SOUTH WEST
Flood & Coastal

Managing Coastal Risk in Dorset

Presentation to the Dorset Geologists Association Group

20 January 2026

Alan Frampton
Strategy, Policy & Environment Manager
South West Flood & Coastal

SOUTH WEST
Flood & Coastal

Working with our communities and partners to address the challenges of flooding and coastal erosion in a changing climate while enhancing the environment.

BCP Council

East Devon District Council

Contents

- What are the risks of coastal flooding & erosion in Dorset?
- How do we manage those risks?
- What are some of the challenges for the future and how are we responding to them?

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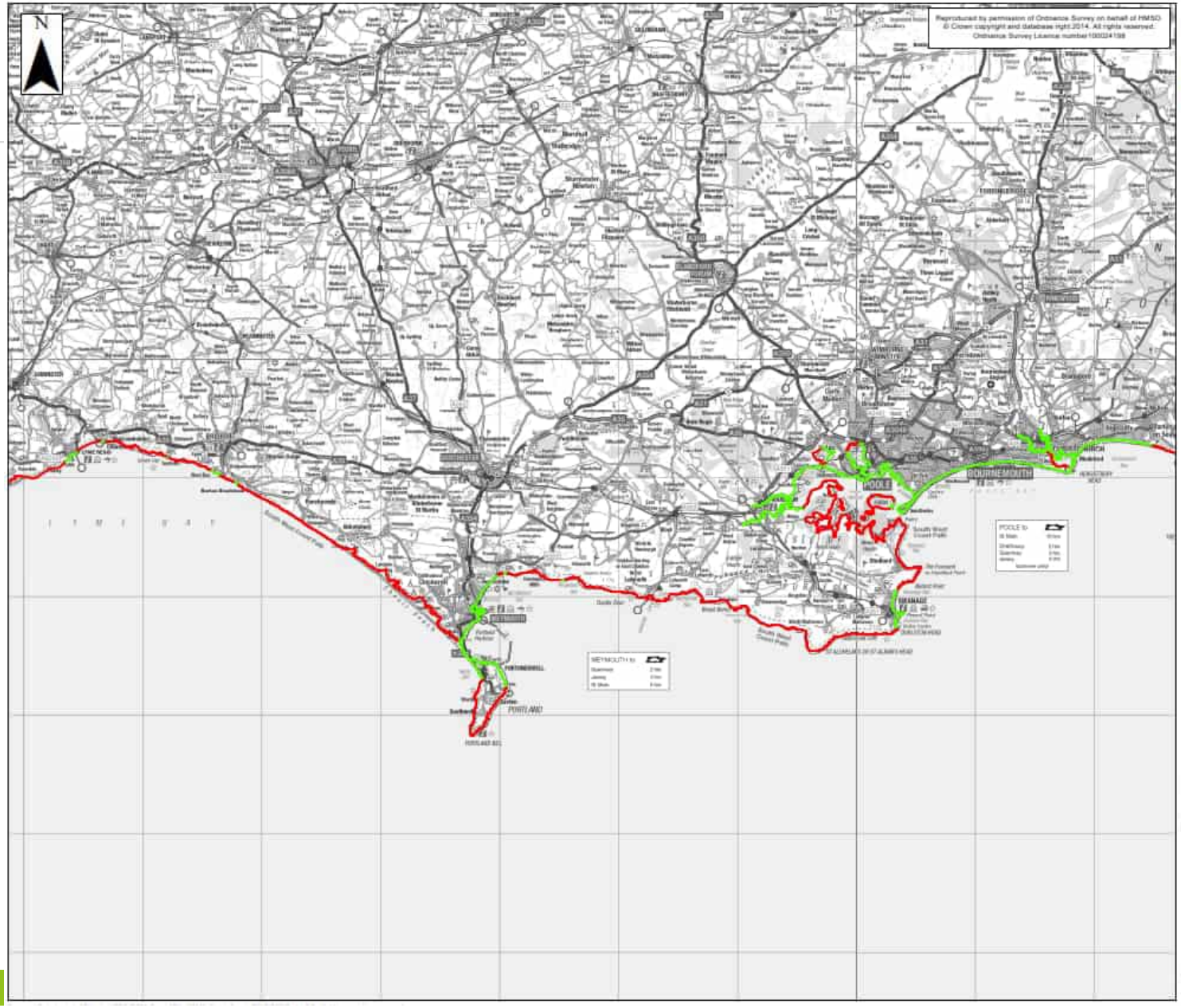
What are the risks along the Dorset coast?



KEY

Management

- Managed
- Unmanaged

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Kilometres

Rev	By	Chkd	Appvd	Date	Description

Client

Environment Agency

CH2MHILL

Project:

Chesil Beach Recovery Works

Drawing:

Managed/Unmanaged Coast

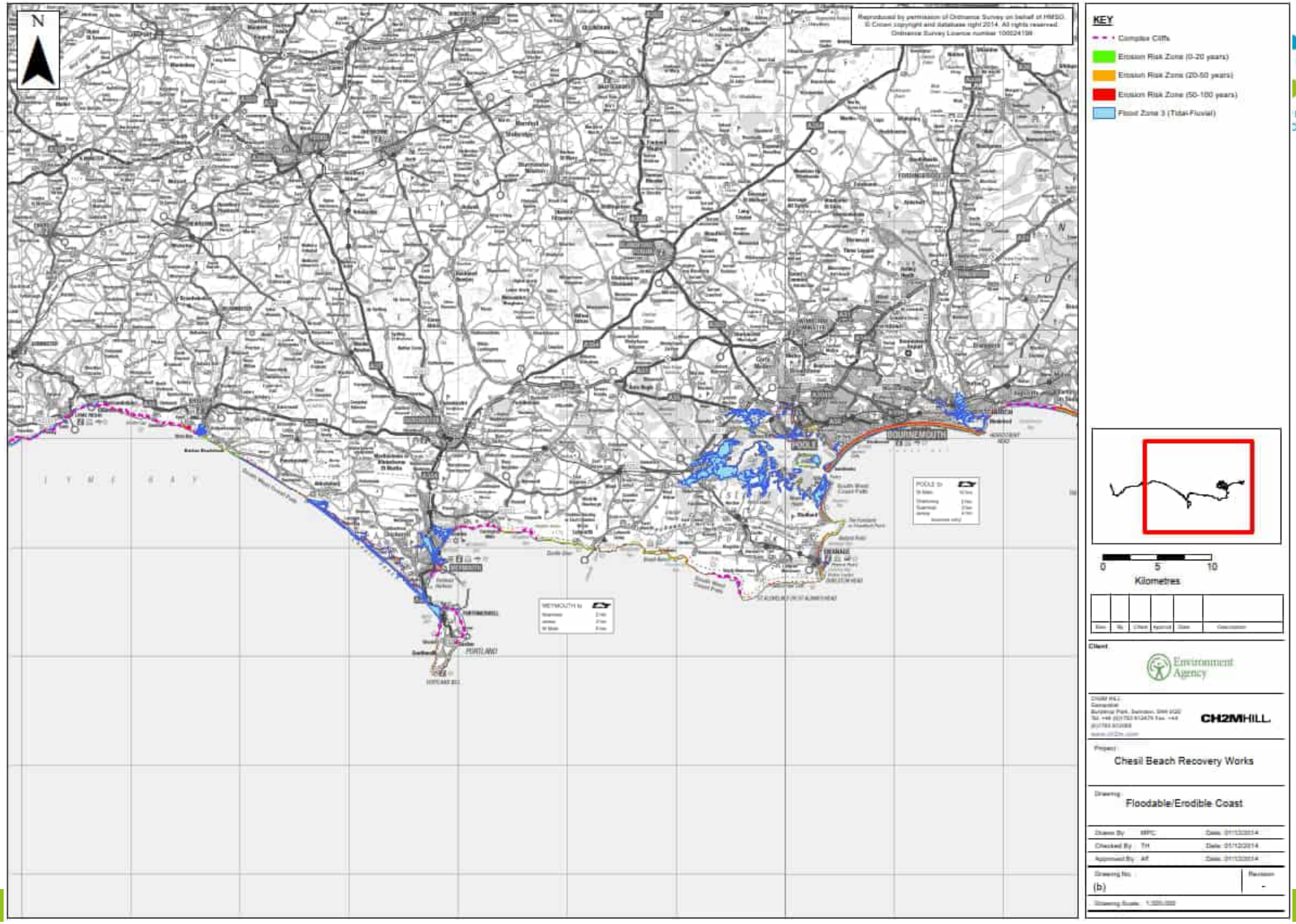
Drawn By: MPC Date: 18/11/2014

Checked By: TH Date: 18/11/2014

Approved By: AP Date: 18/11/2014

Drawing No.: (a) Revision: -

Drawing Scale: 1:XXX,XXX


N
KEY
Complex Cliffs
Erosion Risk Zone (0-20 years)
Erosion Risk Zone (20-50 years)
Erosion Risk Zone (50-100 years)
Flood Zone 3 (Tidal-Fluvial)
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Client
Environment Agency
CH2MHILL
Project
Chesil Beach Recovery Works
Drawing
Floodable/Erodible Coast
Drawn By
Checked By
Approved By
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(b)
Revision
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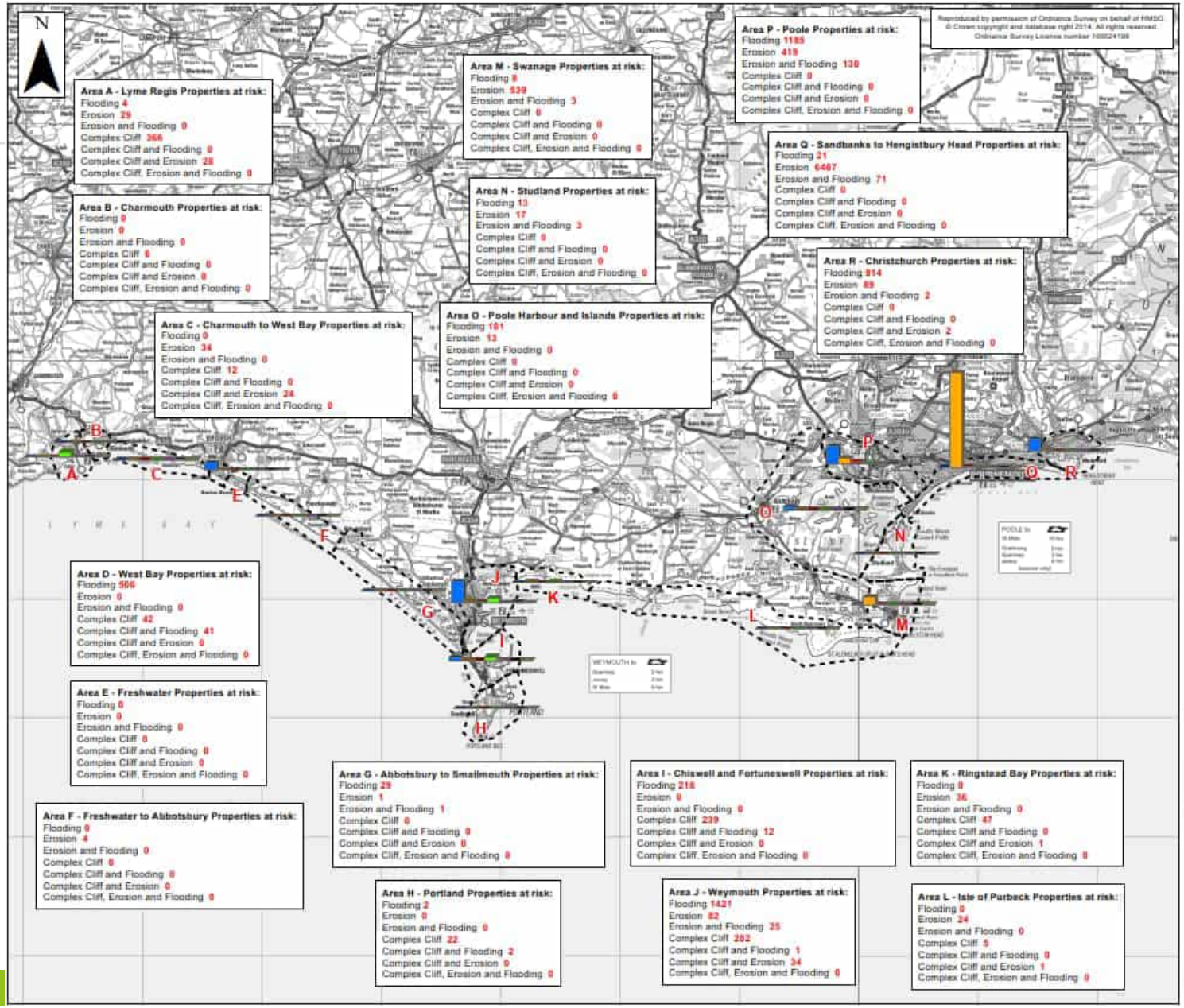
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Area A - Lyme Regis Properties at risk:
Flooding 4
Erosion 29
Erosion and Flooding 0
Complex Cliff 366
Complex Cliff and Flooding 0
Complex Cliff and Erosion 28
Complex Cliff, Erosion and Flooding 0
Area B - Charmouth Properties at risk:
Flooding 0
Erosion 0
Erosion and Flooding 0
Complex Cliff 6
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area C - Charmouth to West Bay Properties at risk:
Flooding 0
Erosion 34
Erosion and Flooding 0
Complex Cliff 12
Complex Cliff and Flooding 0
Complex Cliff and Erosion 24
Complex Cliff, Erosion and Flooding 0
Area D - West Bay Properties at risk:
Flooding 566
Erosion 0
Erosion and Flooding 0
Complex Cliff 42
Complex Cliff and Flooding 41
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area E - Freshwater Properties at risk:
Flooding 0
Erosion 0
Erosion and Flooding 0
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area F - Freshwater to Abbotsbury Properties at risk:
Flooding 0
Erosion 4
Erosion and Flooding 0
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area G - Abbotsbury to Smallmouth Properties at risk:
Flooding 29
Erosion 1
Erosion and Flooding 1
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area H - Portland Properties at risk:
Flooding 2
Erosion 0
Erosion and Flooding 0
Complex Cliff 22
Complex Cliff and Flooding 2
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area I - Chiswell and Fortuneswell Properties at risk:
Flooding 216
Erosion 0
Erosion and Flooding 0
Complex Cliff 239
Complex Cliff and Flooding 12
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area J - Weymouth Properties at risk:
Flooding 1421
Erosion 82
Erosion and Flooding 25
Complex Cliff 282
Complex Cliff and Flooding 1
Complex Cliff and Erosion 34
Complex Cliff, Erosion and Flooding 0
Area K - Ringstead Bay Properties at risk:
Flooding 0
Erosion 36
Erosion and Flooding 0
Complex Cliff 47
Complex Cliff and Flooding 0
Complex Cliff and Erosion 1
Complex Cliff, Erosion and Flooding 0
Area L - Isle of Purbeck Properties at risk:
Flooding 0
Erosion 24
Erosion and Flooding 0
Complex Cliff 5
Complex Cliff and Flooding 0
Complex Cliff and Erosion 1
Complex Cliff, Erosion and Flooding 0
Area M - Swanage Properties at risk:
Flooding 8
Erosion 539
Erosion and Flooding 3
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area N - Studland Properties at risk:
Flooding 13
Erosion 17
Erosion and Flooding 3
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area O - Poole Harbour and Islands Properties at risk:
Flooding 101
Erosion 13
Erosion and Flooding 0
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area P - Poole Properties at risk:
Flooding 1185
Erosion 419
Erosion and Flooding 130
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area Q - Sandbanks to Hengistbury Head Properties at risk:
Flooding 21
Erosion 6467
Erosion and Flooding 71
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 0
Complex Cliff, Erosion and Flooding 0
Area R - Christchurch Properties at risk:
Flooding 814
Erosion 89
Erosion and Flooding 2
Complex Cliff 0
Complex Cliff and Flooding 0
Complex Cliff and Erosion 2
Complex Cliff, Erosion and Flooding 0
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A = Lyme Regis
B = Charmouth
C = Charmouth to West Bay
D = West Bay
E = Freshwater
F = Freshwater to Abbotsbury
G = Abbotsbury to Smallmouth
H = Portland
I = Chiswell and Fortuneswell
J = Weymouth
K = Ringstead Bay
L = Isle of Purbeck
M = Swanage
N = Studland
O = Poole Harbour and Islands
P =Poole
Q = Sandbanks to Hengistbury Head
R = Christchurch
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Kilometres
Client
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CH2MHILL
Project
Chesil Beach Recovery Works
Drawing
Assets at Direct Risk
Drawing No.
Revision
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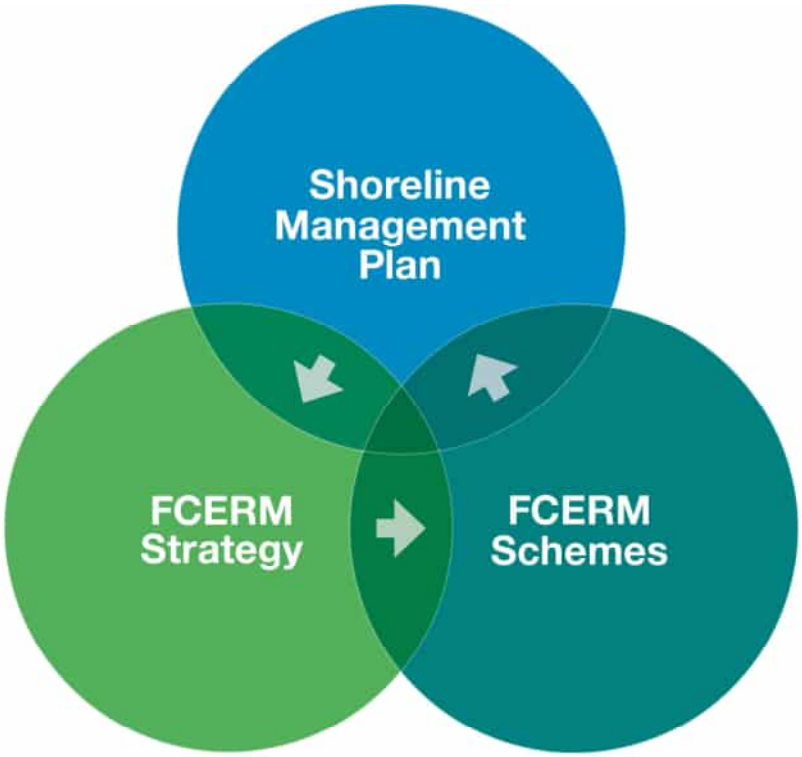
SOUTH WEST
Flood & Coastal

The current FCERM framework in England

FCERM plans, strategies & schemes



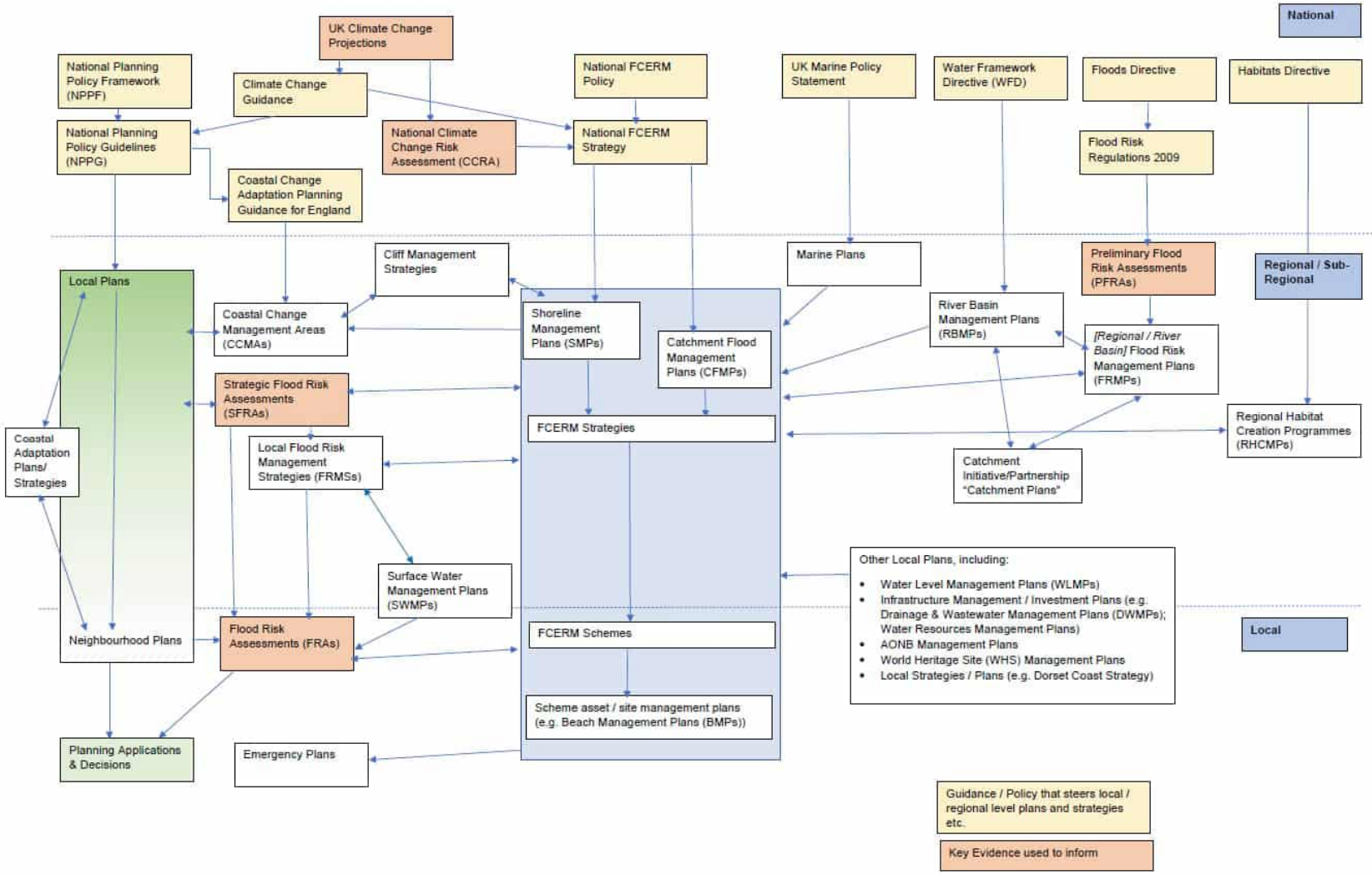
PLAN Long term policies to manage coastal flooding & erosion risk.

STRATEGY Preferred environmentally and economically viable approaches to address risks are identified.

SCHEMES Flooding and Coastal Works are designed to reduce risks to people and assets.

Delivery is dependent on securing the required partnership funding.

The current FCERM Framework in England – plans & policies



Key players

Figure 3.1. Key actors and stakeholders in the Flood and Coastal Erosion Risk Management sector

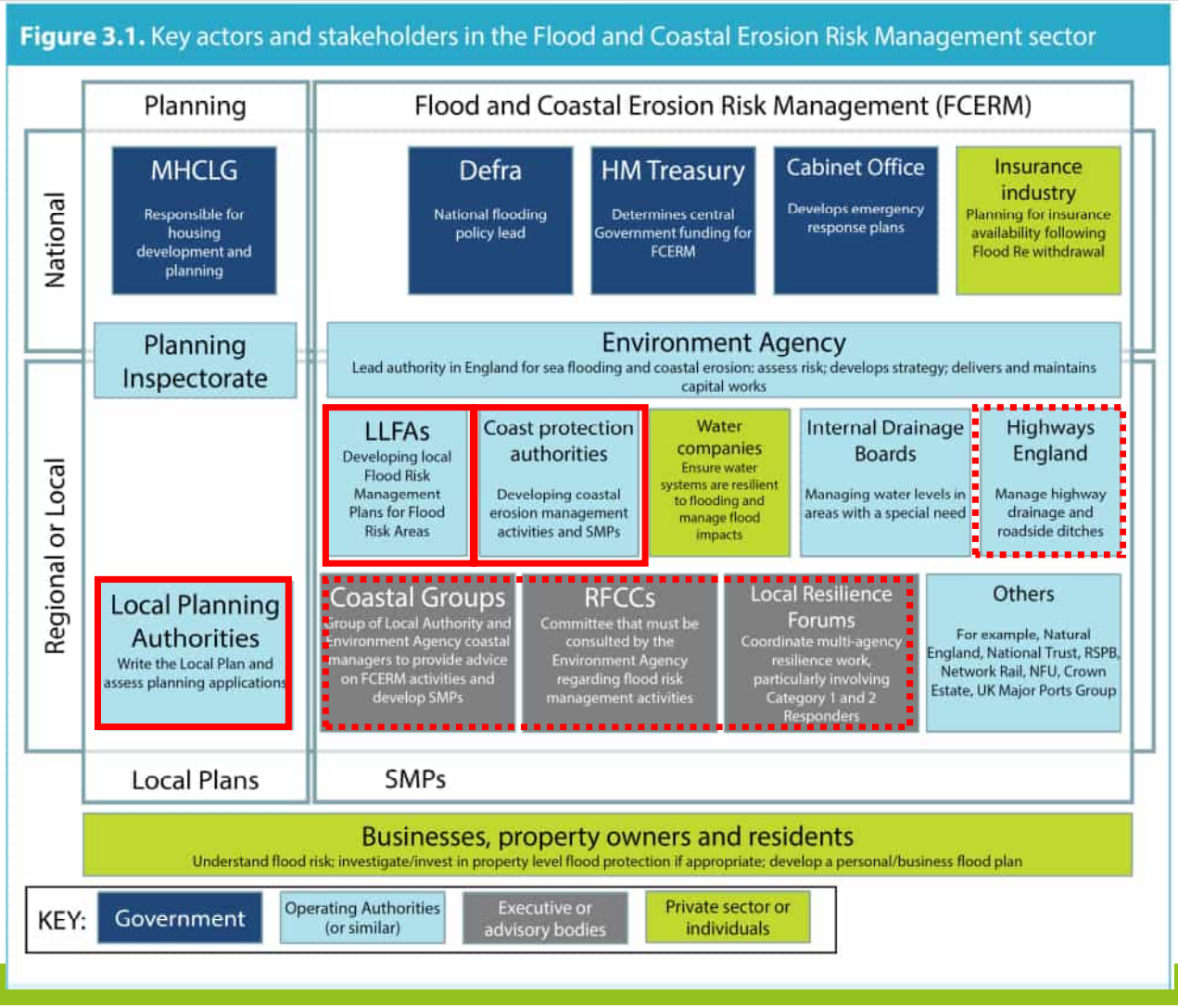


Diagram from *Managing the Coast in a Changing Climate (Committee on Climate Change, 2018)*

SOUTH WEST
Flood & Coastal

Shoreline Management Plans

What is a Shoreline Management Plan (SMP)?

- A guiding principle is that the SMP needs to define a long term sustainable plan for coastal defence.
- The Plan provides the long term vision, considering the interactions and implications across the whole SMP area.
- The ‘policies’ are the means of achieving this Plan at the local level over discrete timescales.
- SMP policies and policy options set the direction of travel for a more sustainable coast but do not guarantee funding or delivery.
- Any scheme or coastal works are expected to be in accordance with the relevant SMP in order to be considered for approval and funding.

Long term policies to manage coastal flooding & erosion risk.

Preferred environmentally and economically viable approaches to address risks are identified.

Flooding and Coastal Works are designed to reduce risks to people and assets.

Delivery is dependent on securing the required partnership funding.

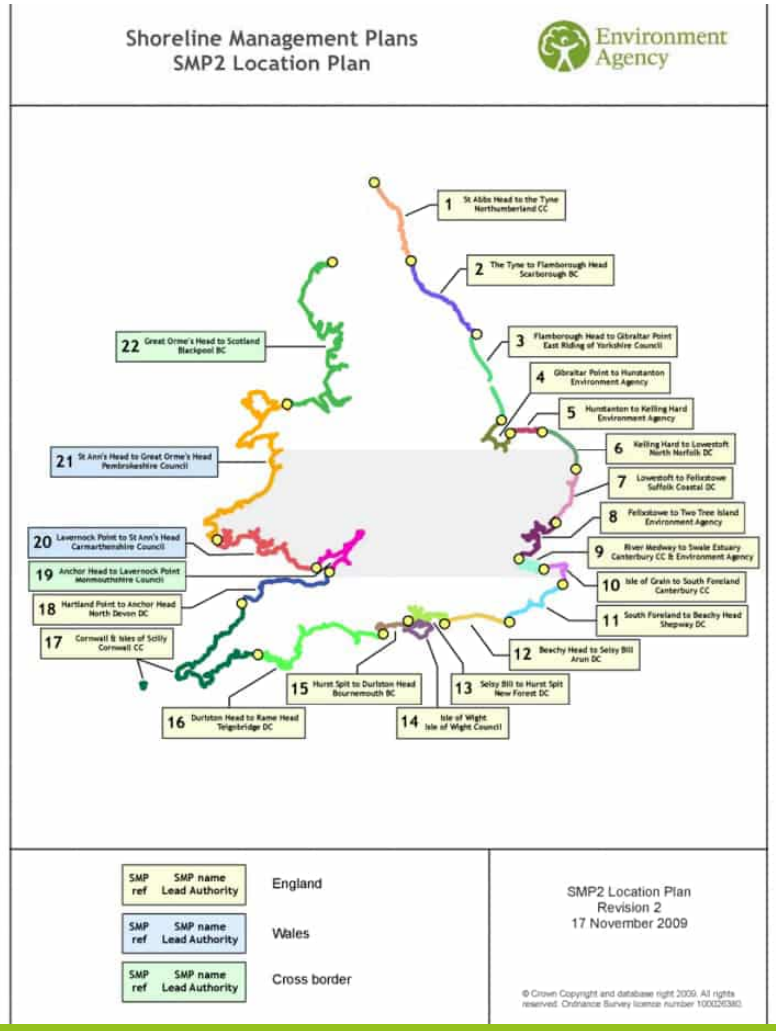
Key aspects of Shoreline Management Plans

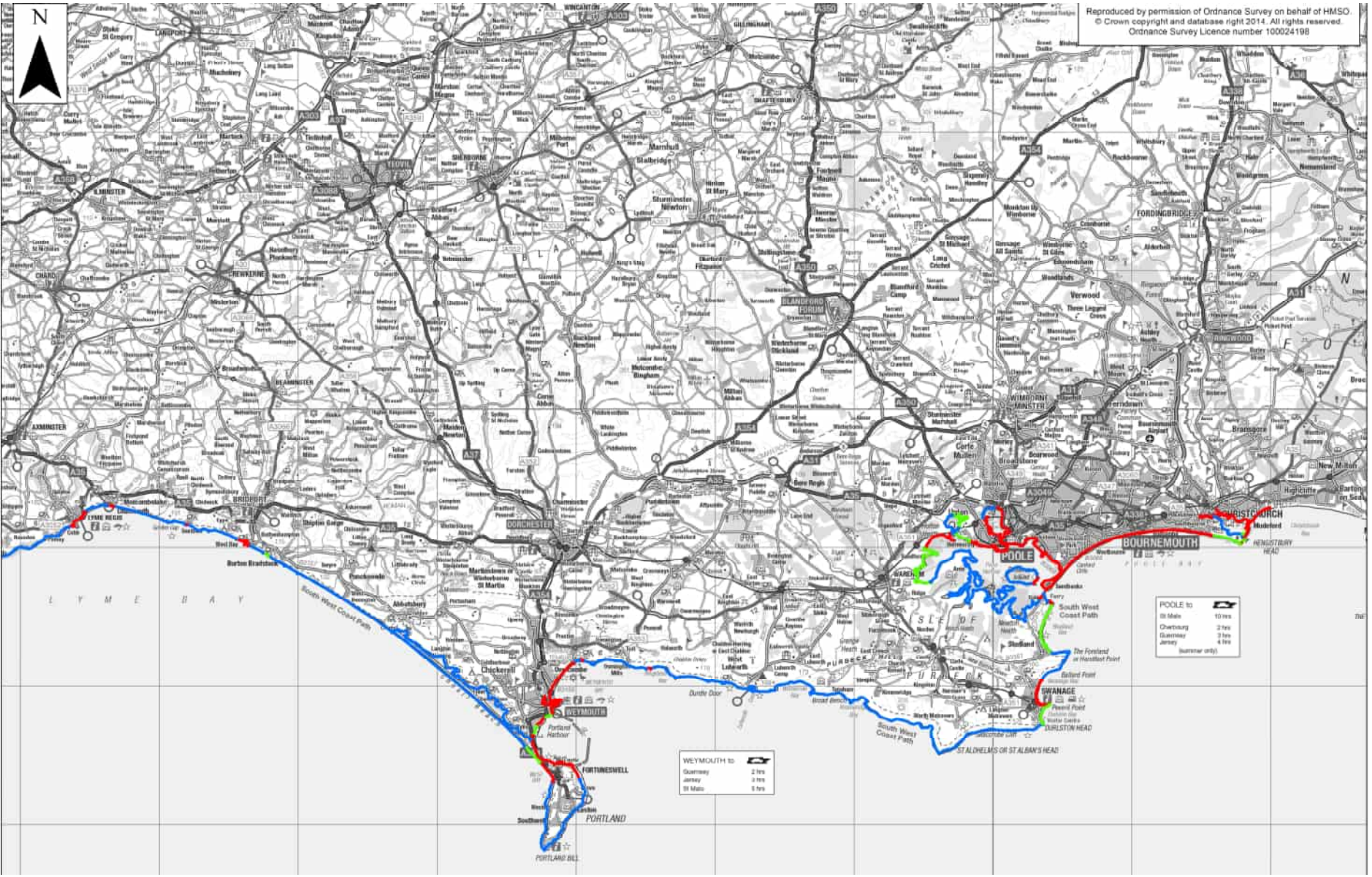
- Policy set over 100 year planning horizon

- Policy defined in each of 3 epochs:
  - 0-20 years (2005-2025)
  - 20-50 years (2025-2055)
  - 50-100 years (2055-2105).

- Define one of 4 policies:
  - No Active Intervention (NAI)
  - Managed Realignment (MR)
  - Hold the Line (HTL)
  - Advance the Line (ATL).

- For more information on SMPs, see: https://environment.data.gov.uk/shoreline-planning.

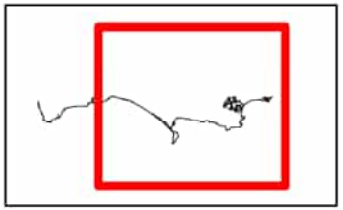




KEY

SMP2 Policy (0-20yr)

- Hold the line
- Managed realignment
- No active intervention



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Client

Environment Agency

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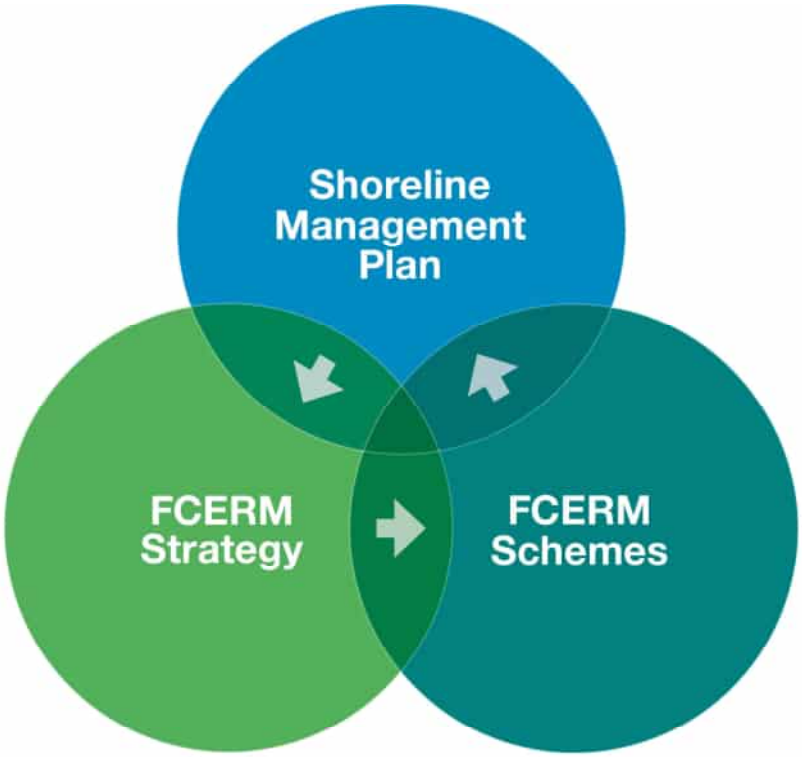
FCERM Strategies

FCERM plans, strategies & schemes



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2014 FCERM Strategy for Poole Bay, Harbour & Wareham

- Poole Bay, Harbour & Wareham FCERM Strategy published in 2014.
- Sets out approach to implementing SMP policy from Durlston Head to Hengistbury Head long-groyne, and around Poole Harbour including Wareham.
- **Will be reviewing this in next 2-3 years!**

Summary of works planned to be undertaken by 2030

	Recommended works	When	Central funding expected	Amendment to SMP policy	Coastal Squeeze
Hengistbury Head to Sandbanks	Beach management	0-20 years (every year)	Most or All	No	None None
Luscombe Valley	None (maintenance only)			No	Loss
Lower Parkstone	None (maintenance only)			No	Loss
Central Poole	Improve defences	1-10 years	Some	No	Loss
Hamworthy	None (maintenance only)			No	Loss
Rockley Sands	None (private expense)			No	None
Lytchett Bay	Managed realignment	5-10 years	Some/Most	No	Gain**
Wareham Banks and Ridge	Some managed realignment (& any minimum maintenance required)	5-10 years*	Most or All	Partly[1]	Loss and Gain**
Poole Harbour South	No works			No	None
Brownsea Island	No works (local maintenance at private expense)			No	None
Studland and Ballard Down	None			No	None
Swanage	Beach management			No	None
Durlston Bay	Cliff stabilisation	On-going		No	None

* Habitat compensation to start in Year 1
** Subject to implementation of managed realignment

[1] Wareham Banks – The SMP Policy is for managed realignment of the tidal banks. The Strategy recommendation is for minimum maintenance whilst this is sustainable.

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Hengistbury Head to Sandbanks
(Long Groyne to Banks Road)

Now-2030	2030-2060	2060-2110
Sustain	Sustain	Sustain

What is at risk?
This frontage of approximately 18km is principally at risk from coastal erosion. The potential rate of erosion would be up to 1m/year if there were no defences in place. If no action is taken, annual damage to over 2,500 beach huts along the Poole Bay frontage would be likely by 2030, and over 6,000 residential and commercial properties would be at risk by 2110. On Sandbanks, 174 residential and commercial properties will have a 1 in 100 (1%) annual risk of flooding by 2110.
The risk of breaching at Solent Beach (Double Dykes) has been reviewed and found to be relatively low (1 in 200 years). A breach across the spit at Sandbanks would be likely by 2030 if erosion was not managed, preventing access to the community and the Sandbanks ferry.

Our Strategy is to…
…Upgrade the terminal groyne at Hengistbury Head and maintain the groynes that control beach erosion. Groynes along this frontage will be replaced, as necessary, and the beach will also need to be recharged periodically.

Other considerations
These works should attract central funding, although some local contribution may also be needed. The harbour frontage of Sandbanks includes local, private defences that will need to be upgraded or replaced as necessary by the owners. The value of the beach as an important amenity has been taken into account.

Shoreline Management Plan
The Strategy agrees with the Poole Harbour and Christchurch Bays Shoreline Management Plan 2 (Two Bays SMP2) policy of *Hold The Line* for policy units CBYE3 to PBY.STU H1-3.

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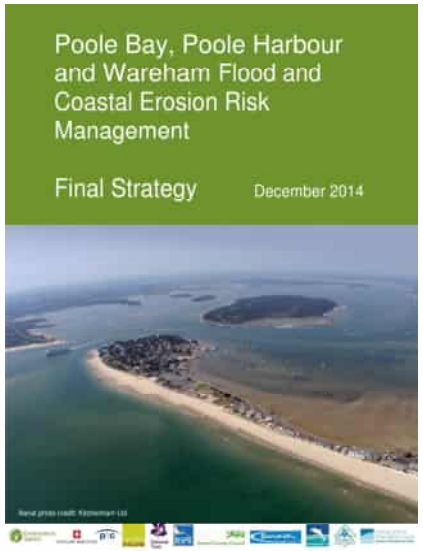


Weymouth Harbour & Esplanade FCRM Strategy, 2020

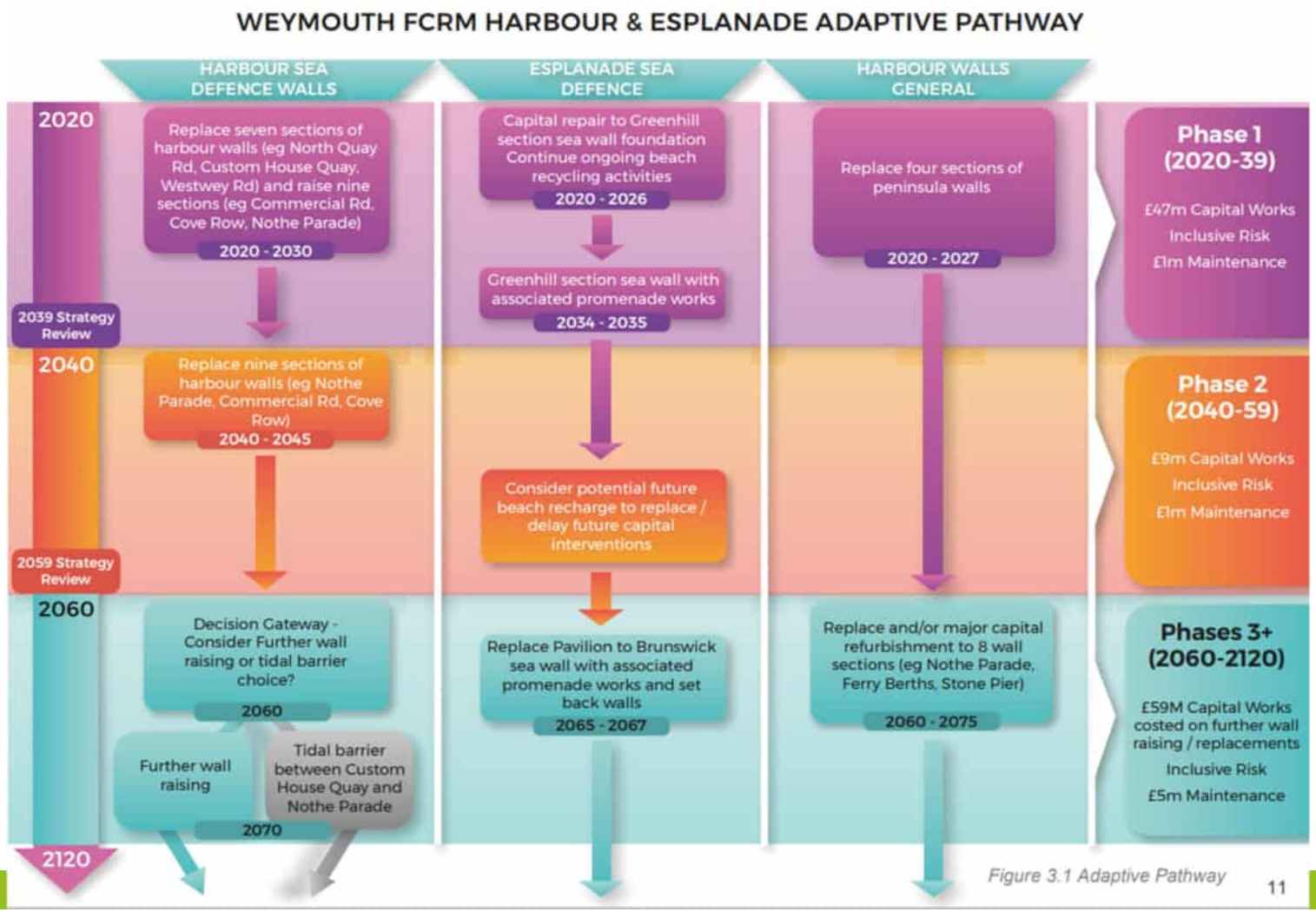
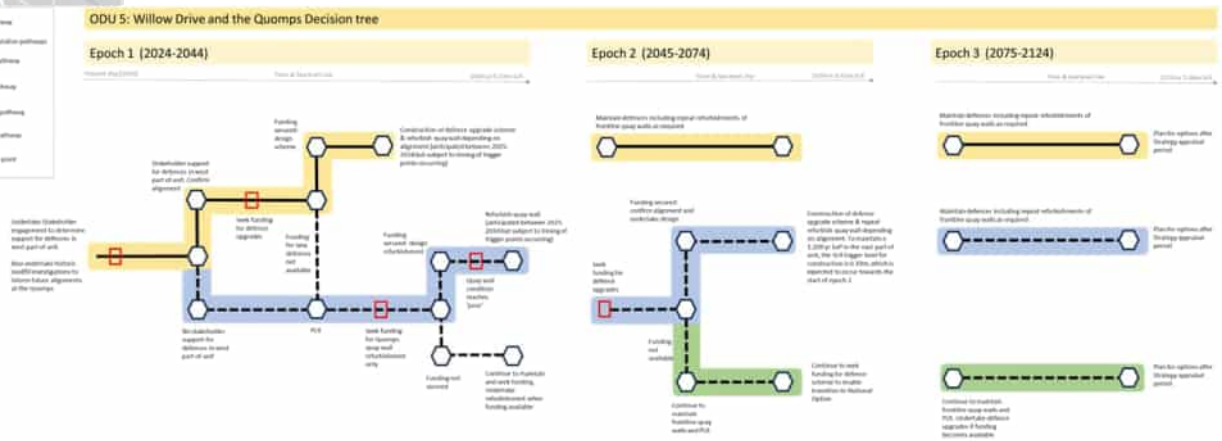


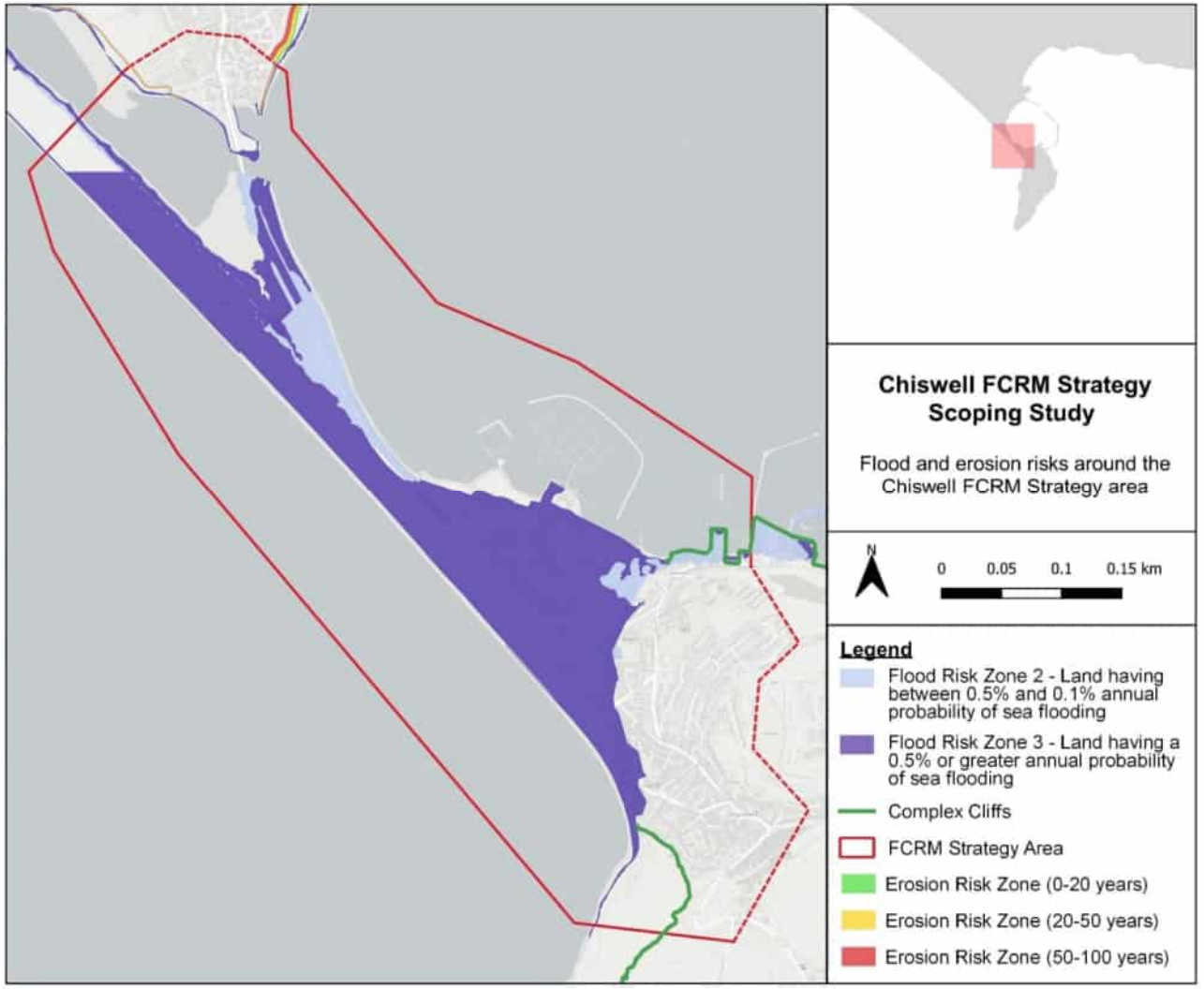
Figure 3.1 Adaptive Pathway

2025 FCERM Strategy for Christchurch Bay & Harbour

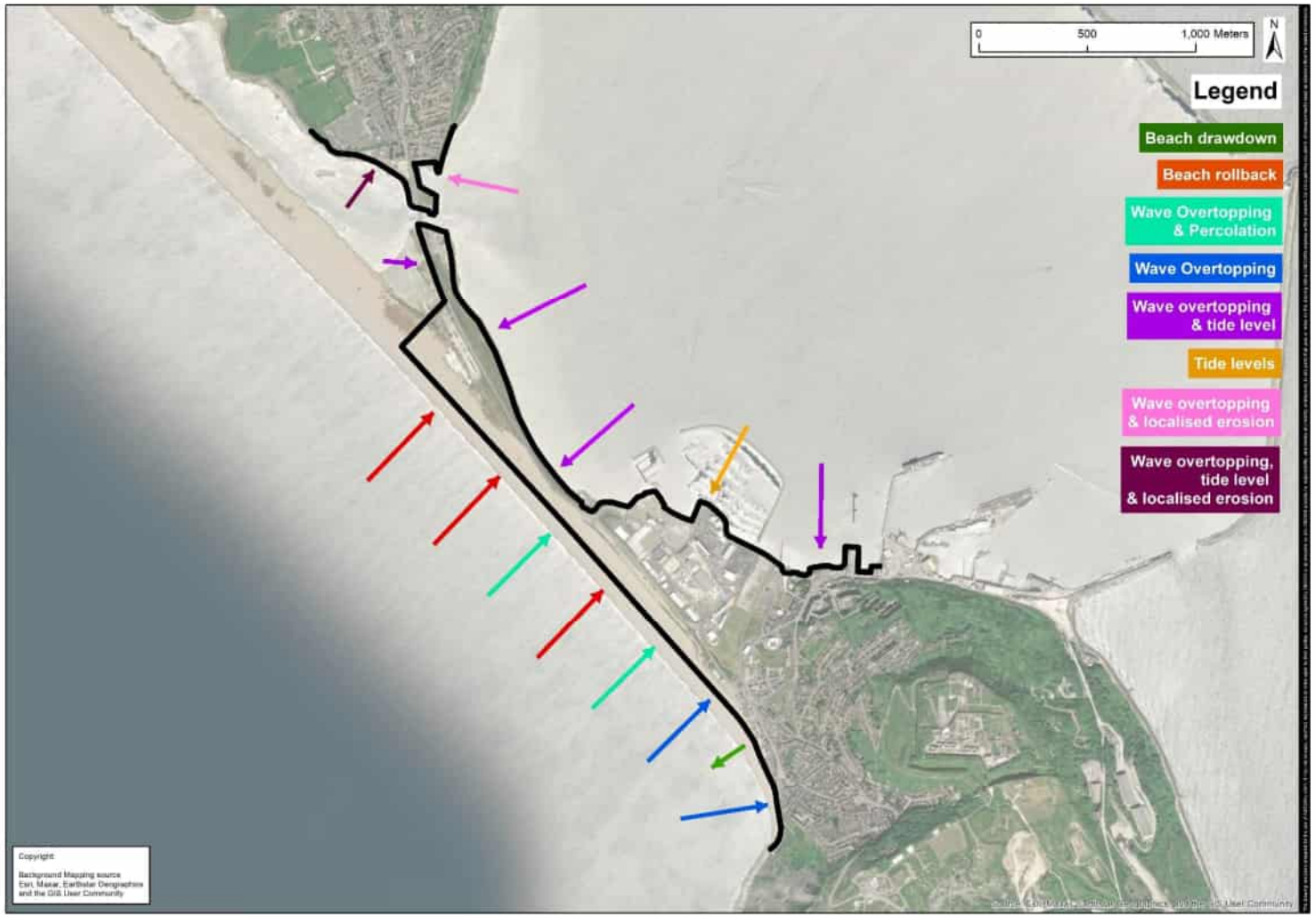


Portland – Wyke Regis FCRM Strategy

Portland – Wyke Regis FCRM Strategy



Portland – Wyke Regis FCRM Strategy



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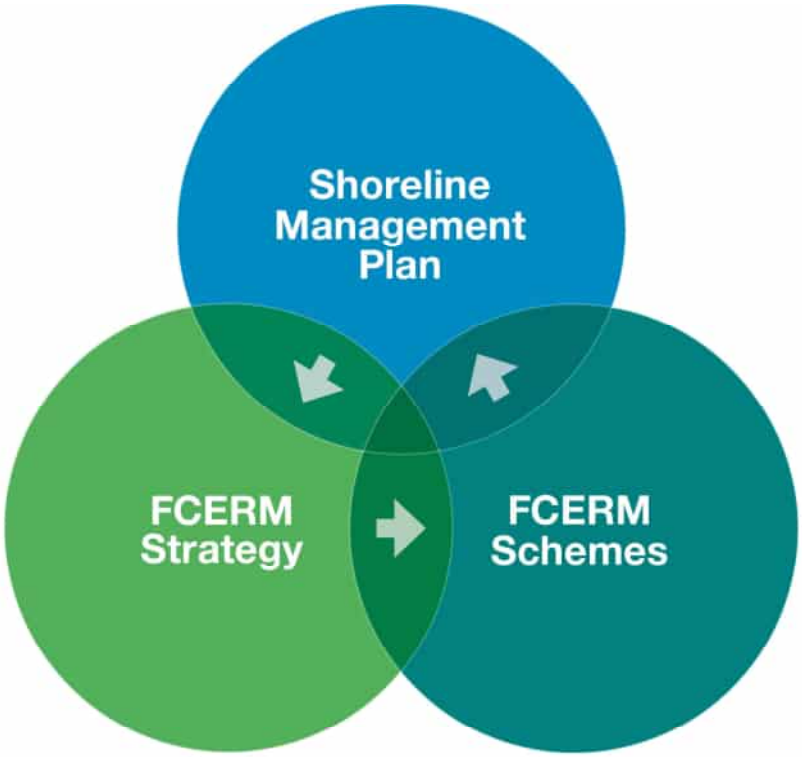
FCERM Schemes – an example

FCERM plans, strategies & schemes



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Poole Bay Beach Management Scheme (PBBMS)

- Following the SMP (2011) and Strategy (2014), the PBBMS Outline Business Case (OBC) was produced in January 2020.

- In May 2020, BCP Council was awarded £33 million of Government funding to add to £3m partnership funding contributions (totalling £36 million) to:
    - Replace 26 timber groynes located along the seafront from Southbourne to Alum Chine.

    - Provide two beach renourishments, the first of which occurred in Jan-Mar 2021 – known as Beach Improvement Schemes BIS6 and BIS7.

    - Repair and upgrade Hengistbury Head Long Groyne in 2024 to ensure the continuation of coast protection for Poole Bay and Christchurch Harbour.

- PBBMS prevents coastal erosion loss to assets situated on along the frontage, including 5,810 residential properties within the 100 year coastal erosion risk envelope.

PBBMS Timber Groyne Renewal

- Let as 2-year contracts as part of ongoing programme.
  - 2020-2022 = Suttles
  - 2022-2024 = Mackleys
  - 2025-2027 = Suttles
- Works are done each winter (Oct-Mar).

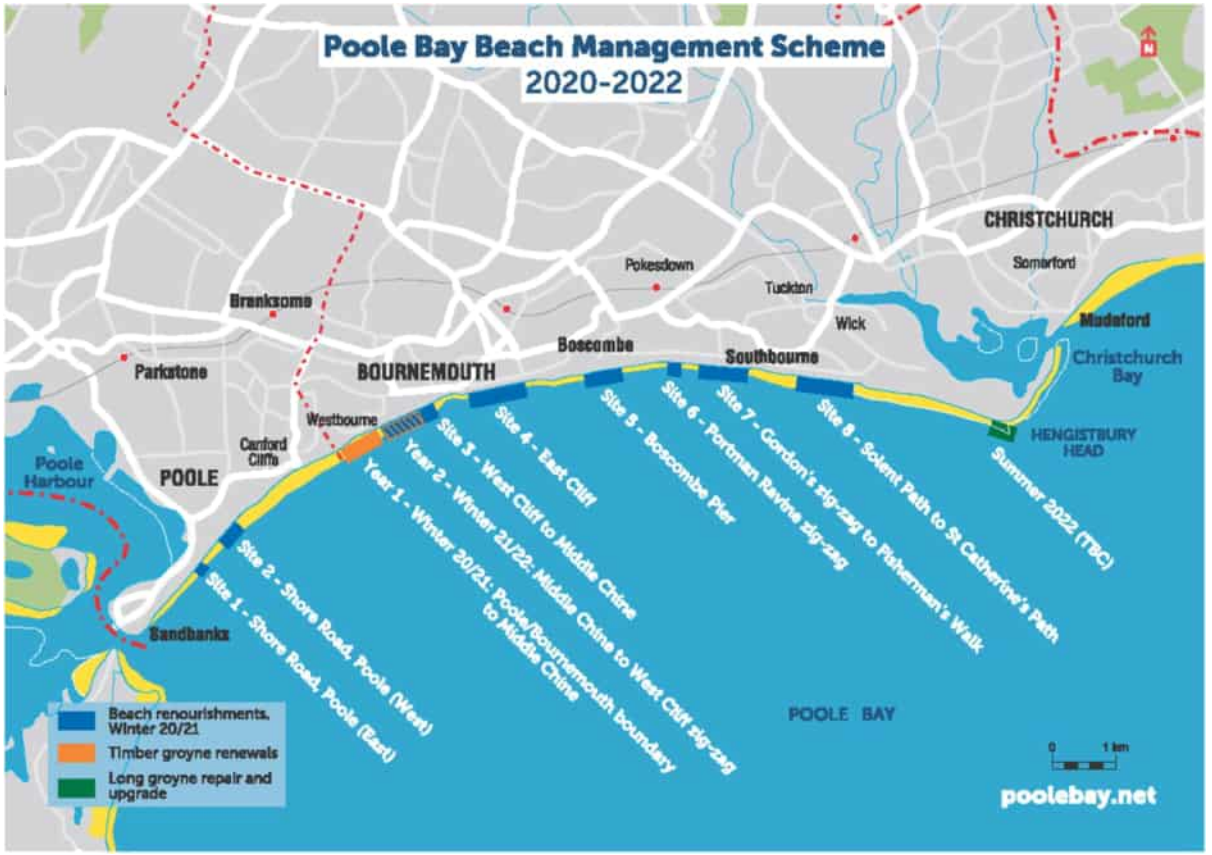
- New tropical hardwood timber used is certified sustainable by the Forestry Stewardship Council (FSC).

- New timber is used for piles and planks. Planks reclaimed from the old groynes have been reconditioned and reused to limit requirement for new timber.

- Remaining reclaimed timbers are recycled and used in other schemes throughout the UK, e.g:
  - Cladding Durley Chine Environmental Hub.
  - Footbridge for flood defence and wetlands scheme at Calstock, Cornwall.

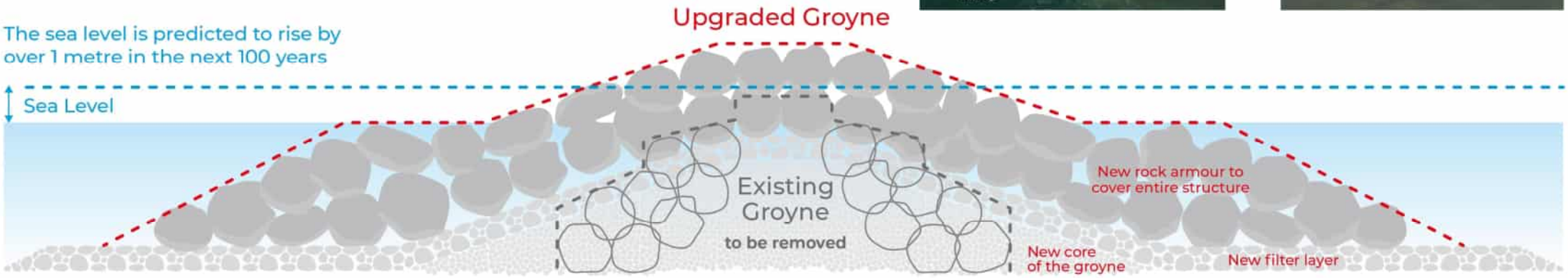
PBBMS Beach Renourishment

- Jan 2021 – Spring 2021, 350,000m3 of sand pumped ashore at eight depleted sections of frontage.
- Contractor: Boskalis Westminster



PBBMS Hengistbury Head Long Groyne Upgrade

- **Previous structure:**
  - Built 1938 – 1939
  - End of serviceable life after various maintenance
- **New structure:**
  - Over 100-year design life
  - Climate resilient (approx. 2m higher and 30m wider)
  - Funding case to make environmental enhancements viable
  - Re-use waste material on-site and use sustainable practices.

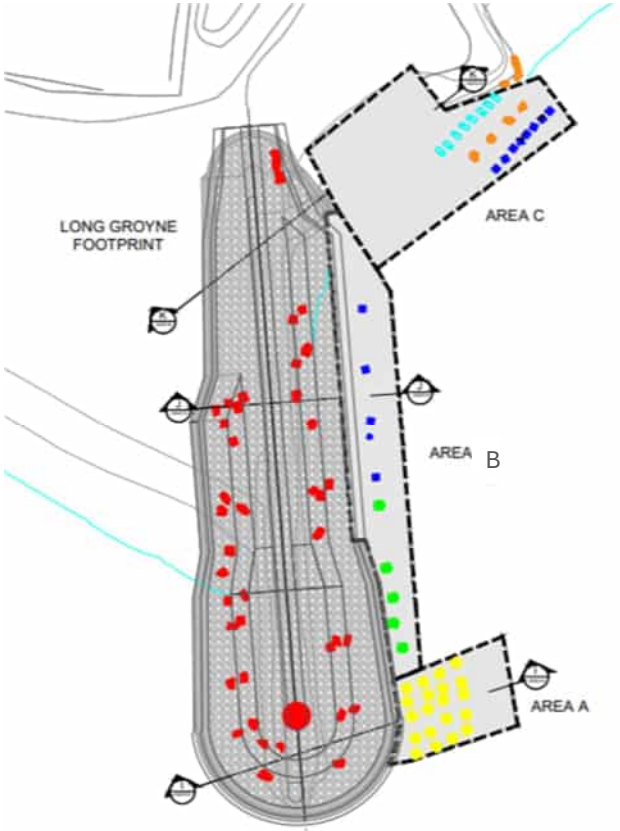


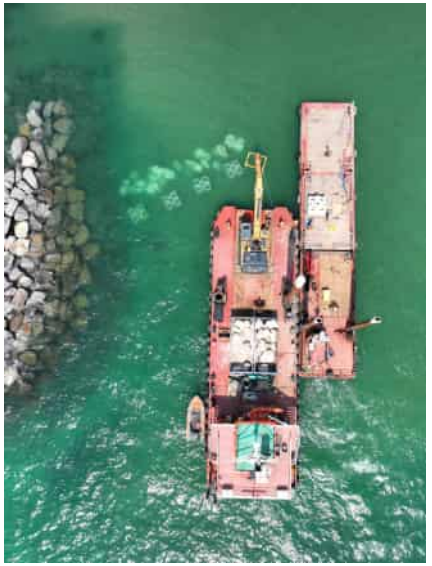
PBBMS Hengistbury Head Long Groyne Upgrade

Marine environmental enhancements:

- Focused on three areas:
  A. Upper intertidal
  B. Lower intertidal
  C. Subtidal

- Carefully selected design and materials:
  - Subtidal Modular Sealife System Reefs (MOSES)
  - Intertidal Modular Sealife System Reefs (MOSES)
  - Arc Marine Cubes
  - Tide Pools
  - Limestone Rock Pools
  - Granite Rock Pools
  - Limestone rock bed





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Future Challenge – Sea Level Rise

Sea Level Rise – increasing flood risk

Time period	Various estimates of relative sea level rise (m)		
	RCP8.5, 70%ile (higher central) – Design Allowance	RCP8.5, 95%ile (upper end)	H++ (from UKCP09)
2020 to 2025	0.03	0.04	0.03
2020 to 2075	0.47	0.60	0.94
2020 to 2125	1.10	1.48	2.55
2020 to 2300	2.80	4.12	N/A

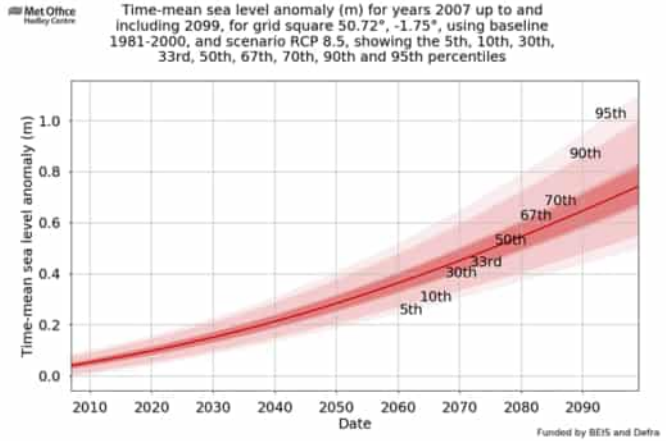


Figure 2-6 Projected change to relative sea level 2007 to 2099 for the UKCP18 RCP8.5 scenario for the eastern Poole Bay area (source: UKCP18 website – https://ukclimateprojections-ui.metoffice.gov.uk/ui/home).

Climate change allowances are taken from: https://www.gov.uk/guidance/flood-and-coastal-risk-projects-schemes-and-strategies-climate-change-allowances

Figure 8: The location of the station of the tidal gauge.

Inayatillah et al. (2021).

https://southerncoastalgroup-scopac.org.uk/wp-content/uploads/2022/01/Digitisation-and-Analysis-of-Poole-Harbour-Tide-Gauge-Record-September-2021.pdf

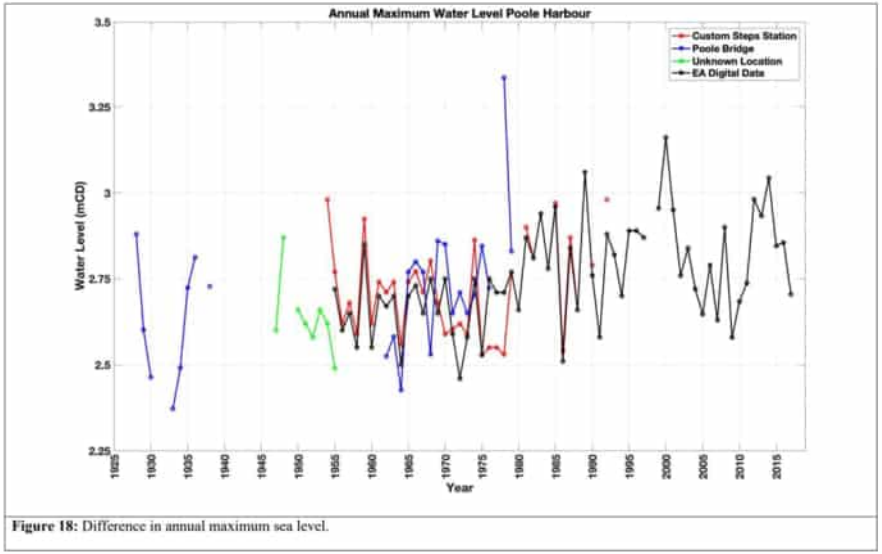
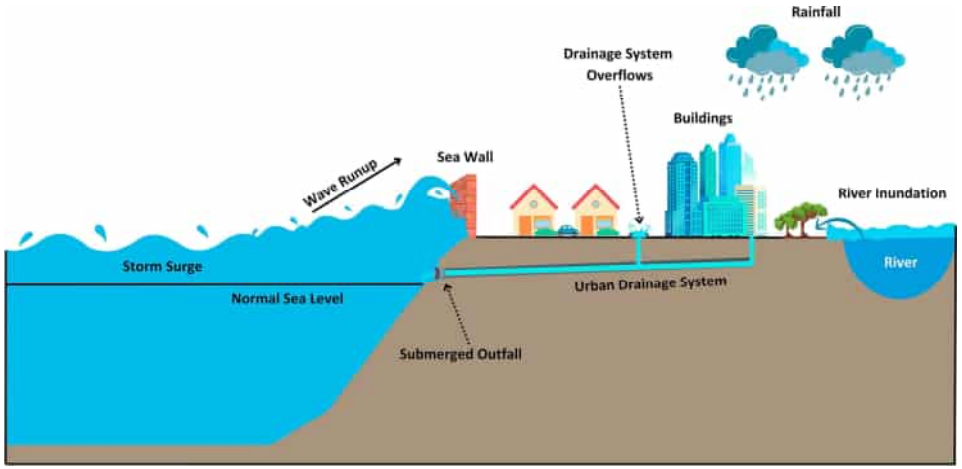


Figure 18: Difference in annual maximum sea level.

Sea Level Rise – compounding risks

- SLR response currently is to raise defence levels in harbour areas (e.g.):
  - In Poole Harbour, there are presently >570 properties at risk of tidal flooding from the 1 in 200 year tidal event; rising to >4,000 by ~2125.
  - In Christchurch Harbour, there are presently >150 properties at risk of tidal flooding from the 1 in 200 year tidal event; rising to >2,200 by ~2125.

- **How high can we keep building walls / raising ground levels? Should we relocate?**
- In Christchurch Harbour, flood risk complicated by interaction with fluvial inputs via Rivers Stour & Avon.
- Also need to consider drainage / surface water flooding and tide-locking.



Source of graphics:

- (upper) Living with a Changing Coast (LiCCO) project c.2013

- (lower) Waddington, K., Khojasteh, D., Marshall, L., Rayner, D. & Glamore, W. **Quantifying the effects of sea level rise on estuarine drainage systems**. Water Resources Research, Volume 58 Issue 6, June 2022)

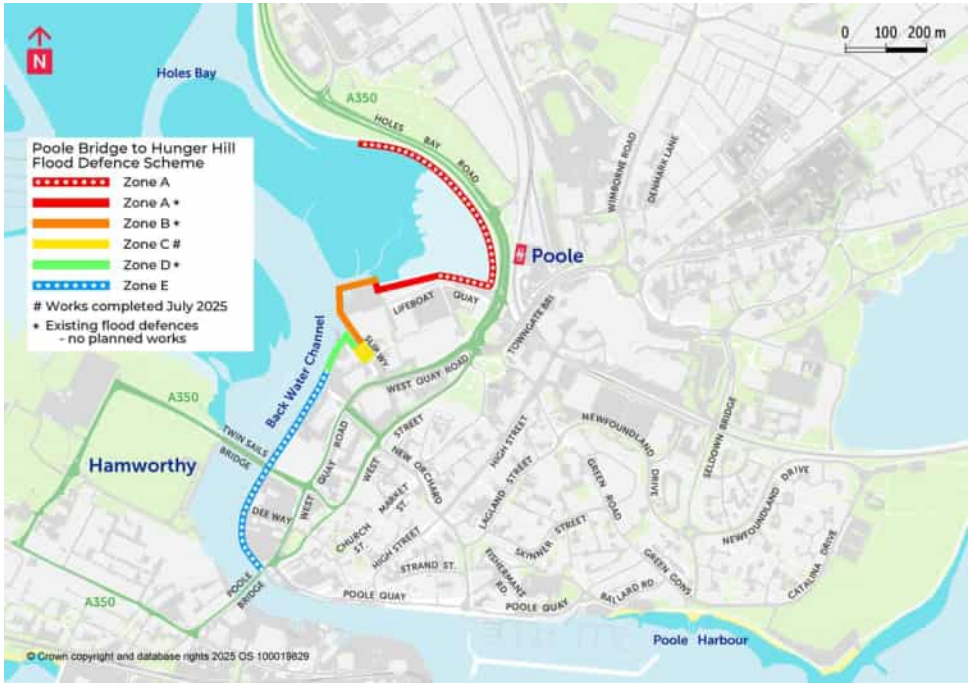
Responding to Sea Level Rise – Poole Bridge to Hunger Hill Flood Defence Scheme

An adaptable design

The ~£29.4m scheme is split into five zones.

Each has different interventions planned for 2025, 2071 and 2105 so that the sea wall levels keep pace with climate change:

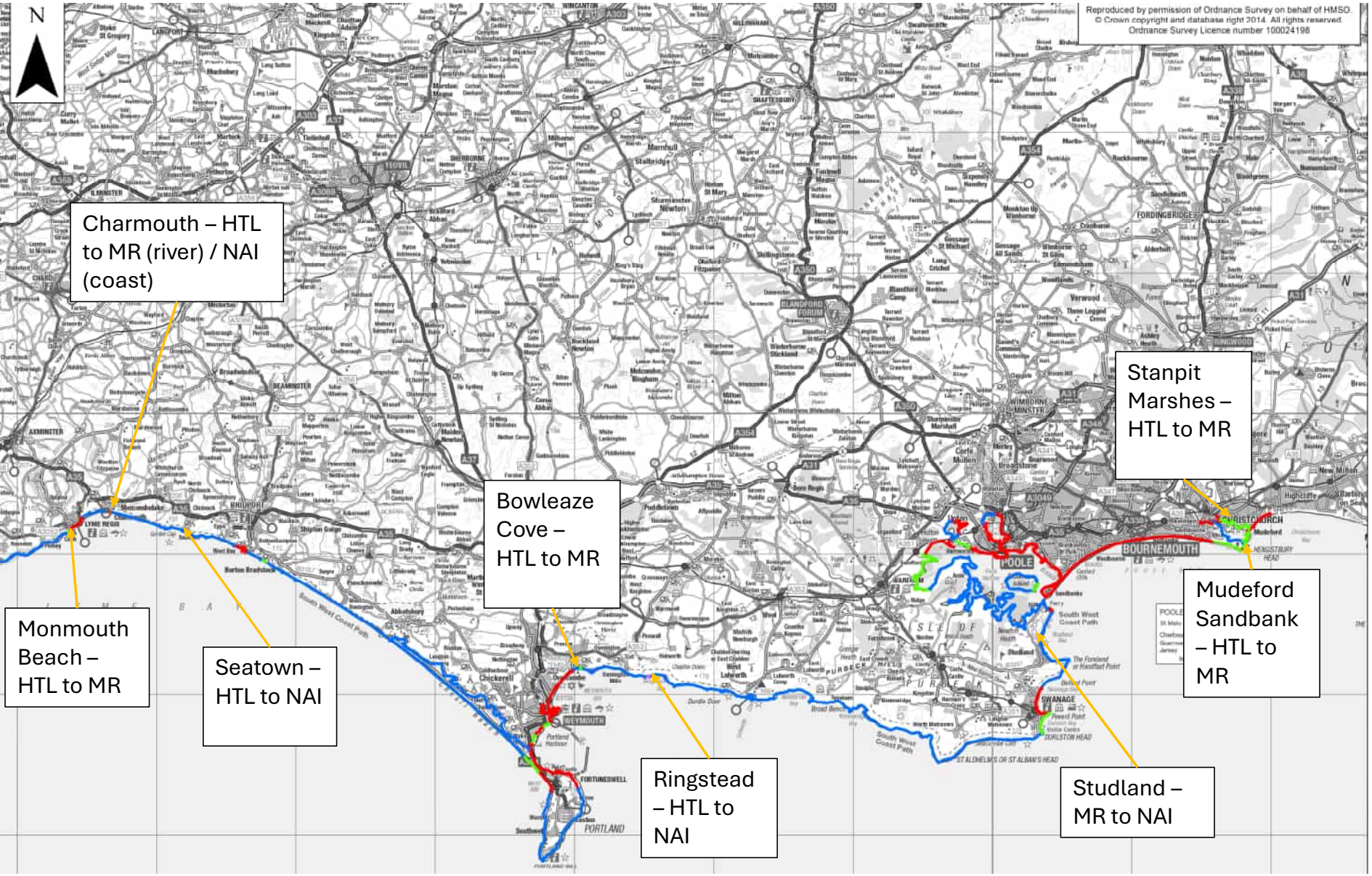
- **Zone A – Holes Bay Path & Lifeboat Quay** Defences will be raised to 2.65m AOD in 2025, then raised again to 3.6m AOD in 2071.
- Zone B – RNLI All Weather Lifeboat Station is protected for the next 85 years. No planned works.
- **Zone C – Slip Way** will make best use of existing assets. Ground levels will be raised to 2.49m AOD in 2025 and then raised again to 3.6m AOD in 2071.
- Zone D – RNLI College is protected for the next 50 years. No planned works.
- **Zone E – RNLI car park to Poole Bridge**. It is more cost effective to replace the current quay walls in 2026, raising the height to 3.6m AOD.



BCP Council intends to take ownership and maintenance liability for the new flood defence. This is an important aspect of ensuring we can maintain and adapt it in the future.

SOUTH WEST
Flood & Coastal

Future Challenge – Changing SMP Policy & the need to adapt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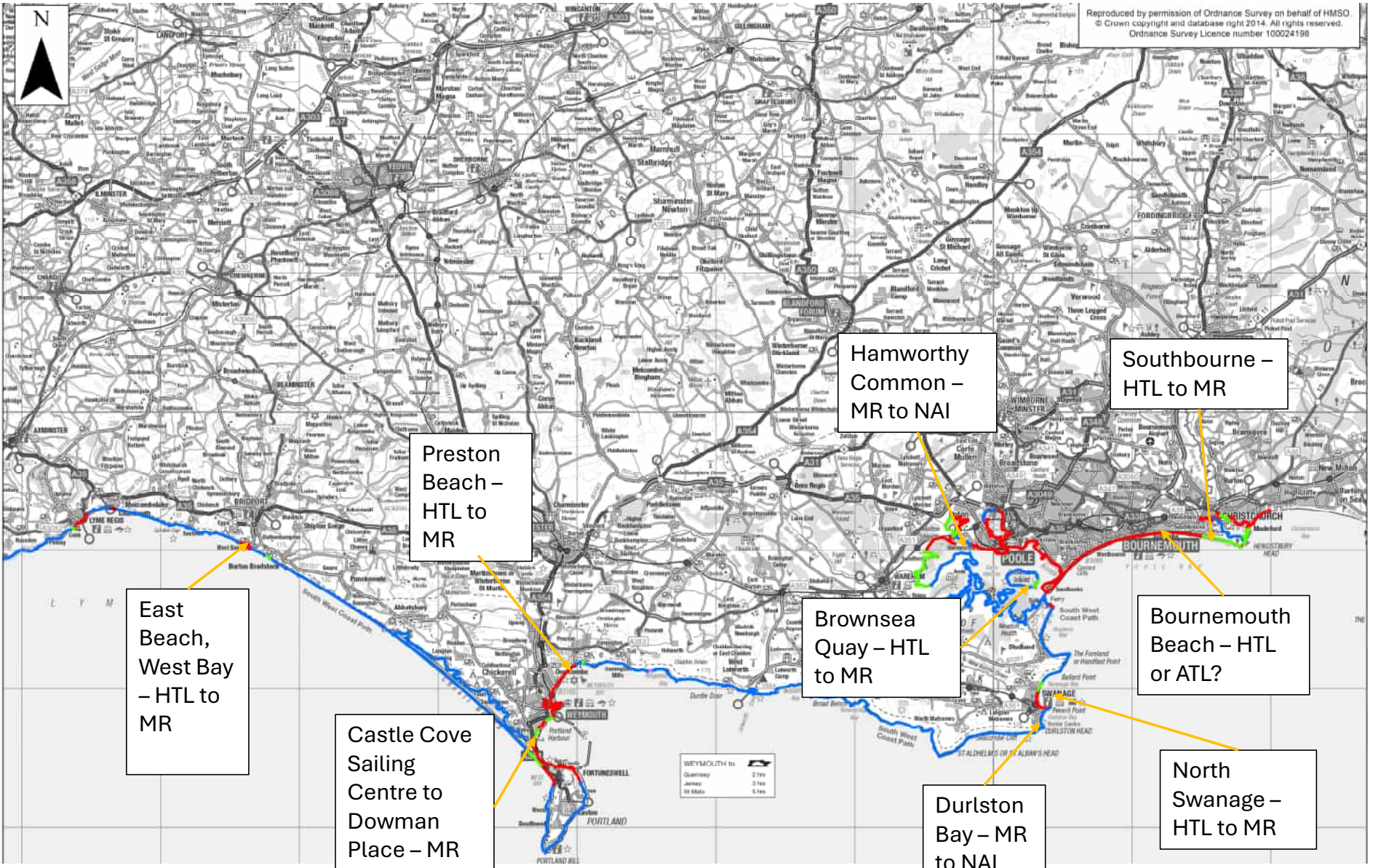
Charmouth – HTL to MR (river) / NAI (coast)
Monmouth Beach – HTL to MR
Seatown – HTL to NAI
Bowleaze Cove – HTL to MR
Ringstead – HTL to NAI
Studland – MR to NAI
Stanpit Marshes – HTL to MR
Mudeford Sandbank – HTL to MR
KEY
SMP 2 Policy (20-50yr)
Hold the line
Hold the line/No active intervention
Managed realignment
Managed realignment/Hold the line
No active intervention
No active intervention/Managed realignment
0
5
10
Kilometres
Rev
By
Chkd
Apprvd
Date
Description
Client
Environment Agency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KEY
SMP 2 Policy (50-100yr)
Hold the line
Hold the line/No active intervention
Managed realignment
Managed realignment/Hold the line
No active intervention
No active intervention/Managed realignment
Hamworthy Common – MR to NAI
Southbourne – HTL to MR
Preston Beach – HTL to MR
East Beach, West Bay – HTL to MR
Brownsea Quay – HTL to MR
Bournemouth Beach – HTL or ATL?
Castle Cove Sailing Centre to Dowman Place – MR to HTL
Durlston Bay – MR to NAI
North Swanage – HTL to MR
0
5
10
Kilometres
Client
Environment Agency

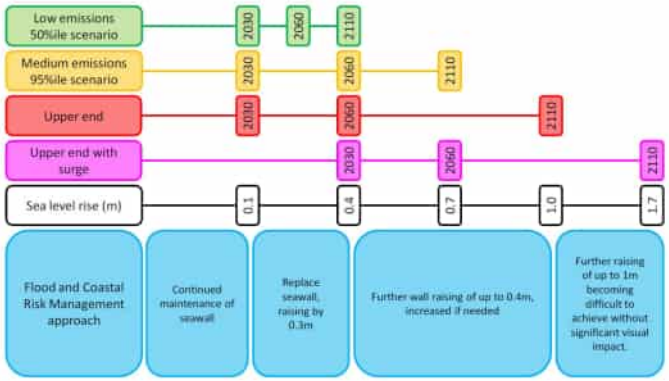
Adaptive Planning and Adaptation Pathways

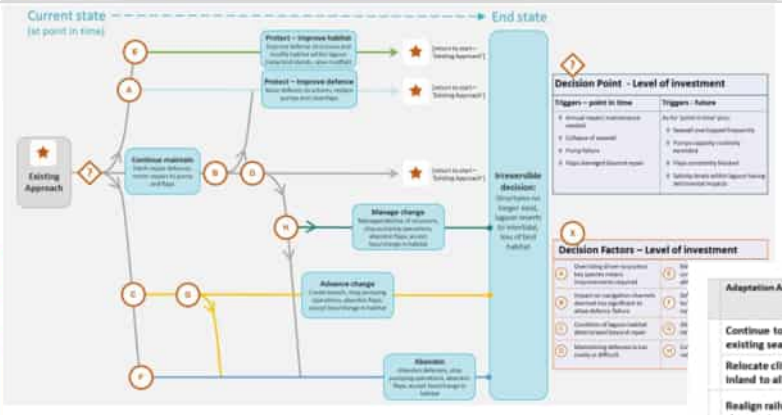
Adaptive Planning – dealing with change & uncertainty

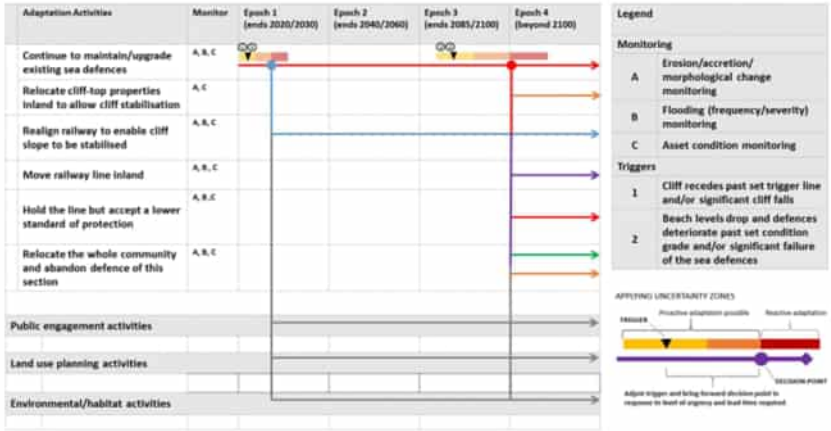
- Adaptive planning is about intervening proactively to ensure key expectations can be met in the face of future change and uncertainty.
- Adaptation Pathways are coherent sequences of planned interventions to maintain the performance of systems over the long term in response to change and uncertainty.
- Interventions are aimed at maintaining or improving the adaptive capacity and resilience of assets and systems in ways that are robust and sustainable.
- Adaptive decision-making is endorsed by the UK Treasury and Defra guidance (2009).

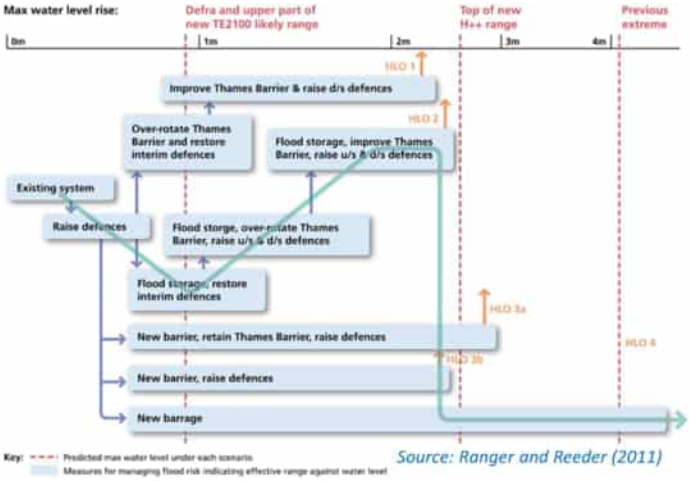
Slide based on paper by *Frampton, A., von Lany, P. and Russell, A. (2019). Adaptation Pathways for Shoreline Management Planning. ICE Coastal Management Conference, La Rochelle, France, 24-26 September 2019.*

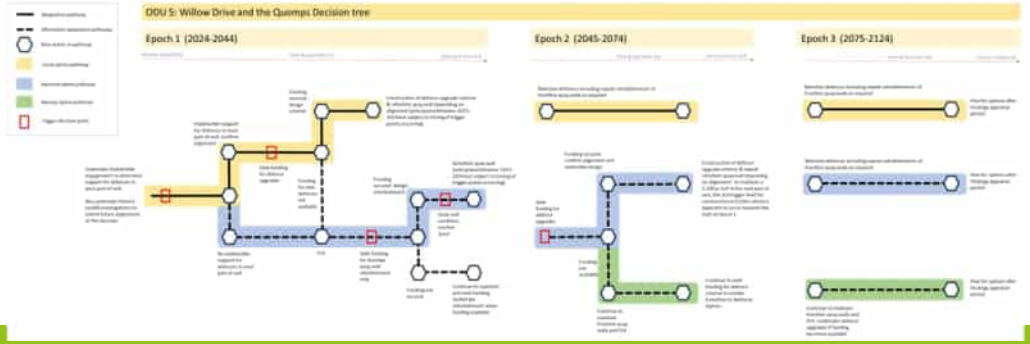
Adaptive Planning and Adaptation Pathways – examples











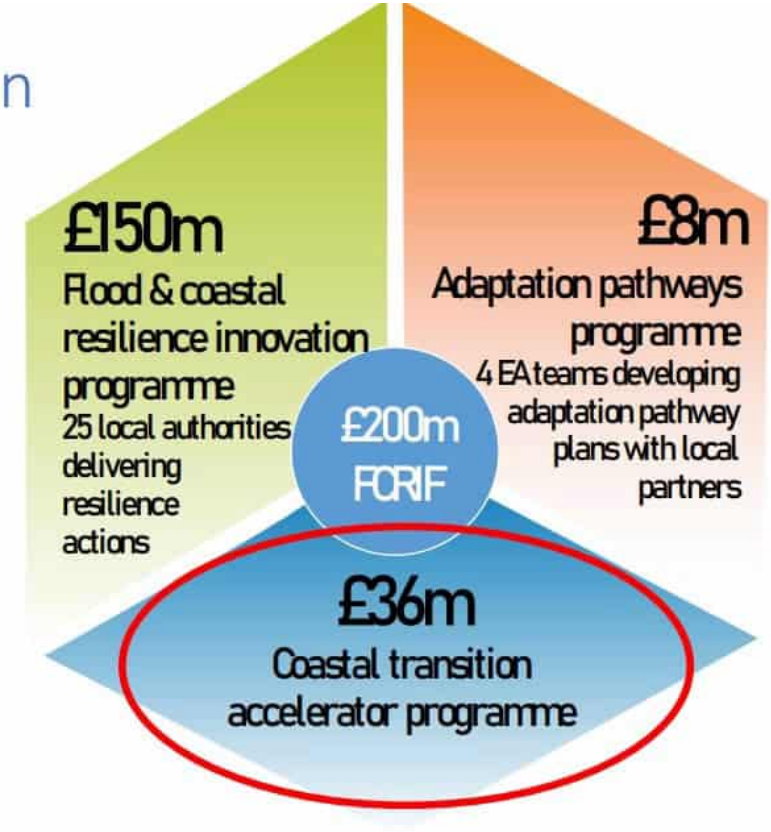
But how do implement adaptation?

The subject of much ongoing research

Flood & Coastal Innovation Programmes (FCIP)

- £200m | 2021-27
- 25 FCRIP local authorities
- 4 EA areas
- 2 coastal authorities

We will drive innovation in flood and coastal resilience and adaptation to a changing climate. We're investing £200 million to test and develop new ways to create a nation resilient to flooding and coastal change.

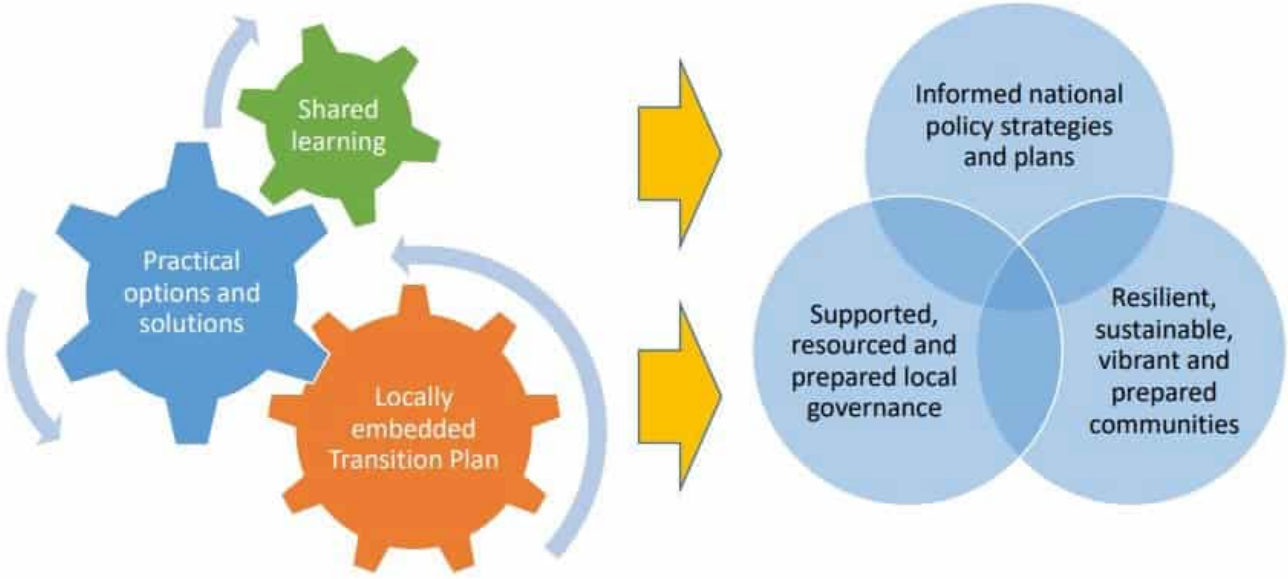


Flood and coastal resilience programmes | Engage Environment Agency (engagementhq.com)

Coastal Transition Accelerator Programme

CTAP Objectives

- Develop Strategic Transition Plans
- Capture evidence, tools and learning
- Embed learning and approaches in FCERM policy and investment decisions and local policy
- Test and demonstrate practical actions
- Share learning and transferability



From: north-norfolk.gov.uk/media/9247/nndc-coastwise-presentation-july-2023.pdf

Coastal Transition Accelerator Programme

Eligible Actions

Exclusions

- **Traditional Coastal Risk Management Structures**
- **Compensation**
- **Normal Local Authority functions (e.g. Emergency Planning)**

From: north-norfolk.gov.uk/media/9247/nndc-coastwise-presentation-july-2023.pdf

CTAP in Dorset >> Future Coast Dorset

- Looking at adaptation in Charmouth and North Swanage.
- Delivering various projects including:
  - **NBS (Vegetation Trials)** – progressing procurement for one trial site. Requires assent from Natural England.
  - **NBS (Natural Flood Management)** – progressing partnership project with National Trust.
  - **Drainage** –identifying several trial sites for dewatering across both Charmouth and North Swanage.
  - **Rollback** – exploring options at Charmouth.
  - **Beach access** – completed feasibility studies for West Beach access steps and Sheps Hollow access steps. Developing designs for both projects.
  - **Access track** – exploring options for new routes in Charmouth.
  - **Interpretation boards** – developing new interpretation boards.
  - **Citizen Science** – CoastSnap installed at Charmouth, and 'Coast Click' at North Swanage.
  - **Adaptation Planning** – Developing Adaptation Plans for both sites, with aim to learn and apply to other areas in future.

Future Coast North Swanage

Future Coast Charmouth

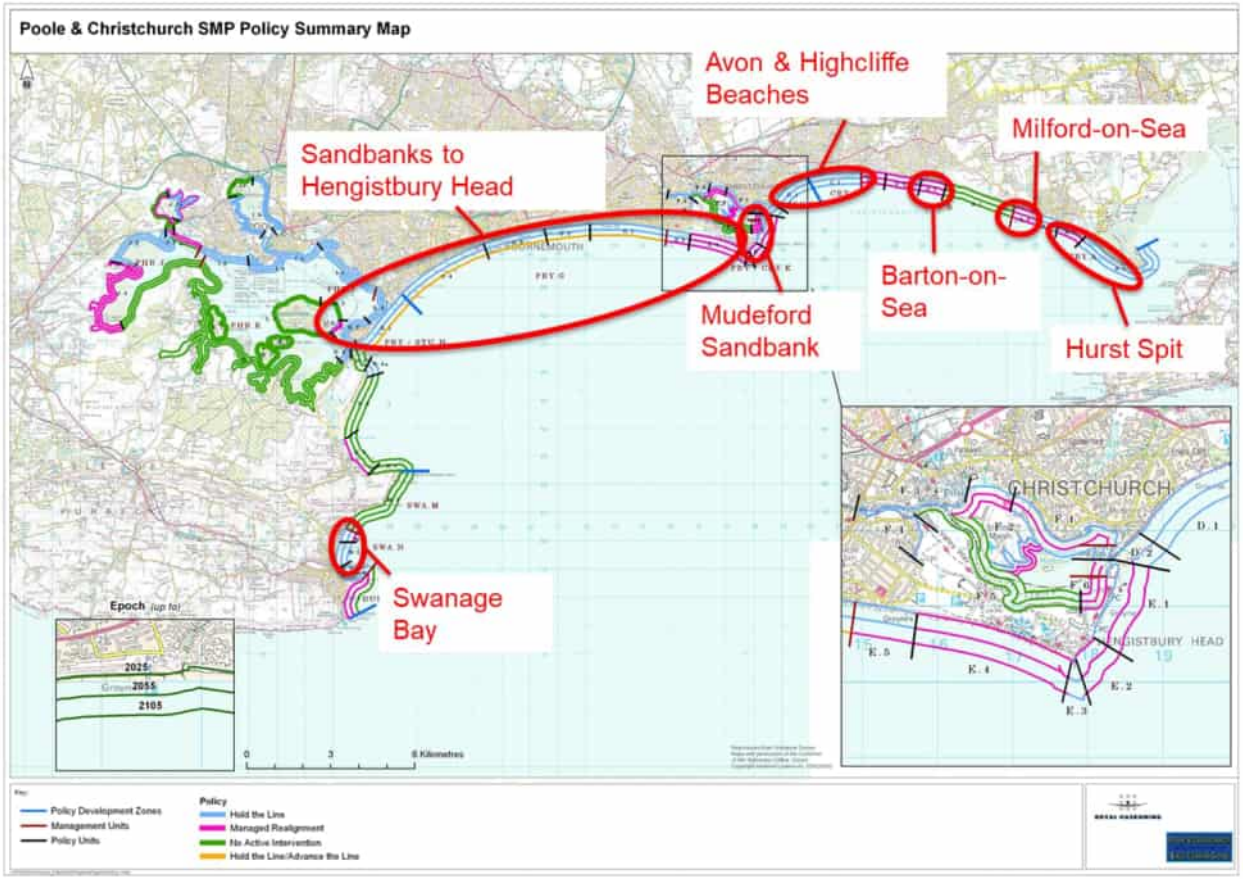
SOUTH WEST
Flood & Coastal

Future Challenge – Beach Management (Poole & Christchurch Bays perspective)

Future Challenges – Beach Management

Beach management locations and policy context

- A long history of beach management being used as part of the coast protection system in the two bays.
- SMP policy is to continue to defend for the foreseeable future assuming beach management can continue.
- Approach confirmed in 2014 Poole Bay, Poole Harbour & Wareham FCERM Strategy, and in the 2024 Christchurch Bay & Harbour FCERM Strategy.



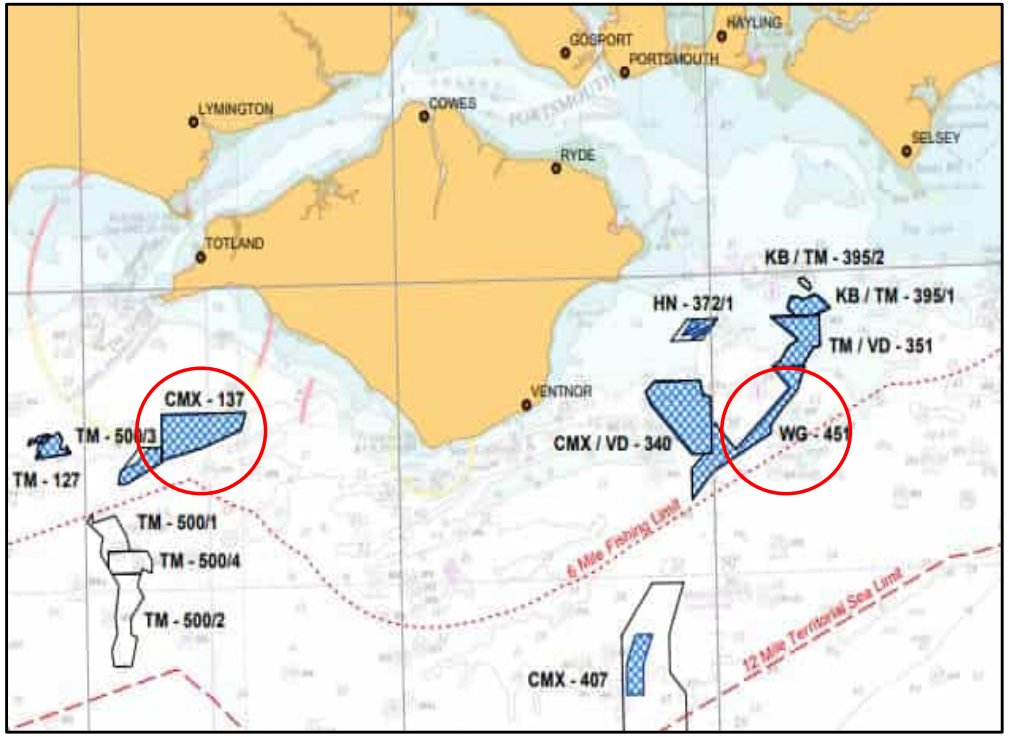
Future Challenges – Beach Management

- A key challenge is the availability of sediment for beach renourishment of the preferred sediment grading, quality and volume required.

- Historically, sediment for beach renourishment has come from either:
  - within Poole Bay/Harbour (inc. beneficial re-use of navigation channel dredging by Poole Harbour Commissioners), or
  - licenced dredge sites around the Isle of Wight.

- In 2021, for the first time ever these historic sources were not viable, and so the sediment placed was dredged from the southern North Sea.

- The consequence of this was:
  - Increased construction costs
  - Increased carbon footprint of this operation
  - Increased risk of weather delays.



Future Challenges – Beach Management

- In addition, there are also questions about:
  - The long-term sustainability of timber-supply for timber groyne replacements.
  - Future beach dimensions / defence geometry.
  - Wind-blown sand >> increasing frequency/cost of promenade clearance operations.

- **Overall, these lessons raise questions of how sustainable the current approach is, and so how best to provide coastal flood and erosion protection along the Poole Bay frontage longer-term.**

19th March 2020 promenade clearance, Branksome

Future Challenges – Beach Management

- Beach lowering and narrowing in response to higher sea levels and more frequent storms leads to greater chance of wave overtopping of defences and / or failure of defences.

- This will be exacerbated as sources of available sediment for beach renourishment become scarcer and / or uneconomical options to implement.

- This will also adversely impact the tourism economies of many communities reliant on amenity beach resource.

Future Challenges – Beach Management

- Alternative options that would need to be considered as part of a future review of the 2014 FCERM Strategy are likely to include:
  - **Do Nothing**, returning the coast to a natural state and relocating development.
  - **Change the required sediment grading** for beach renourishment to be coarser than present, allowing existing licenced dredge areas around the Isle of Wight to be used.
  - **Investigate new areas of seabed** to provide a new source(s) of beach renourishment material.
  - **Change the coast protection approach** to a more hard-engineered system, with larger seawalls and rock revetments.
  - **Change from timber groynes to rock groynes** along the length of the bay at some point in the future.
  - **Change renourishment delivery approach** (e.g. nearshore dumping rather than pipeline to shore?).
  - Consider expanding area of successful **sand dune creation** at Sandbanks to other parts of the frontage.

- **This is not unique to Poole & Christchurch Bays.** There are many locations where beaches will be hard to sustain with rising sea levels.

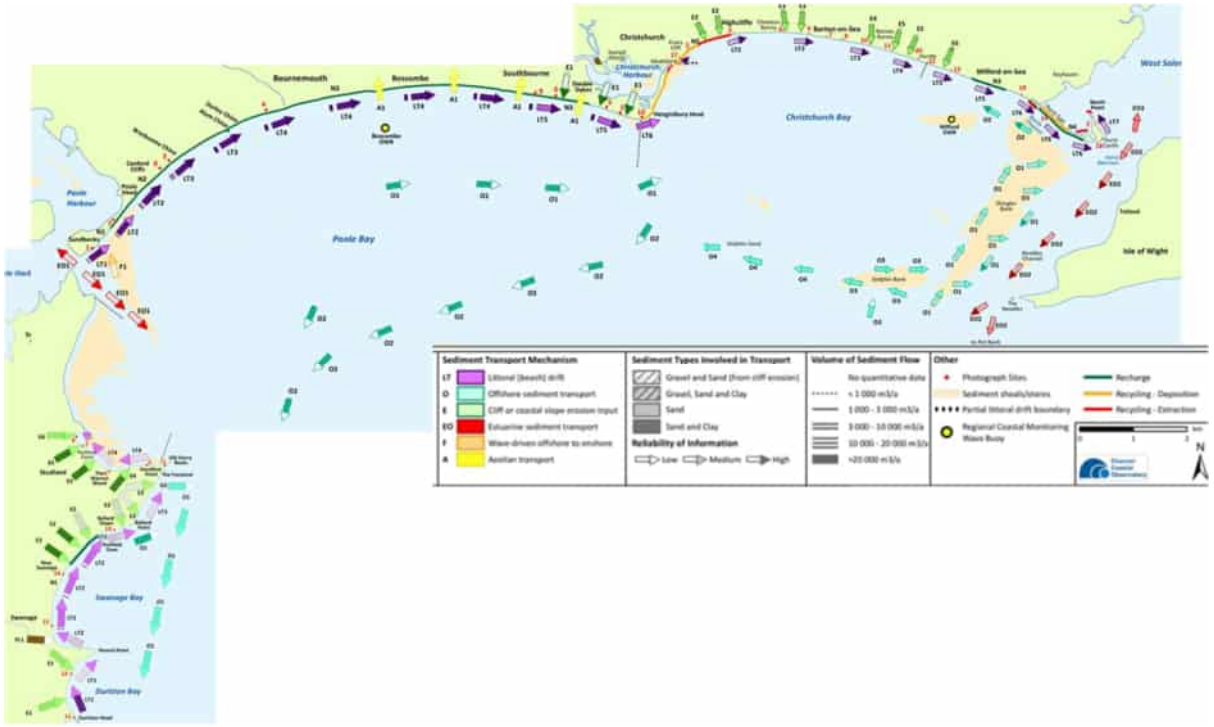
Planning for the future: The SMP-wide Beach Management Study

- Management of beaches in Poole Bay and Christchurch Bay has risen in cost whilst the availability of appropriate material has reduced.

- Climate change and development adds further pressure to manage the coast in these areas which effectively are part of a shared sediment system.

- In 2015, coastal engineers from these areas met with the CCO and Environment Agency to discuss joint working, to be enhanced by development of a regional numerical model that could support coastal engineering works across this region.

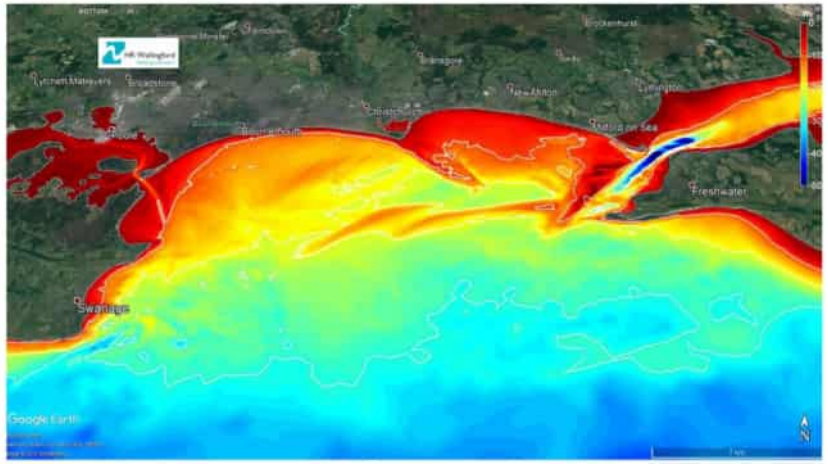
- In 2016, the Environment Agency approved a project to progress this.

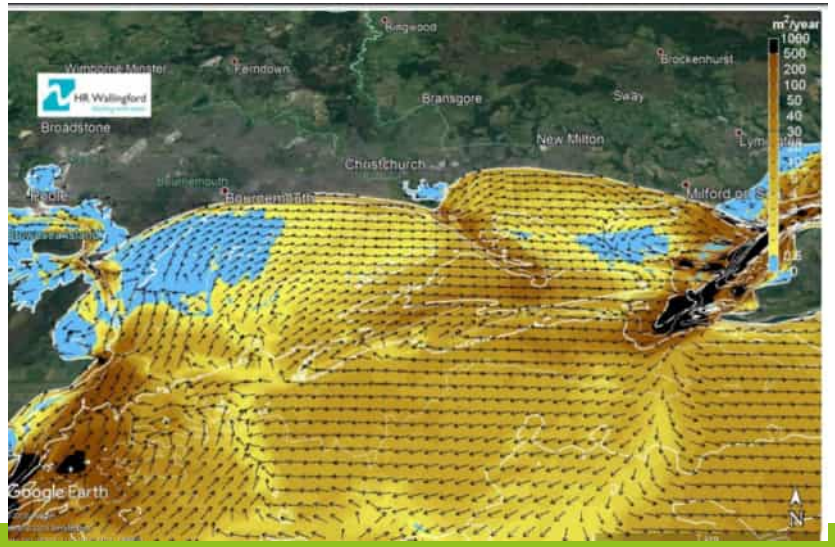


Planning for the future: The SMP-wide Beach Management Study

That FCERM Grant in Aid funded project provided:

- Deployment of 9 in-situ Acoustic Wave And Current (AWAC) recording devices to record field data.
- HR Wallingford development, calibration and validation of numerical models:
  - Coupled flow model (TELEMAC-2D)
  - Wave model (TOMAWAC)
  - Sediment transport (SISYPHE).
- Refinement and handover of model to BCP (for future use); since converted to DHI MIKE model.
- Preparation of summary report to close out project >> improved evidence of sediment transport!
- Developing forward plan to progress towards sustainable use of sediment resources in both bays >> **evolving to be the Durlston to Hurst Sediment Resource Programme**.





Planning for the future: The Durlston to Hurst Sediment Resource Programme

- BCP Council has applied to The Crown Estate for a 20-year seabed licence to access local sediment which would be exclusively used to renourish beaches in Poole Bay, Christchurch Bay & Swanage to defend the shoreline from coastal erosion whilst reducing our reliance on commercial aggregate dredge sites.
- Managing our own seabed licence, would allow us to:
    1. Significantly reduce the cost of beach renourishments by coordinating works across the region and sharing equipment and mobilisation costs.
    2. Access a high-quality sediment resource for coastal defence purposes. The material originates from our local beaches and will be retained in the system for future reuse, without introducing new sediments from dredge sites not local to our region.
    3. Opportunities to increase operational efficiencies.
    4. Improve sustainability in terms of carbon (and other emissions) emissions by avoiding long-haul shipping and/or transportation of materials by road and reducing overall project durations.
    5. Increase our coastal resilience by being able to be more responsive to emergency renourishments (if required) following large storm and erosion events.
    6. Provide additional benefits to the local community in terms of tourism and the amenity value of ‘blue’ spaces.

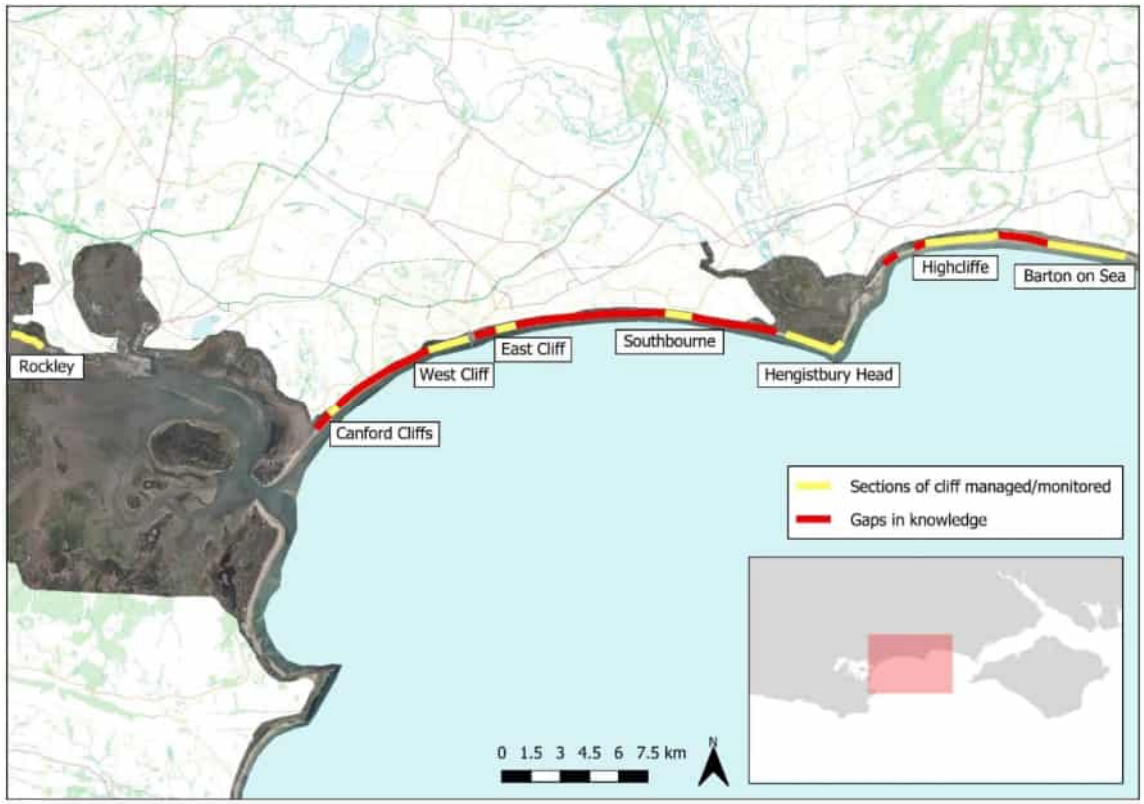
SOUTH WEST
Flood & Coastal

Future Challenge – Cliff Instability (a BCP perspective)

The BCP Sea Cliffs & Chines

- The Sea Cliff and Chine slope ‘frontage’ within the coastline is approximately 15.5 miles, and of this, the sum frontage for ‘Private’ assets (currently registered) is 1.4 miles.

- Within this coastline is an amalgam of cliff/ slope morphologies & geology, risk, ownership, and liability.



The Cliff Instability Challenge (a BCP perspective)

- Even though much of the shoreline is protected by coastal defences at the shoreline, these areas of high-ground that can be defended against coastal erosion from the sea by defences at the shoreline, are still vulnerable to coastal instability due to groundwater and drainage processes.

- These areas require extensive and expensive slope stabilisation measures, yet **there is no national funding available to manage land instability**, with the responsibility placed on the landowner, who in many cases is the local Coast Protection Authority.

- **As the climate changes, there will be an increasing risk of more frequent coastal landslides that will cause loss of cliff top property and infrastructure. So how do we manage the risk to cliff top assets?**

- Arguably it is these high-ground areas that we need to relocate development to from the lower-lying areas at risk of flooding, and so should be seeking to defend; yet the current system does not support this as doing so fails to achieve sufficient economic justification.

Before and after photographs of the East Cliff Lift slip in 2016 (images courtesy of Andrew Emery, 2016).

What we are doing – the BCP Cliff Management Strategy

- We are producing a new integrated BCP-wide Cliff Management Strategy which aims to provide a single, consistent and integrated approach to managing each section of cliff along the BCP coast, such that decisions made by various service areas in BCP Council are based on a common understanding of the risks posed by future cliff erosion and instability which arise from a range of factors including the impacts of climate change.

- The Cliff Management Strategy is still in development and aims to be completed by March 2026.

- At its core is treating the cliffs as an asset system and applying an asset management system approach to their management. This involves establishing systematic and repeated inspections to assess whether cliff stability issues are present and whether existing cliff stability measures are functioning as they were designed to do.

SOUTH WEST
Flood & Coastal

Future Challenge – Potential FCERM impacts on the Jurassic Coast WHS Outstanding Universal Value

Jurassic Coast World Heritage Outstanding Universal Value

The Jurassic Coast WHS

- The Jurassic Coast was inscribed by UNESCO in 2001 as a World Heritage Site, recognised for its outstanding rocks, fossils and landforms.
- It is unique in England as the only natural World Heritage Site (WHS).
- The site boundaries are described as the break in slope at top of the cliff down to mean low water.

The Jurassic Coast WHS

- It is one of the few places on Earth where an almost continuous sequence of rocks from the Triassic, Jurassic, and Cretaceous Periods can be observed together, representing 185 million years of Earth's history.
- The attributes of the Site are largely maintained by ongoing dynamic coastal processes, with erosion playing a key role in continuing to expose the geology and fossils along the cliffs and foreshore as well as acting as a driving force for a range of coastal geomorphological systems.

Theme 7: Coastal systems

Table 7: World Heritage Properties inscribed under criterion (viii) with Theme 7 as the major theme for inscription, or as an ancillary theme.

Criterion (viii) Properties Inscribed Principally Under Theme 7	Date Inscribed (extension)	Criterion (viii) Properties for which Theme 7 was an Ancillary Theme for Inscription	Date inscribed (extension)
Everglades National Park, United States of America	1979	Galápagos Islands, Ecuador	1978 (2001)
Gulf of Porto: Calanche of Piana, Gulf of Girolata, Scandola Reserve, France	1983	Great Barrier Reef, Australia	1981
Fraser Island, Australia	1992	Shark Bay, Western Australia, Australia	1991
Wadden Sea, Denmark, Germany, Netherlands	2009 (2014)	Ha Long Bay, Viet Nam	1994 (2000)
		Desembarco del Granma National Park, Cuba	1999
		Dorset and East Devon Coast, United Kingdom of Great Britain and Northern Ireland	2001

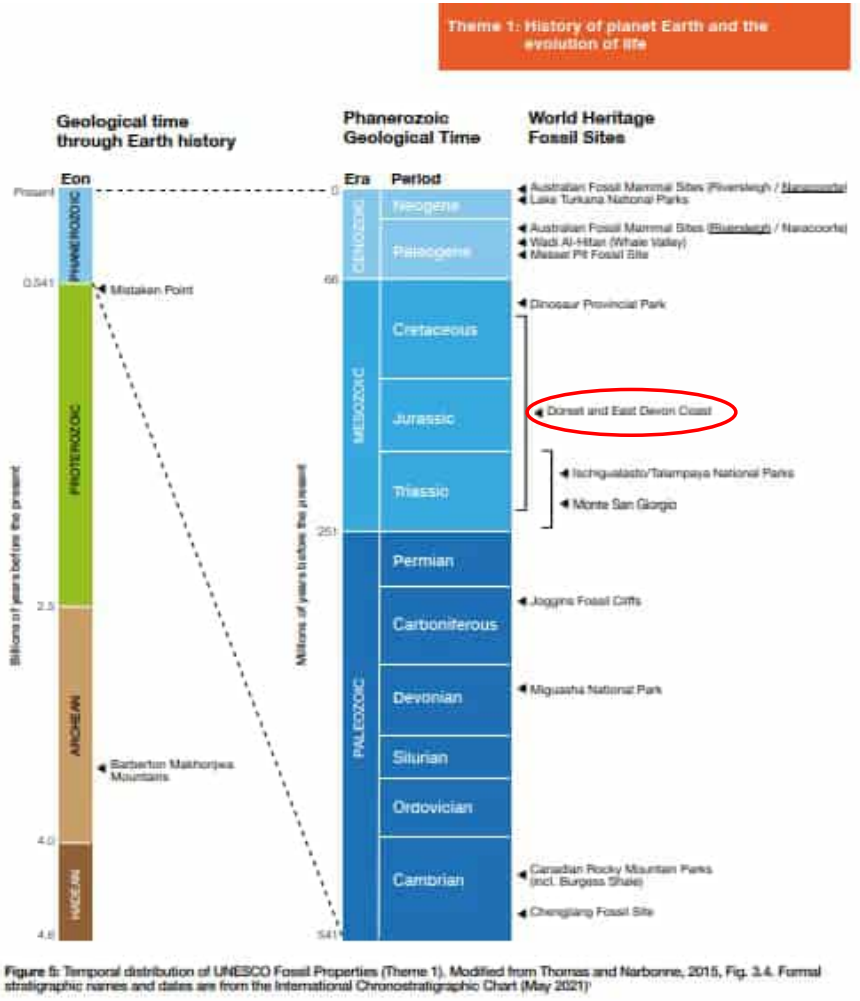


Figure 5: Temporal distribution of UNESCO Fossil Properties (Theme 1). Modified from Thomas and Narbonne, 2015, Fig. 3.4. Formal stratigraphic names and dates are from the International Chronostratigraphic Chart (May 2021)[1]

Images from: McKeever, P.J. & Narbonne, G.M. (2021). *Geological World Heritage: A revised global framework for the application of criterion (viii) of the World Heritage Convention.* IUCN.

The Jurassic Coast WHS – the challenge for FCERM

- Over recent years, FCERM schemes delivered in line with the adopted Shoreline Management Plans (SMPs) have begun to increasingly conflict with the statement of Outstanding Universal Value (OUV) of the Jurassic Coast, principally by constraining or preventing the continued erosion of the coastline and other natural coastal processes through coastal defence measures.
    - The potential for such conflicts will grow in the future as more FCERM schemes occur, posing a growing risk of adverse impacts on the Jurassic Coast OUV.
    - Consequently, it is increasingly likely that '172 notification(s)' will have to be notified to UNESCO by the UK Government (in this case DCMS) so their technical advisors can input into the process and provide comment.
    - Ultimately, in a worse case scenario, this could lead to loss of UNESCO WHS designation.

Figure 3.1. The 'three pillars' of Outstanding Universal Value.

"The need for coastal sea defences is the largest ongoing threat to the site and climate change will exacerbate it."

IUCN World Heritage Outlook 2025 (Dorset and East Devon Coast | World Heritage Outlook)

The Jurassic Coast WHS – the challenge for FCERM

- The SMP15 and SMP16 action plans that both contain the following action:

  Ensure all SMP planning and delivery supports the Dorset and East Devon UNESCO World Heritage Site management policies and objectives as set out in the Jurassic Coast Partnership Plan. Engage with the Jurassic Coast Trust and affected stakeholders on the potential implications of risk management activities on the Site's Outstanding Universal Value, and any mitigation required.

  - This will require undertaking impact assessments specific to the World Heritage Site, supported by stakeholder consultation and consideration of options to minimise or mitigate for impacts if it is not possible to avoid them.

  - However, as the Jurassic Coast is the only natural WHS in England, this has demonstrably created challenges in terms of EIA processes for FCERM projects in the past (i.e. it is very difficult to avoid impact, so we must understand better how to minimise and mitigate in the context of the WHS).

The Jurassic Coast FCERM Mitigation Study – Objectives

- **Primary Objective:** To investigate how to apply UNESCO's toolkit and guidance on Impact Assessments in relation to FCERM projects in order to:
  a) create a more tailored yet widely applicable framework for how to deal with the OUV of the Jurassic Coast WHS as a receptor when conducting impact assessments – including a mechanism for identifying WHS-wide cumulative impacts, and
  b) establish methodologies that seek to avoid and minimise risks to the Outstanding Universal Value of the Jurassic Coast WHS whilst also mitigating risks to FCERM project deliver.

- **Secondary Objective:** To test a real world example of (b) and establish a 'menu' of measures to avoid and minimise risk to the OUV of the WHS as part of the mitigation measures identified.
  - This menu system will not be limited to simple recommendations, as the project will also aim to affirm pathways to fund / invest in the mitigation required to offset damage to the WHS, where damage is unavoidable, so that FCERM schemes remain deliverable.

- Achieving these objectives will deliver a coherent and forward looking approach to coastal risk management which enables maximum benefits from investment in FCERM schemes to be delivered through joined up management of the WHS by multiple organisations, whilst delivering on the ambitions of UNESCO and the responsibilities of the UK Government for maintaining the OUV of the Site.

The Jurassic Coast FCERM Mitigation Study – Deliverables

The project deliverables will be:

- Jurassic Coast WHS tailored version of the UNESCO guidance for assessing OUV as part of Environmental Impact Assessments applicable at all stages of FCERM project development, from SMP policy, to strategies, to schemes and into operations, including a matrix of mitigation approaches that are appropriate to consider as part of those assessments.

- Supporting Technical Report.

- An approach to improving the co-ordination of FCERM activities across the length of the Jurassic Coast, including ongoing assessment of cumulative impacts.

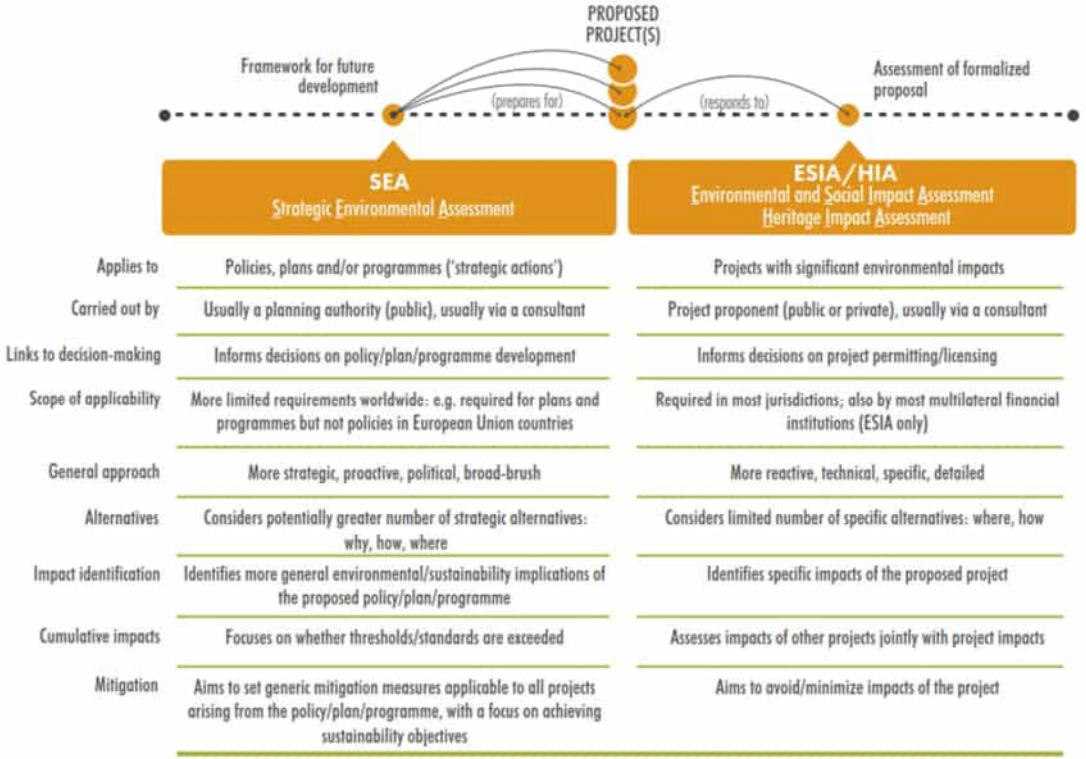


Figure 4.2. The difference between SEA and ESIA. *Source*: Content adapted from CSIR, 1996; World Heritage Leadership.

The Jurassic Coast FCERM Mitigation Study – Outcomes

1. The UK Government, as the state party to the World Heritage Convention, will have more confidence that the OUV of the Dorset and East Devon Coast WHS is safeguarded and that it is benefiting from investment where mitigation is needed.

2. Dorset Council and Devon County Council, the Environment Agency, Natural England and FCERM authorities, will have a more robust and shared understanding of how to align their work with the expectations of UNESCO in regard to FCERM projects.

3. FCERM projects will have a clarified, more confident and streamlined approach to dealing with the WHS OUV as they are developed. The approach developed may also then be helpful (possibly with additional work) to other sectors delivering projects along the WHS.

In addition, additional potential for any mitigation work to create new research / engagement / education outputs as well – addressing other policies set out in the Jurassic Coast Partnership Plan 2020-2025.

The Jurassic Coast FCERM Mitigation Study – Outcomes

- There are also wider economic benefits as well as from ensuring we are safeguarding the WHS OUV .

- A 2015 report on "Dorset's Environmental Economy" included specific economic impact studies of the Jurassic Coast WHS and the Dorset AONB [now National Landscape]. *"While there is some overlap in the estimates which follow, the study concluded that:*
  - *The Dorset AONB influences circa £62-67 million of output p.a. (a mid-point of £65 million)*
  - *The **Jurassic Coast influences circa £103-119 million of output p.a. (mid-point £111 million)***
  - *While these estimates can not be attributed to the designations specifically, it is **likely that their existence has increased the scale of benefits to the area significantly***
  - *Surveys highlighted the **high level of brand recognition** and the positive view of the impact of the AONB and WHS designations held by visitors, businesses and residents*
  - *The business survey showed a **demonstrable positive impact of AONB and WHS status on business performance***
  - *The AONB and the WHS partnerships have played an important role in developing the economic value of the environment and **extract significant additional value from the designations** through the leveraging of additional funding from a variety of sources."*

SOUTH WEST
Flood & Coastal

www.swfloodandcoastal.org.uk