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Adaptation to Coastal Change

Quick Scoping Review

July 2018

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Coastal Adaptation to Coastal Change: Quick Scoping Review

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Executive Summary

Background

Shoreline Management Plans provide the high level, long term policy framework with which to manage the risk of coastal change to people and the environment. Coastal Protection Authorities develop the plans, and the Environment Agency oversees their production and quality. The management recommendations are based on scientific, social, economic and environmental information. They recommend four approaches to managing sections of the coastline:

- Hold the Line - defences are maintained and upgraded or replaced in their current position where funding permits.

- Managed Realignment - this policy allows realignment of the shoreline (forwards or backwards) with management to control or limit the movement. Any increase in flood risk will also be managed. Although this policy typically applies to low-lying areas at risk of flooding it can equally apply to cliff areas, whereby cliff recession could be slowed down for a period of time.

- No Active Intervention (do nothing) - this is a policy decision not to invest in the provision or maintenance of any defences. Where there are no existing defences the shoreline will continue to evolve naturally. This policy can also apply to areas that are currently defended but may not be defended in the future. These areas will evolve more naturally, which may include an increased risk of flooding or coastal erosion. It may be necessary to intervene (by removing old defences) in order that a 'No Active Intervention' policy can be implemented

- Advance the Line - new defences are built seaward of existing defences where funding permits, involving a significant reclamation of land in the process

For areas of the coastline where the adopted policy is Managed-Realignment and No-Active-Intervention, there is potential for the loss of land, homes, businesses and infrastructure. In such areas local authorities will need to work with local communities to develop and implement ‘adaptation strategies’ that support a positive and effective response to their changing coastline.

Defra broadly understands how much of the coastline have adopted Managed-Realignment or No-Active-Intervention policies. However, because the implementation of these policies is devolved, Defra does not have records of the extent of the losses being incurred, the coastal adaptation actions that are being delivered on the ground, and the associated costs being borne by local authorities. Defra also wants to try and understand the scale of both the challenges that local authorities are facing now and those they are anticipating in the long-term – including the number and nature of properties that may be affected, over different timescales. Defra would like to have information on where coastal adaptation policies have been put in place, what the policy impacts are, the extent to which

planners are actively engaged with adaptation, and how stakeholder interactions and communication channels with Defra can be opened and supported.

The QSR Process

A QSR aims to provide "an informed conclusion of the size and type of evidence available and a summary of what that evidence indicates with respect to the question/s posed" but does not extend to a critical appraisal of the evidence (Collins et al., 2015).

This review addressed a number of key questions as far as was possible, taking account of the limited scale of the project. The elements to be addressed in order to formulate an answer were identified using the Population, Intervention, Comparison and Outcome (PICO) framework set out in the following table.

PICO element	**PICO element within this QSR**
Population	Local authorities (and any other organisation with coastal management responsibilities)
Intervention	Shoreline management plans, coastal adaptation planning policies (e.g. Coastal-Change-Management-Areas)
Comparator	N/A
Outcome	Success in terms of delivering effective coastal adaptation

The approach to the QSR then involved the following steps in answering the key questions:

- Academic literature review (371 potentially relevant pieces of literature were identified through searches of Web of Science and SCOPUS databases);
- Mapping of properties at risk (using publically available information sources);
- Grey literature review (evidence drawn from 9 key national-scale sources from the Environment Agency, Defra and the National Trust, together with local Shoreline Management Plans, local authority planning documentation and local coastal management and adaptation websites);
- Interviews (8 undertaken as part of this project and evidence drawn from 12 undertaken as part of the development of the Climate Change Adaptation Planning Guidance (CCAPG, 2015);
- Evidence synthesis.

Key Findings

1. How many properties have been lost since plans were drawn up (i.e. since 1996)?

The results of this quick review indicate that the numbers of properties lost since 1996 might be of the order of 50 permanent properties and 30 temporary properties, plus 100 or so beach huts. Caravans would also have been lost, had they not been moved back away from the cliff edge.

A more comprehensive evaluation of historic property losses could be established via:

- A comprehensive survey of all coastal local authorities; and/or
- A GIS mapping of historic address point data from 1996 onto current shoreline position and seeing where properties have been lost. Note this would exclude caravans.

The value of coastal authorities maintaining a register of properties lost to coastal erosion going forwards, so that this information is collected routinely, was established.

2. What numbers and types of properties and infrastructure are at risk going forwards and where are they?

The evidence for answering these questions was established via a GIS mapping exercise of existing national datasets (of erosion rates, property addresses and Shoreline Management Plan extents). The results are summarised in the following table and mapped at high level in Chapter 4. This evidence is based on an assumption that the interventions currently set out in Shoreline Management Plans are fully implemented across all epochs and does not include individual caravans – of which there are a large number on all stretches of the coast in close proximity to the cliff edge, and which are likely to be at considerable risk.

Shoreline Management Plan Ref[1]	Residential			Commercial			Community			Public			Service Infrastructure		
	Epoch			Epoch			Epoch			Epoch			Epoch		
	ST	MT	LT	ST	MT	LT	ST	MT	LT	ST	MT	LT	ST	MT	LT
1	2	53	148	1	9	17	0	2	2	2	8	12	1	5	8
2	3	13	44	1	1	11	0	0	0	0	1	4	0	0	2
3	31	97	204	4	15	29	0	1	1	0	2	6	0	4	10
4	0	0	77	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	18	90	554	1	6	32	0	0	2	0	2	5	0	2	8

[1] Data source https://www.gov.uk/government/publications/shoreline-management-plans-smps

7	2	12	35	0	3	3	0	0	0	0	0	2	0	0	2
8	6	36	154	0	1	7	0	1	1	0	0	0	1	1	3
9	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
10	0	5	32	0	4	7	0	0	0	0	0	2	0	0	3
11	3	13	44	1	3	10	0	0	1	0	0	4	1	2	4
12	1	19	39	0	0	0	0	0	0	1	1	2	0	0	0
13	0	29	252	1	14	42	0	1	1	0	1	3	0	0	5
14	4	29	101	0	3	15	0	0	1	0	2	4	0	0	4
15	0	1	57	1	4	5	0	0	0	0	1	2	0	1	1
16	6	28	101	3	10	22	0	0	0	0	1	6	0	3	8
17	4	36	247	2	8	36	0	0	1	0	6	14	0	1	15
18	4	9	29	3	3	8	0	0	0	0	1	1	2	2	2
19	3	3	3	0	0	1	0	0	0	0	0	0	0	0	0
22	5	20	48	0	5	11	0	0	0	0	2	8	0	0	5
All SMPs	92	494	2170	18	89	256	0	5	10	3	28	75	5	21	80

(ST: within 20 years; MT: within 50 years; LT: within 100 years)

3. What are the social characteristics of the places at most risk and how is this impacted by the threat and reality of coastal erosion?

This evidence suggested the following:

- In the North East (East Riding of Yorkshire Council and Scarborough Borough Council), rural and often isolated coastal communities at risk from coastal erosion are predominantly low income with social deprivation.
- In Norfolk and across the South and South West of England, there are a mixture of wealthy villages / individual properties and deprived, low income communities.
- Social deprivation puts greater financial burdens on local authority resources, with people who require new accommodation as a result of coastal erosion, often being dependent on the availability of council housing.
- Isolated rural communities tend to be more dependent on their immediate supporting community infrastructure (e.g. transport and communications links, jobs, local shops and social activities) which may also be threatened by erosion.
    - Many of the people who live at the coast are also more vulnerable to impacts because of socio-economic issues such as high proportions of older residents and transient populations, low employment levels and high

seasonality of work, physical isolation and poor transport links. A lack of understanding in disadvantaged coastal communities of the range of possible climate change impacts they potentially face and how to respond appropriately was also an issue, together with their lack of agency and capacity to take action.

- Wealthier property owners (including businesses) often have more agency and capacity to engage and influence. In addition, they may try and secure planning permission to implement private defences against coastal erosion. There were concerns about whether such private defences were always of environment benefit, and about the risk of lack of support from councillors of local council policies with respect to adaptation.

4. Have local authorities' policies in place to help businesses in the area adapt to the threat of coastal erosion to retain community viability?

The evidence suggested the following:

- There appear to be few local authorities with policies specifically relating to supporting businesses. East Riding of Yorkshire Council is an exception, with integrated community guidance on adaptation options available online.

- Caravan parks tend to be the most prevalent business with assets at immediate risk of coastal erosion. Caravan park owners tend to plan and implement their own actions with respect to roll back on their private land.

- Businesses are more likely to be keen to fund private defences. However there was concern about whether these would always be in support of Shoreline Management Plan policies and it was recognised that it is fundamental to ensure localised actions do not exacerbate wider risk.

- Local businesses (potentially with assets at risk) are often an important source of partnership funding for larger schemes.

5. What strategies, actions and other activities have Local Authorities in England taken, plan or desire to take to adapt to coastal erosion?

The evidence suggested the following:

- The extent and nature of adaptation policy development, and adaptation actions and support is very variable across England and depends on the extent of potential future losses, the imminence of future losses, and the nature of those losses (e.g. whether they are property or environmental assets).

- North Norfolk District Council and East Riding of Yorkshire Council are the most advanced in terms of adaptation planning – with accessible support mechanisms for

property owners, policies and mechanisms for roll-back, and well established coastal community groups.

- Some participants felt that there are local authorities with properties potentially at risk within the next 10 years that currently have low awareness of roll-back options and without relevant policies to support that type of action.

- Coastal-Change-Management-Areas (CCMA's) are generally being considered and/or implemented in Local Plan updates unless the risk is perceived to be very low (i.e. there is currently full Hold-the-Line coverage).

- There is no apparent current recognition by local authorities in policies of potential risks to Shoreline Management Plan policy delivery – should funding not prove to be available.

As this review was necessarily limited in extent, an additional gap-filling exercise could be undertaken by comprehensively interviewing all coastal local authorities. A mapping exercise could also be undertaken to establish the numbers and types of properties at risk, where delivery of Shoreline Management Plan policies is potentially at risk due to funding shortfalls.

6. What are the costs and timescales associated with the planned actions?

The evidence suggested the following:

- The costs established in the Coastal Change Pathfinder (Defra, 2012) are likely to give the best indication of the cost of strategic coastal adaptation activities relating to managing the impact of property losses at the coast.

- Some individual estimated costs of localised Managed-Realignment projects are available. Funding shortfalls for these projects are anticipated by authorities.

- Risk mapping and project prioritisation and appraisal is being systematically undertaken in Cornwall, however, costs associated with planned actions are not yet available.

- Most strategic adaptation planning work is undertaken as part of existing allocated staff time (business as usual).

- The cost of removing defences (or allowing defences to fail), making the area environmentally and socially safe, and re-naturing is significant and new funding opportunities are required (e.g. estimated. £2.91 million at Weybourne and Cart Gap, Norfolk).

As this review was necessarily limited in extent, an additional gap-filling exercise could be undertaken to comprehensively interview all coastal local authorities.

7. What support do Local Authorities require from Defra for effective coastal adaptation?

The evidence suggested the following:

a. Strategic planning

Perceived needs related to strategic planning include guidance on and support with:

- the interpretation of and required actions relating to Coastal-Change-Management-Areas;
- how to effectively align short-term decision-making with long-term risk management planning (ensuring difficult decisions are not deferred);
- how to bring adaptation planning in line with Shoreline Management Plan delivery, including how to fund adaptation strategies, and how to evaluate risks and opportunities associated with short-term interventions to 'buy time' for communities to adapt/move;
- Improved strategies across Shoreline Management Plan/ Shoreline Management Plan, policy unit boundaries.

b. Legal

Perceived needs related to legal issues include guidance on and support with articulating a clear legal framework around adaptation planning, roll back and other adaptation policy implementation processes. This includes the local authority legal duties and obligations with respect to adaptation and at-risk property.

c. Funding

Perceived needs related to funding include guidance on and support with:

- putting in place long-term investment strategies, when there is significant uncertainty over future funding sources;
- the full suite of financing options available including what Grant in Aid funding can and cannot be used for, the opportunities for ring-fenced local authority adaptation funds, insurance compensation possibilities (if any), and partnership funding approaches;
- how to best incentivise roll back;
- the development of new financial products that could enable vulnerable communities to adapt cost-effectively (e.g. developer contributions, better focusing the Coastal Communities' Fund on coastal adaptation).

d. Community engagement

Perceived needs related to community engagement include guidance on and support with:

- raising awareness of Shoreline Management Plan and policies generally, including how to convey that there may be risks with policy non-deliverability due to longer term funding gaps;
- securing funds for dedicated and skilled community engagement individuals to reduce future risk and raise awareness, particularly where there is a shift from Hold-the-Line to No-Active-Intervention policies in the Shoreline Management Plan;
- securing engagement and buy-in from elected councillors;
- Strategic planning for supporting community infrastructure;
- Strategic planning for caravan park businesses and their inhabitants.

e. Monitoring

Perceived needs related to monitoring include guidance on and support with monitoring coastal erosion, monitoring property and infrastructure at risk and when lost to coastal erosion (including temporary infrastructure e.g. caravans).

Contents

1. Introduction

1.1 Background to the project

Shoreline Management Plans provide the high level, long term policy framework with which to manage the risk of coastal change to people and the environment. Coastal Protection Authorities develop the plans, and the Environment Agency oversees their production and quality. The management recommendations are based on scientific, social, economic and environmental information. They recommend four approaches to managing sections of the coastline:

- Hold the Line - defences are maintained and upgraded or replaced in their current position where funding permits.

- Managed Realignment - this policy allows realignment of the shoreline (forwards or backwards) with management to control or limit the movement. Any increase in flood risk will also be managed. Although this policy typically applies to low-lying areas at risk of flooding it can equally apply to cliff areas, whereby cliff recession could be slowed down for a period of time.

- No Active Intervention (do nothing) - this is a policy decision not to invest in the provision or maintenance of any defences. Where there are no existing defences the shoreline will continue to evolve naturally. This policy can also apply to areas that are currently defended but may not be defended in the future. These areas will evolve more naturally, which may include an increased risk of flooding or coastal erosion. It may be necessary to intervene (by removing old defences) in order that a 'No Active Intervention' policy can be implemented

- Advance the Line - new defences are built seaward of existing defences where funding permits, involving a significant reclamation of land in the process

For areas of the coastline where the adopted policy is Managed-Realignment and No-Active-Intervention, there is potential for the loss of land, homes, businesses and infrastructure. In such areas local authorities will need to work with local communities to develop and implement ‘adaptation strategies’ that support a positive and effective response to their changing coastline. Local planning policies usually define areas that are likely to be affected by coastal change (physical change to the shoreline through erosion, coastal landslip, permanent inundation or coastal accretion) as Coastal-Change-Management-Areas (CCMA’s), although the term Coastal Erosion Constraint Area is also used.

Defra broadly understands how much of the coastline have adopted Managed-Realignment or No-Active-Intervention policies. However, because the implementation of these policies is devolved to (mainly district) councils[2], Defra does not have records of the extent of the losses being incurred, the coastal adaptation actions that are being delivered on the ground, and the associated costs being borne by local authorities. Defra has close associations with some local authorities[3] – and there are therefore areas where they have a good picture of 'adaptation in action'. However there are a number of other areas for which they have less information and they would like these gaps to be filled by this project.

Defra wants to try and understand the scale of both the challenges that local authorities are facing now and those they are anticipating in the long-term – including the number and nature of properties that may be affected, over different timescales. Defra would like to have information on where coastal adaptation policies have been put in place, what the policy impacts are, the extent to which planners are actively engaged with adaptation, and how stakeholder interactions and communication channels with Defra can be opened and supported.

1.2 Objectives

A QSR aims to provide "an informed conclusion of the size and type of evidence available and a summary of what that evidence indicates with respect to the question/s posed" but does not extend to a critical appraisal of the evidence (Collins et al., 2015).

This study aims to address the following key questions as far as is possible within the scale of this project:

A There are predictions about the number of properties set to be impacted by coastal erosion in the next 5, 20 and 50 years? How many have been lost since plans were first drawn up? What numbers and types of properties are at risk going forwards?

B What infrastructure is set to be impacted by coastal erosion in the next 5, 20 and 50 years? What is this and where?

C Community infrastructure is an important aspect of sustainability of places. What are the social characteristics of the places at most risk and how is this impacted by the threat and reality of coastal erosion?

D Economic cohesion. Have local authorities put policies in place to help businesses in the area adapt to the threat of coastal erosion to retain community viability?

[2] Under the 1949 Coast Protection Act, they were identified as Coastal Protection Authorities.

[3] In particular, those that took part in the Coastal Change Pathfinder project.

E What strategies, actions and other activities have Local Authorities in England taken, plan or desire to take to adapt to coastal erosion?

F What are the costs and timescales associated with the planned actions?

G What is the national picture and where are the gaps in knowledge?

The key elements that need to be addressed in order to formulate an answer have been identified using the Population, Intervention, Comparison and Outcome (PICO) framework set out in Table 1.1.

Table 1.1 PICO considerations

PICO element	PICO element within this QSR
Population	Local authorities (and any other organisation with coastal management responsibilities)
Intervention	Shoreline management plans, coastal adaptation planning policies (e.g. Coastal-Change-Management-Areas)
Comparator	N/A
Outcome	Success in terms of delivering effective coastal adaptation

1.3 Methodology

The approach to the QSR involved the following key steps in answering the questions posed in Section 1.2:

- Academic literature review (relevant for all questions);
- Mapping of properties at risk (relevant for questions A and B);
- Grey literature review (relevant for all questions);
- Interviews (relevant for all questions);
- Evidence synthesis.

An initial high level review of the grey literature indicated that a relatively comprehensive series of interviews on coastal adaptation had been undertaken as part of the supporting work for the development of the Coastal Change Adaptation Planning Guidance (CCAPG), by CH2M in 2015. In addition, further information was gathered by Defra on the currently ongoing Adaptation Sub-Committee (ASC) project on coastal adaptation – also being undertaken by contactors CH2M Hill[4], which indicated detailed case study work in two

[4] CH2M Hill became part of the Jacobs group in 2017

specific areas (East Riding of Yorkshire and North Norfolk). It was not considered appropriate to re-interview any of those targeted by these two studies, and interviews were therefore planned and implemented in other areas as a gap-filling exercise. The CCAPG (12 interviews in total) and new interviews (8 interviews in total) were used to provide geographically relevant evidence on the extent to which adaptation processes are being considered, supported and implemented in their area; the extent of integration of coastal erosion risk assessment and management with planning; how adaptation actions are being funded and what challenges this presents; and what further support they would like to see from central government on this issue. In the new interviews, interviewees were also asked if they had records of how many properties had been lost to coastal erosion since 1996.

The interview locations are summarised in Table 1.2. In general, interviewees' job profiles were related to coastal management, strategic resilience and/or planning. Two further councils were approached but no responses were forthcoming within the timescale of the project.

Table 1.2 Summary of Interview Locations and Contacts

Shoreline Management Plan	Area at Risk	Coastal Group	Interviewee	New / CCAPG[5]
1	Northumberland	North East	Northumberland County Council	New
2	Scarborough	North East	(Scarborough Borough Council	CCAPG
2 & 3	East Riding of Yorkshire	North East	East Riding of Yorkshire District Council	CCAPG
4	Lincolnshire	East Anglia	Lincolnshire County Council	CCAPG
5 & 6	North Norfolk	East Anglia	North Norfolk District Council	CCAPG
6	Great Yarmouth	East Anglia	Great Yarmouth Borough Council	CCAPG
6 & 7	Waveney	East Anglia	Waveney District Council	CCAPG
11	Hastings	South East	Hastings Borough Council	CCAPG
14	Isle of Wight	Southern	Isle of Wight Council	CCAPG
13	Chichester	Southern	Chichester District	CCAPG

[5] Questionnaire consultation published as part of the evidence presented in CH2M (2015b)

Shoreline Management Plan	Area at Risk	Coastal Group	Interviewee	New / CCAPG[5]
			Council	
13	Eastleigh	Southern	Eastleigh District Council	New
13 & 15	New Forest	Southern	New Forest District Council	New
15 & 16	Purbeck	South West	Purbeck District Council	New
16	Dorset	South West	Dorset County Council	CCAPG
16	East Devon	South West	East Devon County Council	New
16	South Hams	South West	South Hams District Council	CCAPG
16 & 17	Cornwall	South West	Cornwall County Council	New
17 & 18	Torridge	South West	Torridge District Council	New
18	Somerset	South West	Somerset County Council	CCAPG
22	Sefton	North West	Sefton Borough Council	New

2. Grey Literature Review & Interviews: Evidence of Adaptation in Practice

2.1 Methodology

Stretches of coastline were identified that were either established as a 'high erosion risk' location, or a location specifically referenced in the coastal adaptation literature reviewed as part of this project. Existing evidence and interview consultation outcomes were combined with new interviews for some of the locations to secure the most comprehensive picture of the coastal adaptation activities currently being undertaken nationally in order to answer the following questions (posed in Section 1.2):

B What infrastructure is set to be impacted by coastal erosion in the next 5, 20 and 50 years? What is this and where?

C Community infrastructure is an important aspect of sustainability of places. What are the social characteristics of the places at most risk and how is this impacted by the threat and reality of coastal erosion?

D Economic cohesion: Have local authorities put policies in place to help businesses in the area adapt to the threat of coastal erosion to retain community viability?

E What strategies, actions and other activities have Local Authorities in England taken, plan or desire to take to adapt to coastal erosion?

F What are the costs and timescales associated with the planned actions?

G What is the national picture and where are the gaps in knowledge?"

The data has been collated and described at a county level, and evidence from each piece of literature or interview that is relevant for that county is reported in separate sub-sections. A map showing the locations of each of the following sections is provided in Figure 2.1.

Figure 2.1 Geographic location map for evidence (Chapter 2 sub-sections)

2.2 Northumberland

2.2.1 Interview (New, 2018)

The Northumberland coastline is 83 miles in length and largely natural / undefended. Priorities areas for adaptation are those lengths which front the coastal towns and villages as well the coastal highway route where it is at risk from coastal evolution.

The emerging Local Plan for Northumberland recognises the impact of coastal change on development and includes Coastal-Change-Management-Areas within its draft. In these areas, any development proposals are required to carry out a coastal vulnerability assessment.

The Shoreline Management Plan action plan provides the framework for how plan policies will be implemented in the long term. Short term requirements are focused on maintaining existing defences which involves large capital maintenance schemes. Other forms of adaptation, such as roll back, and longer term actions are proposed but specific local discussions with stakeholders on these have not progressed beyond consultation.

Funding is perceived to be a key barrier, particularly where engineering works are required. It is felt that there are now risks to delivery of second generation Shoreline Management Plan policies as a result of the national Partnership funding mechanism which was introduced subsequent to the drafting of the plan. Resetting some of the criteria for benefit categories within the Partnership funding calculator was suggested as a way to help support coastal adaptation in Northumberland.

2.3 Scarborough

2.3.1 Literature

Knipe Point is a development of 56 properties on the top of Clayton Cliffs, just to the south of Scarborough. The cliffs have been subject to significant landslips as a result of the combined effects of coastal erosion and the underlying instability of the coastal slopes. The remobilisation of this landslide in 2008 has resulted in the loss of private land and the enforced demolition of three properties (Defra, 2012). Further properties are considered to be at risk over the next five years, together with part of the old A165 and properties beyond this. The land affected is privately owned by the National Trust and Knipe Point Freeholders Ltd.

Using Pathfinder funding, the council purchased land away from risk, obtained planning permission for the land and provided a serviced site with infrastructure. At risk property owners were then offered the option of rebuilding their homes on the new site. Site appraisal and comprehensive community engagement were key activities and keeping the community intact was initially a significant deliverable. However, this was found not to be a priority for residents and the process of agreeing a preferred approach was challenging.

2.3.2 Interview (CH2M, 2015b)

The coastal region includes some isolated coastal villages with areas of low education and employment, and some deprivation. Stakeholders to the process of managing coastal change here include the National Trust, Natural England and the County Council and there is concern that there is a lack of overarching knowledge on coastal change between these groups. It was highlighted that the North Yorkshire National Park were considering a policy for adaptation in the area (Note: this was not obvious from a follow up web search).

No Coastal-Change-Management-Area is planned for Scarborough (as of 2015, and a follow up web search appears to indicate that this is still the case). In 2015, there was no specific coastal change policy in the Local Plan, however the revised plan (adopted in

2017) includes reference to areas of coastal erosion risk (designated in the 2007 Shoreline Management Plan) and to development being unacceptable if it might exacerbate erosion or itself be at risk over its lifetime.

It was felt that better synergies between planning and coastal change horizons were required and that adaptation needs integration within the Flood and Coastal Erosion Risk Management options appraisal process to allow its delivery in line with Shoreline Management Plan aspirations. Buy-in from elected members was highlighted as being key to the coastal adaptation process.

At Knipe Point, unlike those at risk of losing property elsewhere around the coast, residents can claim on their home-insurance, once their houses are actually lost because the cause of land collapse here was a landslide. This points to a need to better understand insurance issues and payments – where properties are at risk.

2.4 East Riding of Yorkshire

2.4.1 Literature

The clay cliffs of East Riding experience one of the fastest erosion rates in north-west Europe – overall the coastline has been eroding at an average rate of approximately 2 m per year. 48 km of the coastline is under No-Active-Intervention[6] with only larger communities defended (HTL or Hold-the-Line) to maintain them as viable towns (including Bridlington, Hornsea and Withernsea), and assets defended (e.g. highways, industrial sites). There are a number of properties and isolated communities outside these areas located along undefended section of coast, where the high erosion rates puts homes, farms and caravan parks at risk (CH2M, 2015a).

Residents losing property typically request accommodation via the Housing Team, which has implications for the Council's limited housing stock. Social issues at play in undefended locations include; isolation due to remoteness, pockets of deprivation, an ageing population linked to the inward migration of retired adults, and the limited connection of coastal towns with their hinterlands. The physical loss of retail and transport services / infrastructure which act as lifelines for vulnerable residents in isolated communities which are satellites of larger settlements inland (CH2M, 2015a), is also an issue.

Rollback or relocation of property, community facilities and infrastructure has been identified as a suitable adaptation approach to coastal change by East Riding of Yorkshire Council. The Rollback approach involves looking at how properties can be moved inland away from the threat of coastal change whilst improving the quality of the local

[6] Coastal Protection Authorities base their management recommendations on scientific, social, economic and environmental information when plans are drawn up.

environment and sustaining local communities. The Council assesses each application for rollback in order to establish the level of risk to the property and the suitability of the replacement plot. The policy is effective and allows planning permission to be granted for the re-building of structures at imminent risk of loss from coastal erosion, in areas where planning permission would otherwise not be granted (due to sensitivity in environmental and/or planning terms). The Council is working in partnership with private companies to plan for the proactive rollback of utilities which must be safeguarded for the benefit of remaining residents and service providers (CH2M, 2015a).

The East Riding of Yorkshire Coastal Change Pathfinder Project (completed 2011) tested ways of aiding implementation of this policy – essentially taking a risk-based approach to providing practical support and guidance to at risk coastal communities (rather than providing compensation for loss of property). The project enabled to Council to refine its approach to establishing the erosion risk of any property and thus prioritise applications for advice and support. A range of measures were then tested to give incentives to people living with imminent threat of losing their home to relocate to safer areas. Three risk categories were defined – Imminent, Higher and Lower Risk. For those at Imminent Risk – a relocation package was offered including help with demolition and relocation costs, and help with rent and furnishings. For those at Higher and Lower Risk, an adaptation package was made available which included a buy and lease back option; and erosion adaptation assistance grants for those who felt able to adapt to their living environment rather than immediately move out of the property. Property owners also had access to the relocation package if preferred. The information used to define the risk was considered and reviewed by a cross-directorate Coastal Officers' Working Group, established to help embed an integrated approach to the management of coastal change across the Council.

Early engagement proved invaluable, e.g. giving vulnerable residents additional time in which to plan for relocation, by joining the housing register at an early stage to increase their chances of receiving suitable accommodation offers. Some adaptation options included in the Pathfinder project support packages, including 'Buy and Lease Back' proved difficult to test within the Council's corporate structure and wider legislative and policy framework. In addition, for houses to be rented they need to meet the decent homes standard. This prevented leaseback from being implemented in East Riding.

The Pathfinder projects implemented in East Riding were considered to provide a consistent approach, at a relatively low cost per household assisted compared to other schemes. However assets were not replaced and so this approach would lead to a reduction in the housing stock overall unless more development was facilitated. There was also concern that the approach could be considered as compensatory which is potentially difficult to justify when coastal erosion is just one reason why people might lose their homes.

2.4.2 Interview (CH2M, 2015b)

The key issue for East Riding is the need to balance investment and sustainable growth with raising awareness of coastal change and adaptation responses and to support

relocation away from threatened areas. The coastal zone economy is dominated by small/medium enterprises with reliance on seasonal activity that is very susceptible financially to coastal change and less able to pursue adaptation options.

Officers from various Council teams work in partnership to offer practical support and assistance to residents and are supporting the development of a coastal change communications toolkit detailing rollback and other adaptation options. Other stakeholders include Defra, Environment Agency, North East Coastal Group, Natural England, town and parish councils, and East Riding Coastal Partnership. The council has considered full scale rollback of communities and is reviewing their rollback policies within their local plans (as at 2015).

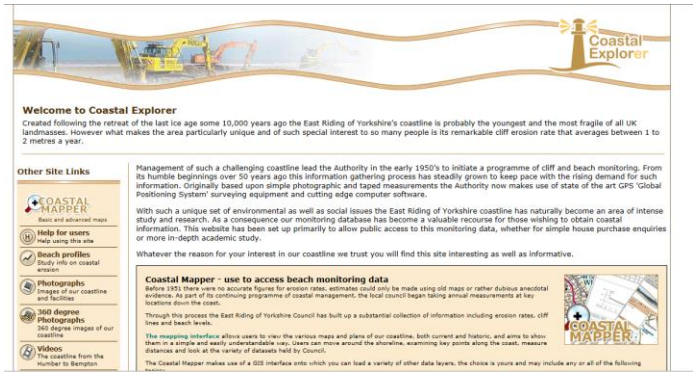
Direct and indirect financial burdens associated with managing the impacts of coastal change (over and above property relocation) are stated as including:

- the monitoring of road networks and implementing road closures;
- the cost of demolishing uninsured properties and seeing to reclaim the costs from owners;
- the costs associated with allocating Council properties to those who are losing their coastal properties;
- the costs of preventing dangerous infrastructure from collapsing onto the foreshore and becoming environmental hazards;
- the costs associated with conducting bi-annual surveys of the entire coastline and subsequently publishing that data on a dedicated website;
- the costs of social support, e.g. for particularly vulnerable residents, relocation is a significant cause of distress and negative impacts may result in need for support from e.g. Adults Services Team;
- The cost of the required extensive consultation throughout the development and implementation of Coastal-Change-Management-Areas (CCMAs) including one to one engagement in at risk communities and for businesses.

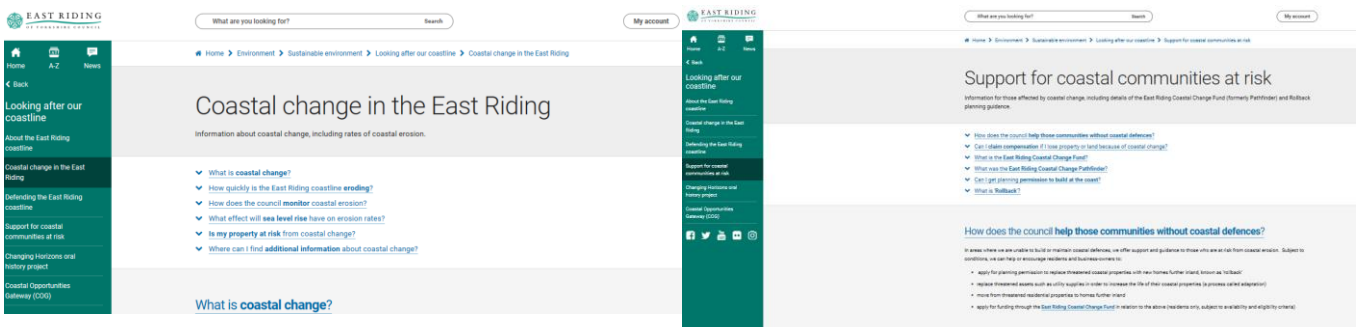
2.4.3 Follow up information (2018)

The latest Local Plan (adopted 2016) has coastal change policies and defines the activities allowable within the Coastal-Change-Management-Area (including changes between epochs). East Riding of Yorkshire Council also have websites dedicated to:

a) Erosion datasets[7]



b) Coastal Adaptation[8]



2.5 Lincolnshire

2.5.1 Literature

Around 40% of Lincolnshire's land base is at or below sea-level. The coastal zone comprises much of the East Lindsey District and the whole of Boston Borough and South Holland District, amounting to 220,000 people and 103,000 properties. Active coastal erosion processes, already necessitating high levels of protection along the east coast, are expected to intensify and spread to the north and south (Defra, 2012). Pathfinder funding was used to fund a range of activities – the outcomes of which are summarised in Table 2.1.

[7] http://www.eastriding.gov.uk/coastalexplorer/

[8] http://www2.eastriding.gov.uk/environment/sustainable-environment/looking-after-our-coastline/coastal-change-in-the-east-riding/

Table 2.1 Key outputs and outcomes of the Lincolnshire (small) Pathfinder project (Defra 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Lincolnshire	*Coastal awareness campaign* to increase flood risk awareness and emergency preparedness; Targeted testing of *engagement techniques* to increase flood risk awareness; *Mablethorpe Case Study*, which will deliver a range of awareness raising activities based in a new community information hub building.	Developing principles and potential spatial planning options Through a *Coastal Study*; *Mass evacuation research,* resulting in improved plans for evacuation of vulnerable groups; Improved *knowledge of hidden" caravan community.*		*Economic coastal model* testing impacts of economic development, investment, climate change adaptation and housing market changes in the coastal region; *Design solutions* e.g. handbook of flood resilience solutions; toolkit for developers in flood risk areas.

2.5.2 Interview (CH2M, 2015b)

There are high levels of elderly/vulnerable communities as the coastal zone in Lincolnshire is a popular retirement location. There are also large numbers of static caravans (around 25,000) in the coastal zone – some of which are occupied throughout the year and high levels of deprivation as much of the work in the region is seasonal.

It is considered that the development of Coastal-Change-Management-Areas is unlikely as the main issue across the coastal region is flood risk and all the Shoreline Management Policies are Hold-the-Line.

2.6 Norfolk

2.6.1 Literature

The East Anglian coastline has been subject to erosion for many years, with historic references to earlier settlements and properties lost to coastal erosion. Approximately half the affected coastline in North Norfolk consists of soft cliffs (clays, silts, sands and gravels) which are highly susceptible to erosion, the remainder is low-lying and susceptible to coastal flooding. Erosion rates vary from 0.4 to 2 m a year (Defra, 2012).

There are many communities along this vulnerable coastline that are at the low end of social deprivation indices. The second generation Shoreline Management Plans for this coastline (adopted 2010 and 2012) advocated changes in policy from continued defence to

"No-Active-Intervention[9]". This is a decision not to invest in providing or maintaining any defences, which means (in the longer term) that properties, local communities, environmental assets and infrastructure are at risk of loss. This has resulted in blight for some property owners with impacts on house prices, and a reduced ability of areas identified as at risk, to attract business investment (CH2M, 2015a). The Coastal Change Pathfinder review (Defra, 2012) cites recent examples of the direct impacts of coastal change on the North Norfolk coastline as including the loss of 16 chalets, closure of a cafe and guest house and loss of a beach ramp at Happisburgh.

The North Norfolk Coastal Change Pathfinder Project (completed 2011) tested ways of aiding the implementation of Roll Back policies (Defra, 2012). In particular, this looked at 'buy and lease' mechanisms and relocation approaches. It found that buy and lease was possible to deliver, but not attractive to do so at the time due to the high level of risk involved. In part, these risks were associated with legal issues. Roll back was perceived to have delivered financial benefits to the property owners (since they received a value for their home above the at risk value – note: this could be seen as the council paying an inflated or compensatory value for properties) and allowed the council to recoup some of the acquisition costs through sale of land (although there was a risk of the Council not being able to recoup the full value having purchased the site without full planning permission). In addition, properties are being replaced elsewhere so the size of the settlement is maintained – delivering further economic benefits.

The full outcomes of the Pathfinder project are summarised in Table 2.2.

Table 2.2 Key outputs and outcomes of the North Norfolk Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
North Norfolk	*Coastal Heritage project* involving events, training and resource use completed with publication of a heritage book still outstanding	*Property acquisition for lease back scheme* appraised but not pursued.	*Happisburgh property acquisition and demolition programme*; *Happisburgh cliff top enhancement* project involving construction of car park, toilets and new beach access ramp and removal of beach debris (NB: Not all activity may be considered adaptive); *Rollback of the Manor caravan park* (extension granted to allow owner to find an alternative site); Infrastructure package (footpath realignment, removal of beach debris and	*Business advice project* involving 90 businesses (advice, business grants/loans and tourism audit); *Marketing toolkit for businesses;* Study into the potential for private sector contributions towards a defence project in *Wolferton.*

[9] Coastal Protection Authorities base their management recommendations on scientific, social, economic and environmental information when plans are drawn up.

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
	but already over-subscribed		investigation of rollback of Trimingham Village Hall) (NB: Not all activity may be considered adaptive).	

A small Pathfinder project was also undertaken in Scratby, just north of Great Yarmouth. This focussed on community engagement, education and information programmes, and adaptation planning for the village, e.g. research into equity release and equity transfer schemes; rollback options and funding sources for rollback; and development of a Community Adaptation Management Plan (Defra, 2012).

North Norfolk District Council (NNDC)'s Core Strategy was adopted in 2011 and includes two policies relevant to coastal change. Coastal Erosion Constraint Areas (CECA) are defined in Policy EN11 to discourage development within these areas unless it can be demonstrated that it will result in no increased risk to life or any significant increased risk to property. A supporting guidance note (Development and Coastal Erosion) was published to provide clarity on implementation of the policy and on the nature of development likely to be appropriate within the CECA. In particular, this guidance states that temporary development is often an appropriate response to help the community 'gain time' to enable adaptation. Changes in use (e.g. from residential to employment related) of existing buildings at risk may also be a means of enabling adaptation.

To enable adaptation in advance of actual property loss and to minimise potential effects of blight, NNDC developed Policy EN12 to help facilitate Roll Back of development to safer areas inland. To support policy implementation, NNDC provides site-specific vulnerability reports for house purchases. NNDC is currently developing a set of guidelines / advice for property owners to help them use LDF core strategy policies to relocate or undertake appropriate development within risk zones.

2.6.2 Interview (CH2M, 2015b)

Coastal communities in North Norfolk are mostly at the low end of social deprivation indices (with pockets of greater wealth). Where predictions of erosion are significant, this is perceived to be causing blight for property owners with impacts on house prices and reduced ability for areas to attract business investment.

Adaptation policies developed for Norfolk include the definition of Coastal Erosion Constraints Areas in Local Plans plus a set of guidelines for property owners/developers. There is also a policy to support and enable relocation, however there is often difficulty in finding suitable available land with a community willing to accept relocated assets. For effective adaptation, community relationships are essential and need resourcing – and this is being achieved in Norfolk through a Coastal Concern Action Group which provides a forum for organisations/local councillors/parish councillors/residents to capture knowledge and ask questions.

North Norfolk District Council has now implemented a new integrated coastal zone management approach, seeking to integrate policy and plans to maximise benefits e.g. coordinated approaches to funding, coastal protection, tourism, economy etc. There is a feeling from this that the Coastal Communities Fund should be refocussed on adaptation not economy development and that the Flood and Coastal Erosion Risk Management options appraisal process needs to integrate adaptation options to support shoreline management plan delivery. In support, it was felt that there would also be benefits from a more joined up approach between Defra and Ministry of Homes and Local Government (MHCLG).

2.6.3 Follow up information (online)

At Hemsby (Great Yarmouth) – residents were evacuated by the local authority from 13 properties close to eroding cliffs in March 2018. The demolition cost is around £28k per property (grant £6K). 5 properties were demolished on 23/03/2018, 7 further properties were demolished in early May 2018. https://www.great-yarmouth.gov.uk/article/3956/Hemsby-updates.

In December 2013, 3 houses and a lifeboat hut in Hemsby, Norfolk were also swept into sea along with a popular cafe at Caister-on-Sea. The cliffs at Happisburgh, Norfolk have also been eroding rapidly. Figure 2.2 shows properties lost between 1992 and 2004.

Figure 2.2 Erosion at Happisburgh (http://www.bgs.ac.uk/landslides/happisburgh.html)

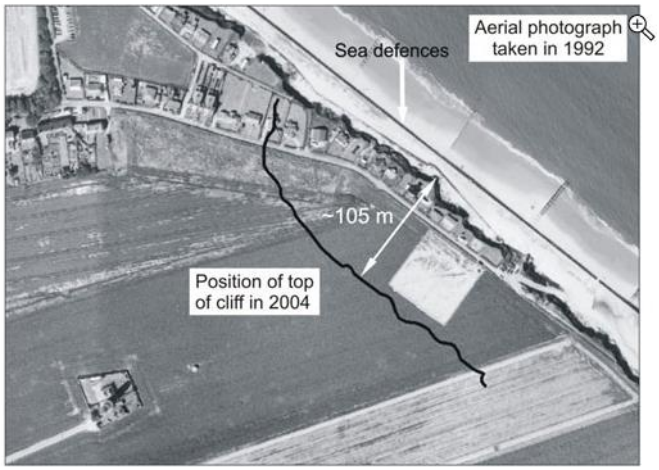


Figure 2 Cliff top position in 2004 — this had retreated a further 20 metres in 2007. 1992 aerial photograph © Environment Agency, reproduced with kind permission of the Shoreline Management Group, (Anglian Region).

Notes from the Infrastructure Group – Norfolk Strategic Framework (Coastal Evidence (Flooding and Coastal Erosion)), January 2017 indicate that there is a funded North Norfolk District Council project between Weybourne and Cart Gap for the management and removal of redundant coastal defences and re-naturing of the landscape (£2.91 million).

2.7 Suffolk

2.7.1 Literature

East Anglia has one of the fastest eroding coastlines in Europe. Over 50% of the Suffolk coast is eroding, more than any other county. Coastal cliff erosion poses risks to properties and businesses in the short and medium term. Beach erosion and associated loss of beach access is also having an impact on the local tourism industry in Corton which is at risk from erosion. Easton Bavents is built on soft cliffs which are eroding at 2.6 m a year (Defra, 2012).

Pathfinder funding was used to fund adaptation work at Waveney, as summarised in Table 2.3.

Table 2.3 Key outputs and outcomes of Waveney Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Waveney		Review of *rollback policy*; *Workshops* with utility providers to discuss coastal erosion impacts.	Testing of planned *rollback* of nine households most at risk in *Easton Bavents.*	Development & implementation of *Corton beach strategy* including works to beaches, improved beach access, footpaths and signage.

As the council did not actually purchase homes from those at risk, this is a lower cost approach compared to similar approaches adopted in North Norfolk. By replacing properties elsewhere in Waveney, the community could remain together. The project led to amendments to planning policy and clarification of rights associated with properties lost due to coastal erosion (including the right for property relocation with a legal basis in the planning system even if the property is lost to erosion before a relocated site/property has been secured).

The revised draft of the Local Plan (currently with Government for approval, as of July 2018) includes a policy defining the Coastal-Change-Management-Area (CCMA) for Waveney (based on the 2005 baseline as defined in the current shoreline management plans. All planning applications for development within the Coastal-Change-Management-Area (and a specified zone around the CCMA) need to be accompanied by a Coastal Erosion Vulnerability Assessment. In addition, the risk posed to supporting infrastructure such as essential transport links have to be considered. The Development and Coastal Change Supplementary Planning Document (2013) has been prepared to aid in the interpretation of the coastal change policies. The Supplementary Planning Document will be updated following adoption of the Local Plan. A further policy deals with development relocation, see Box 2.1 below:

Policies for individual identified development sites in the Local Plan area include statements requiring a certain number of plots to be made available on the site for the relocation of policies under threat from coastal erosion with the provision that the plot should be used for affordable housing if it has not been used for the replacement of a dwelling at risk from erosion within a period of 5 years from the completion of the rest of the development.

Box 2.1 Property relocation policy from Waveney Final Draft Local Plan (Waveney District Council, March 2018)

Policy WLP8.26 – Relocation and Replacement of Development Affected by Coastal Erosion

Proposals for the relocation and replacement of community facilities, commercial, agricultural and business uses affected by coastal erosion will be permitted in the Countryside, provided that:

- The proposed development replaces that which is within the Coastal Change Management Area as identified on the Policies Map and is forecast to be affected by erosion within 20 years of the date of the proposal;
- The new development is located at an appropriate distance inland with regard to Policy WLP8.25 on the Coastal Change Management Area;
- The new development is in a location that is accessible to the coastal community from which it was displaced; and
- The existing site is either cleared and made safe or put to a temporary use beneficial to the local community.

Proposals for the relocation and replacement of dwellings affected by coastal erosion will be permitted in the Countryside where:

- The development replaces a permanent building which is within the Coastal Change Management Area as identified on the Policies Map and is forecasted to be affected by erosion within 20 years of the date of the proposal;
- The relocated dwelling should be in a location which exhibits a similar or improved level of sustainability with respect to access to services and facilities as the original dwelling;
- The relocated dwelling is outside of the Coastal Change Management Area as identified on the Policies Map; and
- The existing site is either cleared and made safe or put to a temporary use beneficial to the local community.

The Alde & Ore Future Pilot Project has been set up to bring together all those engaged with issues affecting life around the Alde & Ore Estuary. Working groups chaired by, and made up of, local people have explored a range of issues facing the community (from housing to coastal defence) and conclusions were then shared through drop in sessions to gain feedback from wider community. The responses have directly fed into the Framework Plan for the Estuary and into the establishment of the Alde and Ore Estuary Partnership which has enabled decisions on flood defence and erosion risk management to be moved to a more local level. This community group is taking an overall view of the management of the estuary defences and the funding of their future repair and maintenance.

At Dunwich Heath, the National Trust are extending their ownership of coastal heathland in order to secure space for coastal habitats under future change (National Trust, 2015).

2.7.2 Interview (CH2M, 2015b)

The Suffolk coastline is largely rural with small coastal communities. Communications links (e.g. transport) to these communities is difficult in many locations. There are two major settlements – Lowestoft, which is quite deprived, and Felixstowe, which is less deprived – due to the port. The Shoreline Management Plan policy is to move from Hold-the-Line to No-Active-Intervention (NAI) – therefore there is likely to be a number of properties at risk over the next 20-50 years. However, there is currently a lack of perception and understanding of the impacts associated with coastal change.

East Suffolk, Suffolk Coastal and Waveney Councils already have Coastal-Change-Management-areas within local plans (2014-2036). These policies include requirements for any planning application located within 30m of the 100 year Shoreline management plan "No-Active-Intervention erosion line" to complete a coastal erosion vulnerability assessment to determine the risk of the proposed development to coastal erosion and identification of mitigating actions. There are also policies addressing roll back for properties affected by coastal erosion. Lessons that have been learnt to date are that there is a need for extensive consultation with both relocating and receptor communities and anyone else who might be affected, and there is a need to work with timescales people can relate to.

Particular challenges occur in areas where there are people who have always been defended but may not be in the future, as their perception of risk is likely to be low. The Suffolk Coastal Forum - an overarching stakeholder forum (statutory bodies, local government at all levels, local communities) – was set up to discuss and plan coastal management in response to erosion issues.

Funding relocation is problematic. The Pathfinder project explored the use of 'enabling development' but this was assessed as not being legal. For funding of defences, however, there is appetite for private financing (e.g. at East Lane, Bawdsey – the landowner is selling farmland to put proceeds into a trust for defences to match-fund government contributions; and in Thorpeness, private funds have provided significant contributions).

2.8 Essex

2.8.1 Literature

Tendring District Council received Pathfinder funding to explore planning for, and managing, adaptation to coastal change for the Tendring Peninsular, Jaywick, and Walton-on-the Naze communities (Defra, 2012). Tendring District Council worked in partnership with Essex County Council, especially in Jaywick where the County Council took the lead on the acquisition and demolition programme. The full outcomes of the Tendring Pathfinder project are summarised in Table 2.4.

Table 2.4 Key outputs and outcomes of the Tendring Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Tendring	Recruitment of *Community Development Worker*.	Introduction of an interim *planning policy* to prevent development at Jaywick (subsequently rescinded on the basis of a lack of sufficient consultation with local people) Consideration of *buy and lease back* scheme (not pursued).	*Acquisition of four properties* which were demolished (the programme was halted in September 2010 following a budget review).	Support for the construction of a *community garden at Brooklands Gardens*; Crag Walk (coastal defence project that slows erosion, with a walkway to allow visitors to see the erosion processes)

The properties were aquired at their 'at risk' value and independent property firms were used to carry out property valuations. The disadvantages of the approach were perceived to be that it does not allow for assets to be replaced and so leads to a reduction in the housing stock overall and that is was difficult to justify greater levels of assistance for those who lose their home due to coastal erosion as opposed to any other reason. In Jaywick the 'buy to demolish' programme was linked to wider regeneration objectives, specifically, the need to reduce housing density in an area at risk of flooding and to tackle crime by widening passageways between properties. Buyback and leaseback or properties was not an option as the houses in Jaywick did not meet the decent homes standard.

The storm surge in 2011/12 prompted the development of a Coastal Adaptation Strategy for Northey Island by the National Trust (National Trust, 2015c). They are now putting together a business case for a 10 year adaptation project giving full consideration for development planning, public access, visitor facilities and tenancy issues. The National Trust aim to match their internal Neptune project funding (dedicated to protecting the coastline in general) with external sources of funding and funding avenues such as European Union Funding, Environment Agency, Natural England, funding award bodies (eg landfill operations and landfill tax credits), and smaller bids from charitable trusts (for e.g. interpretation and signage) will all be investigated. Public engagement is ongoing and a communications plan will be rolled out, including for advocacy, so the Trust are able to effectively 'work ahead of the game'. The plan is to engage with the key stakeholders first and then through a broader communications plan aim to engage with all stakeholders, including the district council, the local and parish councils and the wider community.

2.9 Kent

2.9.1 Literature

The National Trust are working on coastal adaption measures at the White Cliffs of Dover (National Trust, 2015c) which has involved the acquisition of arable land to revert it to chalk grassland in case of ongoing coastal erosion. The public were involved heavily in

this acquisition in as much as they supported, via donation, the message of coastal management and securing access. They have also been actively involved in the decision making process (even down to the location of fencing) which has helped get buy in from the communities. The 'Up on the Downs' Landscape Partnership comprises a legacy of partners who have been working together on coastal adaptation for some time.

2.10 East Sussex

2.10.1 Literature

The movement of shingle material along the Hastings coastline has resulted in substantial accretion of shingle both within the harbour and on the beach. The steep gradient that this causes for the beach-launched fishing fleet has resulted in significant problems for the safe landing and launching of the fishing boats (Defra, 2012). The full outcomes of the Hastings Pathfinder project are summarised in Table 2.5.

Table 2.5 Key outputs and outcomes of the Hastings (small) Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Hastings	Consultation with fishermen – consensus reached on the initial options presented on adapting to accretion; Historical record of the impact of coastal change upon the fishing community.	Shingle movement study & development of adaptation options – study on reasons for and impacts of climate change on shingle movement in the harbour, and recommended options to reduce its impact on the fishing industry.	Small fund to help deliver the preferred option(s).	

The focus of the Cuckmere Pathfinder Project was a series of engagement events at which members of the community worked alongside East Sussex County Council, landowners and various statutory bodies to identify different options, and together come up with a preferred approach (defence in the short term and reactivation of the meanders in the long term) for the future of the Cuckmere Estuary following the Environment Agency decision to stop further maintenance funding for estuary defences. Research was also undertaken on the economy, visitor profiles, landscape and heritage of the Estuary, and the visual modelling of options. It should be noted that follow up communications to Defra indicates that the local community may now not be completely supportive of the approach and that this issue may not therefore be considered as resolved.

In 2012, the National Trust acquired an area of farmland at Gayles Farm (east of Birling Gap) in part to enable habitat roll-back over time (National Trust, 2015c). A large public appeal was launched which raised over £1 million to acquire the land. The visitor centre at Birling Gap has information and videos showing coastal erosion, using lines on the ground

to represent where the cliff edge would be over time. Other visual engagement methods have included using art with stones on the beach and cliff to represent past and future positions of the cliff and using contemporary art to illustrate the changing coast. A coastal change monitoring group has been set up by the National Trust, made up of people with learning disabilities who take regular photographs of the cliffs.

2.11 West Sussex

2.11.1 Literature

The Manhood Peninsula is a small triangular peninsula south of Chichester. Historically, the Peninsula has experienced considerable coastal change, including permanent inundation, land reclamation, erosion and coastal flooding. Currently, 1,168 properties and businesses on the peninsula are protected from flooding and erosion by defences, but these will be at risk if funding to maintain/replace them cannot be identified in the future (Defra, 2012). In 2007 a section of sea wall in Selsey collapsed. Funds were approved for essential repairs but most of the remaining defences have a life expectancy of less than ten years. The risks from coastal flooding and erosion in the area are expected to increase in the next 20-25 years, and will be exacerbated by climate change. With rising sea levels, the number of properties and businesses likely to be flooded could rise to over 4,571 in the next 100 years. If the existing defences are not maintained, erosion could cause an additional 1,500 properties to be lost (Defra, 2012).

The Chichester Coastal Change Pathfinder project included exploration of Integrated Coastal Zone Management (ICZM) in the context of planning and No-Active-Intervention with the initial step of developing a working partnership between all parties. It developed a spatial policy for inclusion within the Core Strategy for the Chichester District, focussing on a sense of place for the peninsula. The full outcomes of the Chichester Pathfinder project are summarised in Table 2.6 (Defra, 2012).

Table 2.6 Key outputs and outcomes of the Chichester (small) Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Chichester	*Coastal Literacy* programme of engagement and awareness raising; *Coastal Change Grants Scheme* (supported 12 community projects).	*"Towards ICZM"* adopted as an aspirational plan & material planning consideration.	Re-instatement of *beach access ramp* at Selsey.	*Selsey Coastal Trust* (testing whether a trust could manage regeneration projects on publicly owned land, with profits funding coastal defence activity) *Manhood Peninsula Destination Management Plan* setting out key issues and actions for those interested in the local visitor

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
				economy.

At East Head in West Wittering, the National Trust has produced a property leaflet to raises awareness of natural processes and highlight the continuing and historic changes occurring at the property (National Trust, 2015c). In the future they hope to produce a film showing changes and how they occur, dune development and loss, human impacts and the impacts of sea defences. The East Head Coastal Issues Action Group, was originally set up for the second generation Shoreline Management Plan to help gain acceptance for adaptive management. The group has persuaded the West Wittering Estate to remove a number of failing gabions (rock-filled wire cages implemented for coastal protection) and not replace them. Other case studies were used as examples and site visits were undertaken by the group (to Medmerry and Spurn Head previously) to explain and give a better appreciation of other successful coastal adaptation methods and schemes (National Trust, 2015c).

2.11.2 Interview (CH2M, 2015b)

Chichester District Council (CDC) actively manages 11 km of flat, open coastline between East Head and Pagham Harbour entrance, where erosion of land is the primary risk. An Integrated Coastal Zone Management plan (developed under Pathfinder) has been formally adopted and forms part of the core strategies evidence base. CDC has adopted a Hold-the-Line policy, and therefore Coastal-Change-Management-Areas (CCMAs) are not currently a consideration for the Council. However, it was also sensed that a gap exists in considering coastal risks for planning frameworks and decisions.

The Council has participated in a number of other local adaptation initiatives, including:

- Coastal Communities 2150 and Beyond (now ended): a communications project to engage vulnerable communities at risk from coastal change http://webarchive.nationalarchives.gov.uk/20140328085239/http://www.environment-agency.gov.uk/aboutus/wfo/128455.aspx

- Coastal Literacy (now ended): community and stakeholder engagement initiative to understand and raise awareness of coastal change. http://peninsulapartnership.org.uk/projects/coastal-change-pathfinder-project/coastal-literacy/coastal-literacy-reports/

- East Solent Coastal Partnership (ongoing): encourages technical, economically and environmentally sound coastal defence measures. https://www.escp.org.uk/

2.12 Hampshire

2.12.1 Literature

Work undertaken by Hampshire County Council on planning for adaptation to climate change has highlighted the risks of flooding and erosion due to sea level rise and increased storminess (Defra, 2012). Calshot Spit was formed by longshore transport of sediment from west to east along the coast, and the future stability of the spit will depend on a supply of sediment from the west. At Lepe Country Park (an important community asset for leisure and tourism), erosion will cause loss of the foreshore and cliffs and rising sea levels and increased storminess will lower the beach area and cause flooding.

Table 2.7 Key outputs and outcomes of the Hampshire (small) Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Hampshire	Community engagement on "*Coastal Change –past, present and future*" Structured workshops to identify, assess & prioritise adaptation opportunities (e.g. Lepe Country Park); Education/awareness raising events involving ten schools and colleges.	*Adaptation plan covering Beaulieu to Calshot* (CCATCH project).	*Feasibility study* on possible access improvements in Lepe Country Park.	

The use of timelines or stories of change (where people can record their own memories) to illustrate how the coast has changed in the past is a good way of explaining future coastal change and was used successfully in Hampshire. Another idea that was developed through a Heritage Lottery Funded project at Lepe Country Park, is a Solent Community Coastal Observatory. It does not appear that this has been implemented (as of July 2018).

2.12.2 Interview (New, 2018)

The updated New Forest District Council Local Plan (2016-2036) includes a policy for implementation of the Coastal-Change-Management-Areas identified for this coastline. In addition, the New Forest District Council's Core Strategy (adopted 2009) covers the issue of developer contributions, which 'may be required towards publically funded flood alleviation schemes', including 'identification of opportunities for managed retreat of the coastline where defence is no longer the most economic or environmentally sustainable option'.

Managed-Realignment at Barton on Sea forms part of new adaptive policy (shifting from Hold-the-Line). This change was suggested by a local councillor, following concerns that Hold-the-Line would overburden the council into the future, financially. Eroding cliffs at Barton on Sea result from erosion and instability from groundwater levels. Some groundwater monitoring (£300k funded by central government) and dewatering pilots (funded by local levy) are ongoing. There has been full engagement with local at risk

communities throughout the development and publication of erosion mapping in the Shoreline Management Plan. Information was presented as 'predictions' (ie with significant uncertainty) rather than 'forecasts'. A hotel, row of shops, café, and businesses with flats above – are all potentially at risk within 10 years; with more significant road and property loss in a 50-100 year period. However, no roll back / re-location policies are under development as yet and the council will be looking for support with this from central government.

At Naish Farm Caravan Park, west of Barton on Sea, private land owners have a policy of gradual roll back of caravans. They are investing in new caravans and some private cliff protection work.

2.13 Isle of Wight

2.13.1 Literature

A large proportion of the population of the Isle of Wight live in coastal towns and villages which are likely to be affected by rising sea levels and coastal erosion. The coastal slopes in the Cowes to Gurnard area of the island has historically been extensively developed, in places, on steep ground with marginal stability – leading to an apparent increase in the number of reported problems of ground instability. A slope stability study was undertaken (2000) which has output planning policy guidance and a planning guidance map – to effectively control development in areas subject to land instability. This ensures that prospective land/property purchasers in these areas are made aware of the potential risks along with any legal responsibilities with regard to safeguarding their property and neighbouring land from instability.

The Isle of Wight Council has laid out its intention to produce a Flood Risk and Vulnerable Coastal Communities Supplementary Planning Document (SPD). Policy DM15 of the Council's 2012 Island Plan sets out the Council's approach to managing development in coastal areas affected by coastal change, explaining that the Council will identify Coastal Change-Management-Areas (CCMAs) within the SPD. Part 1 of the policy lays out criteria which development policies are expected to meet, including those that both the Council and Environment Agency must be satisfied with, noting the importance of collaboration and partnership.

At St Helens, Duver, the National Trust has undertaken guided walks and meetings with the local community leaders to explain why they are allowing natural processes (National Trust, 2015c). This engagement has been constant and regular to keep messages reinforced. At Dunsbery Farm, the access road and land at Compton and Brook Bay will be lost in the future. The National Trust are involving local partners in developing a landscape and habitat roll-back policy at this location.

2.13.2 Interview (CH2M, 2015b)

The Isle of Wight has a complex coastline with key infrastructure arriving at the coast from Hampshire, important transport links including the ferry terminal, tourist destinations and a range of environmental designations. In general it is felt that there is a need for improved understanding of the implications of coastal access and coastal change interactions. There is also perceived to be increasing conflict between planning policy and the vulnerability of new development to flood, erosion and landslide risks. This is addressed by Policy DM15 (Coastal Management) in Core Strategy of the Local Plan.

Isle of Wight Council were involved in the CCATCH project – looking at community adaptation to climate change. Coastal Communities Adapting to Change (CCATCH - the Solent) was part of a larger European funded project that was led by the Environment Agency called 'Coastal Communities 2150 and Beyond' (CC2150)'. It ran between 2011 and 2014. http://www.solentforum.org/services/past/CCATCH/. A coastal adaptation plan for Yarmouth was developed under this project. The Isle of Wight Climate Adaptation Report (Natural Enterprise, 2011) identifies coastal erosion as a key risk and suggests that if, in the future, current Shoreline Management Plan policies had to change to No-Active-Intervention, then retreat from the coast may be a necessary action.

2.14 Dorset

2.14.1 Literature

Dorset County Council received Pathfinder funding to explore planning and managing adaptation to coastal change on the "Jurassic Coast". This included the communities of Sidmouth, Charmouth, Seatown, Weymouth, Ringstead and Swanage where changes in policy to No-Active-Intervention or Managed-Realignment[10] will put property at risk in the future. The full outcomes of the Pathfinder project are summarised in Table 2.8 (Defra, 2012).

Table 2.8 Key outputs and outcomes of the Jurassic Coast Pathfinder projects (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Jurassic Coast	*Scenario planning workshops* in six case study areas, leading to development of adaptation options; *Training* for community leaders*; Exchange visits* for communities*; Facilitator training* for public servants;	*Research into how spatial planning* can	*Community Adaptation Fund* – to support	

[10] Coastal Protection Authorities base their management recommendations on scientific, social, economic and environmental information when plans are drawn up.

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
	Public exhibition showing workshop conclusions; Baseline and follow-up *public opinion surveys* in six case study areas (follow-up survey showed no significant change in awareness of coastal change); *Education project* to embed coastal change in the Geography curriculum in local schools.	best support sustainable adaptation to coastal change.	adaptation options identified at workshops.	

Scenario planning was used to inform discussions with communities via facilitated workshops. High quality digital visualisations of change using LIDAR (Light Detection and Ranging) and aerial photography showing what the coast might look like should erosion continue to the fullest extent of the 20, 50 and 100 year risk lines identified in Shoreline Management Plans was used to help communities understand the implications of coastal change.

Pathfinder project outstanding funds were spent on reviewing options for relocating Charmouth Heritage Centre (and developing a fund). The Swanage coastal change forum was established to help the community of Swanage become well prepared for adapting to future coastal changes resulting from erosion and sea level rise. Stakeholders include Purbeck District Council, Swanage Town Council, Environment Agency, Natural England, Jurassic Coast World Heritage Site team, Dorset Coast Forum.

The National Trust have been working on roll back/realignment of the coastal path at Burton Bradstock, and at Studland they have worked with the local community to develop shared understanding of coastal change issues, moved 42 beach huts to less vulnerable sites, closed the toilet block that was considered at risk, and removed some gabion sea defences to allow a greater reliance on natural processes (National Trust, 2015c). The National Trust employ a Coastal Change Engagement Officer for the Purbeck area.

The National Trust, Environment Agency and Dorset Coast Forum were partners of the Living with a Changing Coast (LiCCO) project spanning Poole Harbour, and including Purbeck, Studland and Brownsea Island. This cross-channel project included partner organisations from Devon, Dorset and Normandy working together on this part European-funded project, led by the Environment Agency (http://www.licco.eu/). The project aimed to work with communities where coastal change is likely to have the most significant impact, explore how change will impact on them, and empower them to adapt to that change and take part in decision making about how their coast will be managed in future. The project delivered a compendium of best practice (http://www.licco.eu/wp-content/uploads/2013/03/Capitalisation_Report_EN.pdf)

The Dorset Wildlife Trust has been closely involved with the Trust in exploring options for the lagoon at Brownsea Island. This has produced good consensus building between the two organisations. Community engagement with the volunteer community on Brownsea Island took place preceding the removal of sea defences.

2.14.2 Interview (CH2M, 2015b)

This area comprises a range of large urban areas within which there is both deprivation and wealth, together with numerous small, isolated rural coastal villages. Purbeck District Council's current Local Plan (adopted 2012) includes a coastal erosion policy that defines:

- Indicative Erosion Zones from the Shoreline Management Plan to constrain new residential development; and
- A further spatial constraint in relation to new development and a 'No water discharge consultation zone' in relation to ensuring the stability of nearby cliffs.

Future Coastal-Change-Management-Areas (CCMAs) will be a material consideration in the determination of planning applications. Purbeck District Council's validation list includes a requirement for a land stability assessment in areas of coastal instability. The use of up to date validation lists is now considered an important tool in ensuring sufficient and relevant information is attained for proposed developments within the CCMAs. It has been shown to be important that local planning authorities understand the extent of information and conditions they are able to require for any planning application (refer to the Growth and Infrastructure Bill, 2012 and Circular 11/95 six tests for conditions).

In 2012 Dorset County Council developed the West Dorset, Weymouth and Portland Coastal Risk Planning Guide, an internal coastal risk guidance for planners and engineers on the nature of risks posed to coastal areas from future coastal change. The staged approach taken by the council has been recommended by the Coastal Change Adaptation Planning Guidance (CH2M, 2015a) as exemplar. The guide provides consistent advice for informing planning applications requirements and decisions as well as informing the appraisal of future development in CCMAs.

2.14.3 Interview (New, 2018)

The Council has completed three consultations on the review of its Local Plan. As part of the options consultation the Council published background papers on Coastal-Change-Management-Areas (CCMAs) in Purbeck and 'new policies' that adopt the following approach:

- To define CCMAs based on the indicative / predictive erosion zones identified in relevant Shoreline Management Plans (these will be identified on a policies map – the Council plans to show the risk from coastal change over each of the time horizons);
- To identify specific appropriate types of development for CCMAs;
- To outline an assessment process (using a vulnerability assessment) for determining whether other types of development would be appropriate;

- To outline an assessment process for relocation of development away from CCMAs.

2.15 Devon

2.15.1 Literature

Slapton is the key area with property at risk from coastal erosion. The Slapton Line is a shingle barrier beach dividing the largest natural freshwater lake in South West England from the sea. Potential future erosion of the shingle barrier will have impacts on a road (the A379), a number of car parks, a nature reserve and the local community. The Slapton Line Partnership was formed to co-ordinate the future management of the Line and to support the local community as it adapts to the changing coastline, including the temporary and eventually permanent loss of the road. A Pathfinder project (Defra, 2012) funded some coastal adaptation work at Slapton.

Table 2.9 Key outputs and outcomes of the Slapton (small) Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Slapton Line	*Coastal Change Adaptation Toolkit, Timelines and the changing coast* archive photographs, articles and videos *Schools outreach and engagement*, including a programme of „Learning with a Changing Coast".			Activity related to *business and tourism adaptation and resilience*, focusing on interpretation points.

The National Trust is involved in a number of coastal adaptation projects in Devon (National Trust, 2015c), including at:

1. Man Sands: Initial adaptation work involved the removal of degrading coastal defences and allowing farm land behind the beach to find its own level, redirecting the coastal path and managing public perceptions. There has been a 'fear of change' at a community level, but good communication of the expected outcomes has helped to manage expectations.

2. South Milton Sands: The winter storms of 2014 wiped out most of the soft sand dune sea defence at South Milton Sands and breached a key National Trust access track which is also used as a public highway. The Trust consulted with local communities and agreed to rebuild the road set back from the coast to buy some limited time while other adaptation measures are put in place for the future. This approach has worked well and has gained good support from the local community, however, this is a long term process and the Trust appreciates the need to ensure

that it continues to provide the backing required to ensure its success. Where the reinstatement of natural processes involved the relocation of a car park, investment in communications were crucial. After the project ended and engagement was stepped back, inevitable coastal change after storms caused unrest and questioning by the public so further engagement was required.

3. Saltram: At Saltram, a realignment of the estuary foreshore is proposed in addition to an area of managed inundation which is protected by a stone-faced embankment. The saltmarsh has been part of a 20 year habitat restoration scheme funded by Natural England, although this has now expired. Due to on-going erosion of the embankment the property is considering breaching the embankment to allow regular tidal inundation of the area of saltmarsh behind the wall. Consultants are being commissioned to undertake an environmental survey after which the Trust will work with other stakeholders to agree future plans. Some of the estuary banks are stone walled and form part of an amphitheatre promontory, a Grade II* listed structure. Some other walled banks protect footpaths and areas requiring vehicle access. These are key links and re-aligning would require working with other organisations to agree plans, support, funding and resources.

2.15.2 Interview (New, 2018)

East Devon District Council have identified the following locations as priority areas for adaptation:

- Seaton (West) to Seaton Hole (shoreline management plan policy unit: 6a30) where a section of Old Beer road has been lost through erosion, and homes are at imminent risk;

- River Sid and East Sidmouth (shoreline management plan policy unit: 6a35) where there is a fairly high rate of loss of cliff top gardens which is threatening properties; and

- Beer Head to Salcombe Hill (shoreline management plan policy unit: 6a34) where there are chalets at risk. A private landowner here applied to renew/improve the coastal defences, which was initially objected to by Natural England / the Jurassic Coast Team, Eventually planning was granted on a time limited basis with a condition of the approval being that the applicant has an exit plan.

At Seaton, the previous Hold-the-Line policy was changed to Managed-Realignment which means that the existing rock revetment is being allowed to fail. Works to support this are being funded under a capital maintenance grant. Work on adaptation is currently just being undertaken within existing staff time as part of business as usual activities.

East Devon District Council are working on a project to introduce Coastal-Change-Management-Areas as part of development planning policy, either as a Supplementary Planning Document or as part of the Local Plan refresh. The current Local Plan (2013 – 2031) contains policy EN25 (Development Affected by Coastal Change) which allows for

more favourable treatment of development which is necessary because of coastal change. This policy is not thought to have been used yet.

It was suggested that there was a need for a positive central government commitment to:

- Showing the consequences of coastal change on readily available mapping (like the flood maps for planning etc.) with areas at risk clearly shown;
- Use of adaptation / No-Active-Intervention where coastal protection schemes are not viable (either economically, or within the grant funding available).

There is nervousness of stakeholders about discussing adaption, the need for it, and the consequences of coastal change. At a local level, No-Active-Intervention is seen to pose political challenges and local councillors are not keen. Clear guidance was felt to be necessary on what funded adaptation would look like, how it could be delivered or whether/when it is economically viable.

2.16 Cornwall

2.16.1 Literature

In Cornwall, the National Trust are undertaking a range of adaptation actions including relocating catering facilities at Porthcurnick; managed roll-back at Gunwalloe, the Lizard and Mullion Harbour; archaeological excavations in response to erosion at Constantine Island, Gunwalloe and Park Head; investigation of possible adaptation solutions at Godrevy (where there is increasing threat to the access road, coastal path and beach access); and protecting the café at Chapel Porth.

2.16.2 Interview (New, 2018)

A consultancy has been commissioned to develop a dynamic risk mapping tool for Cornwall, utilising over 20 GiS layers (including coastal erosion and sea flooding risk), to allow Cornwall County Council (CCC) to prioritise future projects. This work was paid for by CCC, but was agreed by all the Risk Management Authorities through the Strategic Resilience Board (this board is unique to Cornwall and presents a unified voice for the County).

Part of CCC's pipeline project development (2021-2027) is the "Delivery of shoreline management plan2 Intent". This will be a programme of works where projects will be designed to satisfy the policies in the shoreline management plan (and subsequent review in 2016). CCC are currently trying to raise the profile of the second generation shoreline management plan as there is currently a low level of awareness, particularly amongst developers and strategic planners.

The adopted Local Plan (2016) includes Policy 26 that guide's development and redevelopment or relocated development, with respect to flood risk management and

coastal change. The Planning Inspector picked up that this Local Plan policy on coastal change was insufficiently strong and Cornwall County Council have agreed that improved policies are best implemented via Neighbourhood Plans (NP). Newquay NP consultation is now complete (this addressed Coastal-Change-Management-Areas) and Cornwall County Council are now trying to roll this approach out Cornwall wide but progress is slow due to insufficient resourcing. Coastal change policies will be strengthened in the next version of the Local Plan and the recommended approach will be:

- No new development in areas identified as within the National Coastal Erosion Risk Management map erosion zone;
- For communities likely to be affected / within Coastal-Change-Management-Areas – promote Coastal-Change-Management-Areas and draft and implement a local coastal change management plan with full stakeholder buy-in.

The guidance that has been drafted to date has raised concerns from planners (due to a lack of awareness of coastal change issues), however until new policies are adopted, Cornwall County Council relies on planning officers to heed their advice regarding proposed new development in the coastal zone.

Cornwall County Council's strategic resilience officer is writing a 25 year investment programme on flood resilience. The projects will be designed to maximise the availability of funding, so will include social deprivation funding and economic regeneration opportunities. Two of the largest value projects on the pipeline plan (Penzance and Looe) total around £80m but only qualify for low percentages of Flood Defence Grant in Aid.

Priority areas for Cornwall County Council include:

- Newquay where there have been a number of cliff falls over recent years and properties are now at risk.
- Downderry (south coast): where there is an actively eroding coast line and a significant numbers of properties will be at risk within a decade or two.
- Praa Sands, Lizard which is suffering from active erosion: currently gardens are at risk, but 5-10 properties are at risk in the relatively short-term.
- Mounts Bay, Penzance: where Cornwall County Council are trying to find a strategic approach to managing risk in the long term (100 years). They have just secured Flood Defence Grant in Aid funding for a short-term fix to give the area time to plan effectively (£3million for extra rock armour to protect railway, A30 and commercial property). From 2025, Managed-Realignment is the Shoreline Management Plan policy, but funding of this will be extremely challenging.
- West of Penzance: similar picture and funding issue to Penzance. Cornwall County Council are concerned over the complexity of the strategic planning and funding evaluation that will be required going forwards (particularly when funding for such strategies has been stopped), and also about how to deal with evaluating

applications for private defences – particularly in areas where the shoreline management plan policy is No-Active-Intervention. They perceive a need for wider support with both these issues from Defra. In addition, roll back will becoming pressing in the near future and guidance is required on the best way of delivering and funding this.

Cornwall County Council is trying to get more involved with the new Environment Agency (EA) project Coastal Tidal Community Assessment being run by the EA Partnerships and Strategic Overview (PSO) team covering Devon, Cornwall and Isles of Scilly (DCIoS) to better understand tidal flooding and coastal erosion risk at settlements around Devon and Cornwall estuaries and coast that either haven't been identified within existing studies or strategies or where further information is required. This is a strategic review which will be used to further develop projects for the Flood & Coastal Erosion Risk Management Capital Programme 'Pipeline' (projects beyond 2021).

Cornwall County Council believe that in general there is a need for possible schemes and routes to delivery to have been developed before community engagement, however engagement continuity is fundamental i.e. it should not be constrained by funded project timescales. With respect to other key stakeholders, Cornwall County Council have a good relationship with the National Trust, though it is acknowledged that they should/could do more.

2.17 North Devon (Torridge)

2.17.1 Interview (New, 2018)

There are no areas currently under No-Active-Intervention with property at risk. Planning policies in the current Local Plan defer to the areas of coastal erosion defined in the shoreline management plan. Although there are no defined Coastal-Change-Management-Areas, planning and coastal change is perceived to be well integrated and Torridge District Council work well with North Devon biosphere and Natural England. There are two key areas in this county at risk of erosion:

1. Westward Ho village where there is significant beach lowering and storm impacts. Here Torridge DC (TDC) are working with the Environment Agency (EA) on new linear defences funded via a mix of TDC and Flood-Defence-Grant-In-Aid funding.

2. Northern Burrows Former Landfill Site (that Torridge DC have inherited) which is part of an area that has a Managed-Realignment policy. It is an historic dune system linked to salt marsh and a former landfill site, SSSI, and England's oldest golf course. Gradual historic losses of the dune system have accelerated in recent years (in Storm Eleanor 15 m of the dune system was lost in one night - note the other side of the bay has a rapidly increasing dune system). It is very unclear how Torridge District Council will be able to fund either the realignment or the cost of liabilities relating to the movement of contaminated waste. It currently appears that they will have to pay contaminated landfill tax on whatever material they have to

move off site, therefore there is an urgent need for help with respect to securing some form of Exemption.

2.18 North Somerset

2.18.1 Literature

The focus of the North Somerset Pathfinder project was on three communities: Porlock Weir; Steart; and Brean and Berrow which were identified as “hot spots” at risk of flooding and coastal change (Defra, 2012). The policy for these locations in the medium to long term recommends No-Active-Intervention or Managed-Realignment, The full outcomes of the Pathfinder project are summarised in Table 2.10.

Table 2.10 Key outputs and outcomes of the Somerset Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs
Somerset	*Scenario planning tool* – using future scenarios to identify adaptation measures (Porlock Weir); One-year funding for a *community engagement officer* (Steart); Development of a *community coastal change monitoring initiative* (Brean & Berrow); *DVD* on Somerset’s changing coastline; *e-game* for all Somerset primary schools to enable children to learn about and explore the coast.	Development of an *adaptation action plan* for Porlock Weir		

2.19 Merseyside

2.19.1 Literature

Formby Point (north of Liverpool) has been eroding since the end of the 19th century whilst the areas to the north and south are currently accreting. The erosion proceeds at an average of up to 4.5 m per year focused on the centre of Formby Point and extending over a length of 5 km coast comprising sand dunes. Sefton Council has predicted, factoring in climate change that future coastal change could result in erosion of up to 680 m over the next 100 years at Formby Point, with impacts on habitat and a valued community landscape provided by the sand dunes (Defra, 2012). The full outcomes of the Pathfinder project are summarised in Table 2.10.

Table 2.11 Key outputs and outcomes of the Sefton (small) Pathfinder project (Defra, 2012)

Pathfinder project	Community engagement	Adaptation planning	Delivering adaptive solutions	Other outputs

Sefton	Formby Point visualisation; Car park study; Caravan park engagement; Dissemination activity.	Dune Slack Study.	Boardwalk construction.	

2.19.2 Interview (New, 2018)

The whole of the Merseyside coastline is a priority for adaptation. In particular, issues within the following areas are highlighted as being of particular concern:

- Southport has an accreting shoreline on the edge of the Ribble estuary: the beach is becoming muddier and salt marsh is rapidly expanding. There is a need to consider the advantages of this as natural coastal defence whilst also managing the expectations of resident and visitors who come to Southport beach for its 'golden sands' that are now covered in saltmarsh and mud.

- Birkdale and Ainsdale have an accreting section of coastline where saltmarsh has developed a large wet slack known locally as the green beach. The accretion here is becoming difficult to manage where inland drains outfall onto the beach. These outfalls become blocked and filled with sediment which prevents surface water from draining out to sea and in turn leads to surface water flooding in the local area.

- At Formby the coast is eroding by approximately 4 m/yr. The National Trust now own and manage the coast in Formby as Sefton Borough Council (SBC) have transferred the land to the National Trust at Lifeboat Road. Here the National Trust have issues with managing a car park and caravan park that are being close to be being eroded, and are also finding it difficult to manage debris from the dunes which gets eroded onto the beach from old car parks and caravan parks previously inundated by the roll back of the sand dunes and now abandoned.

- Hightown to Crosby where there are issues with erosion, a deteriorating training wall through which the river is beginning to breach, parts of the coast comprising made ground with material from bomb damaged buildings in Liverpool that contains asbestos and is continually eroding, and an unstable rising main which pumps raw sewerage at 430l/s and serves 12,000 properties in Crosby and Hightown. Sand dunes are beginning to form in front of the sea wall, adding a further level of protection to this ageing defence. However the sand is being blown inland and blocks access routes to the beach. The management of this windblown sand is extremely costly to the Council and there is a need to consider how sustainable this approach is in the longer term.

The need to consider adaptation now that the NI 188 performance monitoring system is no longer in place (https://data.gov.uk/dataset/172a4386-b95f-469e-bad5-c4f9a5668afe/ni-188-planning-to-adapt-to-climate-change) has led to work on adaptation being lower down on local authority corporate agendas. However, the Coast plan http://www.seftoncoast.co.uk/plan was published last year and since then the council have

been working on developing an adaptation strategy and supporting nature conservation and visitor management strategies. The Local Plan for Sefton (2015 – 2030) was adopted in 2017 but this does not include development planning restriction policies relating to coastal change.

Funds from Defra for coastal adaptation in the past were not ring-fenced and subsequently offered up by Sefton Borough Council (SBC) as a saving. SBC are now concerned that this has negatively impacted upon their ability to secure future funding from Defra. SBC considers that there is a need for national policy on coastal adaptation, funding boosts from central government, guidance on how the UK will commit to climate change adaptation following BREXIT and a unified, consistent approach from central government and regulators.

3. What is perceived as being needed to support effective coastal adaptation?

3.1 Methodology

Grey literature and interview responses have been interrogated for evidence relating to the question framed in Section 1.1 ‘Background to the Project’ relating to the support perceived as being needed from central government to support coastal adaptation.

The evidence presented in the following sections has been extracted directly from:

- Write-up of coastal erosion adaptation workshop (Defra, May 2017);
- National Trust, Shifting Shores: Playing our part at the coast (2015);
- National Trust, Public policy and adaptive approaches to coastal change management; how are we doing?’ CH2M (October 2015);
- Interview feedback.

In general, the feedback provided in interviews (described in each of the county sections in Section 2) reflect the same themes and needs as those stated in the above documents, but a few additional issues are also presented here.

3.2 Coastal Erosion Adaptation Workshop (Defra, May 2017)

3.2.1 Summary

This was a technical meeting to explore the challenges faced by Local Authorities with coastal erosion adaptation.

3.2.2 Definition of Adaptation

In reviewing a number of definitions of adaptation there was no clear front-runner. There was consensus on the need to be clear about the audience but a divergence of views over whether there should be one definition for all, or a lay and technical version. Key themes identified were to include opportunities as well as risks, and to have a proactive component with action prior to the erosion taking place.

When exploring the aims of adaptation, the narrower the definition the more people had to say; suggesting a broad definition that focuses on the people and communities affected may be preferable.

3.2.3 Desired Outcomes

Delegates' general feeling was that the current approach will fail to address the economic challenges that climate and coastal change are presenting. Communities will become more isolated, disconnected, be unequal and become 'ghost towns'. There is also a significant risk that there will be an increase in conflict between people and the environment.

Delegates considered their aspirational outcomes for the coast. The economy and wider UK growth was a key theme, along with removal of uncertainty for communities and local choice. Despite prompting, the group found it difficult to identify specific tangible actions that they would like to see happen on the ground in order to make communities more sustainable.

A summary of desired outcomes was:

- Joined up across sectors and government;
- Wider outlook as to solutions to coastal and climate change;
- Better understanding of the opportunities as well as the risks;
- Wider understanding as to the role of the environment in delivery of solutions;
- Development of effective communication and understanding (all levels);
- National approach which supports delivery of local solutions;
- An even footing with other risk management activities;
- Appropriately resourced;
- An approach which is defendable and is considered equitable.

3.3 National Trust

In relation to coastal adaptation, the key general challenges that are perceived as needed to be addressed by all those concerned with coastal management are set out by the National Trust in their Shifting Shores document (National Trust, 2015a) as:

- Valuing and resourcing coastal adaptation: empowering local authorities to take a lead whilst ensuring effective joint working across government departments and agencies to help turn policy and strategies into tangible practice. This is likely to include reviewing how coastal groups can more effectively support government.
- Developing a coastal vision for sustainable coastal management regionally and locally, communicating that vision and maintaining active and ongoing engagement with at risk coastal communities.

- Supporting innovation in coastal risk management so people have a wider range of choices and developing new financial products and mechanisms that can deliver risk management and enable vulnerable communities and environments to adapt cost-effectively.

The document interprets these wider challenges specifically for England within the context of long-term planning and government coordination and innovation, making the following specific recommendations:

(A) Long-term planning

- Shoreline management plans need to be made more accessible for local authority planners and local communities. They need to be consistently implemented through local plans, using Coastal-Change-Management-Areas and refined guidance is needed for implementing shoreline management plans to avoid difficult decisions being deferred and to allow change following storm events.

- A coastal adaptation performance measure is needed to sit alongside the current Environment Agency coastal erosion measure.

- Strategic monitoring needs support in order to ensure there is an evidence base for long-term decision making.

(B) Government co-ordination and innovation

- A national policy and delivery framework is needed that supports adaptive coastal change management – on an equal footing with engineered defences.

- Local authorities need to have the lead role in driving coastal change management and need to be adequately funded to deliver this. The role and function of coastal groups should be reviewed to maximise effectiveness and regional coastal forums should be promoted to ensure change management is considered alongside wider issues. Planning guidance needs revision to require greater detail on coastal change management and to ensure inclusion of Coastal-Change-Management-Areas are a requirement for local plans.

- 'Innovative' approaches are required for funding coastal adaptation.

In their review of public policy and adaptive approaches (National Trust, 2015b), the National Trust summarise the relevant key needs established by the pathfinder projects (Defra, 2011b and 2012c) including:

- **Planning** – the need to plan ahead to ensure that a more planned and coordinated approach is being taken to address coastal erosion.

- **Engagement** – the need to make people more aware of the risk of coastal erosion prior to purchasing a property and for meaningful engagement and awareness raising to drive social acceptance of the need for change.

- **Guidance** - for coastal authorities on how to use legislation (e.g. housing and building control amongst others) to tackle issues associated with coastal erosion, particularly in relation to rollback and buy and lease back (taking into account deliverability in practice, as established by Pathfinder projects); and on strategies to ensure that social aspects and communities themselves do not pose barriers to coastal adaptation.

- **Funding** – the need for further financial assistance with demolition costs provided which appears to be low, insufficient and not very flexible.

- **Partnership** – the need for a partnership approach to tackling coastal erosion.

3.4 Interviews

The majority of 'needs' identified in the interviews of stakeholders in different coastal areas are covered in Sections 7.2 and 7.3 above. Comments made by interviewees on additional aspects are summarised as follows:

- **Planning** – Interviewees considered there was a need to: set out a framework for bringing adaptation in line with other mechanisms for shoreline management plan policy delivery; to understand the level of risk and support required for caravan park businesses and their inhabitants, to establish clear mapping on coastal erosion risk with an obligation to share and promote this to communities, businesses and wider stakeholders; and to provide guidance on when short –term fixes (to buy time for communities) are appropriate (by evaluating risks and opportunities) and how best to move from that to a Managed-Realignment or No-Active-Intervention policy with community buy in.

- **Engagement** –. Interviewees suggested there was a need to secure support and buy in for adaptation policies from elected councillors; and that any education / awareness-raising projects had long-term continuity to ensure effectiveness.

- **Funding** – Interviewees felt there was a potential need for re-focussing of the Coastal Communities' Fund (CCF) on coastal adaptation rather than economic regeneration; there was a need for a mechanism for financing the mitigation of the social impacts of coastal change (including supporting infrastructure e.g. transport links); and there was a need for support with identifying, securing and maximising funding from wide range of possible grants that could finance schemes that might qualify for a low proportion of Flood Defence Grant in Aid funds (e.g. regeneration funds, growth deals, CCF, partnership funding). The importance of funding for 'strategies' was also highlighted – particularly for complex adaptation strategies, potentially affecting both property, communities and infrastructure.

- **Legislation:** Some interviewees wanted guidance on the links between coastal change and coastal access obligations; others suggested a mandatory reporting requirement on adaptation to coastal change.

4. Evidence synthesis

4.1 How many properties have been lost since plans were drawn up (i.e. since 1996)

The evidence for answering this question was sourced from a literature review, internet search, and interviews of local authority personnel. A discussion with various Coastal Group Chairs (and subsequently confirmed in local area interviews) indicated that this information is not routinely collected and stored by either Coastal Groups or Local Authorities.

No information specifically on property losses since 1996 was found in literature. However, some evidence is reported in news articles or local history sites on the web. A series of reports on historic losses over approximately 100 years (Halcrow, 2010) was also used to provide comparative information. The internet search was a rapid, high level search focussed at high risk areas of the country. The interviews were planned to complement those undertaken by Halcrow between 2012 and 2015 as part of the development of the Coastal Change Adaptation Planning Guidance (CH2M, 2015a) and the case study sites adopted for the Committee on Climate Change, Adaptation Sub-Committee (ongoing) – so also do not provide comprehensive national coverage.

The results indicate that the numbers or properties lost since 1996 might be of the order of 50 permanent properties and 30 temporary properties, plus 100 or so beach huts. Caravans would also have been lost, had they not been moved back away from the cliff edge. The results are summarised in Table 4.1.

Table 4.1 Summary of evidence of properties lost to coastal erosion since 1996 (sourced from web search and selected interviews)

Location	Source	Properties Lost (Date)
Scarborough	Pathfinder (Defra, 2012)	3 (2008) Enforced demolition of properties (Knipe Point)
East Riding of Yorkshire	Pathfinder (Defra, 2012)	17 permanent (date not stated) 31 temporary (date not stated)
Norfolk	Web search	1992-2004: 15-20 properties, Happisburgh 2013: 3 houses, lifeboat hut, café, Caister-on-Sea 2017/18: 13 property evacuations – all of which have subsequently been demolished, Hemsby (Great Yarmouth)
New Forest	Interview (New Forest District Council)	0 permanent residential (although 1 had to be demolished in 1989 following cliff stabilisation works - may have been lost anyway) 70/80 beach huts (Christchurch Bay) in 2014

This compares to an estimate of 122 properties lost over the last 100 years (reported in Defra (2010) and summarised in Table 4.2 but likely to be an underestimate due to the inclusion only of older properties identified on the historical mapping rather than any additional properties constructed in the interim period).

Table 4.2 Historic erosion rates & estimated losses over approximately 100 years (Halcrow, 2010)

Coastal Group Region	Area Eroded (km^2)	Number of properties lost
Southwest	1.7	14
Southern	4.2	29
Midlands	0.6	0
Anglian	4.4	29
Northwest	1.5	2
Northeast	9.8	48

Source: Halcrow (2010)

A more comprehensive evaluation of historic property losses could be established via:

- A comprehensive survey of all coastal local authorities; and/or
- A GIS mapping of historic address point data from 1996 onto current shoreline position and seeing where properties have been lost. Note this would exclude caravans.

It would be useful if coastal authorities maintained a register of properties lost to coastal erosion going forwards, so that this information is collected routinely.

4.2 What numbers and types of properties and infrastructure are at risk going forwards and where are they?

It was established that the issue has not been covered in academic literature and that previous studies have not published national summaries of numbers, types and location of properties at risk. The evidence for answering these questions was therefore established via a GIS mapping exercise of existing national datasets (of erosion rates, property addresses and shoreline management plan extents).

The results are summarised in Table 4.3 and mapped at high level in Figure 4.1 – Figure 4.3.

Table 4.3 Numbers and types of property estimated to be at risk going forwards (ST: within 20 years; MT: within 50 years; LT: within 100 years)

Shoreline Management Plan Ref[11]	Residential			Commercial			Community			Public			Service Infrastructure		
	Epoch			Epoch			Epoch			Epoch			Epoch		
	ST	MT	LT	ST	MT	LT	ST	MT	LT	ST	MT	LT	ST	MT	LT
1	2	53	148	1	9	17	0	2	2	2	8	12	1	5	8
2	3	13	44	1	1	11	0	0	0	0	1	4	0	0	2
3	31	97	204	4	15	29	0	1	1	0	2	6	0	4	10
4	0	0	77	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	18	90	554	1	6	32	0	0	2	0	2	5	0	2	8
7	2	12	35	0	3	3	0	0	0	0	0	2	0	0	2
8	6	36	154	0	1	7	0	1	1	0	0	0	1	1	3
9	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
10	0	5	32	0	4	7	0	0	0	0	0	2	0	0	3
11	3	13	44	1	3	10	0	0	1	0	0	4	1	2	4
12	1	19	39	0	0	0	0	0	0	1	1	2	0	0	0
13	0	29	252	1	14	42	0	1	1	0	1	3	0	0	5
14	4	29	101	0	3	15	0	0	1	0	2	4	0	0	4
15	0	1	57	1	4	5	0	0	0	0	1	2	0	1	1
16	6	28	101	3	10	22	0	0	0	0	1	6	0	3	8
17	4	36	247	2	8	36	0	0	1	0	6	14	0	1	15
18	4	9	29	3	3	8	0	0	0	0	1	1	2	2	2
19	3	3	3	0	0	1	0	0	0	0	0	0	0	0	0
22	5	20	48	0	5	11	0	0	0	0	2	8	0	0	5
All SMP	92	494	2170	18	89	256	0	5	10	3	28	75	5	21	80

[11] Data source https://www.gov.uk/government/publications/shoreline-management-plans-smps

Figure 4.1 National Mapping (Short Term: 20 year epoch - 2038)

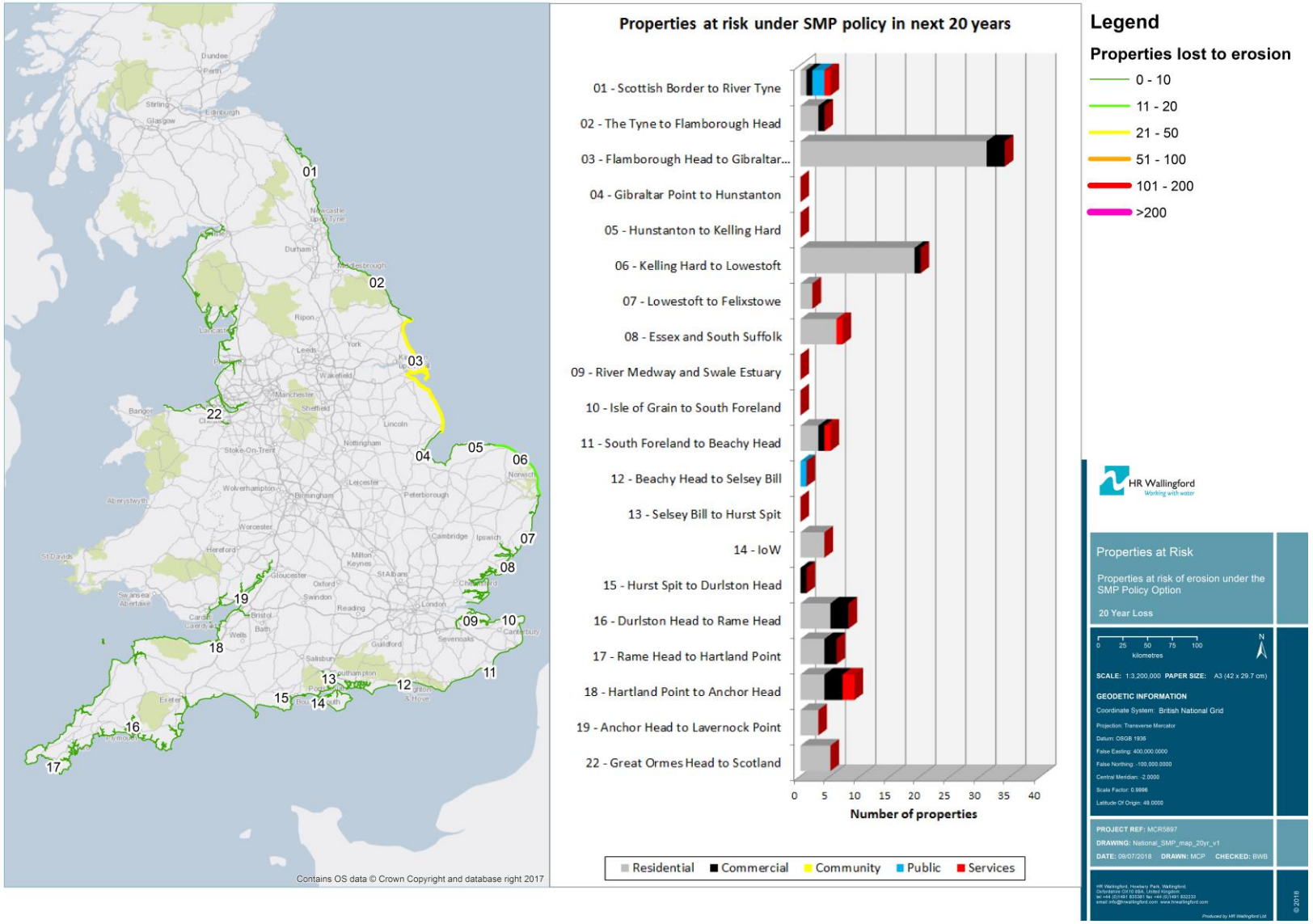


Figure 4.2 National Mapping (Medium Term: 50 year epoch - 2068)

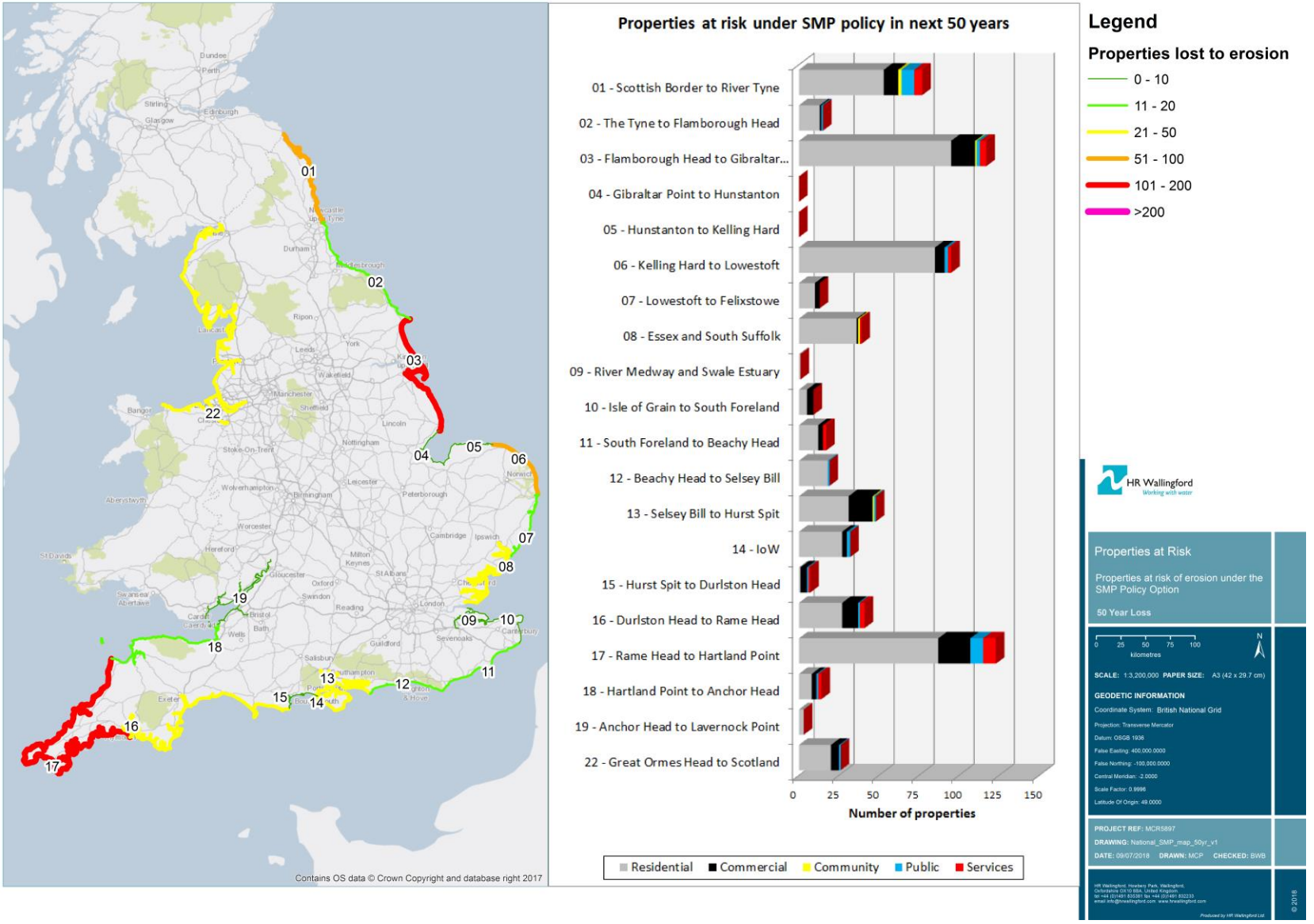
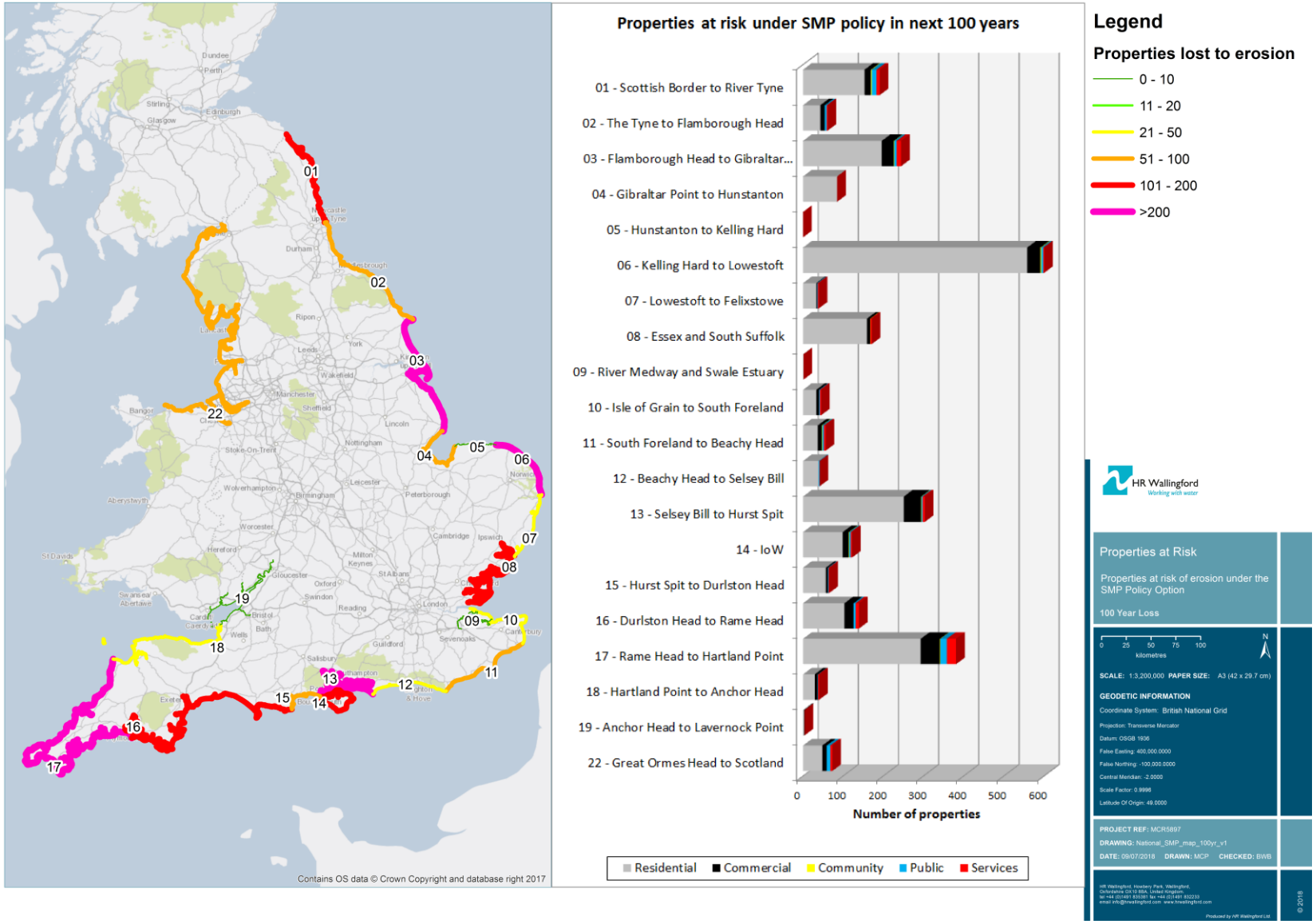


Figure 4.3 National Mapping (Long Term: 100 year epoch - 2118)



This evidence does not include individual caravans – of which there are a large number on all stretches of the coast in close proximity to the cliff edge, and which are likely to be at considerable risk. A national assessment of risk to caravans could be made using satellite imagery or aerial photography and artificial intelligence (AI) methods to produce a caravan site dataset. Although the 'signal' of a caravan roof would be relatively unmistakable and the data could be verified against the Address Layer 2 data to avoid double counting, it should be recognised that caravans are transportable buildings. The data is therefore likely to require frequently updating and any losses in the erosion loss zone are likely to be of plot and services only. Characteristics of caravan parks and temporary chalet parks at risk i.e. numbers, ownership, management, whether occupied all year round etc. would also be important to establishing total risk to these receptors.

4.3 What are the social characteristics of the places at most risk and how is this impacted by the threat and reality of coastal erosion?

The evidence for answering this question was sourced from grey literature and interview responses (as described in Chapter 2). This evidence suggested the following conclusions:

- In the North East (East Riding and Scarborough), rural and often isolated coastal communities at risk from coastal erosion are predominantly low income with social deprivation.
- In Norfolk and the South and South West, there are a mixture of wealthy villages / individual properties and deprived, low income communities.
- It was felt that social deprivation puts a greater burden on local authority resources, with people requiring new accommodation as a result of coastal erosion being dependent on council housing stock (i.e. they are unable to afford to re-build on an alternative plot if this is offered to them).
- Isolated rural communities are thought to be more dependent on their immediate supporting community infrastructure (e.g. transport and communications links, jobs, local shops and social activities) which may also be threatened. Many are also more vulnerable to impacts because of socio-economic issues such as high proportions of older residents and transient populations, low employment levels and high seasonality of work, physical isolation and poor transport links. A lack of understanding in disadvantaged coastal communities of the range of possible climate change impacts they face and how to respond appropriately was also an issue, together with their lack of capacity to take action.
- It was felt that wealthy property owners (including businesses) often have more capacity to engage and influence. In addition, they may try and secure planning for implementing private defences against coastal erosion. There were concerns about

whether proposed private defences were always of environment benefit, and about the risk of lack of support from councillors of local council policies with respect to adaptation.

Further GIS mapping could be undertaken of social deprivation indices for high risk areas to better understand the social characteristics and vulnerability of areas at risk of coastal erosion. However it should be noted that the academic literature review (e.g. Sayers et al, 2018) suggests that alternative metrics might give greater insights on this issue.

4.4 Do Local Authorities have policies in place to help businesses in the area adapt to the threat of coastal erosion to retain community viability?

The evidence for answering this question was sourced from grey literature and interview responses (as described in Chapter 2). This evidence suggested the following conclusions:

- There appear to be few local authorities with policies specifically relating to supporting businesses. East Riding is an exception with integrated community guidance on adaptation options available online.
- Caravan parks were felt to be the most prevalent business with assets at immediate risk of coastal erosion. Caravan park owners tend to plan and implement their own actions with respect to roll back on their private land.
- The perception was that businesses are more likely to be keen to fund private defences. However there was concern about whether these would always be in support of shoreline management plan policies and it was recognised that it is fundamental to ensure localised actions do not exacerbate wider risk.
- It was felt that businesses can be important as a source of partnership funding for larger schemes.

4.5 What strategies, actions and other activities have Local Authorities in England taken, plan or desire to take to adapt to coastal erosion?

The evidence for answering this question was sourced from grey literature and interview responses (as described in Chapter 2). This evidence suggested the following conclusions:

- The extent and nature of adaptation policy development, and adaptation actions and support is very variable across England and depends on the extent of potential

future losses, the imminence of future losses, and the nature of those losses (e.g. whether they are property or environmental assets).

- North Norfolk and East Riding are perceived to be the most advanced in terms of adaptation planning – with accessible support mechanisms for property owners, policies and mechanisms for roll-back, and well established coastal community groups.
- Some participants felt that there are local authorities with properties potentially at risk within the next 10 years that currently have low awareness of roll-back options and without relevant policies to support that type of action.
- Coastal-Change-Management-Areas are generally being considered and/or implemented in Local Plan updates unless the risk perceived to be very low (i.e. there is currently full Hold-the-Line coverage).
- There is no apparent current recognition by local authorities in policies of potential risks to shoreline management plan policy delivery – should funding not prove to be available.

As this review was necessarily limited in extent, an additional gap-filling exercise could be undertaken to comprehensively interview all coastal local authorities. A mapping exercise could be undertaken to establish the numbers and types of properties at risk, where delivery of shoreline management plan policies is potentially at risk due to funding shortfalls.

4.6 What are the costs and timescales associated with the planned actions?

The evidence for answering this question was sourced from grey literature and interview responses (as described in Chapter 2). This evidence suggested the following conclusions:

- The Pathfinder costs (Defra, 2012) are likely to give the best indication of the cost of strategic coastal adaptation activities relating to managing the impact of property losses at the coast. The published expenditure on adaptive solutions, as funded by the Pathfinder projects is summarised in Table 4.4 and Table 4.5.

Table 4.4 Breakdown of expenditure on the ten smaller Pathfinder projects

	Staff costs (£k) (%)	Consultancy (£k) (%)	Capital spend on adaptive solutions (£k) (%)	Revenue spend on adaptive solutions (£k) (%)	Workshops, publications, comms materials (£k) (%)	Small grants (£k) (%)	Other (£k) (%)	Total (£k)
Chichester	£128k (28%)	£125k (28%)	£150k (33%)	£44k (10%)	£4.5k (1%)	£37k (8%)		£450k

	Staff costs (£k) (%)	Consultancy (£k) (%)	Capital spend on adaptive solutions (£k) (%)	Revenue spend on adaptive solutions (£k) (%)	Workshops, publications, comms materials (£k) (%)	Small grants (£k) (%)	Other (£k) (%)	Total (£k)
Cuckmere	£43k (17%)	£191k (77%)			£16k (6%)			£250k
Hampshire	£32k (19%)	£113k (66%)			£19.5k (11%)		£6k (4%)	£171k
Hastings	£22.5k (20%)	£73k (63%)			£20k (17%)			£116k
Jurassic Coast	£161k (43%)	£62k (17%)		£27k (7%)	£126k (33%)			£376.5k
Lincolnshire	£142k (18%)	£458k (56%)		£3k (<1%)	£209k (26%)			£810k
Scratby	£20k (9%)	£173k (82%)			<£1k (<1%)	£2k (1%)	£16k (8%)	£211.5k
Sefton	£13k (9%)	£45k (30%)	£91k (61%)					£149k
Slapton	£24.5k (91%)				£13.5k (9%)			£38k
Somerset	£127k (54%)	£19.5k (8%)		£36.5k (16%)	£45k (19%)	£4k (2%)	£3k (1%)	£235k
Total	£713k (24%)	£1,258k (44%)	£241k (9%)	£110k (4%)	£454k (15%)	£43k (2%)	£25k (1%)	£2,809k

Table 4.5 Breakdown of expenditure on the five larger Pathfinder projects

	Staff costs (£k) (%)	Consultancy (£k) (%)	Capital spend on adaptive solutions (£k) (%)	Revenue spend on adaptive solutions (£k) (%)	Workshops, publications, comms materials (£k) (%)	Small grants (£k) (%)	Other (£k) (%)	Total (£k)
East Riding	£96k (8%)		£366k (28%)	£583k (49%)	£40k (2%)	£150k (13%)		£1,206k
North Norfolk	£352k (12%)	£172k (6%)	£1,875k (63%)	£455k (15%)	£5k (<1%)	£115k (4%)		£2,973k
Scarborough			£772.5k[1]					£772.5k
Tendring	£46k (5%)		£695k (70%)				£258k[2] (26%)	
Waveney	£175k (12%)	£204k (13%)	£971k (63%)	£4k (<1%)	£6k (<1%)	£30k (2%)	£145k (10%)	£1,543k
Total	£669k (9%)	£376k (6%)	£4,650k (64%)	£1,042k (14%)	£51k (1%)	£295k (4%)	£145k (2%)	

Notes: 1: It has been assumed that current and possible future spend will both be capital.
2: Tendring has uncommitted funds of £258k. They may be spent on regeneration activities outwith the Pathfinder programme and so they have not been included in the totals column.

- Some individual estimated costs of localised Managed-Realignment projects are available. Funding shortfalls for these projects are anticipated.
- Risk mapping and project prioritisation and appraisal is being systematically undertaken in Cornwall, however, no costs are associated with planned actions are yet available.
- Most strategic adaptation planning work is undertaken as part of existing allocated staff time (business as usual).
- The cost of removing defences (or allowing defences to fail), making the area environmentally and socially safe, and re-naturing is significant and funding routes are required (e.g. estimated. £2.91 million at Weybourne and Cart Gap, Norfolk).

As this review was necessarily limited in extent, an additional gap-filling exercise could be undertaken to comprehensively interview all coastal local authorities.

4.7 What support do Local Authorities require from Defra for effective coastal adaptation?

The evidence for answering this question was sourced from grey literature and interview responses (as described in Chapter 2). The outcome of research commissioned by the National Trust in 2015 together with evidence from recent Environment Agency/Defra workshops articulate the perceived and stated needs of local authorities in effectively supporting adaptation.

These needs can be categorised and summarised as follows:

a) **Strategic planning**

Perceived needs related to strategic planning include guidance on and support with:

- the interpretation of and required actions relating to Coastal-Change-Management-Area's;
- how to effectively align short-term decision-making with long-term risk management planning (ensuring difficult decisions are not deferred);
- how to bring adaptation planning in line with shoreline management areas delivery, including how to fund adaptation strategies, and how to evaluate risks and opportunities associated with short-term interventions to 'buy time' for communities to adapt/move;
- Improved strategies across shoreline management area/shoreline management area policy unit boundaries.
-

b) **Legal**

Perceived needs related to legal issues include guidance on and support with articulating a clear legal framework around adaptation planning, roll back and other adaptation policy implementation processes. This would include the local authority legal duties and obligations with respect to adaptation and at-risk property.

c) **Funding**

Perceived needs related to funding include guidance on and support with:

- putting in place long-term investment strategies, when there is significant uncertainty over future funding sources;
- the full suite of financing options available including what Grant in Aid funding can and cannot be used for, the opportunities for ring-fenced local authority adaptation funds, insurance compensation possibilities (if any), and partnership funding approaches;
- how to best incentivise roll back;
- The development of new financial products that could enable vulnerable communities to adapt cost-effectively (e.g. developer contributions, re-focusing the Coastal Communities' Fund on coastal adaptation).

d) **Community engagement**:

Perceived needs related to community engagement include guidance on and support with:

- raising awareness of shoreline management plan and policies generally, including how to convey that there may be risks with policy non-deliverability due to long term funding shortfalls;
- securing funds for dedicated and skilled community engagement individuals to reduce future risk and raise awareness, particularly where there is a shift from Hold-the-Line to No-Active-Intervention policies in the Shoreline Management Plan;
- securing engagement and buy-in from elected councillors;
- strategic planning for supporting community infrastructure;
- Strategic planning for caravan park businesses and their inhabitants.

e) **Monitoring:**

Perceived needs related to monitoring include guidance on and support with monitoring coastal erosion, monitoring property and infrastructure at risk and when lost to coastal erosion (including temporary infrastructure e.g. caravans.

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