific simulation exercises based on scientific information about local coastal or fluvial flood risk; they also drew on in-depth interviews with multiple stakeholders (including public officials) and community members. The resulting simulations therefore reflected a realistic picture of local interests, areas of contention and conflict, political dynamics and institutional economic realities. The simulations themselves were structured around a clear set of adaptation choices for consideration by each community (for example, whether to invest in further sea defences or to implement a process of managed retreat in some areas), again based on local realities and science. They were:

> 'designed to portray what is and is not known about climate risks and adaptation options, help participants engage with the potential costs and benefits of various adaptation strategies, and introduce a collaborative approach to adaptation decision-making' (Rumore et al. 2016, p. 9).

The role play simulations were run by the project team with between 110 and 170 people from each town. Participants would take on stakeholder roles that differed from their own, so a local official might take on the role of a town resident and vice versa. Each participant was provided with a clear set of instructions, with a general briefing about climate change and flood risk, plus specific information about their character's preferences and the reasoning behind those preferences. Simulations lasted for around 90 minutes, involving a facilitated discussion of the specified options for adaptation in their community, followed by a debriefing (out of role). For details of each custom-designed simulation, see https://necap.mit.edu/role-play-simulations

The project generated some very helpful insights into the potential uses of role play simulations in community and stakeholder engagement in the context of difficult adaptation decision-making processes.

Role play simulations: Some questions to consider

- In what contexts in England and Wales might role play simulations be a helpful tool to build readiness, understanding of different stakeholder and community perspectives, and the literacy of different adaptation scenarios and choices?
- What are the cost–benefit trade-offs involved in generating context-specific simulations? Conversely, might there also be potential for learning from simulations generated for similar settings elsewhere (for example, those developed for the New England Climate Adaptation Project)?
- What levels of willingness and/or reluctance to engage in role play simulations might there be among professionals, stakeholders and communities in England and Wales? Which groups might be particularly open or reluctant to participate in such processes?

5.2 Visualising change

One of the barriers to engagement in considering and responding to climate change impacts is the difficulty, for many people, of envisaging what climate change might mean for the place in which they live. Making anticipated changes to local landscapes visible can thus be a powerful tool in encouraging engagement with likely impacts and potential adaptation measures.

- ***Visualisation is commonly used in local planning processes, with varying degrees of community participation***. Visual representations can 'encapsulate issues, helping to 'bring home' choices and providing a focus for debate regarding alternative courses of action' (Lovett et al. 2015, p. 86). Planners and researchers have experimented with and evaluated a range of different formats, including:
    - static two- and three-dimensional visualisations of current landscapes, built environments and future scenarios
    - experiments with interactive and multidimensional visualisations that allow users to zoom between scales and timeframes
    - computer games (Dulic et al. 2016) and augmented reality apps that can map future changes (for example, sea level rises) onto real landscapes that people are travelling through (Bishop 2015)
- ***Visualisation might be particularly helpful for contexts where climate change is likely to lead to significant changes in landscapes***. It can be hard to imagine changes to familiar landscapes such as coastlines, especially since many people seem to value a sense of stability in landscapes, thus often favouring the status quo and finding it difficult to accept significant change (Bishop 2015). In this context, visualisation of climate change impacts in places that people know and care about has particular potential in efforts to break the silence and encourage more serious conversations on climate change, mitigation and adaptation (Shaw et al. 2009, Sheppard et al. 2011, Sheppard 2015).

  This is a fast-moving field of research and development, particularly in the fields of digital and virtual reality technology. Researchers are continuing to compare and evaluate different forms of visualisation, both in experimental and in real life settings, and it would be worth keeping an eye on new developments and conclusions.

  While there is an increasing range of options for landscape visualisation using sophisticated technologies, however, '[t]echnical advances in landscape visualization have tended to, and still do, outstrip the understanding of how best to use them in practical planning contexts' (Lovett et al. 2015, p. 85); see also Sheppard (2001). As Schroth et al. (2015, p. 156) pointed out, '[v]isualizations are only as good as the participatory process in which they are embedded'. ***Visualisations are one tool among others in larger processes, and efforts to get them right should not distract from attention to the other qualities needed in engagement processes***.
- **To fulfil their potential in engagement processes, visualisations need to be accurate, relevant to stakeholders and unbiased** (Sheppard 1989, Lovett et al. 2015). While this might sound like common sense, it is probably easier said than done. Challenges here include:
    - the availability of accurate data (particularly in modelling future scenarios about which there is scientific uncertainty or debate) (Bishop 2015)
    - variations in what is salient and relevant to different stakeholders
    - the temptation to present favoured solutions/designs in the best possible light (Sheppard 2001)

  In the light of these challenges, Sheppard (2001) called for 'a code of ethics for landscape visualisation'.
- ***There are trade-offs between the 'perfect' visualisation and other key principles and demands of engagement practice***. For example, 'increasing the

legitimacy of a participatory process by making it accessible to a wide range of players may require compromises in information content such that scientific credibility is reduced' (Lovett et al. 2015, p. 86, with reference to Clark et al. 2002). Similarly, increased interactivity in virtual models tends to be at the cost of greater detail and realism. And of course, the time and cost implications of producing realistic sophisticated visualisations may be difficult to justify given the constraints of real life planning and decision-making processes. (Lovett et al. 2015)

Schroth et al. (2015), for example, evaluated user feedback on different ways of visualising the same data for citizens in a Canadian town (that is, presentations using visual aids, posters and an interactive virtual globe). Their research suggested that there is no one visualisation format that works best for all contexts, purposes and users. Different participants in the study expressed preferences for different formats, partly depending on their familiarity or otherwise with digital media. Interestingly, more traditional formats (for example, poster/s) were found more helpful in the longer term as they were identified as easier to reuse and more user-friendly than more high-tech, interactive formats like the virtual globe.

An example: Here-Now-Us – effective visualisation of climate change impacts in situ

In 2015, residents of Marin County in California had the chance to visualise likely impacts from sea level rises for and in their place. The installation of 2 OWL digital viewfinders (Figure 4.2) – modelled after the coin-operated binoculars found in places with scenic views – gave people a realistic, 360° visual experience of the place they were looking at under current risks, future sea level rise and with the adoption of 2 different potential measures against increased flood risks (Figure 4.3). The visual experience was accompanied by an audio script and the opportunity for viewers to answers questions about the impact of the experience (Moser et al. 2016).

Figure 5.2 OWL digital viewfinders

Source: https://climateaccess.org/blog/visualizing-climate-solutions

Importantly, this opportunity to visualise change was followed up with a community workshop that gave participants a chance to engage in dialogue and deliberation with planners, researchers, elected officials and each other.

The research that accompanied the project found that the OWL experience reduced participants' psychological distance from climate change – particularly for participants with previously low levels of concern – and increased readiness to consider climate change impacts and interest in learning more about options for adaptation. Providing an opportunity for additional learning and discussion was an important part of the process, with workshop participants placing particular value on the chance to connect and engage in dialogue with each other (Moser et al. 2016).

This example highlights the value of visualisation in situ and the importance of treating visualisation as one element in an engagement process that also includes other opportunities for learning and discussion. As in this example, in situ visualisation can be helpful in recording what happened in past events, conveying likely future scenarios and picturing potential solutions.

Figure 9: OWL users experienced dry conditions during the installation period (as shown in the picture at the top).

Two visualizations in the OWL depicted flood risks: the first visual showed a flood similar to the December 2014 event that resulted from a 20-year storm with king tides and current sea level.

A second risk visualization showed a flood from a similar storm and king tides on top of 3 feet of sea level rise.

The remaining two visualizations showed possible adaptation response options: an 8 ft.-high seawall protecting against the kind of flood shown above but cutting off the view and access to the waterfront.

The second adaptive option showed an eco-berm or horizontal levee with a bike path on top.

(Source: Visualizations created by Owlized)

Figure 5.3 Visualisations from the OWL project

Notes: See also www.marincounty.org/main/owl-virtual-reality-project/about-the-project
Source: Moser et al. (2016, p.24)

Visualising change: Some questions to consider

- What kinds of visual tools have risk management authorities in the UK used to date, particularly in places that are likely to experience significant change? What learning has this generated?
- What are the costs and trade-offs involved in exploring more sophisticated technologies for enhanced visualisation of future scenarios?
- In what contexts, and for which audiences, might visualisation be particularly effective? Do different audiences and purposes need different types of visualisation?
- What training and/or professional development might planners, designers and others involved in developing visual tools need to enable them to explore the ethical challenges and choices involved in landscape visualisation?
- What difference does the physical setting in which visual tools are presented and used (for example, in situ, indoors, as part of a presentation) make to their engagement value and reception?
- How can visual methods be integrated into wider engagement strategies?

5.3 Engaging with narratives and stories

Stories are an important way in which people, both individually and collectively, make sense of who they are, where they have come from and where they are going. Stories 'are shaped by us and they shape us and the societies in which we live' (Bushell et al. 2017, p. 41). In encountering complex issues, there is a strong tendency for human beings to 'look for … not consistent and reliable facts but a consistent and comprehensible story' (Monbiot 2017). In encouraging meaningful engagement with potentially drastic change, it is therefore worth paying attention to the stories that shape how we make sense of past, present and future.

- ***Working with stories and narratives has the potential to capture aspects that have important bearings on people's engagement with climate change, adaptation and potential responses*** – in particular, the emotional dimensions of place, identity, community, and change (see also Section 4.4). As Lejano et al. (2013, p. 61) pointed out, the narratives people construct to 'make sense of complex issues … richly integrate multiple ways of knowing – including scientific, normative, and cultural dimensions'. Storytelling can thus be interpreted as 'knowing-or-learning-in-action' (Paschen and Ison 2014, p. 1086). Good stories have plots (meaningful sequences of events) and rich characters, and are told in interesting ways (Lejano et al. 2013). In contrast, the way in which institutions traditionally tend to communicate 'displays different narrative properties and is less conducive to narration by others outside the organization' (Lejano et al. 2013, p. 61).
- ***Narratives are closely related to the construction of identity***.

  > 'When asked to explain who they are, persons will not go into a résumé of facts; rather, their impulse is to tell a story. People work out their identities through the construction of coherent narratives' (Lejano et al. 2013, p. 65).

  Among other things, the stories people tell about themselves are likely to influence and shape their responses to future scenarios and their engagement (or otherwise) in planning for a different future than they may have imagined. Importantly, this also applies to staff working in particular contexts, whether as planners, engineers or engagement facilitators.

- Planned or not, ***major events in a community's life are likely to generate momentum towards telling and sharing stories***. As Berry (2007, p. 81) puts it, 'the community … needs to recall the significant things that have happened, and to mull them over and figure out what the significance is'. A severe flooding event, for example, will intensify a community's 'conversation about itself'. One of the several songs that were written after the Calder Valley floods in winter 2015 expresses that: 'thousands of stories were … born when the face of the Calder Valley was torn'.[7] Like severe flooding events, major changes to the trajectory of a place – the abandonment of flood defences, changes to the built environment, the reshaping of a coastline or potential relocation – are likely to reshape existing stories and generate new ones. In such contexts, it is worth considering the potential of arts-based practices and artists in helping people to process difficult emotions and choices.

  Flood narratives have been collected and presented in a number of creative formats (Table 5.1).

Table 5.1 Examples of flood narratives in different creative formats

Creative format	Examples
Songs	'Calder Valley's Rising' by Carol Donaldson (https://soundcloud.com/carol-donaldson/calder-valleys-rising)
Films	'Waving, Not Drowning' (www.youtube.com/watch?v=JoEZ2p0g2JU)
	'Calder' (https://vimeo.com/162076350)
Games	'Flood Snakes and Ladders' – inspired by stories of flood recovery in Hull (http://wp.lancs.ac.uk/cyp-floodrecovery/our-outputs/flood-snakes-and-ladders/)
Verbatim theatre	'Every Time It Rains' (www.theguardian.com/stage/2009/jun/19/flood-hull-truck-every-time-it-rains)
	'The Caravan' (http://lookleftlookright.com/site/thecaravan/)
	'That Day It Came' (https://everobertson.org/that-day-it-came/)
Collections of social media posts	Watermark Calderdale campaign (http://watermarkfund.org/calderdale/the-story-so-far/)
Children's books	'Harry and The Flood' (http://watermarkfund.org/calderdale/directories/harry-and-the-flood/)
	'The Flood' (http://watermarkfund.org/calderdale/flood-book/)
Poetry	'Floods of Tears, Floods of Laughter' – a collection of children's poetry

[7] See www.youtube.com/watch?v=Qm3LEs8ZHsI for the YouTube video of 'The Flood' by Johnny Powell and the Happy Valley.

Creative format	Examples
	(http://watermarkfund.org/calderdale/directories/floods-of-tears-floods-of-laughter/)
Community parade	Hebden Bridge Handmade Parade – 2012 Valley of Lights, a lantern parade, fire finale and night markets in the towns of Todmorden, Hebden Bridge and Mytyolmroyd organised as a response to recent floods in Calder Valley (http://handmadeparade.co.uk/hebden-bridge-parade/)
Community opera	'Calderland – a people's opera' performed with and by the people of Calderdale on 29 September and 1 October 2017 (www.youtube.com/watch?v=pbIKsqjkJ7M))

- ***Some of these stories will be about the interventions of risk management authorities***. As Paschen and Ison (2014, p. 1087) observed:

  > 'The definition of policy problems … involves the classic elements of storying: a beginning, middle and end, as well as the theme of transformation and the positioning of players along the lines of good versus evil in the form of political alliances'.

  Some of these stories may well be stories of a community's resistance against planned changes, against what are perceived to be ineffective responses and/or against organisational cultures that clash with local expectations or values. See, for example:

  - residents' perceptions of the Environment Agency in Pickering, as reported in Lane et al. (2011)
  - residents' perceptions of Natural Resources Wales in Fairbourne (JBA Consulting and Icarus 2016)
  - the memories of a militant action group in Gelli in the Rhondda Valley in south Wales (National Flood Forum and Collingwood Environmental Planning 2018)

  Sometimes these stories will draw a community together, and the resistance they can engender can in itself be interpreted as an opportunity to exercise agency and strengthen community resilience (see, for example, Brown 2015). Risk management authorities will also have their own stories about the same places and communities, and this too will shape how future interactions are perceived and framed.

- ***In any setting, there will be multiple stories***. Sometimes, multiple stories might be compatible, adding up to a larger, community-wide understanding of past events, present realities or future possibilities. Sometimes, they might be a reflection of conflict and divisive in their effects (Paschen and Ison 2014, Boone 2015). Making space for stories can be helpful in such contexts. As Paschen and Ison (2014, p. 1089) suggested:

  > 'By asking questions that elicit alternative narratives, the researcher [or facilitator] contributes to the emergence of previously silenced or unheard community perspectives', allowing participants 'to reflectively process their experiences and situate themselves, their individual capabilities and actions, within the larger story of change'.

- ***Stories and narratives are thus important elements shaping the context of any interventions***. Engaging with stories can be a way of better understanding context, building trust and relationships, and acknowledging the more than rational elements that feed into decision-making and that motivate action (O'Neill and Graham 2016).

  There are many ways of including opportunities to share stories in planning and engagement processes. Asking people to introduce themselves via brief narratives of who they are, how they relate to a place or why they are participating in a process can help to create 'dialogical social spaces' (Paschen and Ison 2014, p. 1085). All this will help to build the conditions for trust and collaboration. Looking at the stories circulating in a place can help to understand its history, present dynamics and future potential. Being more explicit about the stories that lead to particular decisions being made (as a plot with characters) may help in communicating outcomes.

- Lejano et al. (2013) identified the value of narratives in promoting people's engagement with climate change. They drew attention to ***the importance of people telling their own stories rather than being passive recipients of knowledge and frames designed for their consumption*** (see also Paschen and Ison 2014). Their suggestion of 'dialogic learning' – people creating their own narratives and listening to those of others – as a vehicle for engagement is clearly relevant to the question of how to incorporate issues of culture, place attachment, identities, loss and emotions into community engagement for climate change adaptation. Practically, they suggested that this could 'mean that information sessions allow break-out sessions where people discuss and process climate knowledge in their own ways' (Lejano et al. 2013, p. 68).

- Smith et al. (2017, p. 292) observed that '[s]tories … can do powerful work in surfacing a wider range of understandings of a theme or problem, or enable empathy with affected people'. They do not, however, 'in and of themselves resolve such issues'. ***Stories therefore need to enter conversations and planning processes alongside scientific knowledge***. At the same time:

  > '[t]he meaning of data is underdetermined; different conclusions can be drawn from the same data depending on what frameworks or stories are used to interpret it' (Ottinger 2017, p. 41).

  In the process, data may acquire new meanings and stories may undergo changes. Paschen and Ison (2014, p. 1084) observed that looking at narratives is helpful in understanding 'the emergence of knowledge as part of social contexts and interactions'.

- As well as capturing narratives that are currently active, ***it is worth considering how memories of past events and developments can contribute to the understanding of, and engagement, with particular places***. In a paper on 'sustainable flood memories', McEwen et al. (2017, p. 25) pointed out that:

  > 'memory is a fundamental underpinning of individual and collective life in place, and thus needs attention in any deliberation of individual and collective resilience (or lack of)'.

  Memory is clearly also a key factor in relation to place attachment, culture and identity. Looking at how things have changed from past to present, moreover, may also help to promote reflection on how they might change from present to future. In turn, this could be helpful in opening current assumptions and values up for critical examination.

- ***Narratives can be collected and presented in a range of formats, also combining verbal and visual means of communication.*** Mobile technology, for example, provides a relatively simple way in which local residents can record their stories and memories of particular places in situ, potentially adding to a larger mapping process that can include multiple perspectives and places (Boone 2015; see also example below about photo-elicitation). In such a process, local knowledge and narratives can be recorded and shared relatively quickly (for example, over a week), generating a potentially very rich picture of what matters to a local community and where potential conflicts may arise.
- ***Narrative formats can also be used to communicate about climate change impacts and flood and coastal erosion risk and convey the potential consequences of choices to be made.*** For an example that uses story formats in public education about the impacts of personal choices in a crisis, see the Flood Narratives project (www.floodnarratives.com). For an account of how storytelling in coastal areas can enhance public engagement with climate change, see Gonzalez's (2017) reflection from work done in the USA.

- ***In the context of planning for adaptation, particular stories about the challenges faced by specific places and communities need to be situated within a wider narrative about climate change*** as 'the condition for any story that might be told about… our inhabitation of this fractious planet' (Bergamn 2017, cited in Smith et. al. 2017, p. 286). Arguably, government agencies have a particular responsibility to think carefully about how they communicate this larger story – not least because acceptance of climate change as the context for future planning and decision-making will itself make a difference to what decisions are seen as politically acceptable. A recent study of strategic narratives in relation to climate change suggests that current narratives tend to fall short of what is needed, in part because they do not convey that the government itself has 'a credible national level strategy for addressing the problem' (Bushell et. al. 2017, p. 39). The absence of a persuasive narrative, or indeed of effective mitigation efforts at this level, might in itself be a factor that makes it harder to engage local communities in thinking seriously about, and thus planning effectively for, climate change.

An example: photo-elicitation – gathering everyday stories about a place

A relatively simple but effective way of gathering multiple stories about a place is described in the video (https://vimeo.com/83484905) by O'Neill and Graham (2016) about a study that used photo-elicitation to understand place attachment in a community in Australia affected by coastal flooding and the prospect of sea level rise.

Combining visual and narrative methods, the researchers asked a group of 30 local residents to take photos within the locality over a week. Participants chose their motives freely and brought back up to 20 photos, which then formed the basis of interviews with the researchers.

The process of taking and 'curating' the photos encouraged participants to think about their relationships to the place in which they lived, their significant memories and their hopes and fears for the future. In the conversations they then had with the researchers, the photos acted as prompts for telling their stories, as illustrated in Figure 5.4.

While photo-elicitation in this example was used primarily for research purposes, it is equally suited to community engagement. It could be used to help risk management authority staff to get a better sense of what matters to people, in prompting conversations among residents about priorities and trade-offs in adaptation planning, and/or as a means of encouraging more dialogic interactions between participants in a wider process.

> **Figure 3a** This is a very special spot for me, this is a family slip yard. I mean, it's beautiful ... I just feel like it's home. Like, it's totally in my blood ... It means a place that we have built up from the ground, that's still going, that my family have created and are still creating it. It means our connection to the water.
> **Figure 3b** I: So you said the family ritual is to walk to the end of that concrete ... [pier]?
> P: ... Yes, and sit there and meditate for a while. There are usually seals. Often there are dolphins coming out of the entrance so, you know, you have to sit there and watch the wildlife ... that's pretty important to us living here.
> **Figure 3c** There's so many of the people that walk around, walking dogs or exercising and they are all pleasant, there are no muggers, there are no rat-bags. Everybody knows everybody ... to show what this actual place is and how wonderful it is that so many people can use it in peace and harmony and get on ... it hasn't changed, again, for 50 years or 50 plus years.
> **Figure 3d** ... it's just part of the place where I live. I mortgaged everything to get a block that does that, to live on the water. I own it now but at the time it was a big risk to buy it.

Figure 5.4 An example of photo-elicitation

Engaging with narratives and stories: Some questions to consider

- What potential is there to incorporate opportunities to share place-based stories into wider engagement processes? What difference might such opportunities make to how these processes unfold?
- While stories are potentially powerful ways of conveying the need to envision change and think differently, stories that come across as overly moralising or patronising are unlikely to work. What kinds of stories, and what ways of telling them, might be able to work both as stories and as ways of promoting engagement with difficult truths?
- What are the challenges involved in 'storying' climate change and the potential for futures that might look radically different from past and present experiences? What if these are stories without happy endings for individuals, particular places or communities (or for the world at large)?
- While narratives and stories may be more able to communicate key dimensions of human experience than propositions of fact, is it helpful and appropriate for risk management authority staff to communicate in this way? If so, in what ways? Does it help, for example, if staff introduce themselves via stories of who they are? What might be the potential – and the risks – of communicating decisions via telling the story of how they were reached? Might it be possible to develop a culture where risk management authority staff could experience 'the pleasure of participating in togetherness in which one is free to speak for oneself, not in the name of absent others, not under pressure to say things one does not believe in, and not having to hide something for fear of being reprimanded or excluded from further conversation' (Krippendorff 2009, p. 141, cited in Paschen and Ison 2014, p. 1089)?

5.4 Tools for conflict analysis

Conflicts are often very complex, with multiple players, different causes, interacting issues and effects, and evolving dynamics. If it is recognised that there is potential for contention and social conflict within FCERM processes (both generally and specifically in cases where communities may not be protected from flood and coastal erosion risk), then an ability to identify and effectively analyse conflict causes and dynamics could be useful. At present this does not appear to be featured clearly in the available guidance for engagement staff.

Practitioners in the field of conflict resolution have developed numerous methodologies to help capture, organise and analyse information about conflict (for examples, see http://conflictsensitivity.org/conflict-analysis-tools/). Mapping tools help practitioners to visualise and manage complex information and develop insights that can usefully support planning for work with conflict parties.

- ***Some mapping tools are actor-focused***. Like a stakeholder analysis, they are concerned with identifying the main parties to a conflict – those who are either engaged in or affected by a conflict situation and recording information about their needs, interests and/or positions.

  Actor-focused tools may also seek to make judgements about the significance or influence of particular players; for example, who is most powerful in a conflict situation – and about the nature of relationships between parties (that is, establishing where relationships are contentious, where there are alliances or common ground, and so on).

- ***Other mapping tools focus on the causes and drivers of conflict – the various factors that generate and sustain conflict in a given situation.***

  There are many ways of categorising causes of conflict, but they might include:

  - cognitive aspects (beliefs, values or world views)
  - emotional aspects (for example, feelings of anger, frustration, fear)
  - structural aspects (for example, patterns of inequality or discrimination embedded in laws, competition over resources)
  - historical aspects (longer term social, political and cultural influences)
  - data conflicts (where disagreements arise over the interpretation of evidence, law or other information)
  - 'triggers' (specific incidents or events that increase the intensity of disagreements or emotions, causing an escalation of the conflict)

- ***Finally, there are mapping tools that seek a more holistic or systemic view of conflict which takes into account all the different dimensions of conflict situations***. For example, recent approaches to conflict analysis draw on systems thinking to try to capture not just the different elements in conflict – whether people, structures or issues – but the ways that these interact and produce 'emergent' or unintended consequences. In particular, systems approaches emphasise the analysis of 'causal loops' – patterns of interaction or influence that either amplify or counteract specific conflict dynamics. (Li et al. 2012, Gallo 2013).

An example: mapping patterns of conflict with Environment Agency staff

In a workshop with Environment Agency staff in 2017, causal loops were created to reflect staff analysis of common dynamics. Figure 4.5 demonstrates the way in which a lack of trust in the Environment Agency can be a barrier to wide community participation, which in turn may mean that decisions lack representative input, which then undermines trust in the Environment Agency (Smith and Kelly 2017).

Similarly, the causal loop analysis in Figure 4.6 reflects how a tendency to intervene at times of crisis (when emotions and expectations in a community are particularly high) inhibits careful planning, including planning for engagement, which can then make engagement more challenging or less effective.

These examples of using a systems approach to conflict mapping illustrate how this can be a helpful tool for reflection on the causes and consequences of conflictual patterns – both for risk management authority staff and, potentially, for stakeholders and communities.

Using them as part of an engagement process could help participants reflect on the dynamics that make interactions difficult and to think about ways of overcoming vicious circles.

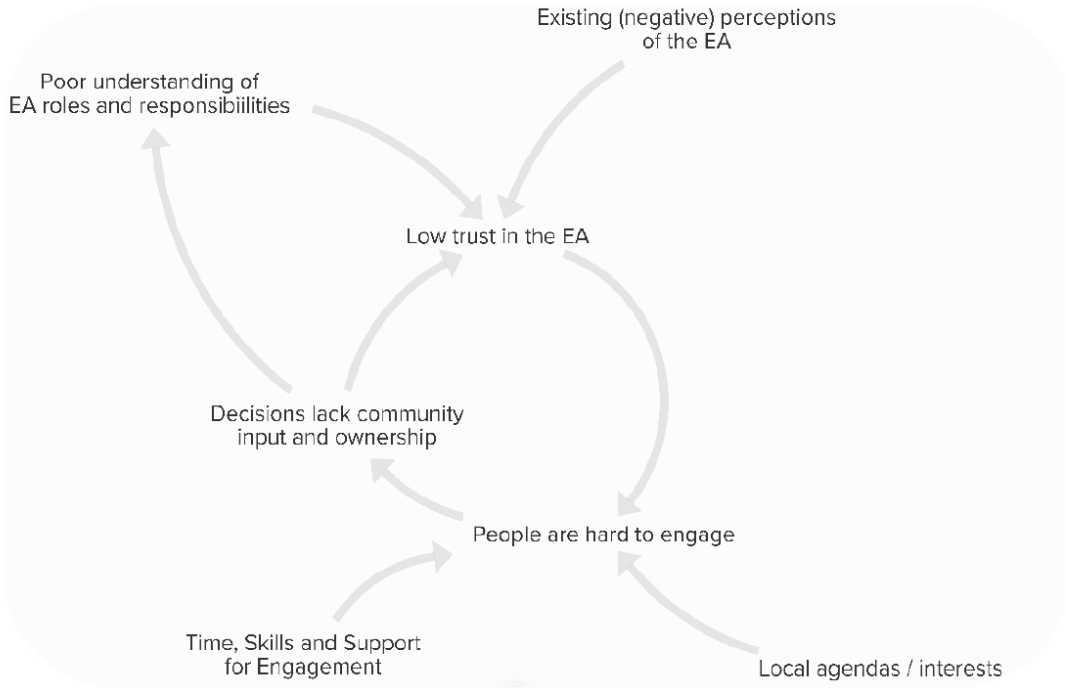

Figure 5.5 Causal loop showing dynamics of trust in engagement

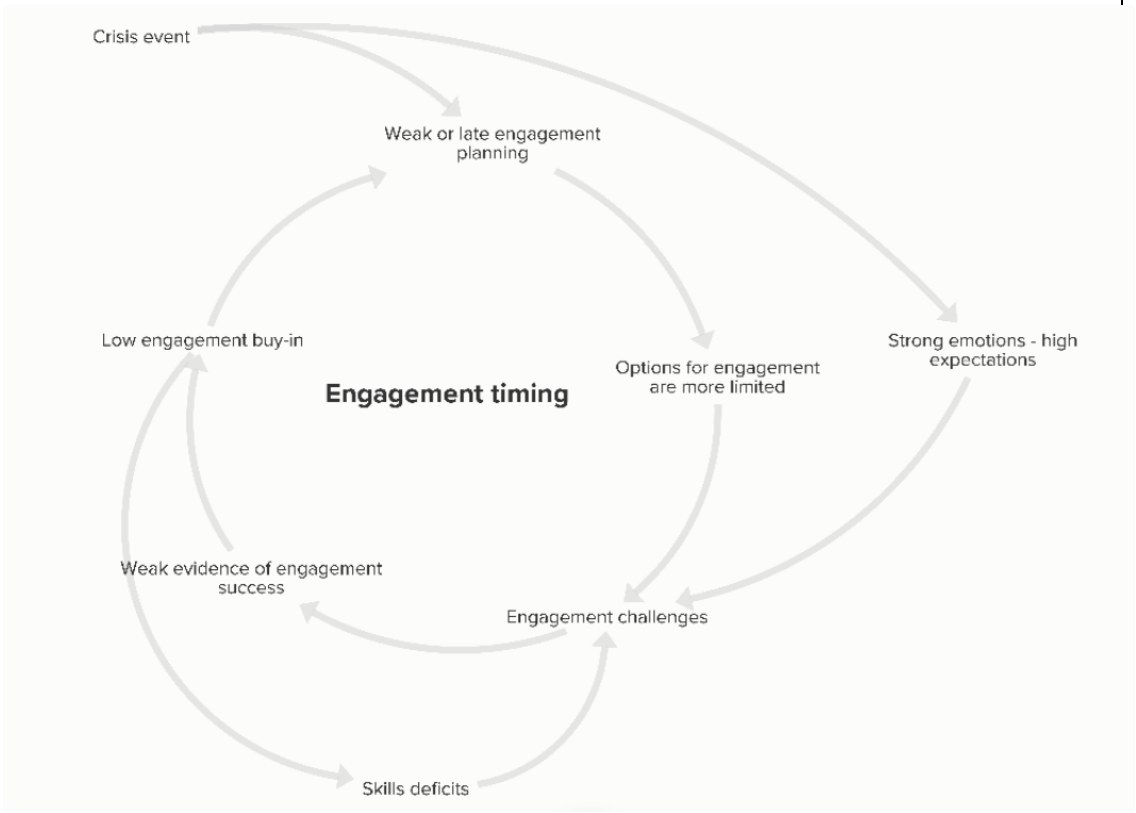

Figure 5.6 Causal loop showing the implications of engaging during a crisis event

Tools for conflict analysis: Some questions to consider
• How might conflict mapping enhance understanding of conflictual patterns, contexts and interactions? • What approaches to conflict mapping might be particularly helpful in which kinds of contexts? • Could the effort to understand what is going on in a conflict in itself be a helpful engagement activity, promoting dialogue between different players on the dynamics between them and on potential ways forward?

5.5 Engaging with 'knowledge controversies'

As noted in Section 4.5, questions of who holds authority, whose and what kinds of knowledge count, and how the different people involved view their own roles and capacities to contribute to the analysis of problems and the formulation of solutions are all ultimately political. So are experiments that try out different ways of approaching these questions. Looking at the issues is particularly important in 'knowledge controversies'. In the present context, this means:

> 'those events in which the knowledge claims and technologies of environmental science, and the regulatory and policy practices of government agencies that they inform, become subject to public interrogation and dispute' (Whatmore 2009, p. 588).

The review by Callon (1999) suggests a broad typology of 3 different models of public engagement with science. These models are considered below.

The public education model assumes that the problem in public controversies over science is a lack of public understanding and sees public education as the remedy. Callon (1999, p. 82) called the Public Education Model 'the simplest and most widespread model, although probably the least suited to current challenges'. In this model, science is subject to processes of peer review but is not subject to critical questioning by non-scientists.

In relation to flood and coastal erosion risk explanation and management, typical examples of public engagement include:

- physical models that illustrate water flows under different scenarios (for example, wider and narrower river channels, with or without sustainable urban drainage systems, or with bridges placed in different locations)
- presentations by experts at public meetings with the purpose of explaining and justifying decisions that have been taken
- visualisations of likely future scenarios and/or of potential solutions (see also Section 5.2 on visualising change)
- public-facing websites that explain flood risks and actions that residents can take

The public debate model seeks to adopt a view of science as more provisional and more open to questioning. Recognising that conditions in real world situations are inevitably more complex and messy than laboratory settings, the model accepts the need for preliminary scientific conclusions to be tested through engagement with local knowledge, with a wider range of players, and with the different perspectives these players may bring to a debate.

The aim, ideally, is to reach agreement or compromise via a process of negotiation and/or the adjustment of scientific models to fit the conditions of particular localities. Importantly, this model increases the transparency of public decision-making and, in some of its manifestations, places a high value on making sure that different stakeholders/interest groups are represented.

Examples of this orientation include:

- public inquiries and commissions at different levels from local to national
- focus groups that seek out participants' views on pertinent issues with a view to feeding them back to researchers and/or experts
- consensus conferences, citizens' juries and other deliberative forums that are set the task of 'assess[ing] the political, cultural and ethical implications of certain research' (Callon 1999, p. 87)
- participatory modelling and companion modelling designed to feed local knowledge into models and/or to educate the public on the use of models, but without the practice of science itself undergoing significant change (see Lane et al. 2011)
- public debates in which different positions are represented, for example, by experts who bring different perspectives to bear on an issue

The co-production of knowledge model assumes 'the capacity of publics to be involved in all elements of knowledge production', while asking all participants – scientists as well as members of the public – to 'question their understandings through practice' (Lane et al. 2011, p. 18). Under this model:

> 'knowledge is co-produced through a process of dynamic, collective learning involving those for whom an issue is of particular concern, whether as a result of their professional position,… their personal position with respect to an issue or their personal experience of an issue' (Lane et al. 2010, p. 18).

As part of this process, the ways in which both scientists and non-scientists see themselves and each other are also likely to shift. Such shifts are partly enabled by a decreased emphasis on participants as representatives or spokespersons for particular groups or interests (Callon 1999, Landström et al. 2011).

Examples that are fully inspired by this model are harder to find, perhaps because this model present a greater challenge to established ways of working than the others. There is, however, at least one fully-fledged and carefully documented case in UK flood risk management. The work of the Ryedale Flood Research Group in Pickering is described in the box below; this experiment was directly inspired by Callon's argument that the operation of this model needed to be understood more fully.[8]

Another promising approach with some similar characteristics is that of Joint Fact Finding (Adler 2014, Matsuura and Schenk 2017, Schenk et al. 2016). This involves bringing together stakeholders, scientists and technical specialists to work on key questions causing controversy and map areas of factual agreement.

The typology described above may not perfectly capture the many experiments with expert–citizen interaction that exist in practice. It is helpful to think of these as situated along a spectrum, with a range of hybrid possibilities. In this context, it is also

[8] The research team behind this work also carried out an experiment with a competency group in Uckfield, Sussex. Unfortunately, it is much harder to find evidence on what happened in this second case. If this was less successful than the Pickering experiment, it would be helpful to know why this was and what lessons might be drawn from it.

worth pointing out that the same terminology – such as co-production, deliberation, participatory action research, citizen science – can be used in the literature to refer to practices that are in fact situated at different points along this spectrum.

Table 5.2 is helpful in capturing different dimensions of scholar–practitioner engagement (or in this case, scientist–citizen engagement), though it is not exhaustive. In Pickering, for example, while practitioners were clearly engaged in the research process alongside academic researchers, the research was not practitioner-funded and at least some aspects of the research were disseminated primarily by the academics.

Table 5.2 Typology of scholar–practitioner coproduction

Low Interaction →			Moderate Interaction →				Intensive Interaction	
Nature of Relationship	**Informal**	**Informants**	**Insight and Feedback**	**Recipients**	**Endorsers**	**Engaged**	**Commission and Oversight**	**Partnerships**
Interactions between scholar and practitioners	At conferences and forums	Practitioners as data source	Practitioners provide feedback on questions and findings	Dissemination strategy targets practitioner publications	Discuss findings and implications	Discuss evidence collected and coproduce knowledge	Practitioners initiate studies, high levels of interaction	Scholars and practitioners research in partnership with each other
Research linked to practitioner agendas	No	No	No	No	Maybe	Yes	Yes	Yes
Practitioner-funded research	N/A	No	No	No	No	No	Yes	Yes
Practitioners influence research design and problems	No	No	No	No	No	No	Yes	Yes
Practitioners engaged in research process	No	No	No	No	No	No	No	Yes
Practitioners influence reported findings	No	No	No	No	Somewhat	Yes	Yes	Yes
Practitioner research dissemination strategy	No	No	No	Yes	Yes	Yes	Yes	Yes
All engaged in academic research dissemination strategy	No	No	No	No	No	No	No	Yes
Long-term relationship	No	No	No	No	No	No	No	Yes

Source: Buick et al. (2016, Table 2)

Across the spectrum of different approaches to participation, deliberation and decision-making, a number of tensions and trade-offs arise. In relation to climate change mitigation and adaptation, there are potential tensions between process and outcomes. As Larsen and Gunnarsson-Östling (2009, p. 260) observed in relation to deliberative processes exploring future scenarios, for example, giving priority to 'process-oriented values such as legitimacy, learning and participat[ion]' does not always sit easily with the need to achieve 'sustainability content values, such as reduced climate impact'.

Arguably, the co-production of knowledge model described above (and below for the case of Pickering) might be helpful here because it clearly links attention to process on the one hand and rigorous exploration and testing of knowledge claims on the other hand. At the same time, however, this model generates its own tensions; the intensity of such a process and the commitment it requires makes it particularly suitable for small groups, and raises difficult questions about trade-offs between breadth and depth of participation.

In practice therefore, different approaches are suited to different purposes and contexts. Nor are they necessarily incompatible. Wider public education efforts and opportunities for public debate can support smaller and more intensive co-production of knowledge processes, while the latter can also feed suggested outcomes back into more public forums for discussion (as described, for example, in Ryedale Flood Research Group 2008). For an example of the combination of 'public education' visual methods and deliberative dialogue, see Moser et al. 2016).

It is beyond the scope of this review to include further examples on deliberative approaches and citizen science. However, there are numerous comprehensive reviews of deliberative methods (see, for example, Delli Carpini et al. 2004, Rowe and Frewer 2005, Cass 2006). There are also many examples of deliberative decision-making,

multi-criteria analysis and other co-production approaches being used in debates around environmental, flooding and climate change issues (see, for example Tsouvalis and Waterton 2012, Bellamy et al. 2013, Maynard 2013, Henriksen et al. 2018).

An example of co-production: 'Making Space for People' in adaptation research and development in Pickering

A project that is particularly relevant to the politics of flood risk assessment and management in the UK is that of the competency group in which a small group of natural and social scientists and local residents (who had been recruited via open invitation) worked together over a period of roughly a year in 2007 to 2008 in Pickering in north Yorkshire (Ryedale Flood Research Group 2008, Lane et al. 2011, Landström et al. 2011). Inspired by the Co-production of Knowledge Model (Callon 1999), the project departed from the more common models of public engagement in science, with interesting results.

This project received research council funding and was conceived by a group of academics. It was also a project that landed in a context of existing controversy involving the Environment Agency. The academic researchers involved noted that they:

> 'were initially steered towards Pickering by the Environment Agency because of the difficulties that they were encountering in finding a way forward for the town, given the limitations placed upon them by national flood defence funding rules, and in the face of repeated flood events' (Lane et al. 2010, 32).

Since these difficulties had also generated negative perceptions of the Environment Agency, '[t]he project team had to explicitly dissociate from the Environment Agency in order to be accepted as working partners by the local residents' (Landström et al. 2011, p. 1625).

In Pickering, the competency group worked together via bimonthly face-to-face meetings, telephone and email conversations, and a group blog. Face-to-face meetings focused on collaborative working in which all participants were able to shape the investigation. Significantly, these meetings also created conditions in which it became possible to subject scientific assumptions, ways of working and models to critical scrutiny and revision (Lane et al. 2011).

Treating the question of 'how flood science is undertaken by academics and consultants' as a research question, the project also documented shifts in the orientations of the modellers involved – a dissociation 'from the science on which the Environment Agency usually bases its local interventions' and new attachments to the joint research group and its priorities (Landström et al. 2011). This also meant a shift from the conventional practice of feeding local data into ready-made, generic models towards creating a model that was simpler but more locally relevant. This enabled the competency group to explore solutions that might work in the specific context of Pickering and which were eventually accepted and implemented by the Environment Agency and partners.

Importantly, the Ryedale Flood Research Group's report concluded that 'participatory science not only produces more socially robust knowledge, but can also be a more cost effective means of exploring how to reduce flood risk' (Ryedale Flood Research Group 2008, p. 8), noting that the project cost significantly less than previous assessments of flood risk management options in Pickering.

The work of the Ryedale Flood Research Group helped to generate new ways of thinking about flood risk management in the UK that have since been deemed a success by the Environment Agency and other partners (Walker 2015). However, the research team for this project were not able to find much evidence that the process-

related lessons, which imply significant shifts in how authority, knowledge and subjectivities are perceived and negotiated, have gone on to inform the philosophy and practice of public engagement in other settings affected by flooding in England or Wales. If this is true, it is suggested that scientific and engagement experts working within and on behalf of the Environment Agency and Natural Resources Wales revisit these lessons and consider their relevance for other contexts.

Note: In the call for this project, Pickering is cited as an example of difficult engagement. It is not clear whether this refers to the Environment Agency's experience in Pickering prior to the constitution of the Ryedale Flood Research Group or to the Group's explicit dissociation from the Environment Agency. The reports and peer-reviewed academic articles available on this case, however, suggest that this is an example of very successful engagement in a difficult situation that risk management authorities could learn from. One of the articles (Lane et al. 2011, p. 33) suggested that this was recognised by the Environment Agency at the time, and cited the Ouse Catchment Manager as saying that 'this work enabled us to improve our relationship with the community in Pickering and one that will hopefully lead to a successful outcome for all'.

Engaging with 'knowledge controversies': Some questions to consider

- What are the costs and benefits of the different models of engagement between science and lay people described above?
- Under what conditions is public education a necessary and sufficient response to public knowledge controversies? What formats and processes have been found to be particularly effective in relation to public education on flooding and flood risk management?
- When does the 'public debate model', with the range of approaches included under this heading, offer helpful ways forward? To what extent do approaches that emphasise representation and representativeness increase the perceived legitimacy of public decision-making processes?
- In what contexts does it make most sense to commit to a full 'co-production of knowledge model'? What obstacles or resistance might this encounter, not least from scientists whose expertise becomes open to questioning? Conversely, what benefits might such experts experience, for example, in the form of the further development of science in the process?
- What trade-offs are there between the depth and quality of public engagement and the scale of participation? How do decisions to limit or expand the number of participants bear on process decisions, and on the perceived legitimacy of different processes?
- What are the tensions, in particular contexts grappling with difficult adaptation decisions, between process and outcomes? What ways of working are most likely to take appropriate account of both the need for good process and the demand for serious engagement with the best available knowledge?
- How important are representation (of different groups and interests) and representativeness (that is, the extent to which participants mirror wider dynamics in the wider community)? What difference does it make whether or not participants in collaborative processes or debates see themselves as representatives or spokespersons for wider constituencies?

- What are the implications of different models, practices and processes for the development of local capacities that last beyond a particular engagement process?

5.6 Summary

This chapter has reviewed interesting ideas and examples of practice covering several important dimensions of community and stakeholder engagement. The chapter began by introducing experiments with role plays and simulations, and considered their potential in enhancing readiness and helping different groups to understand each other's perspectives and ways of framing key issues. It then looked at visualisations of anticipated changes, another potential route towards building readiness to engage in adaptation planning.

In addition, literature and practice that engages with the emotional level of change and its implications for how people relate to places were reviewed. It is suggested that looking at the stories that people tell about themselves and their places, and the ways in which they imagine their past, present and future can open up important avenues for understanding and engaging with the emotional dimensions of change, vulnerability, resilience and adaptation.

Conflict mapping was then introduced as a tool in the analysis of patterns and dynamics of conflict. It is suggested that this could be helpful in engagement planning and potentially to open up shared reflection on conflictual interactions between participants in engagement processes themselves. Finally, the chapter considered a spectrum of approaches to situations in which knowledge is contested from public education to fully-fledged co-production of knowledge.

Each section of the chapter contains an illustrative example of interesting practice and a list of questions that may be answered in different ways in different situations, but which deserve serious consideration in the design of engagement practices and processes.

6 Discussion and conclusions

Chapters 3, 4 and 5 of this report set out a number of key issues and questions for consideration. It is hoped that these will provide helpful food for thought for those involved in engagement processes tackling the difficult challenges facing communities and risk management authorities in England and Wales as we approach an increasingly uncertain future.

This final chapter focuses on some overall observations and identifies some recommendations for the next phase of this project – that of designing and trialling suitable engagement processes in 2 locations. These observations are expected to have wider relevance for other similar projects and locations.

1. **The evidence review indicates that a first step in engagement planning could, or should be, an assessment of readiness within a community and among stakeholders.**

Are people ready and able to participate constructively in the advanced and difficult stages of planning and decision-making processes? The evidence review also suggested that readiness is multifaceted. For example, the literature on place attachment and emotional responses to social–environmental changes indicates that knowledge about risk or options for change, while important, may not be sufficient to build readiness. Instead, engagement processes might need to include opportunities for stakeholders to explore their perceptions, needs and feelings. Readiness might also include various kinds of skill or social capital, including the capacities to engage in deliberation around complex technical, political and ethical questions.

Although work is needed to define more clearly what 'readiness' means (and some dimensions might be particular to different contexts), the evidence review suggested that knowledge and understanding of climate change is one important component. Efforts to build readiness probably need to facilitate awareness of long-term climate scenarios and their local implications.

The review also noted that an assessment of readiness extends to all stakeholders, including professional staff working in risk management authorities. Some of the challenges relating to FCERM in areas facing complex future choices are different or more demanding, requiring in turn new knowledge, approaches and skills.

2. **Linked to the above, the evidence review emphasised the emotional and mental health dimensions of climate change adaptation, suggesting that this deserves fuller consideration within engagement processes.**

The evidence review indicates that this is a complex area, with various implications for work with communities. As shown by the literature on place attachment, the ways in which people relate to the places in which they live or that otherwise hold significant meaning for them have significant emotional dimensions; these make a difference to whether and how they might engage with the challenges of adaptation.

A similar observation can be made about the narratives and stories that circulate within a community. In addition, emotional mechanisms of denial or resistance in relation to genuinely 'difficult knowledge' about climate change and its implications might be linked to the willingness to engage or the nature of engagement by individuals. Engagement staff might need better understanding of these issues, including a chance to reflect on their own emotional responses to the realities of climate change.

Again, this point extends to all stakeholders: practitioners and experts may also be affected by the emotional dimensions of climate adaptation efforts, including the potential for conflict in and/or with communities during engagement and decision-

making. Understanding what additional knowledge, skills or support is needed by practitioners will be important as this area of work develops.

The review also noted the intersection of existing disadvantage with issues of mental health, and how both can be exacerbated by environmental issues. This implies a need to consider how engagement initiatives can be responsive to different needs and circumstances.

3. **The review of relevant literature also observed that processes of engagement and decision-making around difficult adaptation choices are inescapably political.**

Questions of who has the authority to lead processes or make decisions, whose knowledge is heard and respected, how the identities and capabilities of different individuals and social groups are being constructed and with what effects reach to the heart of engagement practice and are often contested.

It may be tempting to shy away from taking a closer look at the complex politics of adaptation. Evidence suggests, however, that a failure to do so may miss important aspects of the dynamics that shape the potential for conflict or collaboration. Choices around who to engage, how to communicate and the extent to which engagement can challenge or change working proposals all convey political messages – whether consciously or inadvertently.

This report suggests therefore that both the larger patterns and the micropolitics of power, knowledge, resources and capacities to act should be explicitly considered in the planning, design and delivery of engagement processes, and that doing so may pre-empt some potential conflicts and, conversely, engender new opportunities for constructive collaboration.

4. **The evidence review suggests that clarity about what engagement is for, with realistic expectations about what a given approach or initiative can achieve, is very important.**

The review considered a number of methods or approaches that appeared responsive to specific needs and challenges in different communities (explored in Chapter 4). This included efforts to build understanding of climate challenges, to build capacity for decision-making around adaptation options, and exploring how people understand and value the places they live in. It might be that the next phase of this project can or should only focus on one or two engagement objectives, depending on the context. For example, if there was a need to spend time developing understanding of climate change risks within a community, this might be an appropriate engagement objective within the timeframe and resources of this project.

Related to the above point, clarity about what learning is sought through this specific project will be important in decisions about case study sites, engagement objectives, and methods and approaches. Given the points made in Chapter 3 about the existing knowledge base around engagement practice, it seems sensible to focus on newer or more innovative approaches, or on challenges that are more particular to the places involved. However, the development of new approaches and learning is more time-consuming and resource intensive – again, requiring appropriate objective setting and evaluative criteria.

5. **The evidence review arguably supports, for a number of reasons, the case for an interdisciplinary and collaborative action research or co-creation approach within this project.**

Many of the examples of interesting and innovative practice drew upon expertise and/or methods from different fields. This partly reflects the multifaceted nature of the readiness and the engagement challenge. It also suggests that collaboration between

risk management authority practitioners, academics, artists, engagement specialists and others has the most potential to generate effective and appropriate approaches to engagement.

The evidence about the importance of ‘place’ suggests a need to ensure any process can take account of specific relevant features of each context. A co-creation process would draw on a range of knowledge and perspectives in a given area. It would be interesting to observe similarities and differences in the proposals developed for the 2 locations in the next phase of this project.

The evidence review identified various ways in which engagement practice is complicated by the power dynamics between agencies and local communities, despite sincere efforts to ‘work with others’ in an inclusive way. This included discussion of the politics of knowledge within FCERM, questions about how issues are framed (including by the use of technical or policy language), about whose knowledge and expertise counts, and how knowledge is generated and valued. While these are complex issues, including the fact that there are structural issues that cannot be ignored such as statutory obligations or the demands of funding sources, there could be value in trying to acknowledge and work around these in a transparent way. A genuine co-creation process would help to communicate that all stakeholders are involved in the learning sought within this project, supporting efforts to build trust and a basis for collaborative decision-making at community level.

The evidence review also raised questions about learning processes within risk management authorities such as the extent to which evidence feeds through into practice and the degree to which the independent and critical perspectives found in academic research are available to practitioners.

A co-creation process drawing on different forms of expertise could better support exposure to a range of perspectives and evidence. This could model ways to more directly connect evidence to the development of practice. Opportunities for full co-production of knowledge, in which affected people are involved alongside scientific experts in a collaborative research process, remain underexplored. This in itself could be a valuable outcome of this project.

References

ADGER, W.N., 2016. Place, well-being, and fairness shape priorities for adaptation to climate change. *Global Environmental Change*, 38, A1-A3.

ADGER, W.N., DESSAI, S., GOULDEN, M., HULME, M., LORENZONI, I., NELSON, D.R., NAESS, L.O., WOLF, J. AND WREFORD, A., 2008. Are there social limits to adaptation to climate change? *Climatic Change*, 93 (3-4), 335-354.

ADGER, W.N., BUTLER, C. AND WALKER-SPRINGETT, K., 2017. Moral reasoning in adaptation to climate change. *Environmental Politics*, 26 (3), 371-390.

ADLER, P.S., 2014. *A user's guide to effective Joint Fact Finding*. Honolulu, Hawai'i: The ACCORD3.0 Network. Available from: https://www.mediate.com/articles/AdlerJFF.cfm [Accessed 14 December 2018].

AGYEMAN, J., DEVINE-WRIGHT, P. AND PRANGE, J., 2009. Close to the edge, down by the river. Joining up managed retreat and place attachment in a climate changed world. *Environment and Planning A: Economy and Space*, 41 (3), 509-513.

ALBRECHT, G., SARTORE, G.M., CONNOR, L., HIGGINBOTHAM, N., FREEMAN, S., KELLY, B., STAIN, H., TONNA, A. AND POLLARD, G., 2007. Solastalgia: the distress caused by environmental change. *Australas Psychiatry*, 15 (Suppl. 1): S95-S98.

ALEXANDER, K.S., RYAN, A. AND MEASHAM, T.G., 2012. Managed retreat of coastal communities: understanding responses to projected sea level rise. *Journal of Environmental Planning and Management*, 55 (4), 409-433.

ANTON, C.E. AND LAWRENCE, C., 2014. Home is where the heart is: the effect of place of residence on place attachment and community participation. *Journal of Environmental Psychology*, 40, 451-461.

ASKLAND, H.H. AND BUNN, M., 2018. Lived experiences of environmental change: solastalgia, power and place. *Emotion, Space and Society*, 27, 16-22.

AUTESSERRE, S., 2014. *Peaceland: Conflict Resolution and the Everyday Politics of International Intervention*. New York: Cambridge University Press.

BELLAMY, R., CHILVERS, J., VAUGHAN, N. AND LENTON, T., 2013. 'Opening up' geoengineering appraisal: multi-criteria mapping of options for tackling climate change. *Global Environmental Change*, 23 (5), 926-937.

BERRY, W., 2007. *Conversations with Wendell Berry*, (ed. M.A. Grubb.), Jackson, MI: University Press of Mississippi.

BISHOP, I.D., 2015. Location based information to support understanding of landscape futures. *Landscape and Urban Planning*, 142, 120-131.

BOONE, K., 2015. Disembodied voices, embodied places: mobile technology, enabling discourse, and interpreting place. *Landscape and Urban Planning*, 142, 235-242.

BROWN, K., 2015. *Resilience, Development and Global Change*. Abingdon and New York: Routledge.

BUICK, F., BLACKMAN, D., O'FLYNN, J., O'DONNELL, M. AND WEST, D., 2016. Effective practitioner–scholar relationships: lessons from a coproduction partnership. *Public Administration Review*, 76 (1), 35-47.

BUSHELL, S., SATRE BUISSON, G., WORKMAN, M. AND COLLEY, T., 2017. Strategic narratives in climate change: towards a unifying narrative to address the action gap on climate change. *Energy Research and Social Science*, 28, 39-49.

BUTLER, C., WALKER-SPRINGETT, K., ADGER, N., EVANS, L. AND O'NEILL, S., 2016. Social and political dynamics of flood risk, recovery and response: a report on the findings of the Winter Floods Project. Exeter: University of Exeter.

CABINET OFFICE, 2011. *Strategic National Framework on Community Resilience.* London: Cabinet Office.

CALLON, M., 1999. The role of lay people in the production and dissemination of scientific knowledge. *Science, Technology and Society*, 4 (1), 81-94.

CASS, N., 2006. *Participatory–deliberative engagement: a literature review*. Working Paper 1.2. Manchester: Manchester University.

CLARKE, D., MURPHY, C. AND LORENZONI, I., 2018. Place attachment, disruption and transformative adaptation. *Journal of Environmental Psychology*, 55, 81-89.

CLAYTON, S., MANNING, C.M., KRYGSMAN, K. AND SPEISER, M., 2017. *Mental health and our changing climate: impacts, implications, and guidance.* Washington, DC: American Psychological Association and ecoAmerica.

CLOUTIER, G., JOERIN, F., DUBOIS, C., LABARTHE, M., LEGAY, C. AND VIENS, D., 2014. Planning adaptation based on local actors' knowledge and participation: a climate governance experiment. *Climate Policy*, 15 (4), 458-474.

COLLINGWOOD ENVIRONMENTAL PLANNING, 2016. *Independent Review of Flood Awareness Wales*. Cardiff: Natural Resources Wales.

CORNELL, S., 2006. *Improving stakeholder engagement in flood risk management decision making and delivery*. Joint Defra and Environment Agency FCERM R&D Programme. R&D Technical Report SC040033/SR2. Bristol: Environment Agency.

DEEMING, H., 2017. *Understanding extreme events as catalysts for flood-risk management policy change: a case study of the impact of 'Storm Desmond' in Cumbria, UK.* Brussels: European Commission Disaster Risk Management Knowledge Centre.

DEFRA, 2005. *Making Space for Water.* London: Department for Environment, Food and Rural Affairs.

DEFRA, 2012a. *Coastal Pathfinder evaluation: an assessment of the five largest Pathfinder projects.* London: Department for Environment, Food and Rural Affairs.

DEFRA, 2012b. *Coastal Change Pathfinder review.* London: Department for Environment, Food and Rural Affairs.

DELLI CARPINI, M.X., LOMAX COOK, F. AND JACOBS, L.R, 2004. Public deliberations, discursive participation and citizen engagement: a review of the empirical literature. *Annual Review of Political Science,* 7, 315-344.

DEMERITT, D. AND NOBERT, S., 2014. Models of best practice in flood risk communication and management. *Environmental Hazards*, 13 (4), 313-328.

DEVINE-WRIGHT, P., 2013. Think global, act local? The relevance of place attachments and place identities in a climate changed world. *Global Environmental Change*, 23 (1), 61-69.

DULIC, A., ANGEL, J. AND SHEPPARD, S., 2016. Designing futures: Inquiry in climate change communication. *Futures*, 81, 54-67.

EFRAC, 2016. *Future flood prevention.* London: Environment, Food and Rural Affairs Committee.

ENVIRONMENT AGENCY, 2006. *Addressing environmental inequalities: flood risk.* Science Report SC020061/SR1. Bristol: Environment Agency.

ENVIRONMENT AGENCY, 2008. *Understanding special interest groups*. Science Report SC020067. Bristol: Environment Agency.

ENVIRONMENT AGENCY, 2011. *Community-focussed flood engagement: Evaluation of best practice on behalf of the Environment Agency.* Bristol: Environment Agency.

ENVIRONMENT AGENCY, 2012. *Flood risk: Understanding and communicating with our customers*. Bristol: Environment Agency.

ENVIRONMENT AGENCY, 2015. *Public dialogues on flood risk communication: literature review*. Report SC120010/R1. Bristol: Environment Agency.

ENVIRONMENT AGENCY, 2016. *Working with others*. Bristol: Environment Agency.

ENVIRONMENT AGENCY, 2017a. *Working with Natural Processes – Evidence Directory*. Report SC150005/R1. Bristol: Environment Agency.

ENVIRONMENT AGENCY, 2017b. *Community perspectives and issues for flooding: evidence note*. Bristol: Environment Agency.

ERIKSEN, S.H., NIGHTINGALE, A.J. AND EAKIN, H., 2015. Reframing adaptation: the political nature of climate change adaptation. *Global Environmental Change*, 35, 523-533.

FENN, T., DALY, E., MILLER, J., ELDING, C., CLARKE, C., GUTHRIE, G., HICK, E., FREW, P., SILSON, R. AND HICKLING, D., 2015. *Adapting to coastal erosion: evaluation of rollback and leaseback schemes in Coastal Change Pathfinder projects.* Final report for project FD2679. London: Department for Environment, Food and Rural Affairs.

FERNÁNDEZ-BILBAO, A. AND TWIGGER-ROSS, C., 2009. *Improving response, recovery and resilience. Improving institutional and social responses to flooding*. Joint Defra and Environment Agency FCERM R&D Programme Science Report SC060019 - Work Package 2. Bristol: Environment Agency. Available from: https://www.gov.uk/government/publications/improving-response-recovery-and-resilience-improving-institutional-and-social-responses-to-flooding [Accessed 6 December 2018].

FERNÁNDEZ-BILBAO, A., WOODIN, S., RICHARDSON, J., ZSAMBOKY, M., BOSE, S., ORR, P., TWIGGER-ROSS, C. AND COLBOURNE, L., 2009. *Understanding the processes for Community Adaptation Planning and Engagement (CAPE) on the coast*. London: Department for Environment, Food and Rural Affairs.

FILHO, W.L., MANOLAS, E., AZUL, A.M., AZEITEIRO, U.M. AND MCGHIE, H., 2018. *Handbook of Climate Communication.* Cham, Switzerland: Springer International Publishing.

FRITZ, C., 1996. *Disasters and mental health: therapeutic principles drawn from disaster studies.* Historical and Comparative Disaster Series #10. Newark, DE: University of Delaware Disaster Research Center.

FÜNFGELD, H. AND MCEVOY, D., 2011. *Framing climate change adaption in policy and practice*. VCCCAR Project: Framing Adaption in the Victorian Context, Working Paper 1. Melbourne: Royal Melbourne Institute of Technology University [cited in Tebboth 2014].

GALLO, G., 2013. Conflict theory, complexity and systems approach. *Systems Research and Behavioral Science*, 30 (2), 156-175.

GIBBS, M.T., 2016. Why is coastal retreat so hard to implement? Understanding the political risk of coastal adaptation pathways. *Ocean and Coastal Management*, 130, 107-114.

GONZALES, J., 2017. *Interpreting climate change through human stories at coastal national park sites* [online]. Indianapolis, IN: National Council on Public History. Available from: https://ncph.org/history-at-work/climate-change-stories-at-costal-nps-sites/ [Accessed 14 December 2018].

HAYES, K., BLASHKI, G., WISEMAN, J., BURKE, S. AND REIFELS, L., 2018. Climate change and mental health: risks, impacts and priority actions. *International Journal of Mental Health Systems*, 12, 28.

HENRIKSEN, H.J., ROBERTS, M.J., VAN DER KEUR, P., HARJANNE, A., EGILSON, D. AND ALFONSO, L., 2018. Participatory early warning and monitoring systems: a Nordic framework for web-based flood risk management. *International Journal of Disaster Risk Reduction*, 31, 1295-1306.

HINO, M., FIELD, C.B. AND MACH, K.J., 2017. Managed retreat as a response to natural hazard risk. *Nature Climate Change*, 7, 364-370.

IPSOS MORI, 2012. *Eight principles for flood risk communications.* London: Ipsos MORI.

JBA CONSULTING AND ICARUS, 2016. *Fairbourne Learning Project: Learning bulletin reflection and review*.

JOHNSON, C., TUNSTALL, S., PRIEST, S., MCCARTHY, S. AND PENNING-ROWSELL, E., 2008. *Social justice in the context of flood and coastal erosion risk management: a review of policy and practice*. Joint Defra and Environment Agency FCERM R&D Programme. R&D Technical Report FD2605/TR. Bristol: Environment Agency.

KING, D., BIRD, D., HAYNES, K., BOON, H., COTTRELL, A., MILLAR, J., OKADA, T., BOX, P., KEOGH, D. AND THOMAS, M., 2014. Voluntary relocation as an adaptation strategy to extreme weather events. *International Journal of Disaster Risk Reduction*, 8, 83-90.

LANDSTRÖM, C., WHATMORE, S.J., LANE, S.N., ODONI, N.A., WARD, N. AND BRADLEY, S.M., 2011. Coproducing flood risk knowledge: redistributing expertise in critical 'participatory modelling'. *Environment and Planning A*, 43, 1617-1633.

LANE, S.N., ODONI, N., LANDSTROM, C., WARD, N., BRADLEY, S. AND WHATMORE, S., 2011. Doing flood risk science differently: an experiment in radical scientific method. *Transactions of the Institute of British Geographers*, 36 (1), 15-36.

LARSEN, K. AND GUNNARSSON-ÖSTLING, U., 2009. Climate change scenarios and citizen-participation: mitigation and adaptation perspectives in constructing sustainable futures. *Habitat International*, 33 (3), 260-266.

LEDOUX, L., CORNELL, S., O'RIORDAN, T., HARVEY, R. AND BANYARD, L., 2005. Towards sustainable flood and coastal management: identifying drivers of, and obstacles to, managed realignment. *Land Use Policy*, 22 (2), 129-144.

LEJANO, R.P., TAVARES-REAGER, J. AND BERKES, F., 2013. Climate and narrative: environmental knowledge in everyday life. *Environmental Science and Policy*, 31, 61-70.

LI, Y., ZHU, Z. AND GERARD, C.M., 2012. Learning from conflict resolution: an opportunity to systems thinking. *Systems Research and Behavioral Science*, 29 (2), 209-220.

LOVETT, A., APPLETON, K., WARREN-KRETZSCHMAR, B. AND VON HAAREN, C., 2015. Using 3D visualization methods in landscape planning: an evaluation of options and practical issues. *Landscape and Urban Planning*, 142, 85-94.

MATSUURA, M. AND SCHENK, T. (eds.), 2017. *Joint Fact-Finding in Urban Planning and Environmental Disputes*. London: Routledge.

MAYNARD, C.M., 2013. *Public participation in river research and management: scale, levels of participation and the contexts of knowledge co-production.* Doctoral thesis. Durham University. Available from: http://etheses.dur.ac.uk/9377/ [Accessed 3 December 2018].

MCEWEN, L., GARDE-HANSEN, J., HOLMES, A., JONES, O. AND KRAUSE, F., 2017. Sustainable flood memories, lay knowledges and the development of community resilience to future flood risk. *Transactions of the Institute of British Geographers*, 42 (1), 14-28.

MESCH, G.S. AND TALMUD, I., 2010. Internet connectivity, community participation, and place attachment: a longitudinal study. *American Behavioral Scientist*, 53 (8), 1095-1110.

MONBIOT, G., 2017. *Out of the Wreckage: A New Politics for an Age of Crisis*. London: Verso.

MOSER, S.C, 2012. Navigating the political and emotional terrain of adaptation: community engagement when climate change comes home [online]. Santa Cruz and San Francisco: Susanne Moser Research and Consulting. Available from: http://susannemoser.com/documents/Moser_Navigatingtheterrainofadaptation_prepub_final_000.pdf [Accessed 13 December 2018] [pre-publication version of Chapter 17 in *Successful Adaptation to Climate Change: Linking Science and Policy in a Rapidly Changing World* (ed. S.C. Moser and M.T. Boykoff) published by Routledge in 2013].

MOSER, S.C., 2014. Communicating adaptation to climate change: the art and science of public engagement when climate change comes home. *Wiley Interdisciplinary Reviews: Climate Change*, 5 (3), 337-358.

MOSER, S.C., 2015. Raising the seas, rising to greatness? Meeting the challenge of coastal climate change. In *Applied Studies in Climate Adaptation* (ed. J.P Palutikof, S.L. Boulter, J. Barnett and D .Rissik), pp. 177-180. Oxford: Wiley.

MOSER, S.C. AND BOYKOFF, M.T., 2013. Climate change and adaptation success: the scope of the challenge. In *Successful Adaptation to Climate Change: Linking Science and Policy in a Rapidly Changing World* (ed. S.C. Moser and M.T. Boykoff), Chapter 1. London: Routledge.

MOSER, S.C., DANIELS, C., PIKE, C. AND HUVA, A., 2016. *Here-Now-Us: visualizing sea level rise and adaptation using the OWL technology in Marin County, California* [online]. Santa Cruz and San Francisco: Susanne Moser Research and Consulting. Available from: https://climateaccess.org/sites/default/files/Here%20Now%20Us%20Project%20and%20Research%20Summary.pdf [Accessed 6 December 2018].

NAGODA, S. AND NIGHTINGALE, A.J., 2017. Participation and power in climate change adaptation policies: vulnerability in food security programs in Nepal. *World Development*, 100, 85-93.

NATIONAL FLOOD FORUM AND COLLINGWOOD ENVIRONMENTAL PLANNING, 2018. *Sustainable communities pilot study. Final report.* Report prepared for the Welsh Government and Natural Resources Wales. Available from: https://naturalresources.wales/evidence-and-data/research-and-reports/reports-evidence-and-data-on-flooding/sustainable-communities-pilot-study/?lang=en [Accessed 6 December 2018].

NICOLOSI, E. AND CORBETT, J.B., 2017. Engagement with climate change and the environment: a review of the role of relationships to place. *Local Environment*, 23 (1), 77-99.

NIGHTINGALE, A.J., 2017. Power and politics in climate change adaptation efforts: Struggles over authority and recognition in the context of political instability. *Geoforum*, 84, 11-20.

NOAA, 2015. *Introduction to stakeholder participation*. Social Science Tools for Coastal Programs. Charleston, SC: NOAA, Office for Coastal Management.

O'NEILL, S.J. AND GRAHAM, S., 2016. (En)visioning place-based adaptation to sea-level rise. *Geo: Geography and Environment*, 3: e00028.

OTTINGER, G., 2017. Making sense of citizen science: stories as a hermeneutic resource. *Energy Research and Social Science*, 31, 41-49.

PASCHEN, J.-A. AND ISON, R., 2014. Narrative research in climate change adaptation: exploring a complementary paradigm for research and governance. *Research Policy*, 43 (6), 1083-1092.

PELLING, M., SHARPE, J., PEARSON, L., ABELING, T., GERGER SWARTLING, Å., FORRESTER, J.M. AND DEEMING, H., 2015. *Social learning and resilience building in the emBRACE framework*. Louvain, Brussels: Centre for Research on the Epidemiology of Disasters (CRED).

QUINN, T., LORENZONI, I., ADGER, W.N., OBRIEN, K. AND SELBOE, E., 2015. Place Attachment, Identity, and Adaptation. In *The Adaptive Challenge of Climate Change* (ed. K. O'Brien and E. Selboe), pp. 160-170. Cambridge: Cambridge University Press.

ROWE, G. AND FREWER, L.J., 2005. A typology of public engagement mechanisms. *Science, Technology, and Human Values,* 30 (2), 251-290.

RUMORE, D., 2015. Assessing the social landscape: understanding the readiness challenge. In *Managing Climate Risks in Coastal Communities* (ed. L. Susskind, D. Rumore, C. Hulet and P. Field), Chapter 2. London: Anthem Press.

RUMORE, D., SCHENK, T. AND SUSSKIND, L., 2016. Role-play simulations for climate change adaptation education and engagement. *Utah Law Faculty Scholarship*, 30. Available from: http://dc.law.utah.edu/scholarship/30 [Accessed 4 January 2019].

RYEDALE FLOOD RESEARCH GROUP, 2008. *Making Space for People: involving local knowledge in flood risk research and management in Ryedale, Yorkshire*. Oxford: Understanding Environmental Knowledge Controversies Research Project.

SAYERS, P., HORRITT, M., PENNING-ROWSELL, E. AND FIETH, J., 2016. *Present and future flood vulnerability, risk and disadvantage: a UK assessment.* Report prepared for the Joseph Rowntree Foundation, Climate Change and Communities Programme. Watlington, Oxfordshire: Sayers and Partners.

SCHENK, T., VOGEL, R.A.L., MAAS, N. AND TAVASSZY, L.A., 2016. Joint fact-finding in practice: review of a collaborative approach to climate-ready infrastructure in

Rotterdam. *European Journal of Transport and Infrastructure Research (EJTIR)*, 16, 273-293.

SCHROTH, O., POND, E. AND SHEPPARD, S.R.J., 2015. Evaluating presentation formats of local climate change in community planning with regard to process and outcomes. *Landscape and Urban Planning*, 142, 147-158.

SHAW, A., SHEPPARD, S., BURCH, S., FLANDERS, D., WIEK, A., CARMICHAEL, J., ROBINSON, J. AND COHEN, S., 2009. Making local futures tangible – synthesizing, downscaling, and visualizing climate change scenarios for participatory capacity building. *Global Environmental Change*, 19 (4), 447-463.

SHEPPARD, S.R.J., 1989. *Visual Simulation – A User's Guide for Architects, Engineers & Planners*. New York: Van Nostrand Reinhold.

SHEPPARD, S.R.J., 2001. Guidance for crystal ball gazers: developing a code of ethics for landscape visualisation. *Landscape and Urban Planning*, 54 (1-4), 183-199.

SHEPPARD, S.R.J., 2015. Making climate change visible: a critical role for landscape professionals. *Landscape and Urban Planning*, 142, 95-105.

SHEPPARD, S.R.J., SHAW, A., FLANDERS, D., BURCH, S., WIEK, A., CARMICHAEL, J., ROBINSON, J. AND COHEN, S., 2011. Future visioning of local climate change: a framework for community engagement and planning with scenarios and visualisation. *Futures*, 43 (4), 400-412.

SHMUELI, D., ELLIOTT, M. AND KAUFMAN, S., 2006. Frame changes and the management of intractable conflicts. *Conflict Resolution Quarterly*, 24 (2), 207-218.

SINGH MEHMI, J. AND BAILEY, P., 2018. *Trust in the Environment Agency's Flood and Coastal Risk Management work*. Bristol: Environment Agency.

SMITH, J., BUTLER, R., DAY, R.J., GOODBODY, A.H., LLEWELLYN, D.H., ROHSE, M., SMITH, B.T., TYSZCZUK, R.A., UDALL, J. AND WHYTE, N.M., 2017. Gathering around stories: Interdisciplinary experiments in support of energy system transitions. *Energy Research and Social Science*, 31, 284-294.

SMITH, S. AND KELLY, R., 2017. *Community and stakeholder engagement in flood risk management.* Bradford: University of Bradford.

SOLNIT, R., 2009. *A Paradise Built In Hell: The extraordinary communities that arise in disaster*. New York: Penguin.

SPELLER, G., 2005. *Improving community and citizen engagement in flood risk management decision making, delivery and flood response.* Joint Defra and Environment Agency FCERM R&D Programme. R&D Technical Report SC040033/SR3. Bristol: Environment Agency.

STOKKE, K.B., 2014. Adaptation to sea level rise in spatial planning – experiences from coastal towns in Norway. *Ocean and Coastal Management*, 94, 66-73.

STRAW, E. AND COLBOURNE, L., 2009. *Evaluation of the use of working with others – building trust for the Shaldon Flood Risk Project.* Nantperis, Wales: Lindsey Colbourne Associates.

SUSSKIND, L. AND RUMORE, D., 2015. Helping coastal communities prepare for and respond to climate change-related risks. In *Managing Climate Risks in Coastal Communities: Strategies for Engagement, Readiness and Adaptation* (ed. L. Susskind, D. Rumore, C. Hulet and P. Field), Chapter 1. London: Anthem Press.

TAYLOR, A.L., DESSAI, S. AND DE BRUIN, W.B., 2014. Public perception of climate risk and adaptation in the UK: a review of the literature. *Climate Risk Management*, 4-5, 1-16.

TEBBOTH, M., 2014. Understanding intractable environmental policy conflicts: the case of the village that would not fall quietly into the sea. *The Geographical Journal*, 180 (3), 224-235.

TERPSTRA, T., 2011. Emotions, trust, and perceived risk: affective and cognitive routes to flood preparedness behavior. *Risk Analysis*, 31 (10), 1658-1675.

THALER, T. AND LEVIN-KEITEL, M., 2016. Multi-level stakeholder engagement in flood risk management – a question of roles and power: lessons from England. *Environmental Science and Policy*, 55 (2), 292-301.

TRIBBIA, J. AND MOSER, S.C., 2008. More than information: what coastal managers need to plan for climate change. *Environmental Science and Policy*, 11 (4), 315-328.

TSCHAKERT, P., JYOTI DAS, P., SHRESTHA PRADHAN, N., MACHADO, M., LAMADRID, A., BURAGOHAIN, M. AND ALAM HAZARIKA, M., 2016. Micropolitics in collective learning spaces for adaptive decision making. *Global Environmental Change*, 40, 182-194.

TSENG, C.-P. AND PENNING-ROWSELL, E.C., 2012. Micro-political and related barriers to stakeholder engagement in flood risk management. *The Geographical Journal*, 178 (3), 253-269.

TSOUVALIS, J. AND WATERTON, C., 2012. Building 'participation' upon critique: the Loweswater Care Project, Cumbria, UK. *Environmental Modelling and Software*, 36, 111-121.

TWIGGER-ROSS, C., 2005. *Improving the contribution of social science to the Flood Risk Management science programme.* R&D Technical Report SC040033/SR5. Bristol: Environment Agency.

TWIGGER-ROSS, C., 2006. *Managing the social aspects of flooding: synthesis report.* Joint Defra and Environment Agency FCERM R&D Programme. R&D Technical Report SC040033/SR6. Bristol: Environment Agency.

TWIGGER-ROSS, C. AND COLBOURNE, L., 2009. *Improving institutional and social responses to flooding: synthesis report.* Joint Defra and Environment Agency FCERM R&D Programme. Science Report SC060019 - Work Package 5. Bristol: Environment Agency. Available from: https://www.gov.uk/government/publications/improving-institutional-and-social-responses-to-flooding [Accessed 6 December 2018].

TWIGGER-ROSS, C., KASHEFI, E., WELDON, S., BROOKS, K., DEEMING, H., FORREST, S., FIELDING, J., GOMERSALL, A., HARRIES, T., MCCARTHY, S., ORR, P., PARKER, D. AND TAPSELL, S., 2014. *Flood Resilience Community Pathfinder Evaluation: Rapid Evidence Assessment*. London: Department for Environment, Food and Rural Affairs.

TWIGGER-ROSS, C., ORR, P., BROOKS, K., SADAUSKIS, R., DEEMING, H., FIELDING, J., HARRIES, T., JOHNSTON, R., KASHEFI, E., MCCARTHY, S., REES, Y. AND TAPSELL, S., 2015. *Flood Resilience Community Pathfinder Evaluation. Final evaluation report.* London: Department for Environment, Food and Rural Affairs.

VAN DER LINDEN, S., 2015. The social-psychological determinants of climate change risk perceptions: towards a comprehensive model. *Journal of Environmental Psychology*, 41, 112-124.

WALKER, J., 2015. *Slowing the Flow: working with nature to reduce flood risk in North Yorkshire* [online]. Bristol: Environment Agency. Available from: https://environmentagency.blog.gov.uk/2015/11/11/slowing-the-flow-working-with-nature-to-reduce-flood-risk-in-north-yorkshire/ [Accessed 14 December 2018].WATTS, N., AMANN, M., AYEB-KARLSSON, S., BELESOVA, K., BOULEY, T., BOYKOFF, M., BYASS, P., CAI, W., CAMPBELL-LENDRUM, D., CHAMBERS, J., COX, P.M., DALY, M., DASANDI, N., DAVIES, M., DEPLEDGE, M., DEPOUX, A., DOMINGUEZ-SALAS, P., DRUMMOND, P., EKINS, P., FLAHAULT, A., FRUMKIN, H., GEORGESON, L., GHANEI, M., GRACE, D., GRAHAM, H., GROJSMAN, R., HAINES, A., HAMILTON, I., HARTINGER, S., JOHNSON, A., KELMAN, I., KIESEWETTER, G., KNIVETON, D., LIANG, L., LOTT, M., LOWE, R., MACE, G., SEWE, M.O., MASLIN, M., MIKHAYLOV, S., MILNER, J., LATIFI, A.M, MORADI-LAKEH, M., MORRISSEY, K., MURRAY, K., NEVILLE, T., NILSSON, M., ORESZCZYN, T., OWFI, F., PENCHEON, D., PYE, S., RABBANIHA, M., ROBINSON, E., ROCKLÖV, J., SCHÜTTE, S., SHUMAKE-GUILLEMOT, J., STEINBACH, R., TABATABAEI, M., WHEELER, N., WILKINSON, P., GONG, P., MONTGOMERY, H. AND COSTELLO, A., 2018. The Lancet Countdown on health and climate change: from 25 years of inaction to a global transformation for public health. *The Lancet*, 391, 581-630.

WEHN, U., COLLINS, K., ANEMA, K., BASCO-CARRERA, L. AND LEREBOURS, A., 2017. Stakeholder engagement in water governance as social learning: lessons from practice. *Water International*, 43 (1), 34-59.

WENTWORTH, J., 2014. *Catchment-wide flood management*. POST NOTE 484. London: Parliamentary Office of Science and Technology.

WHATMORE, S.J., 2009. Mapping knowledge controversies: science, democracy and the redistribution of expertise. *Progress in Human Geography*, 33 (5), 587-598.

WHATMORE, S., OWENS, S., HINCHLIFFE, S. AND PIDGEON, N., 2017. *Communicating risk.* Report by the Defra Science Advisory Council, Social Science Expert Group Task Group. London: Department for Environment, Food and Rural Affairs.

WHITTLE, R., MEDD, W., DEEMING, H., KASHEFI, E., MORT, M., TWIGGER-ROSS, C., WALKER, G. AND WATSON, N., 2010. *After the Rain – learning the lessons from flood recovery in Hull.* Final project report for 'Flood, Vulnerability and Urban Resilience: a real-time study of local recovery following the floods of June 2007 in Hull'. Lancaster: Lancaster University.

WILKINSON, D. AND WADE, D., 2005. Managing flood risk through effective stakeholder engagement. A scoping study on the Aire & Calder. Joint Defra and Environment Agency FCERM R&D Programme. R&D Technical Report SC040033/SR4. Bristol: Environment Agency.

WOOD, M., 2015. Depoliticisation, resilience and the herceptin post-code lottery crisis: holding back the tide. *British Journal of Politics and International Relations*, 17, 644-664.

XUE, W., HINE, D.W., LOI, N.M., THORSTEINSSON, E.B. AND PHILLIPS, W.J., 2014. Cultural worldviews and environmental risk perceptions: a meta-analysis. *Journal of Environmental Psychology*, 40, 249-258.

ZSAMBOKY, M., FERNÁNDEZ-BILBAO, A., SMITH, D., KNIGHT, J. AND ALLAN, J., 2011. *Impacts of climate change on disadvantaged UK coastal communities.* York: Joseph Rowntree Foundation.

Glossary

Climate change adaptation	Adjusting to actual or expected future climate to reduce the risks posed by the harmful effects of climate change, such as extreme weather events and sea level rise.
Community	A group of people living in the same place or having a particular characteristic in common. This report uses the term to refer to people living within a geographically bounded area.
Community resilience	The ability of communities to respond, recover and adapt to disasters or hazards, while minimising the impact and disruption caused.
Conflict analysis	The systematic study and mapping of the profile, causes, actors and dynamics of a conflict. This aims to provide a better understanding of how the conflict could be resolved.
Emotional dimensions of environmental change	The effects of place-based changes to the environment on psychological, emotional and mental wellbeing. This can be direct, such as the traumatic impacts of extreme weather or changes to land; or indirect, such as observation of current environmental impacts and concern for future risks.
Engagement practice	The process of working collaboratively with and through groups of people to address particular issues. In the context of this report, it refers to building relationships between geographically located communities and public bodies.
Frames	The culturally determined definitions of reality that allow people to make sense of objects and events.
Frame analysis	A research method that is used to analyse how people understand and communicate about situations, and the effect this has on broader discussions.
Framing	The way in which a particular issue is described in relation to pre-existing social, cultural and political symbols.
Governance	The processes of governing over a social system. It includes mechanisms such as laws, power and norms and encompasses players from the public and private sectors and civil society.
Identity	The characteristics that make an individual, group or thing distinctive.
Knowledge controversies	Disagreements which occur when two or more parties have conflicting information regarding a topic. The discrepancies between interested parties can make it more challenging for policy makers, scientists and the

	public to arrive at a universally accepted understanding of a topic.
Photo-elicitation	A method of interviewing which uses visual images to provoke a response.
Place attachment	A bond that connects people to places. These connections can inform individual and community identity and self-worth.
Place detachment	The intentional dissolution of ties to place.
Readiness	A characterisation of whether human systems are prepared and ready to carry out adaptation measures.
Resilience	The ability to recover or bounce back in the event of adversity.
Risk management authority	Organisations with legal responsibilities for flood and coastal erosion risk management. These include Defra, the Environment Agency, Lead Local Flood Authorities, district councils, highways authorities and water and sewerage companies.
Solastalgia	The distress that is produced by environmental change impacting on people while they are directly connected to their home environment.

Would you like to find out more about us or about your environment?

Then call us on

03708 506 506 (Monday to Friday, 8am to 6pm)

email

enquiries@environment-agency.gov.uk

or visit our website

www.gov.uk/environment-agency

incident hotline **0800 807060** (24 hours)

floodline **0345 988 1188 / 0845 988 1188** (24 hours)

Find out about call charges (www.gov.uk/call-charges)

Environment first: Are you viewing this on screen? Please consider the environment and only print if absolutely necessary. If you are reading a paper copy, please don't forget to reuse and recycle if possible.