



Coastal Adaptation Strategies

& the Brownsea Island Shoreline Restoration Project





- Poole Harbour and Studland areas represent highly dynamic sedimentary environments
- The harbour basin is technically a shallow drowned valley
- The islands in the harbour are simply hilltops!
- Poole Harbour circa 1590



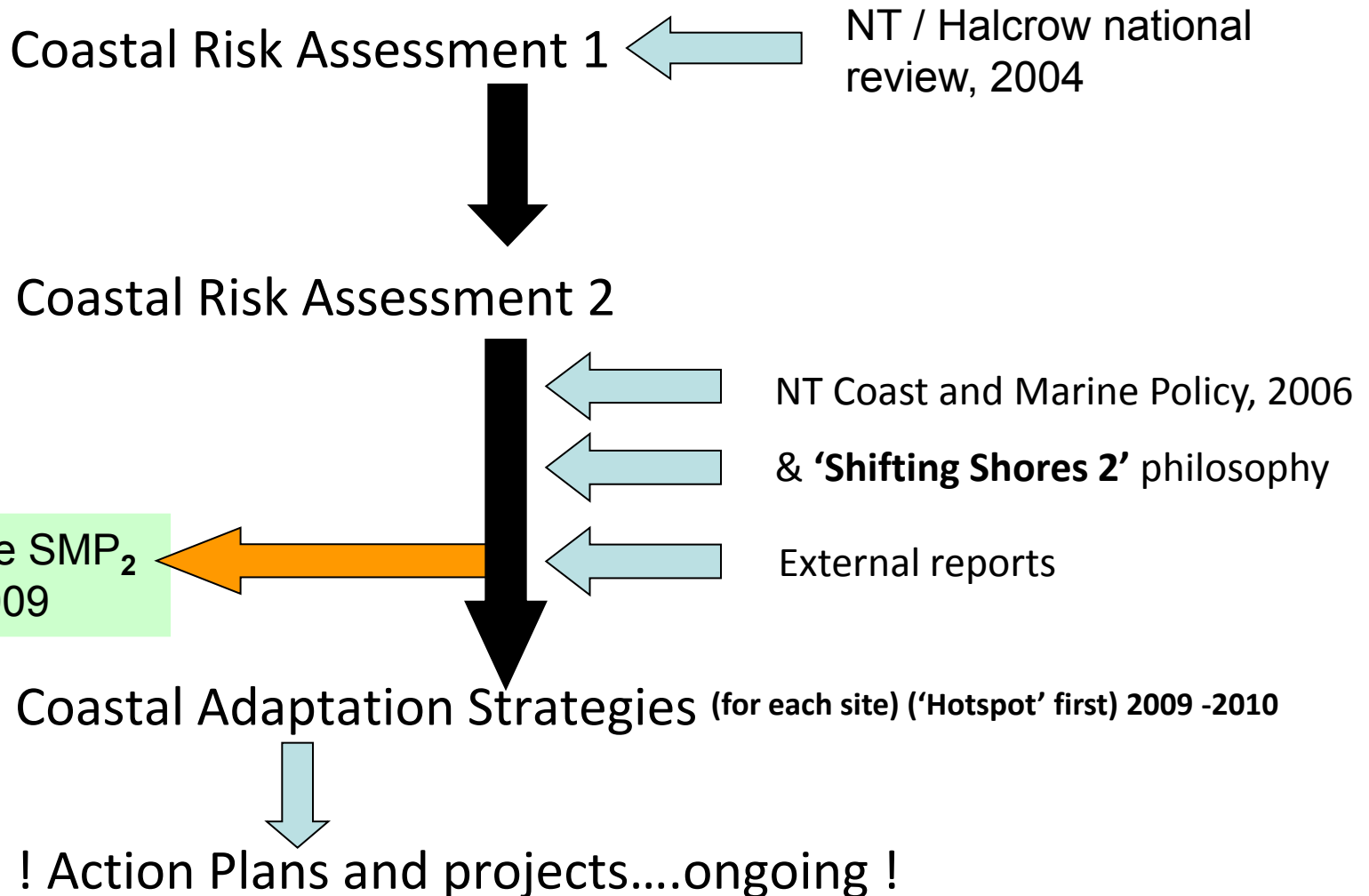
Why does the Trust care about the coast...?

- We manage:**
- 715 miles of coast
 - 24,989 ha of land
 - approximately 10,000ha of intertidal land
 - 92 coastal car parks
 - 20 cafes and shops

....and are concerned with:

- recreation & enjoyment of the outdoors
- local community life
- conservation of marine and terrestrial wildlife
- education
- public access
- safety
- future management in relation to coastal change and sea level rise!

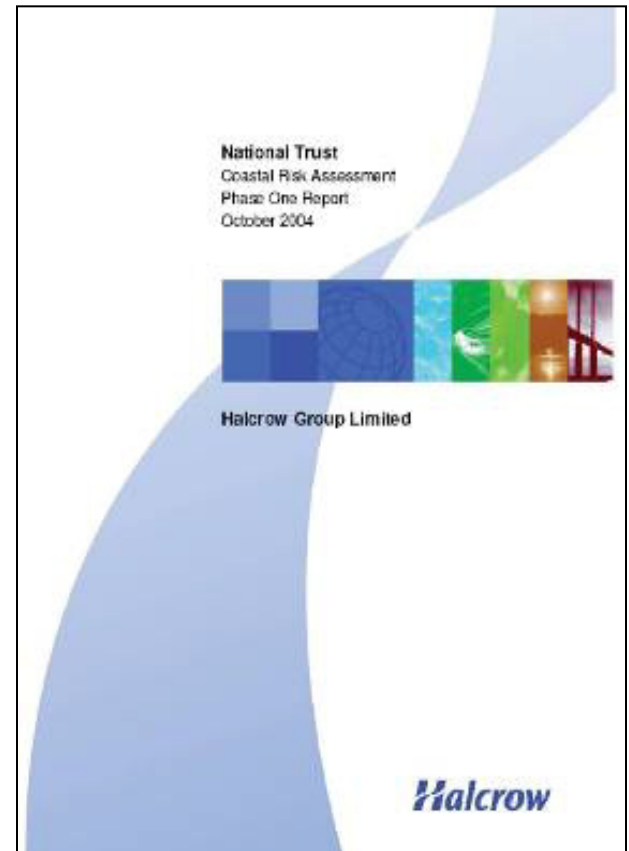
Advanced Coastal Policy Development Overview for 2004 – 2009



The beginning of the coastal risk assessment process...

Coastal Risk Assessments [CRA₁]

- In 2004, Halcrow were commissioned to carry out a large scale survey of all National Trust Coastal properties
- The requirement was to gather high level data regarding flood and erosion risks at each property and to quantify the hectarage likely to be affected





Coastal Risk Assessments in 2004

- The CRA₁ process enabled us to understand and begin to prepare for accelerating coastal erosion and flooding linked to both the rise in mean sea level (a subtle and incremental process) and increased storminess (sudden and chaotic events)
- It considered consequential erosion/accretion at the shoreline
- **The next step** was to look at the emerging 'hotspot sites' in much greater detail and with an extended range of parameters

CRA₁...gathering baseline data

Site	ha	erosion / flood risk
Golden Cap Estate	849.3	EF
Holnicote Estate	5047.2	EF
Ringstead Bay	182.7	EF
Brean Down	63.4	EF
Portland House and Lodge	2.2	E
Burton Bradstock	150.8	EF
Studland	1614.7	EF
West Bexington and Cogden	113.8	EF
Purbeck Estate	446.5	EF
Brownsea Island	205.6	EF



- Risk**
- Coastal erosion
 - Tidal or combined flooding
 - Coastal erosion and tidal or combined flooding
 - Other flood risk (not in IFM as tidal or combined flooding)
 - Not at risk



The emerging 'Hotspot sites' from CRA₁

PROJECT	NATIONAL TRUST COASTAL RISK ASSESSMENT	DATE	Sep 2004
TITLE	Properties at Risk in Wessex		Figure 5.3

CRA₂ Theme tabs

- 1. Consultees
- 2. Headline Coastal Risk Zone
- 3. Key issues
- 4. Listed Buildings and Monuments in the CRZ
- 5. Visitor facilities, Residents, public Expectations
- 6. Historic landscape features
- 7. Soil and Water
- 8. Insurance and income
- 9. Flood data
- 10. Existing sea defences
- 11. Social and economic values
- 12. Natural Environment designations
- 13. Coastal features and habitats
- 14. Inter-tidal and backshore geomorphology
- 15. Rare and protected species
- 16. Wrecks
- 17. Access and land use
- 18. [NT property summary](#)

CRA₂ spreadsheets

The second stage report (CRA₂) was completed in 2008 and represents a much more comprehensive interpretation of the information gathered from every coastal property for the purpose of informing Trust management decision-making.

The report structure reflects the Trust's Coast and Marine Policy of 2006.

B Property Portfolio	C Property Name	D Property Code	E Issue Type	F Issue Identified	G Actions	H Priority (1=short term 5yrs 2=med term 10yrs 3=long term 20+yrs)	I CRA 3 Coastal Adap Strategy required
West Dorset	Golden Cap	10422	Various issues	Black Venn area- slumping and threat to housing and car park and impact of proposed third party sea defences Coast path erodes and cliff falls and slumping loss of nature conservation interest away from cliff edge	Develop coast adaptation strategy and communication plan for Golden Cap 1 Liaise in SMP process to secure short term and long term solutions to housing and sea defence issues; Coastal adaptation strategy and communication plan being written 2 Coast path erodes and new route has to be negotiated on ad hoc basis 3 Provision of information about slumping cliffs and access at high tides 4 Consider extensification of land behind the coast zone	1	coast adaptation strat
West Dorset	Burton Bradstock	10171	Archaeology	Archaeology- 11 SMR sites on the property Soft clay cliffs are eroding and exposing new areas for nature conservation- Café and part of car park in the CRZ	1 Identify any recording projects necessary for the archaeology interest 2 Develop extensification of land behind coast zone? 3 Consider resting of the café in the future and areas of the car park near the shore may not be usable	2	
West Dorset	West Bexington and Cogden	11063		Chesil and the Fleet may change with erosion of Chesil Beach	Monitor	3	
West Dorset	Portland House	10793	Housing and structures	House is at top of CRZ-	Consideration of future of property	2	
West Dorset	Ringstead Bay	10821	Third Party	Caravan site in CRZ off NT land	Expectation NT to authorise provide sea defences to protect third party property- consider measured duty of care and engagement with SMP	1	
Purbeck Estate	Hartland, Middlebere and Corfe	10656/10268	Various issues	Loss of many historic features and landscape elements around Corfe village, Middlebere Quarry and on the heathland- is further survey necessary ?	Develop coastal adaptation and communication strategy for Purbeck Estate: Hartland, Middlebere and Corfe 1 Engage in SMP2 process 2 action to ensure all historic features are surveyed and recorded	1	coast adaptation strat

C	D	E	F	G	H	I	J	K
LANDSCAPES AND FEATURES IN THE COASTAL RISK ZONE								
Property Name	Property Code	Designated Landscape	Archaeological Features	Period	Specific Landscape Values	Historic Buildings	Literary Associations	Myth/Legend/Folklore Associations
Golden cap	10422		SMR bronze age features-6, iron age pottery, neolithic flint and pottery, WW11, limekilns, post medieval field banks, post medieval coastal signal station, napoleonic look out, beacon site	19th C	WSS-largest landslide system in Europe, SSSI/SAC, AONB, HC, fossil collecting	Lime kiln	Lyme Regis French Lieutenants woman Hardy Country	Smuggling, Fossil collecting
Burton Bradstock	10171		WW11 Gun Placements, Pill boxes, Medieval strip lynchets, Roman finds (11 SMR sites)	WW2	WHS, SSSI/SAC, AONB, Heritage coast	WW11 sites	Hardy country Smugglers	Smugglers
West Bexington and Cogden	11063		feature in the CRZ?		SAC out of the crz			
Portland House	10793						Smugglers Jamie Falkner (moonfleet)	Smuggling on Burning Cliff
Ringstead Bay	10821							
Hartland, Middlebere and Corfe	10656/10	N/A	Middlebere Quay and tramway 19th C, East Middlebere Barn 16th C, Iron Age settlement, Middlebere, Many banks and ditches, burial mounds, Vineyard Bridge West Mill, West Halves - Medieval strip fields; And many others round the Corfe area		Extensive heathland (largest area in Dorset), Second largest natural harbour in the world, Corfe Castle landscape setting, Corfe Common; medieval landscapes	Boar Mill; West Mill; Middlebere and Scotland Farmhouses	Hardy's Egdon Heath; Enid Blyton - Corfe Castle	
Studland East					Old Harry, iconic			Old Harry - pirates and associations

NATURAL ENVIRONMENT DESIGNATIONS															
						Area overlap NT Property with.....									
Region	Property Portfolio	Property_Name	Property Ref	Risk	Whole property area	Land or Inter tidal	SSSI (Ha)	SPA (Ha)	SAC (Ha)	RAMSAR (Ha)	NNR (Ha)	Ancient Woodland (Ha)	National Park (Ha)	AONB (Ha)	Heritage
Wessex	West Dorset	Golden Cap	10422	EF	1,078.56		447.97	0	226.84	0	0	24.68	0	844.82	
Wessex	West Dorset	Burton Bradstock	10171	EF	150.8		55.78	0	28.61	0	0	0	0	150.81	1
Wessex	West Dorset	W. Bexington & Cogden	11063	EF	113.84		7.94	0	7.94	0	0	0	0	113.74	1
Wessex	West Dorset	Portland House	10793	E	2.24		0.26	0	0.26	0	0	0	0	0	
Wessex	West Dorset	Ringstead Bay	10821	EF	182.66		58.01	0	50.52	0	0	0	0	182.66	1
Wessex	Purbeck Estate	Studland	10934	EF	1,704.62		893.86	764.28	819.65	764.3	574.64	28.95	0	1703.7	14
Wessex	Purbeck Estate	Purbeck	10806	EF	676.89		173.28	0	173.28	0	0	20.75	0	676.88	5
Wessex	Brownsea Island	Brownsea Island	10160	EF	205.63		203.16	203.16	42.4	41.15	0	0	0	150.81	2
Wessex	Somerset Countryside	Holnicote Estate	10510	EF	5,047.19		3112.43	0	2874.04	0	1601.86	325.39	5047	0	11
Wessex	Somerset Countryside	Greenaleigh Point	10440	F	18.91		1.71	0	1.74	0	0	0	18.91	0	
Wessex	Somerset Countryside	Brean Down	10147	EF	63.45		61.43	0	60.96	0	0	0	0	0	
Wessex	Somerset Countryside	Sand Point & Middle Point	10654	EF	98.25		37.65	3.44	0	3.44	0	0	0	0	
Wessex	Somerset Countryside	Redcliffe Bay	10816	E	5.67		9.73	4.34	0	4.34	0	0	0	0	
Wessex	Westbury Court Gardens	Westbury Court Gardens	11074	F	3.27		0	0	0	0	0	0	0	0	
Total							5063.21	975.22	4286.24	813.2	2176.5	399.77	5066	3823.4	47
						Area overlap NT Risk Zone with.....									
Region	Property Portfolio	Property_Name	Property Ref	Risk	Whole property area	Land or Inter tidal	SSSI (Ha)	SPA (Ha)	SAC (Ha)	RAMSAR (Ha)	NNR (Ha)	Ancient Woodland (Ha)	National Park (Ha)	AONB (Ha)	Heritage
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The Brownsea Coastal Adaptation Strategy [CAS] [March 2009]

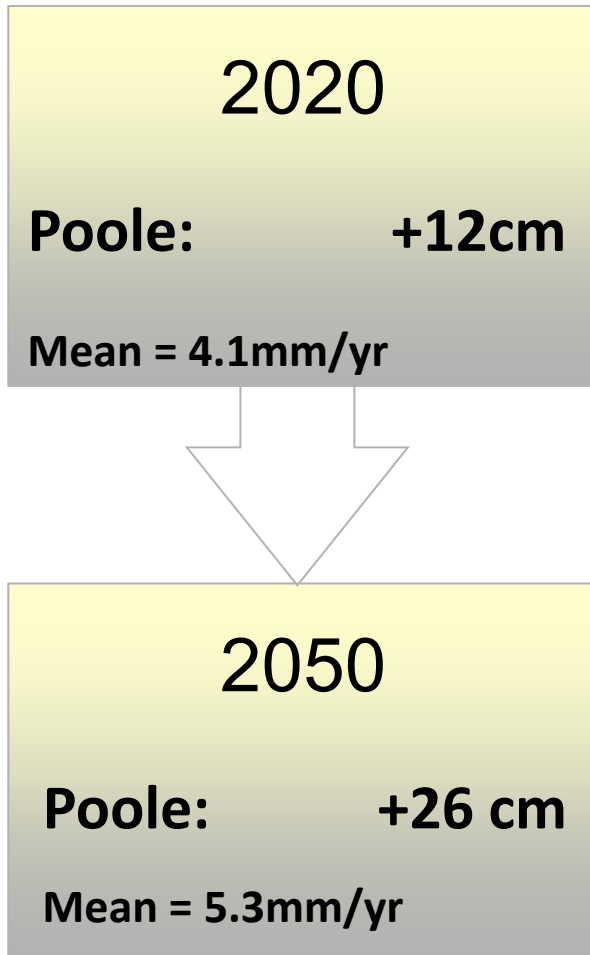
9 themes:

- Primary defences (flood resilience) of the quayside buildings
- Secondary (adaptive) defences for the buildings themselves
- Discreet infrastructure items (utilities, sewage etc)
- **Sea defence strategies for the Island perimeter**
- Long-term viability of the lagoon wall
- Future use of the Pottery Pier location
- Continued accessibility for visitors
- Changes to speciation on the Island
- Emergency evacuations



The CAS has to take into account projected sea level rise and the coastal policies set out in the Shoreline Management Plan 2010

Rising sea levels..... [Relative to a 1991 baseline]



Impacts:

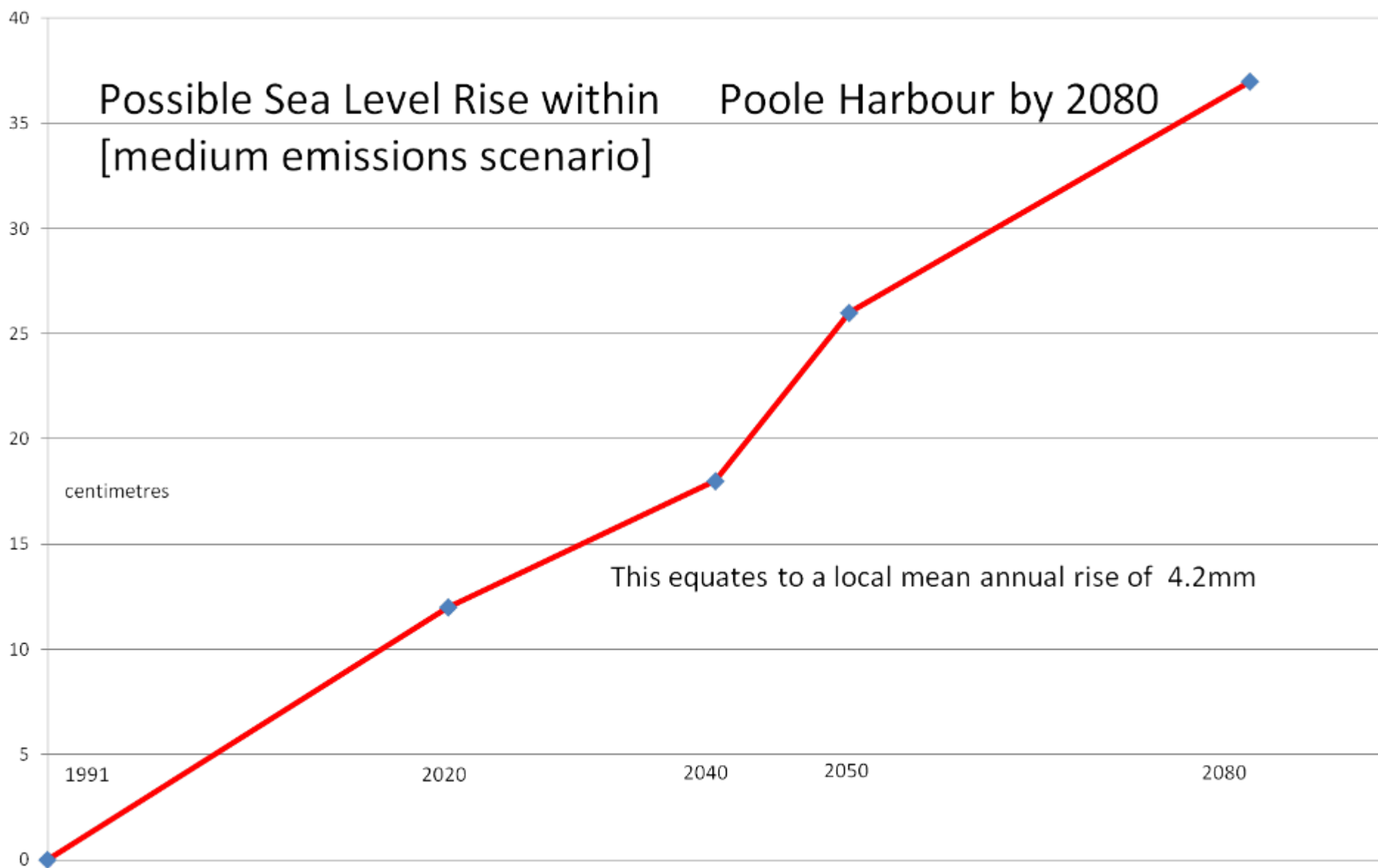
- Increased coastal flooding
- Relocation of buildings and infrastructure
- Reduction in size of some beaches
- Changes to biodiversity
- Increased erosion e.g. to coastal footpaths

Globally: mean annual sea level rise:

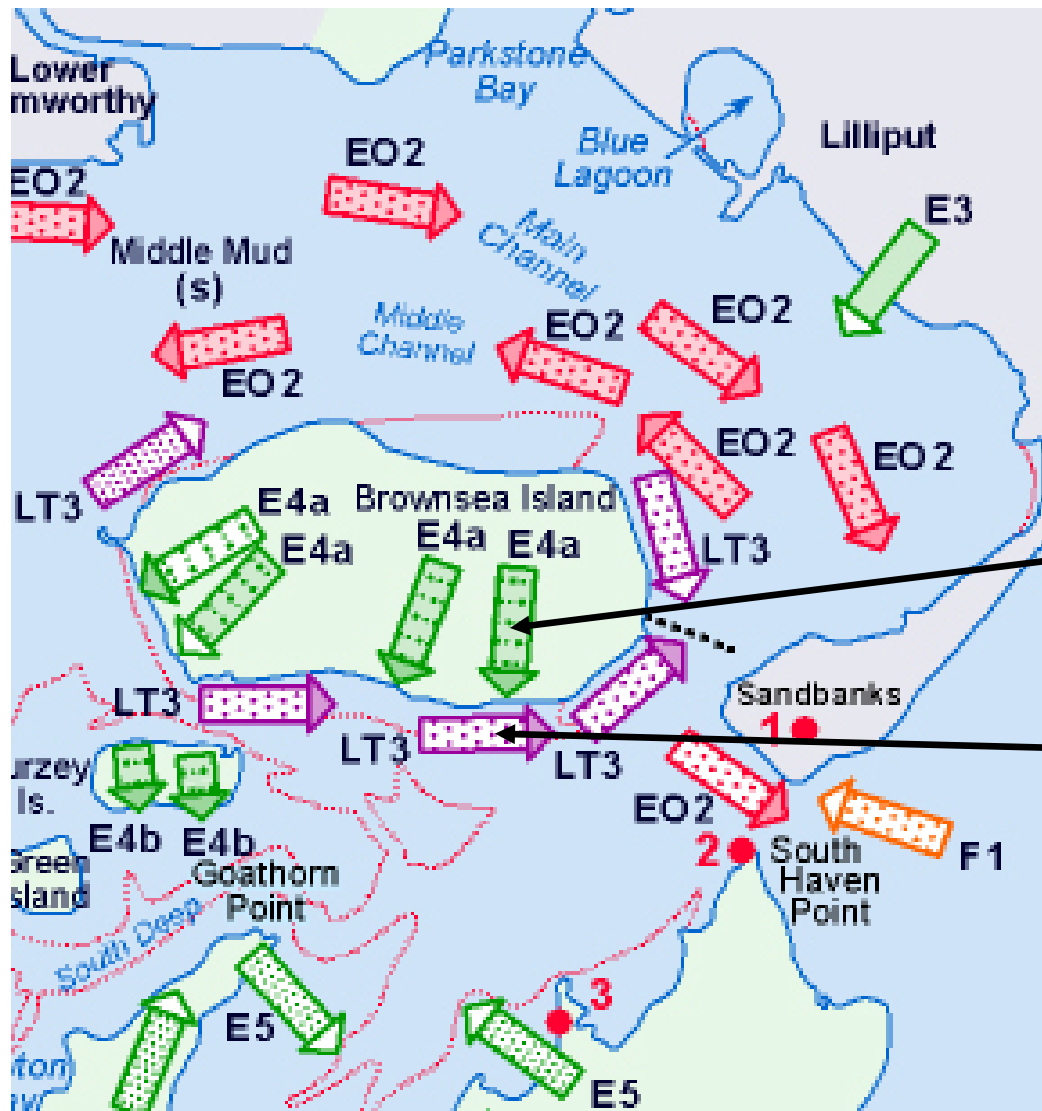
1961-2003 = 1.8mm

1993-2003 = 3.1mm (IPCC, 2007)

Figures shown are central estimates (medium emissions)



Sediment transport around Brownsea

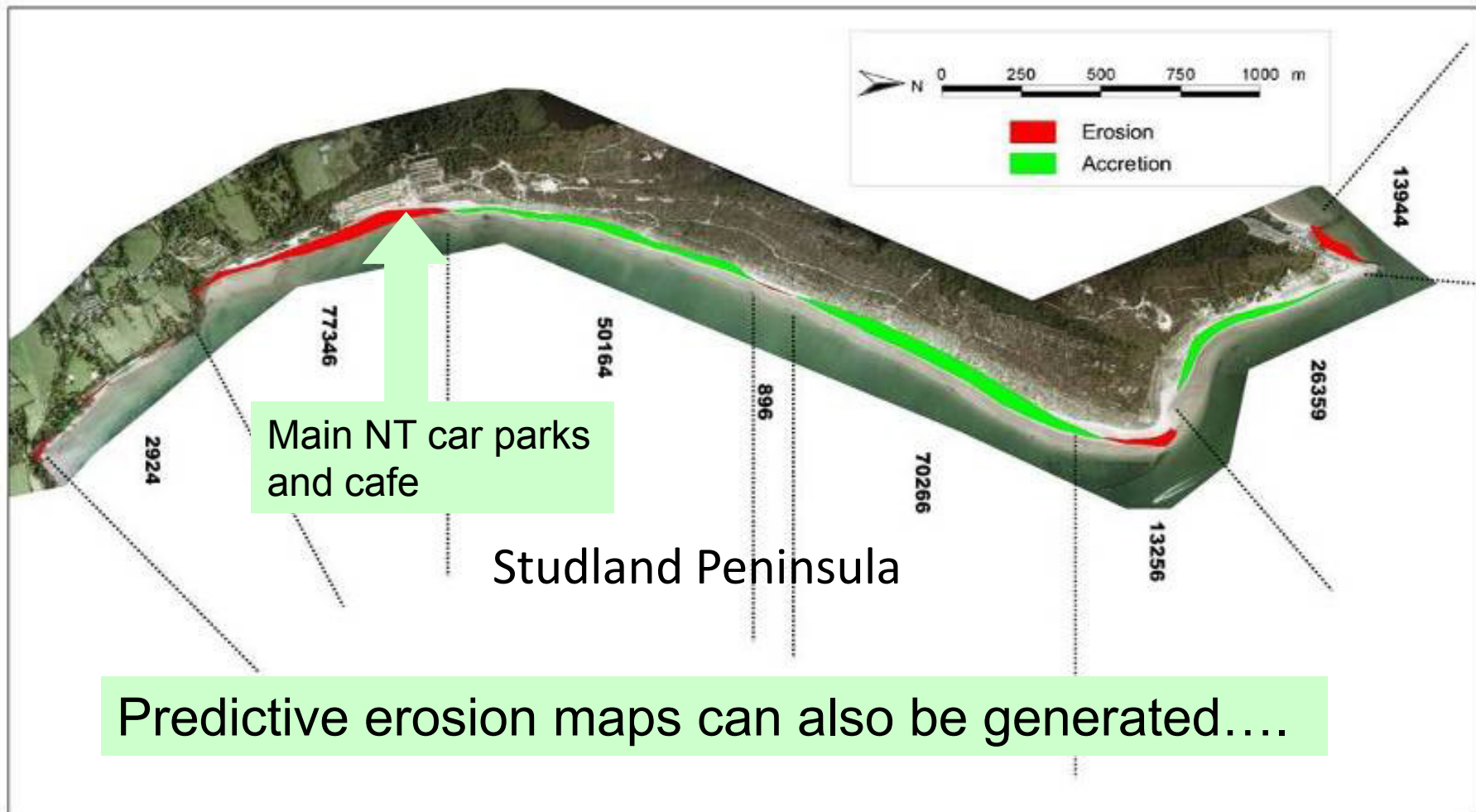


This information is used to determine what we mean by 'working with natural processes'

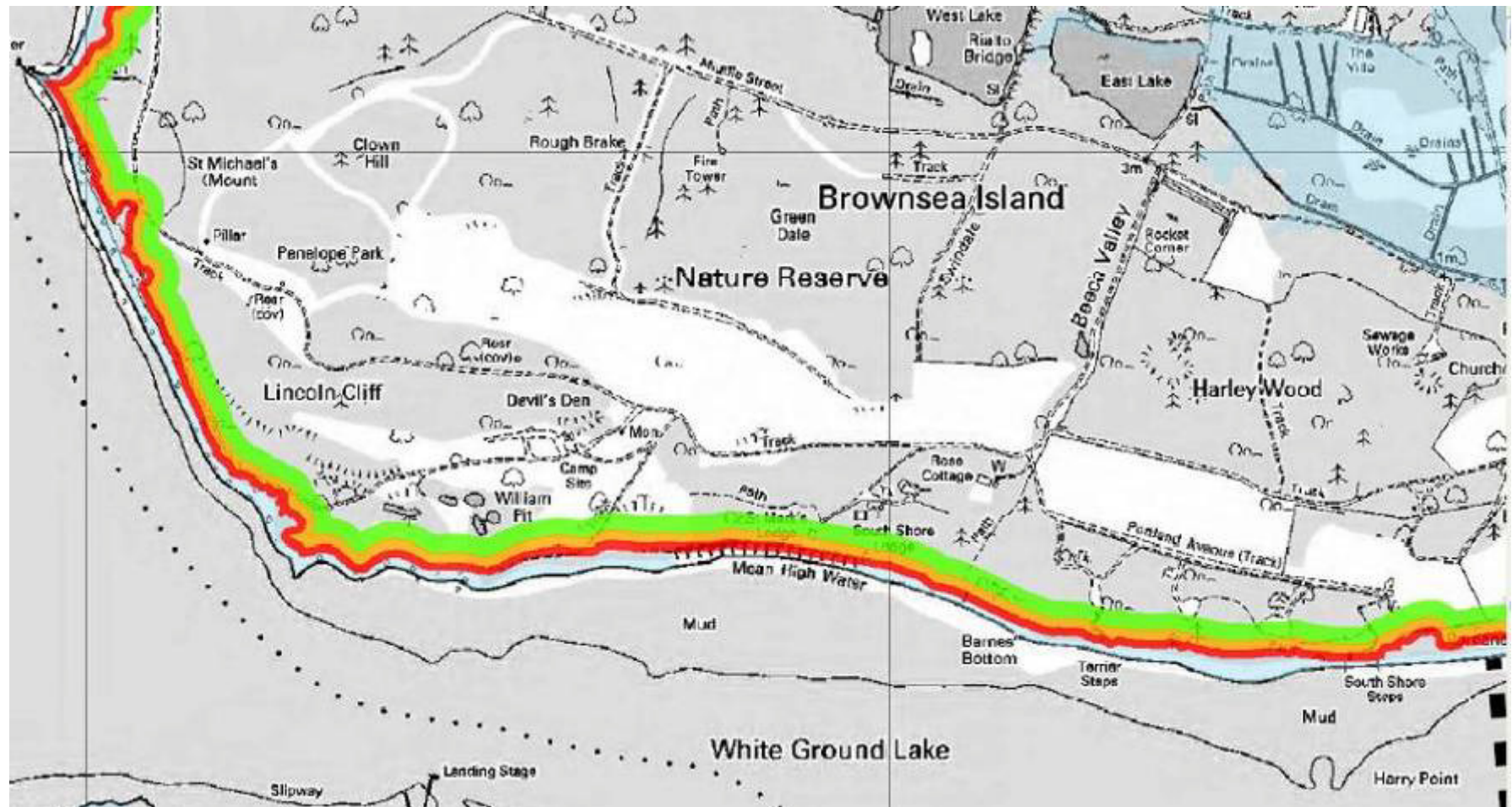
Slope erosion of shingle and sand

Littoral drift of shingle and sand

Additional technical surveys allow differential erosion maps to be produced for some 'hotspot' sites. These gives clues to future coastal evolution.



Shoreline Management Plan (SMP2): predictive erosion bands in more detail



The final adopted policy option for this coastal unit is:

Red. 0 -25 years: NAI (*No Active Intervention*)

Amber. 25 -50 years: NAI

Green. 50 -100 years: NAI

The red, amber and green zones are the indicative erosion bands for the three epochs

SMP₂: Policies for Brownsea Island

Summary of Preferred plan recommendations and Justification Plan:

- *“The overall intent for the management of Brownsea Island is to reduce the influence and impact of defences. Over much of the island the local defences are deteriorating and the longer term plan would be to re-establish a more natural shoreline.*
- *This is line with the landowner's wish to restore natural processes wherever possible.”*

Policy Unit		Policy Plan			
		...2025	...2055	...2105	Comment
PBH.L.1	Western Island	NAI	NAI	NAI	Local management to remove defences.
PBH.L.2	Brownsea Lagoon	NAI*	NAI	NAI	* This would not preclude local management or maintenance.
PBH.L.3	Brownsea Quay	HTL	MR	MR	Subject to discussions with the private landowners (National Trust).
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention, MR – Managed Realignment					

Taken from Royal Haskoning SMP final version: February 2011



The 2011 Shoreline Restoration Project

What was the matter with the South Shore?

Why not just leave it alone???





Unsightly.....

Potentially
dangerous....





Materials involved:

Steel

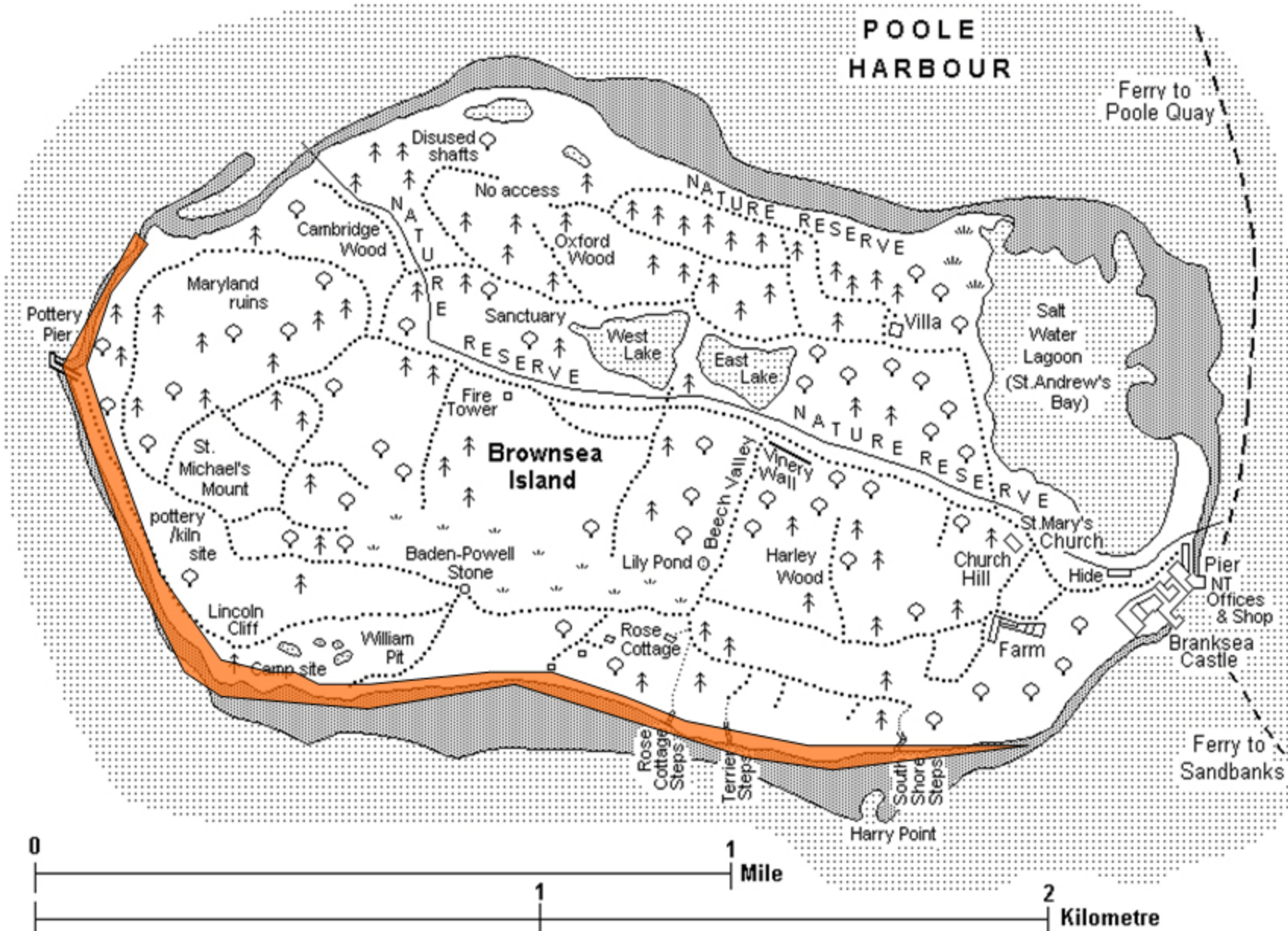
Scots Pine piles

Shards

Limestones

Plastic netting

Area of work (approx 2.45km x 1 - 5m)



The basis of the Brownsea shoreline restoration plan

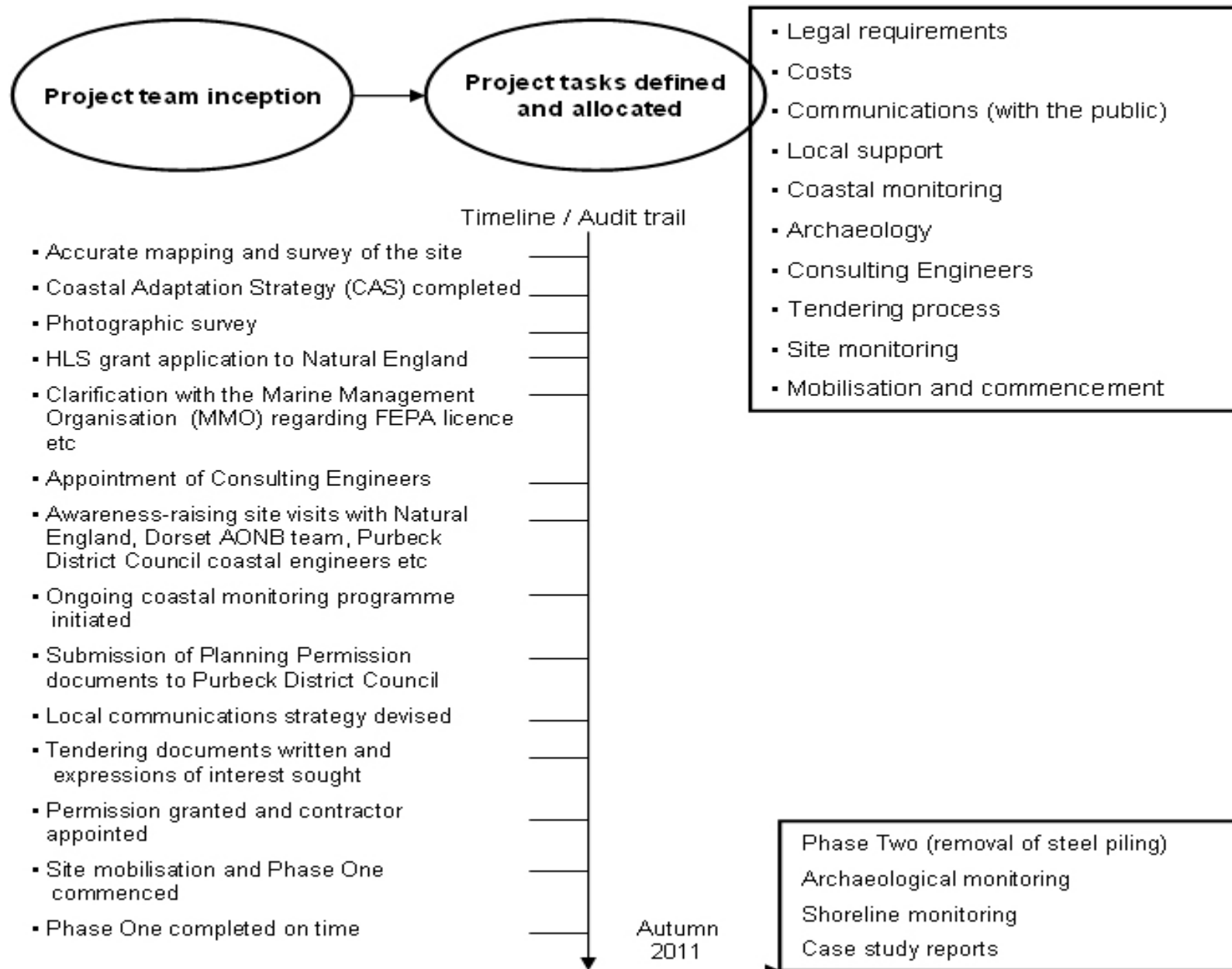
The facts:

- The sea defences bordering the SW and S shores of the Island are in a failing state
- They are no longer providing any meaningful defence against coastal erosion
- They are hindering the natural evolution of this section of coast
- They are actively disaffecting the status of the SSSI
- They are unsightly
- They present a real H&S risk to the public and to staff
- They are a potential navigational hazard

What we wanted to do:

- Return this shoreline to a naturally evolving coast with minimal human intervention following removal of failing defences
- Improve the SSSI rating and comply with the SMP₂ cell policy: **'No Active Intervention'**
- Remove all failing steel works and recycle material on the mainland
- Remove / empty failing gabions (except where steps protection is still required)
- Level the earthenware shards material onto the foreshore
- Pull out the 2600 Pine piles...store for later reuse
- Record the application, consents and operational process for Defra as a case study
- Devise a meaningful communications exercise for staff, members and the public
- Beach profile monitoring & shoreline archaeology monitoring before and after the works

Project overview (2010-2011).



Before and after.....



Removing some of the 2600
wooden piles &
reprofiling the back scarp





The gabion baskets full of pottery shards were all removed....





These steels will be removed in November 2011

Conclusions and thoughts for the future...

- The Trust will continue to be proactive in caring for the coastline for which it is responsible in the face of accelerated coastal change
- The Trust will endeavour to support and assist communities to become more resilient to coastal change and to help them adapt accordingly
- The Trust will always endeavour to work in harmony with natural processes
- Sections of coast are interdependent and influenced by evolution in adjacent areas. These inter-relationships are not always well understood. Coastal monitoring is helping to rectify this situation
- We need ever-more precise predictions of coastal evolutionary trends over the next decade. Shoreline Managements Plans are an important component in this research
- Marine ecology and marine designations are set to have an increasing influence on management strategies and designations

