

ACCESS

'Adapting to Coastal Change along
England's Southern Shorelines'

Dr Samantha Cope
New Forest District Council
Channel Coastal Observatory



www.scopac.org.uk



ACCESS

'Adapting to Coastal Change along
England's Southern Shorelines'

Introduction to “hotspots” and case studies



www.scopac.org.uk

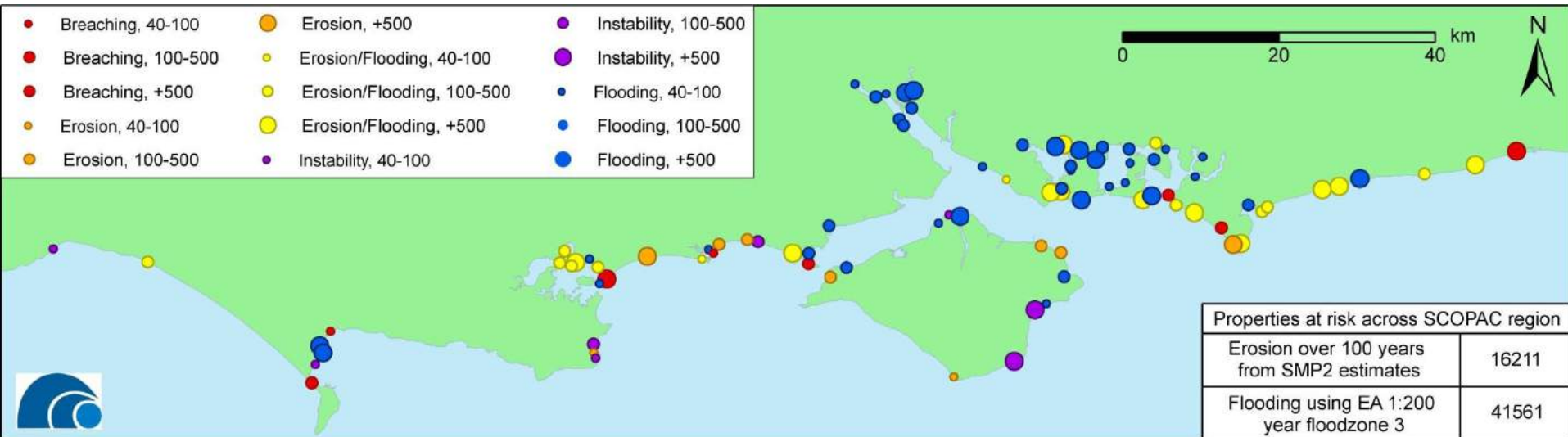


“Hotspot” map



SCOPAC wide assessment of geomorphology types and hazard

Properties at risk map



SCOPAC wide assessment of numbers of properties at risk

ACCESS

'Adapting to Coastal Change along
England's Southern Shorelines'

Case study presentation



www.scopac.org.uk



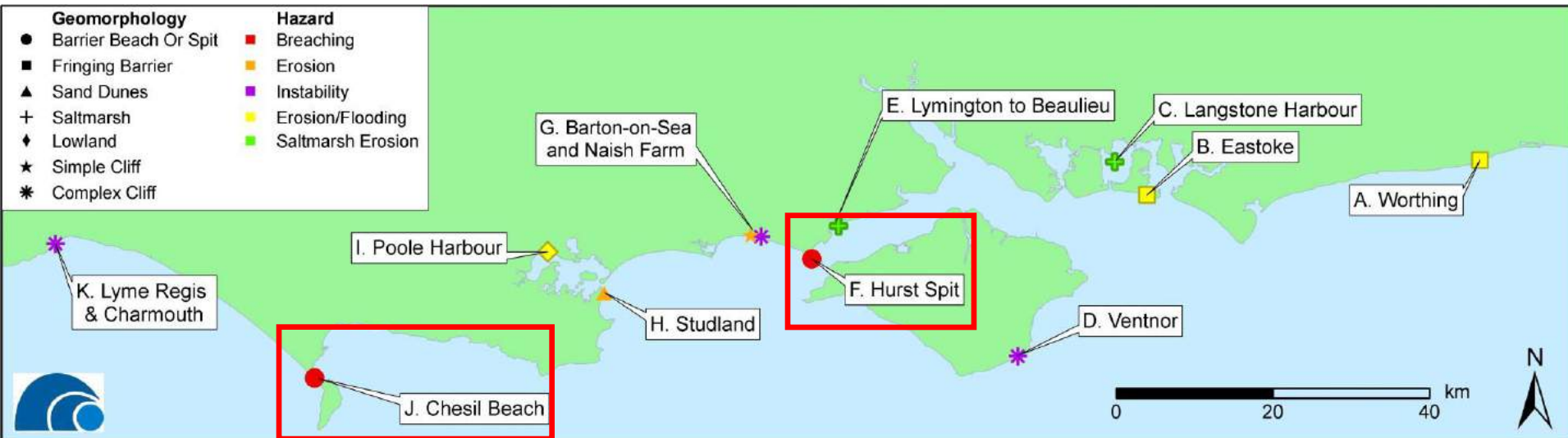
Case study map



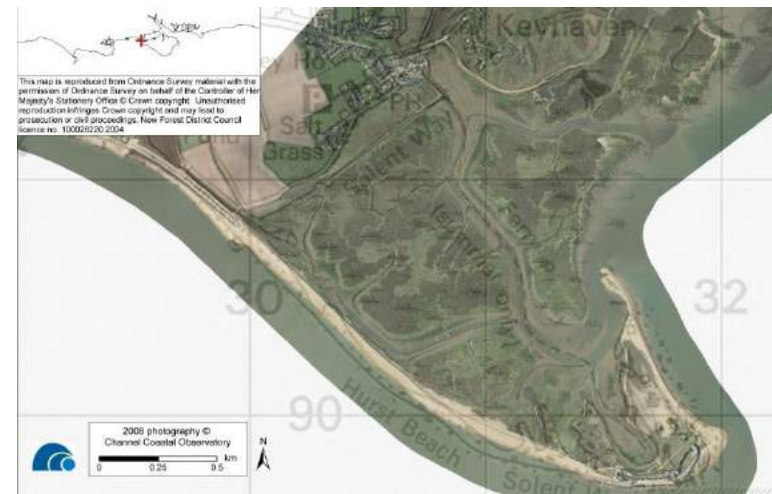
Raise awareness of SCOPAC hazards

Raise profile of “low lying” features such as, barrier beaches, spits, lowland areas, saltmarshes and sand dunes, not covered in national or regional assessments of erosion

Barrier beaches, spits and fringing barriers



Freestanding, backed by a lagoon



Barrier beaches, spits and fringing barriers



Relict barrier beaches, backed by a defence, lowland or lowland



WIDEWATER LAGOON (WORTHING FRONTAGE)

© 2010 Arun District Council

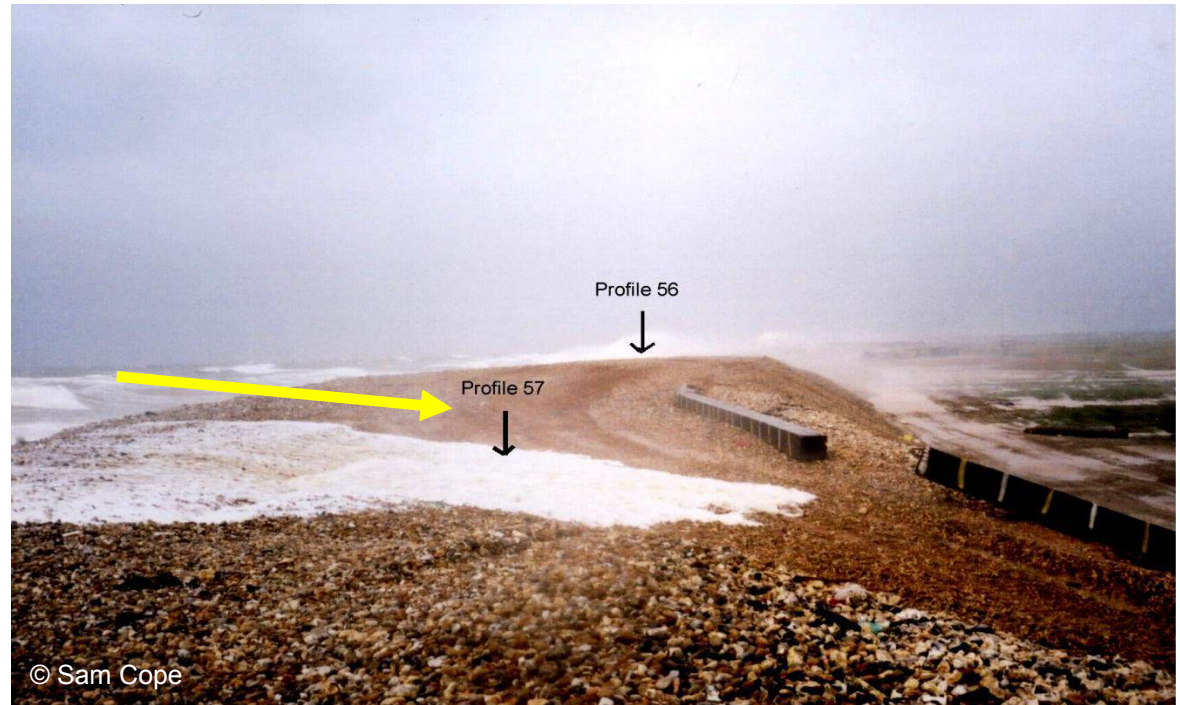
Barrier beaches, spits and fringing barriers – hazard type

- Seepage
- Overtopping
- Crest cut-back
- Overwashing
- Breaching



Barrier beaches, spits and fringing barriers – hazard type

- Seepage
- Overtopping
- Crest cut-back
- Overwashing
- Breaching



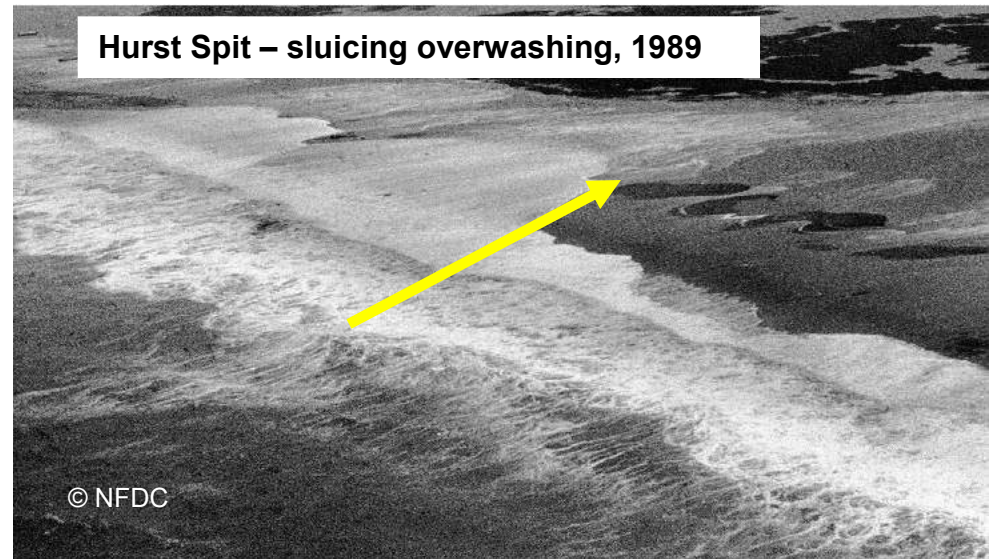
Medmerry barrier, West Sussex, 2002.

Barrier beaches, spits and fringing barriers – hazard type



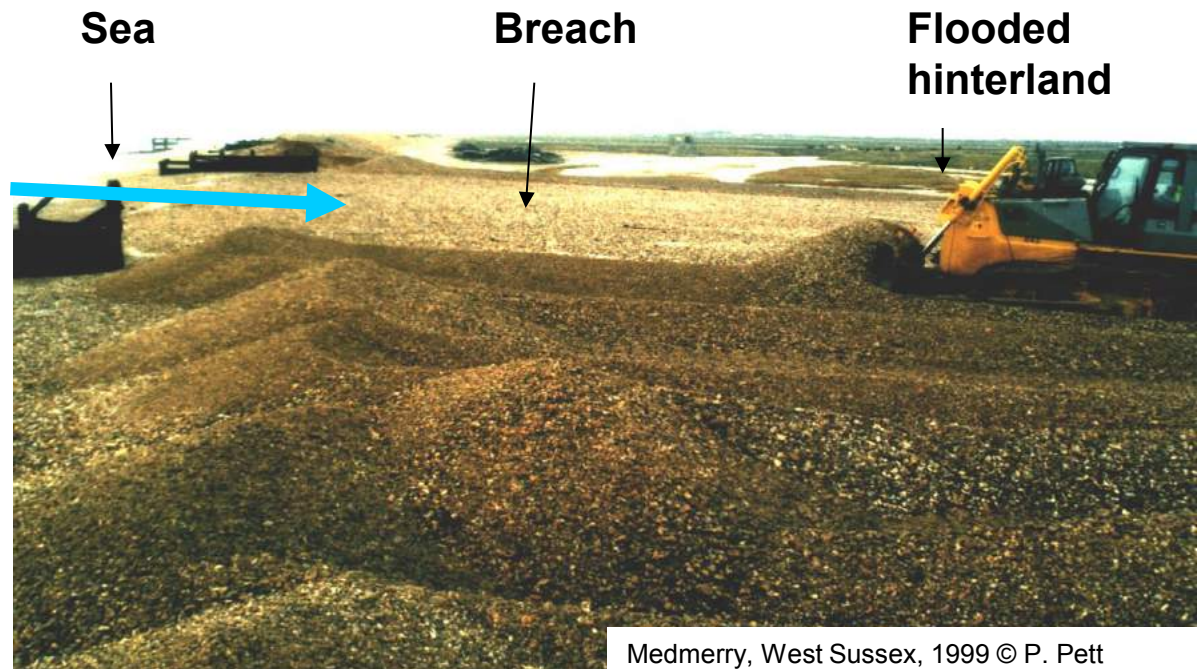
Barrier beaches, spits and fringing barriers – hazard type

- Seepage
- Overtopping
- Crest cut-back
- Overwashing
- Breaching



Barrier beaches, spits and fringing barriers – hazard type

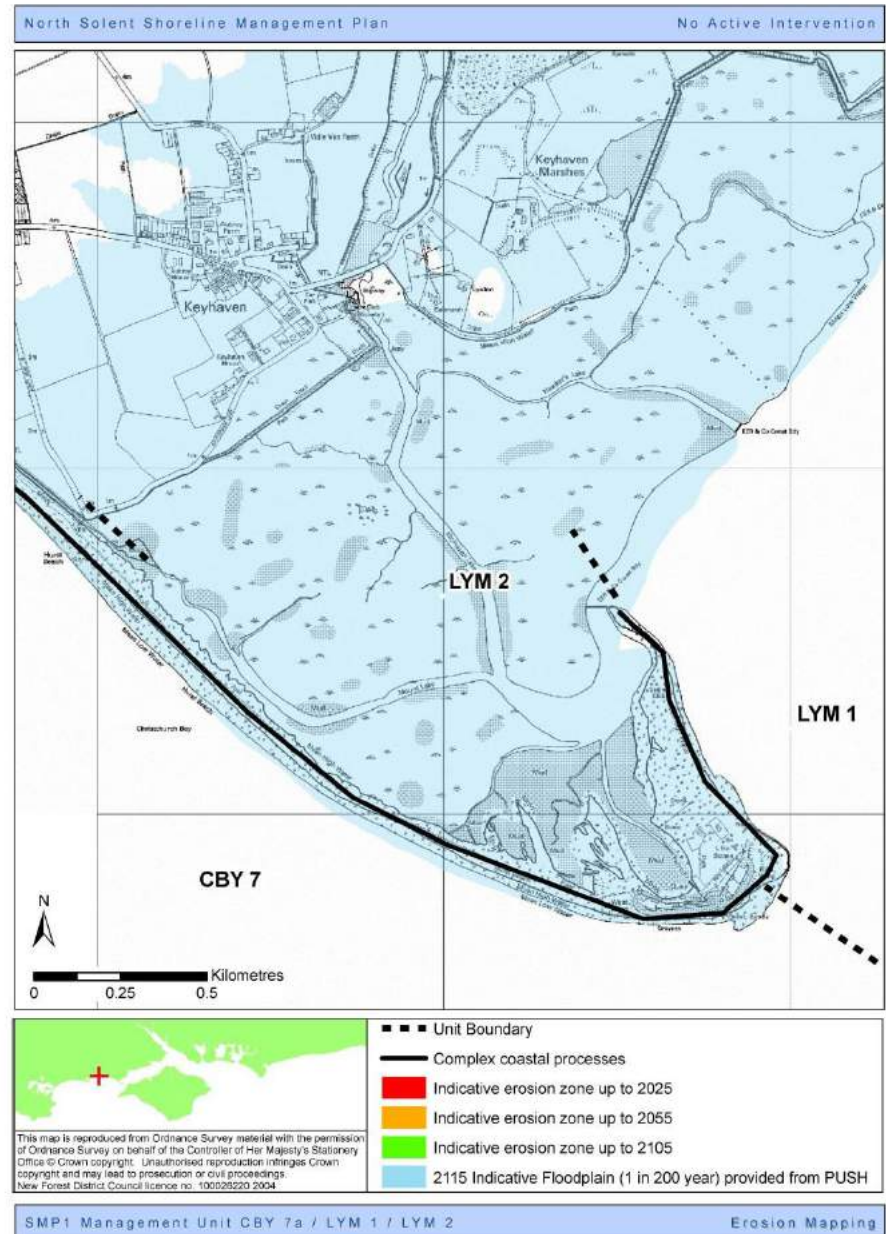
- Seepage
- Overtopping
- Crest cut-back
- Overwashing
- Breaching



Medmerry, West Sussex, 1999 © P. Pett

Barrier beaches, spits and fringing barriers – predicting beach response

- SMP2 = “complex coastal processes”
- Highly dynamic features
- Difficult to predict plan view evolution
- Historical maps and aerial photography
- Dependent on balance between sediment supply, sea level rise and storm attack



Barrier beaches, spits and fringing barriers – predicting beach response

SPIT

Hurst Spit, Hampshire



© NFDC

BARRIER BEACH TOMBOLA

Chesil beach, Dorset

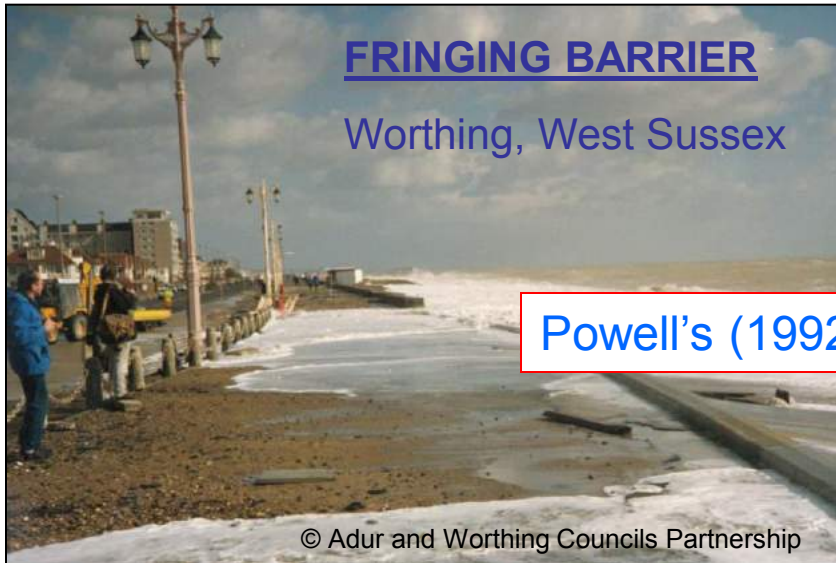


© <http://www.chiswellcommunity.org/page.aspx?p-chbeach>

Bradbury's (1998) overwashing model

FRINGING BARRIER

Worthing, West Sussex



© Adur and Worthing Councils Partnership

FRINGING BARRIER

Eastoke, Hampshire



© Havant, Portsmouth and Gosport Partnership

Barrier beaches, spits and fringing barriers – management and key issues

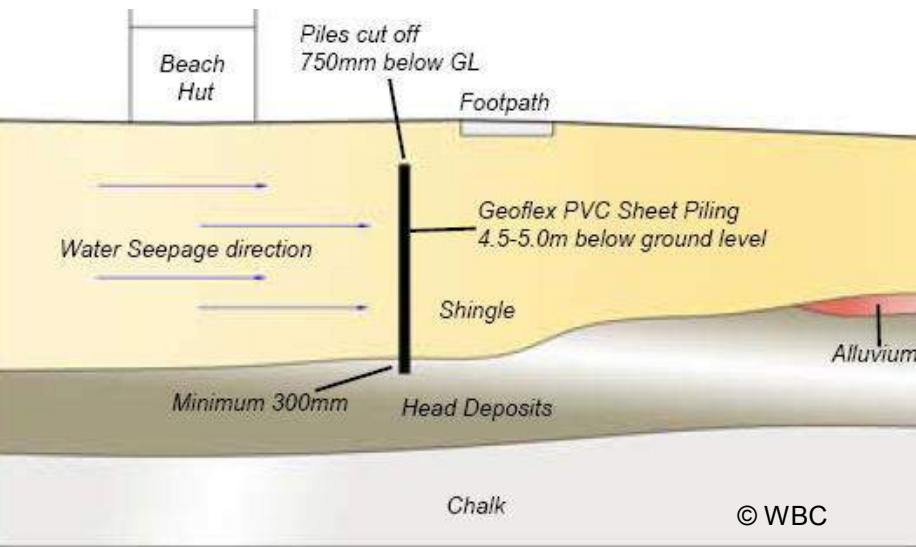
Hurst Spit replenishment 1996



Chiswell scheme (Chesil Beach) 1986



Goring (Worthing) scheme 2006



Eastoke replenishment 1985



Lowland area case study

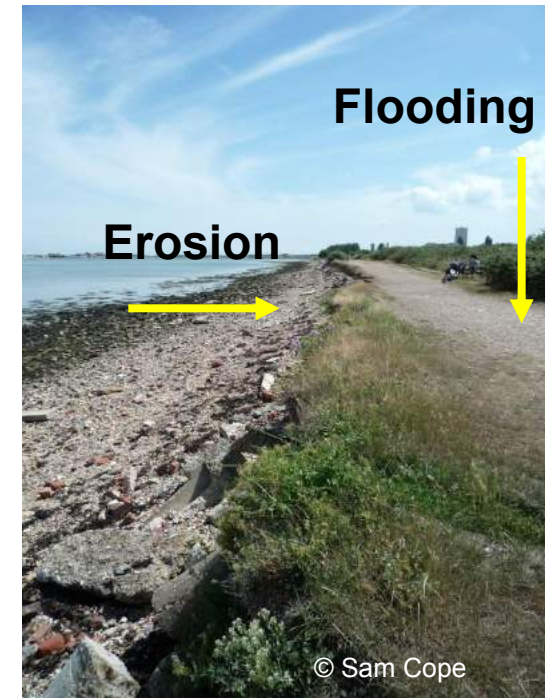


Lowland area case study – hazard type

Poole harbour entrance

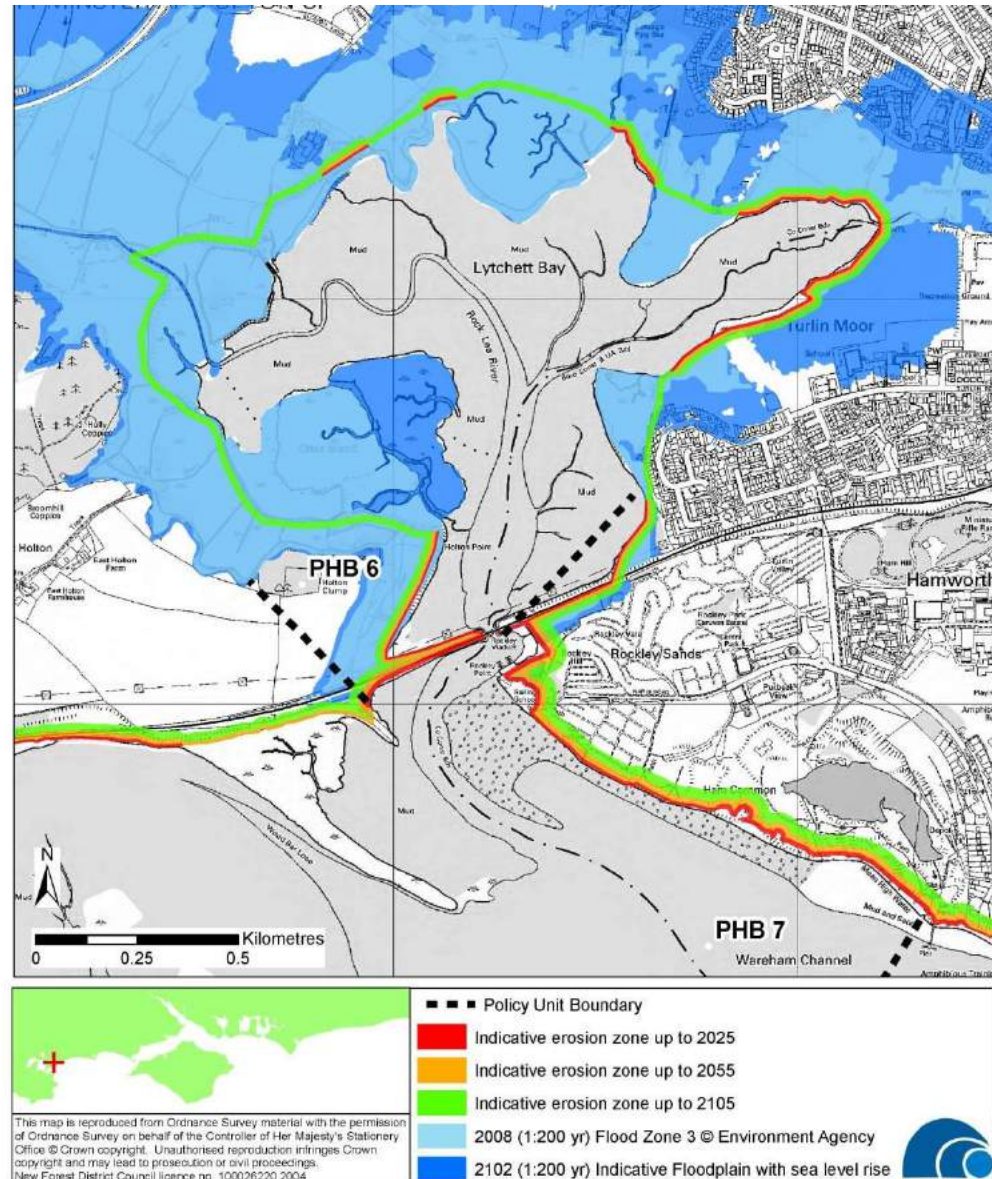


Lytchett Bay



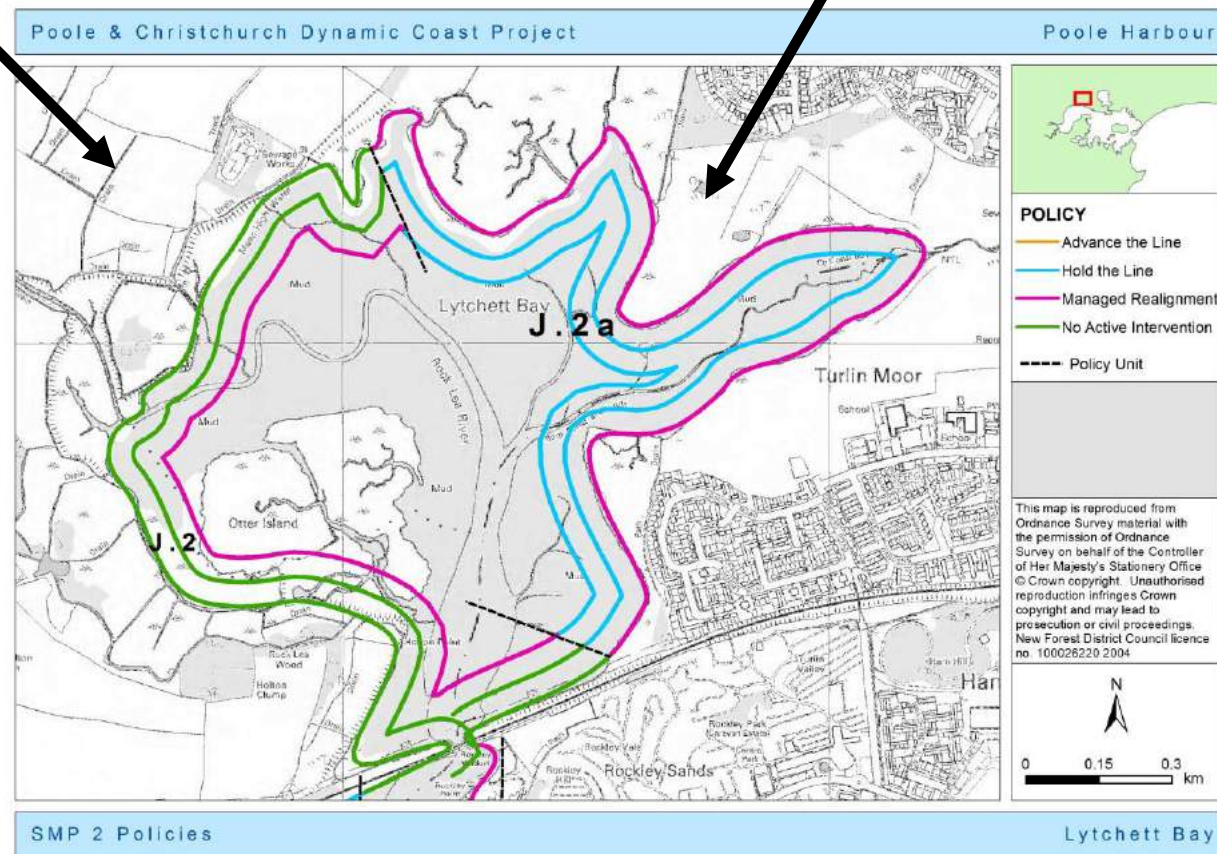
Lowland area case study – hazard type - predicting erosion and flooding

- Identify baseline
- Obtain historical rates of erosion
- When defence is predicted to fail or saltmarsh is predicted to erode, project erosion over next 100 years
- Show EA floodzone 3 for predicted flooding NOW
- Flood digital terrain model to predict likelihood of flooding in 100 years



Lowland area case study – management and key issues

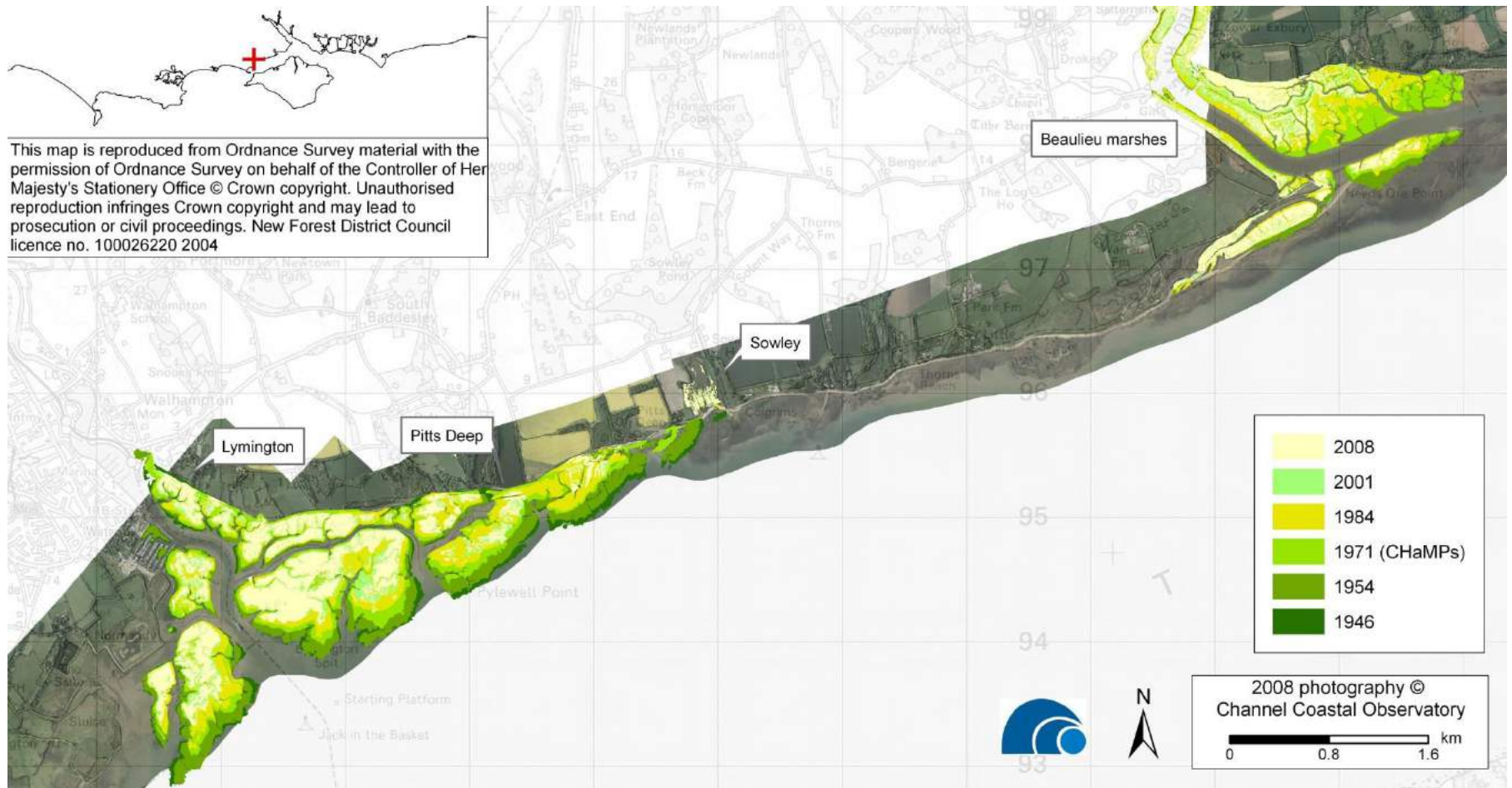
- SMP2 = NAI (0-50 years) allowing natural development of the shoreline, followed by MR (50-100 years) providing local defence to property, subject to sea level rise.
- Unusual example where inter-tidal habitats will naturally form with SLR.
- Requirement for longer datasets to refine current erosion assessments
- SMP2 = MR (0-20 years) move defences to more sustainable position and HTL (20-100 years) to protect assets from erosion and flooding.

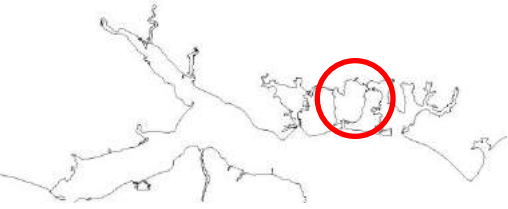


Saltmarshes



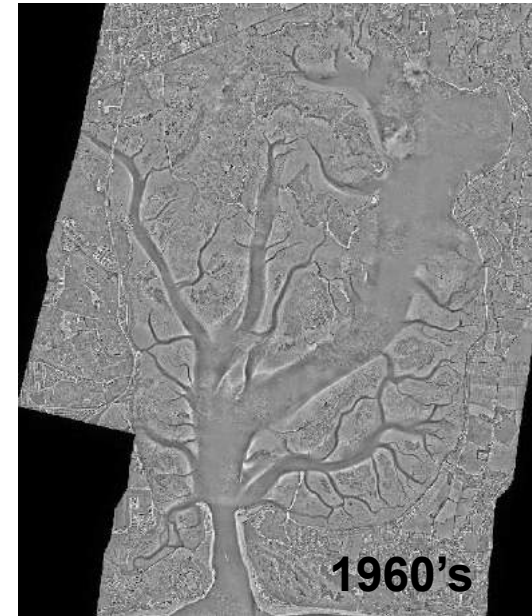
Saltmarshes – hazard and predicting erosion





Langstone Harbour

- Bi-decadal data collection
- Scan
- Geo-rectify
- Mosaic





Langstone Harbour Saltmarsh



Aerial photograph
1946 © Crown
Copyright/MOD



Langstone Harbour Saltmarsh



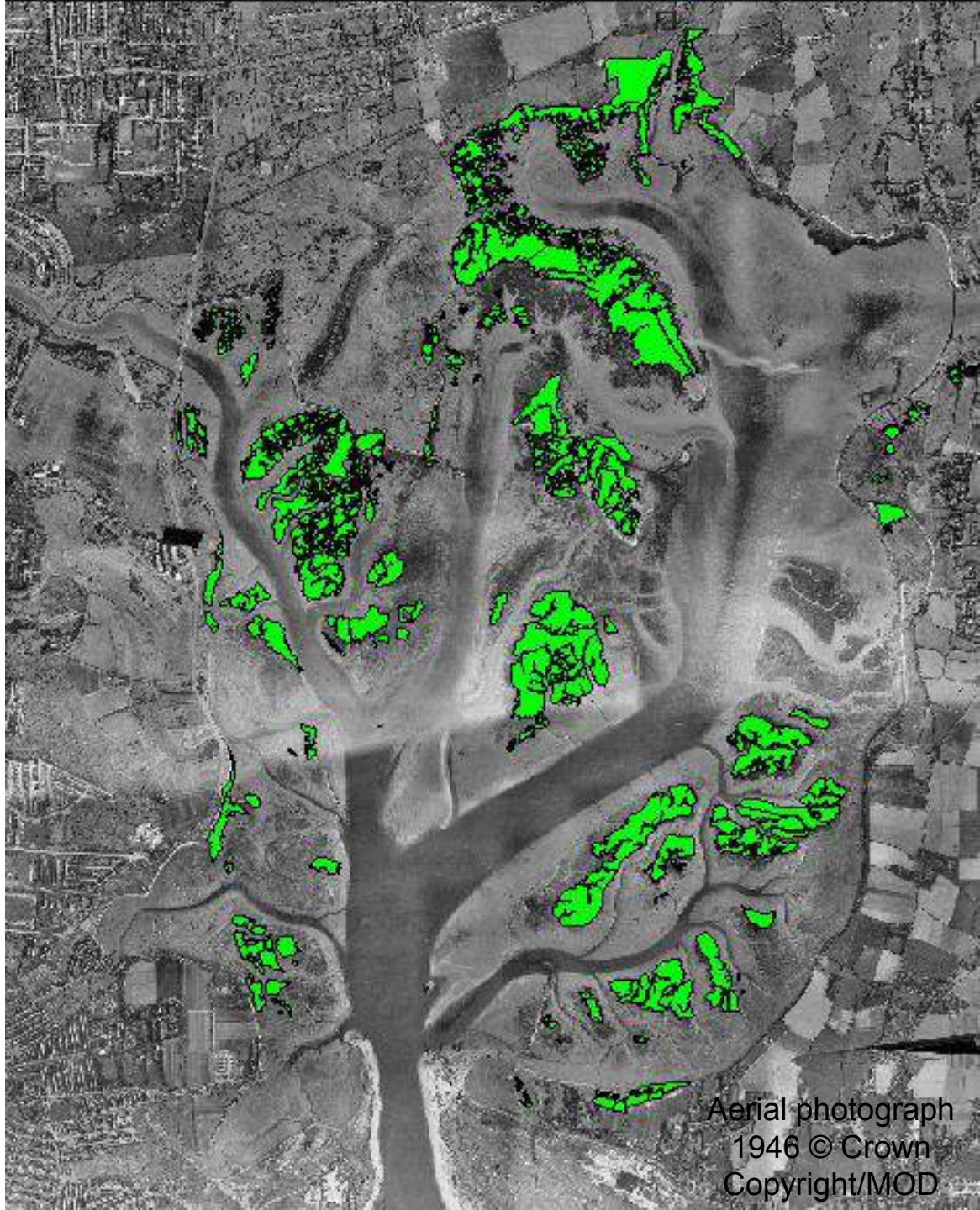
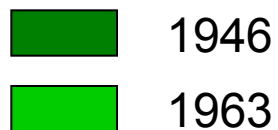
1946



Aerial photograph
1946 © Crown
Copyright/MOD



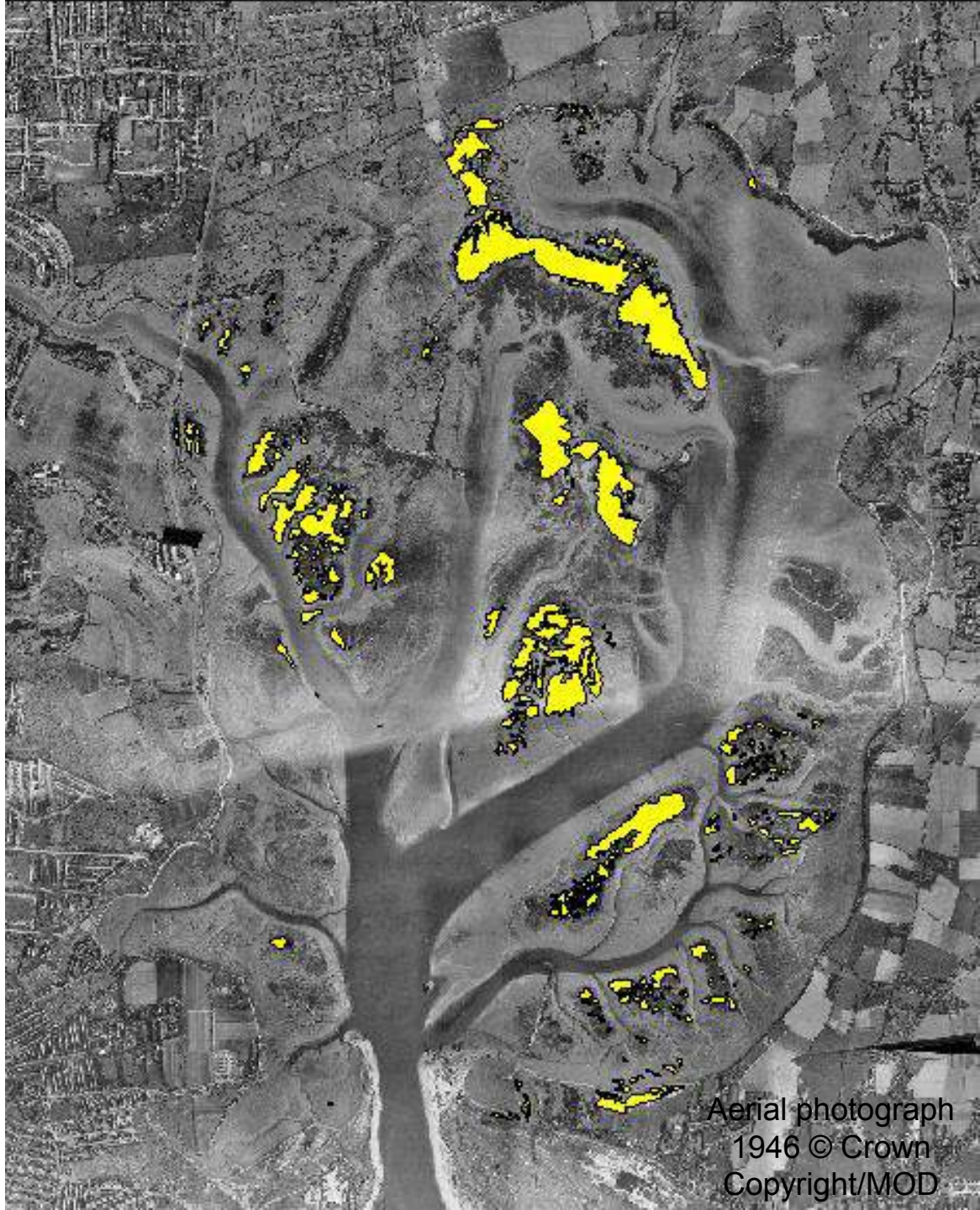
Langstone Harbour Saltmarsh



Aerial photograph
1946 © Crown
Copyright/MOD



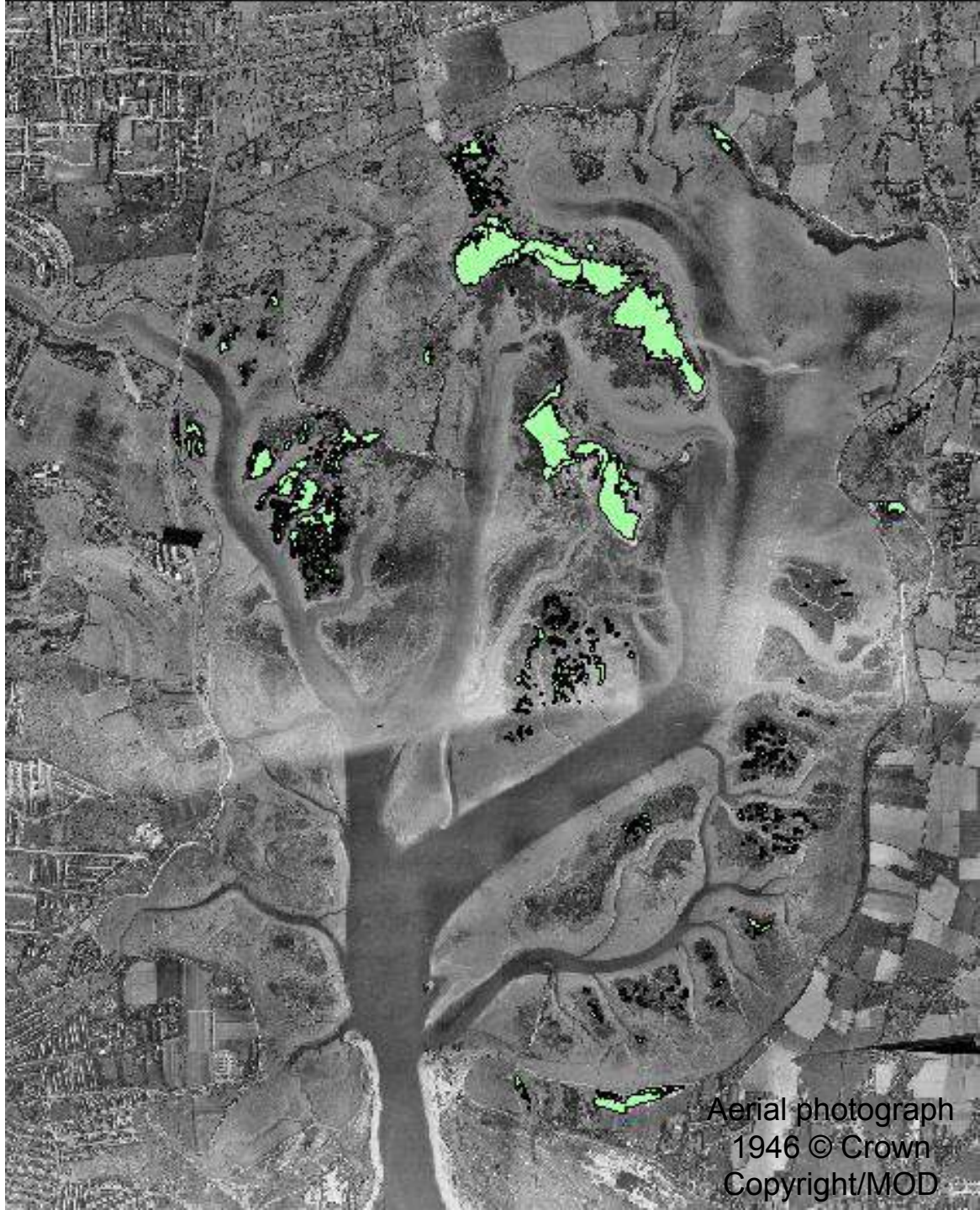
Langstone Harbour Saltmarsh



Aerial photograph
1946 © Crown
Copyright/MOD



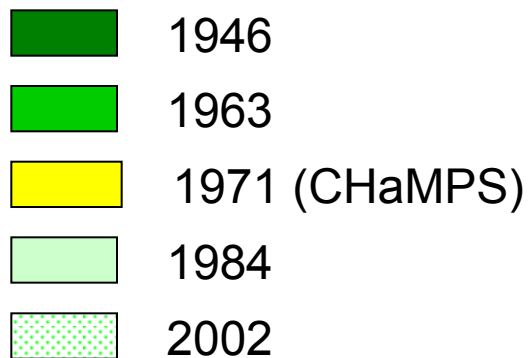
Langstone Harbour Saltmarsh



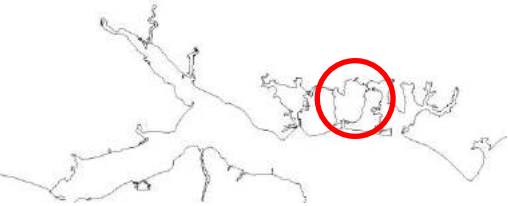
Aerial photograph
1946 © Crown
Copyright/MOD



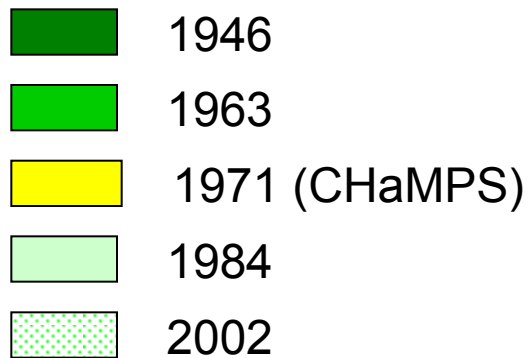
Langstone Harbour Saltmarsh



Aerial photograph
1946 © Crown
Copyright/MOD



Langstone Harbour Saltmarsh

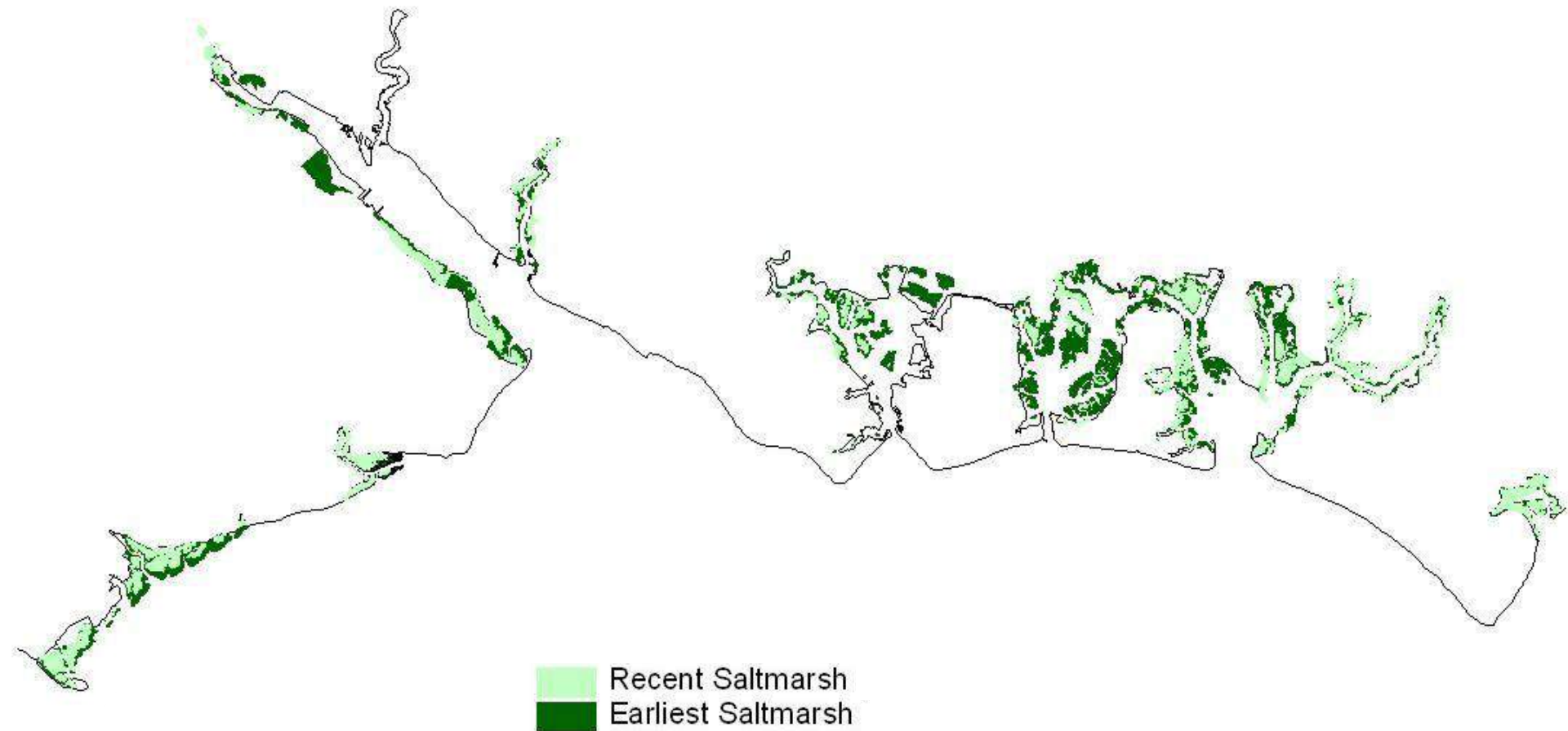


**83% loss in 56 years
(1.5% per yr)**







Aerial photograph
2002 © CCO

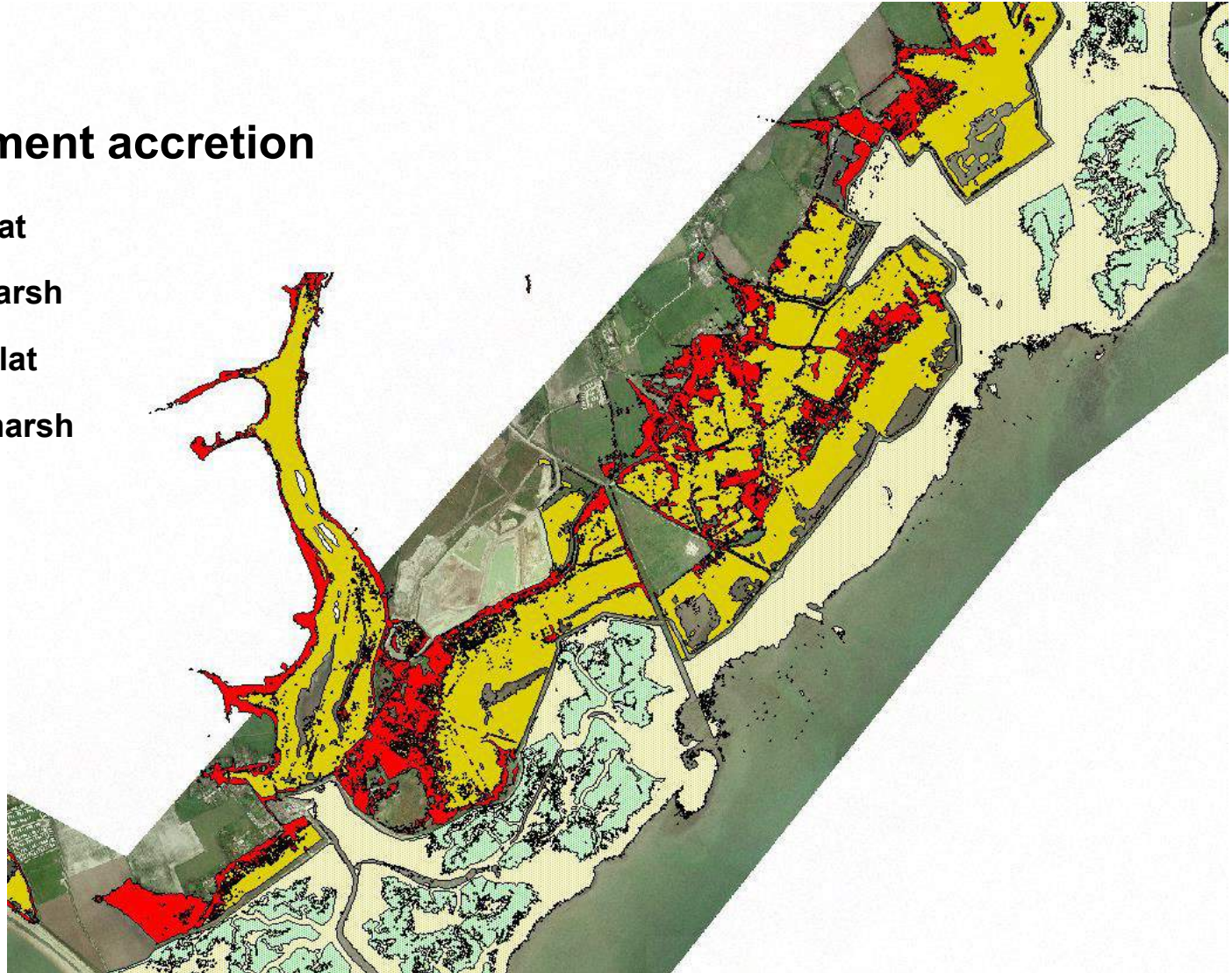
Saltmarshes – hazard and predicting erosion



Saltmarshes – hazard and predicting erosion





NOW – no sediment accretion

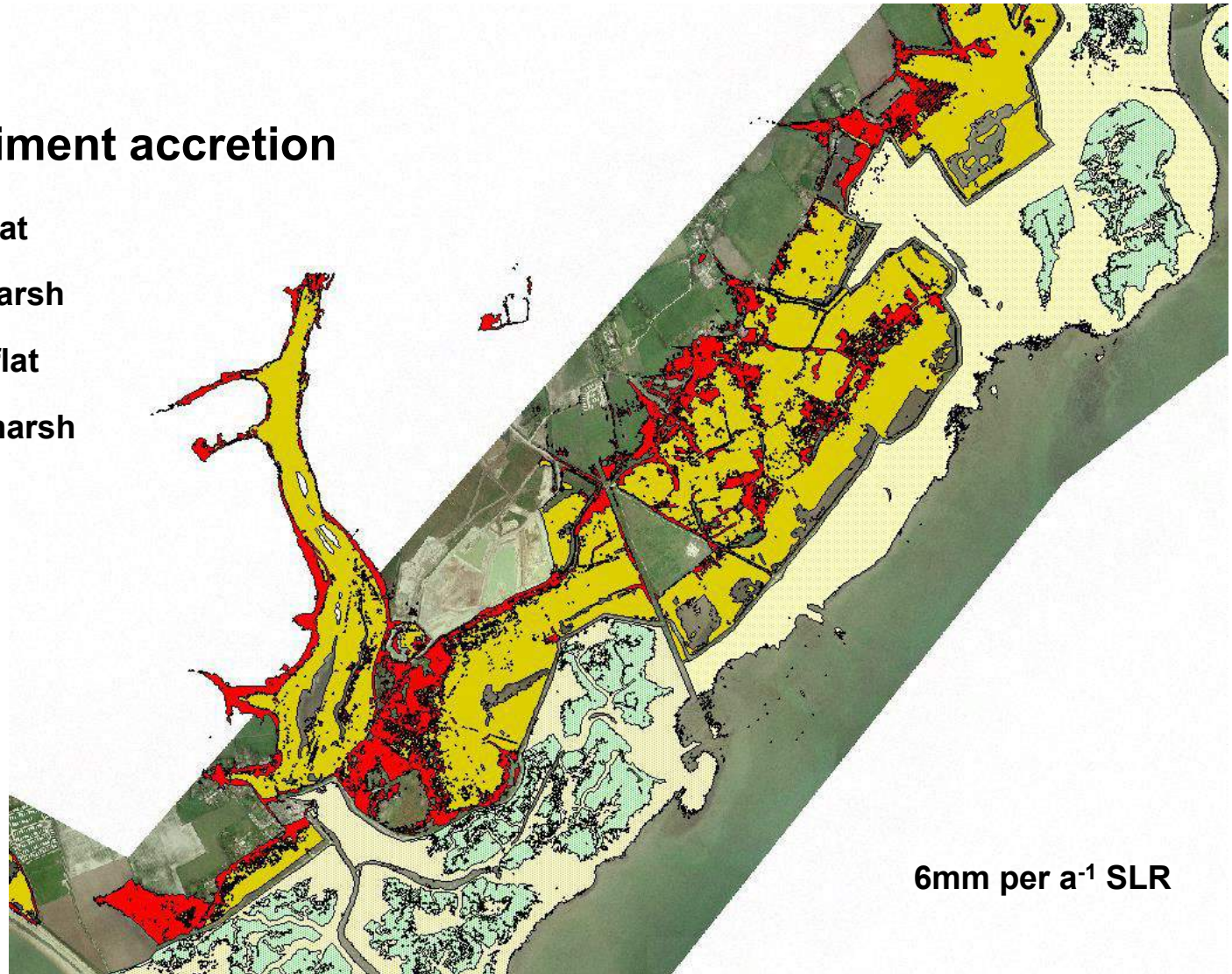
-  Existing mudflat
-  Existing saltmarsh
-  Potential mudflat
-  Potential saltmarsh



Saltmarshes – hazard and predicting erosion





5 YRS – no sediment accretion

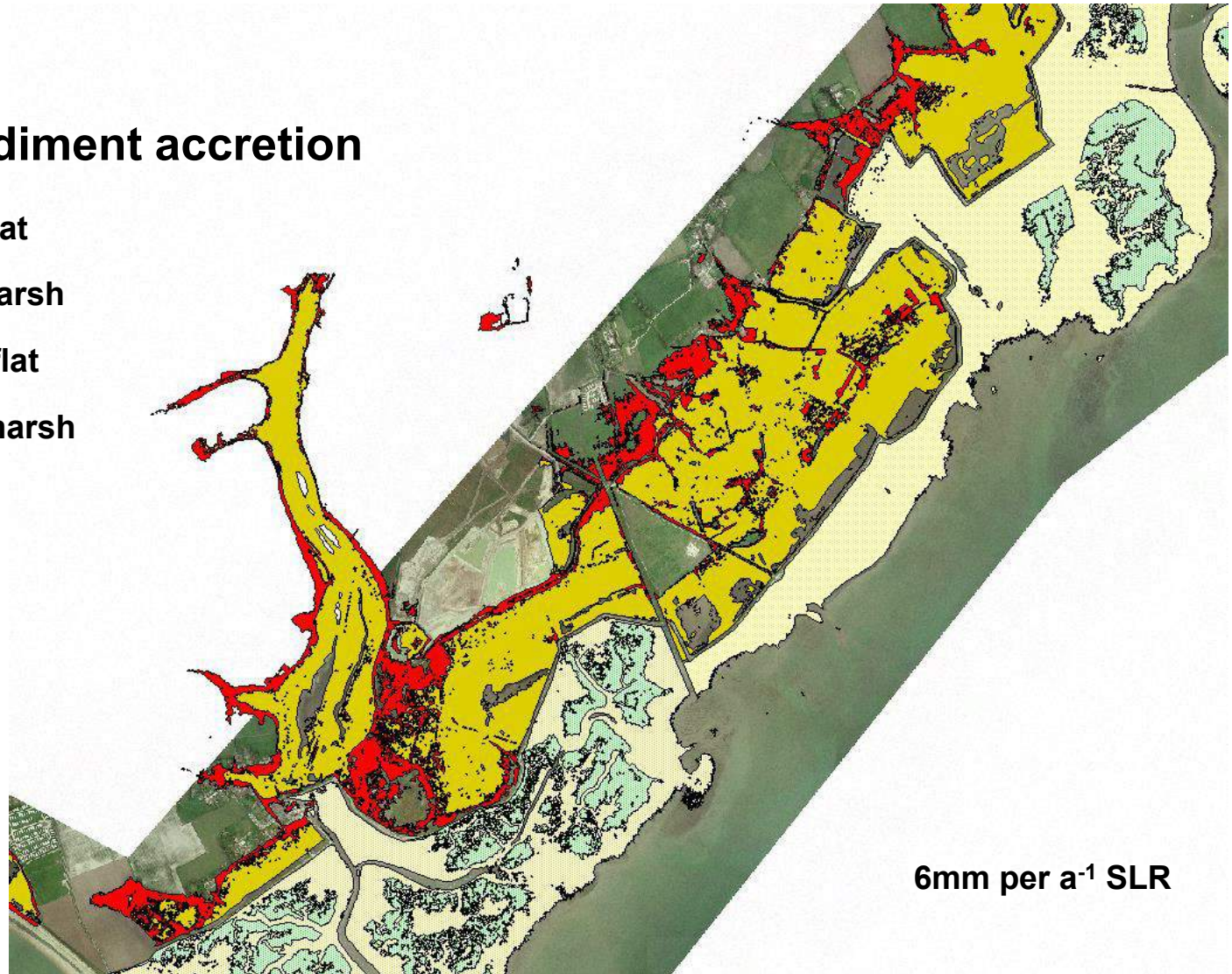
-  Existing mudflat
-  Existing saltmarsh
-  Potential mudflat
-  Potential saltmarsh



Saltmarshes – hazard and predicting erosion

20 YRS – no sediment accretion





-  Existing mudflat
-  Existing saltmarsh
-  Potential mudflat
-  Potential saltmarsh

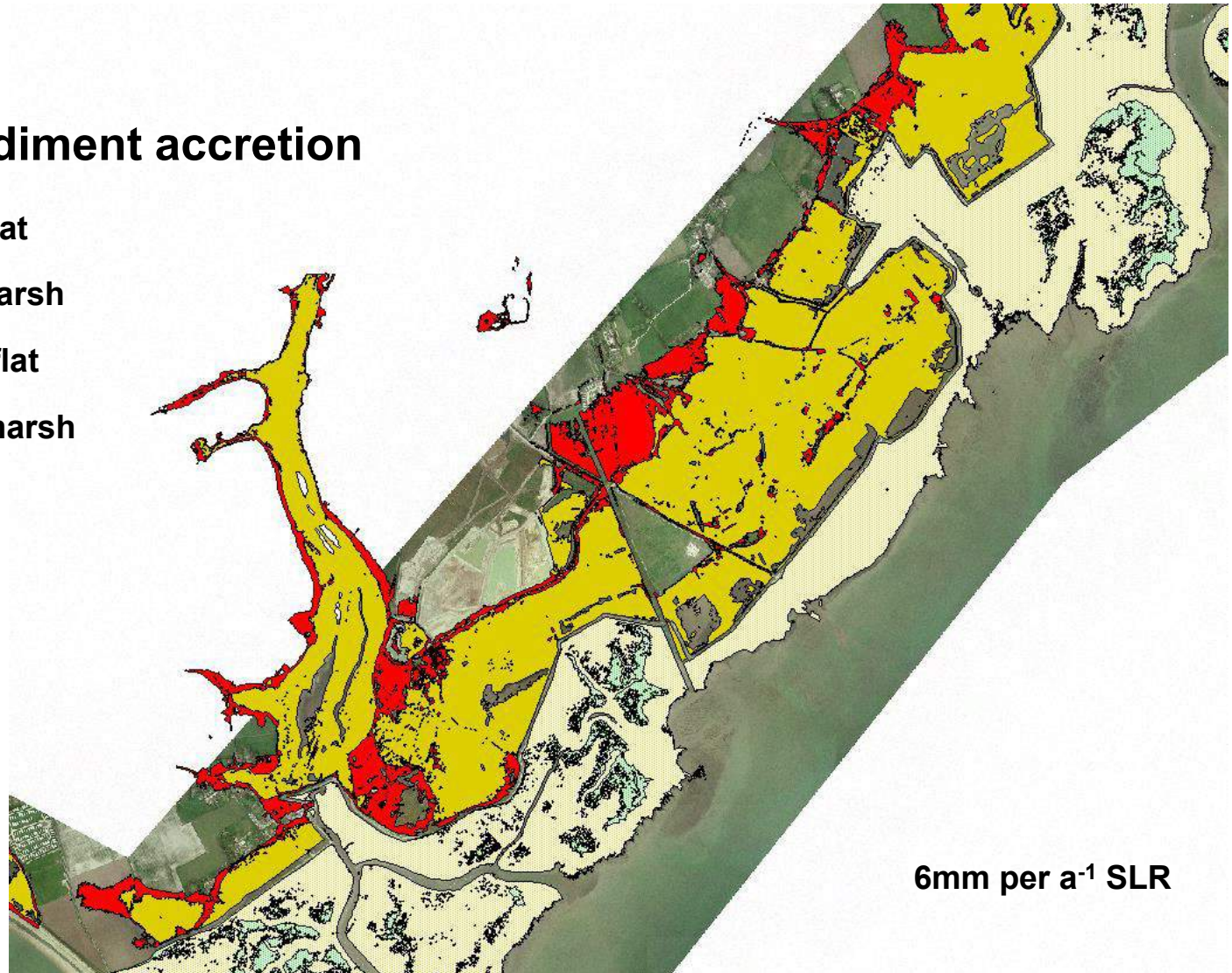


6mm per a⁻¹ SLR

Saltmarshes – hazard and predicting erosion





50 YRS – no sediment accretion

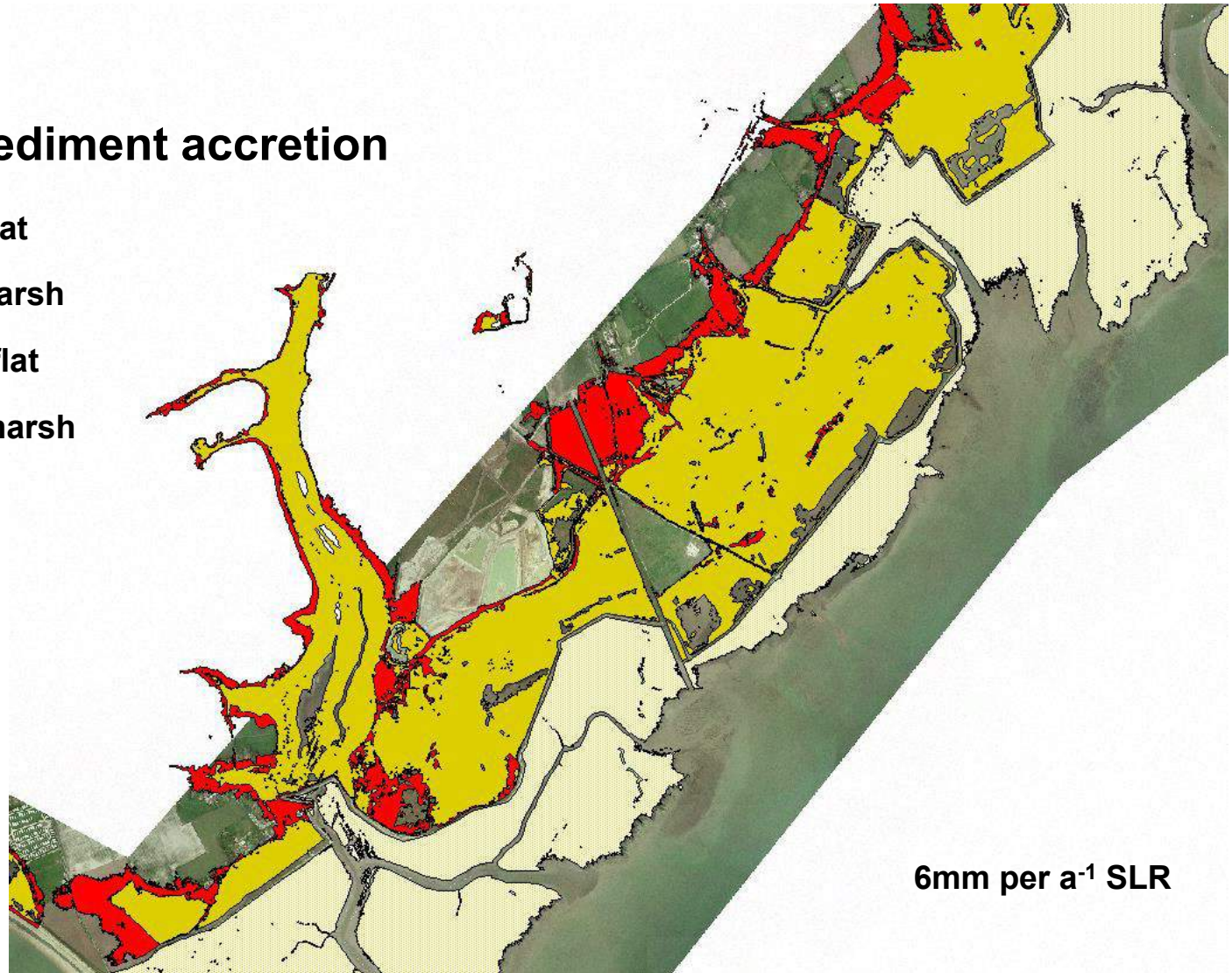
-  Existing mudflat
-  Existing saltmarsh
-  Potential mudflat
-  Potential saltmarsh



Saltmarshes – hazard and predicting erosion

100 YRS – no sediment accretion

-  Existing mudflat
-  Existing saltmarsh
-  Potential mudflat
-  Potential saltmarsh



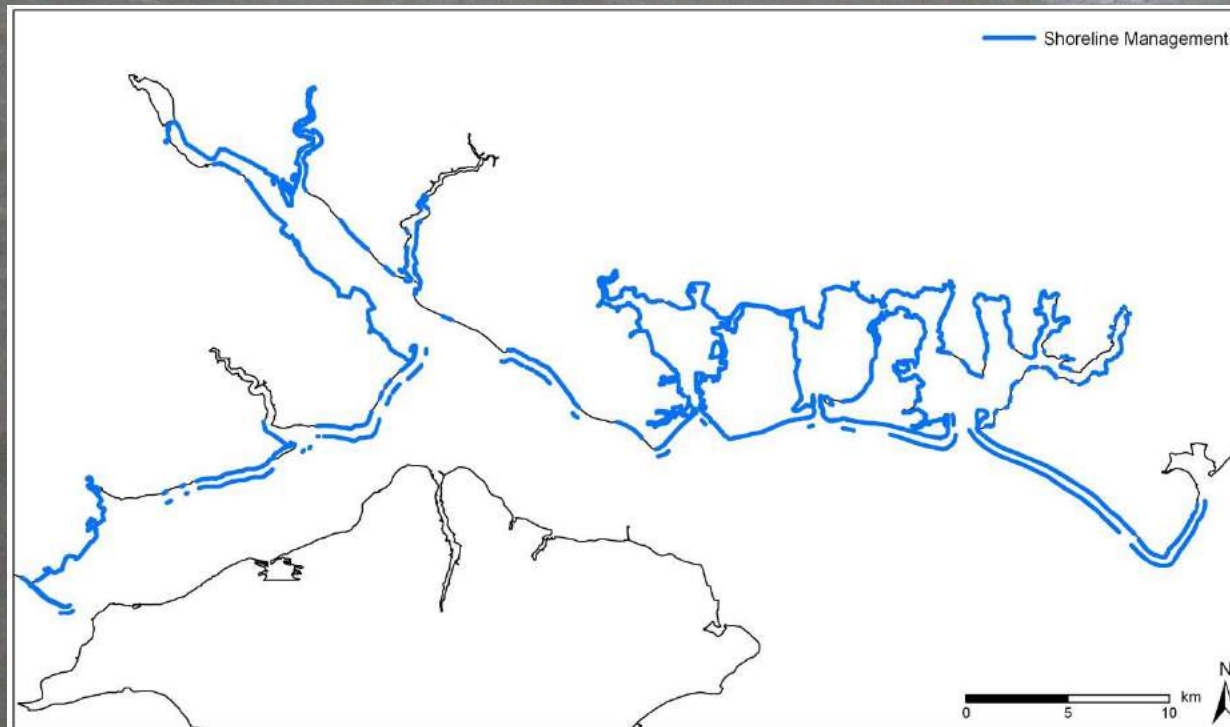
6mm per a⁻¹ SLR

Saltmarshes – management and key issues

Why does saltmarsh loss matter?

Sea defence

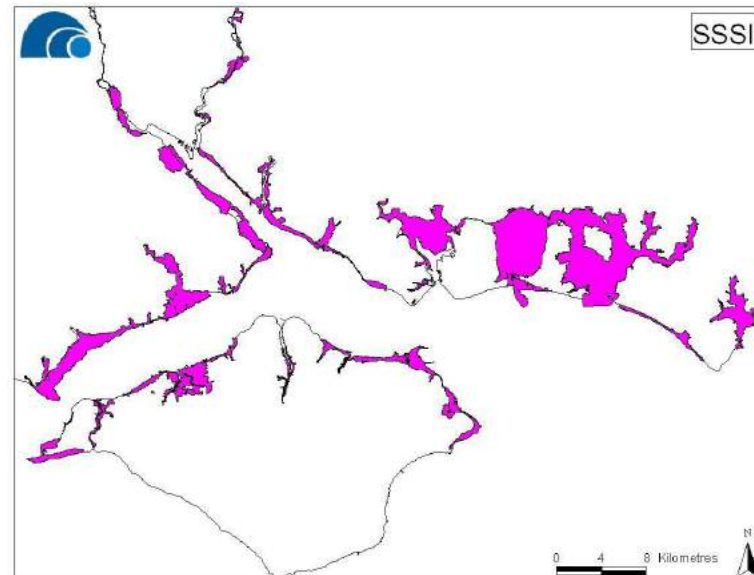
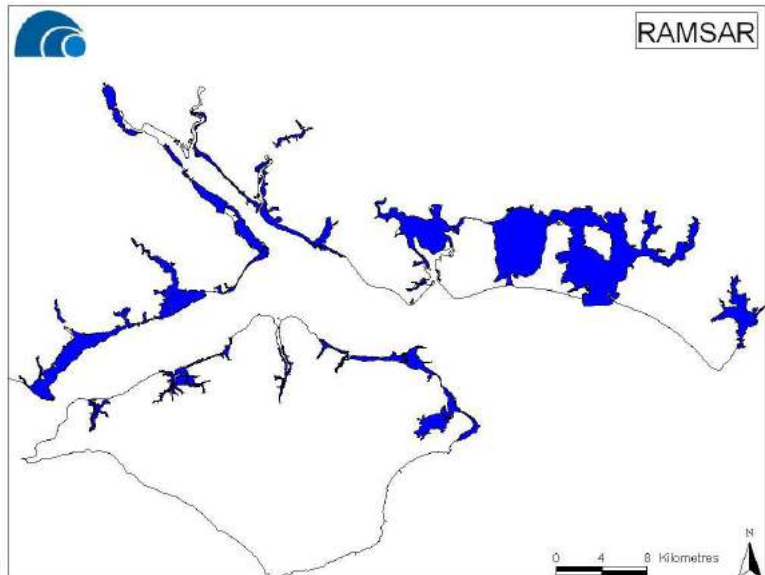
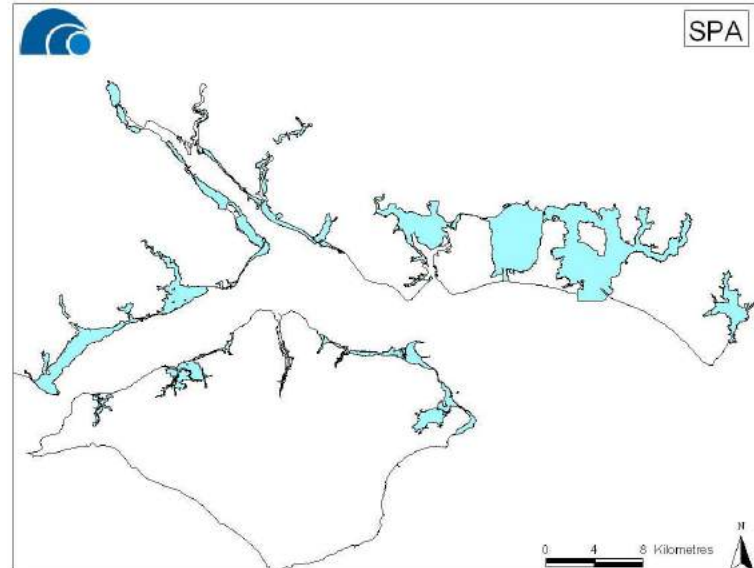
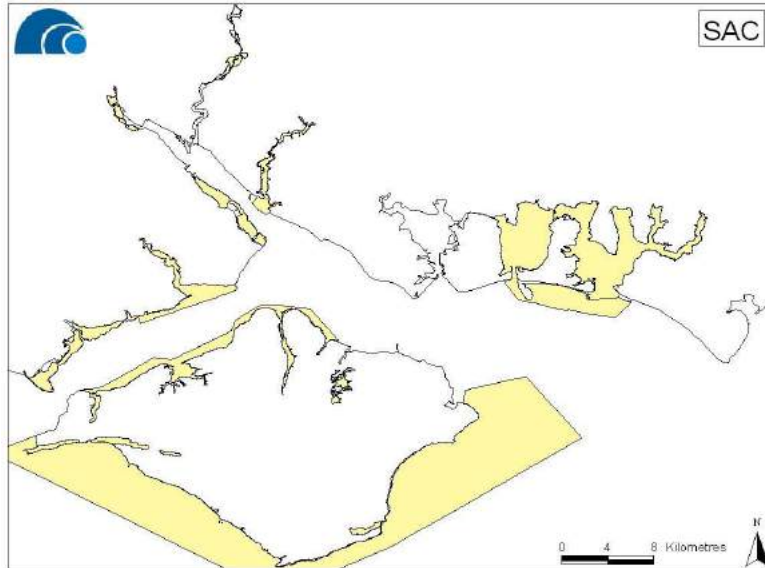
- Seawalls designed assuming saltmarsh in front
- Approximately 60% more saltmarsh in 1950's across Solent
- 50% of defences will be at end of residual life in 20 yrs
- Saltmarsh loss + climate change = significant upgrade



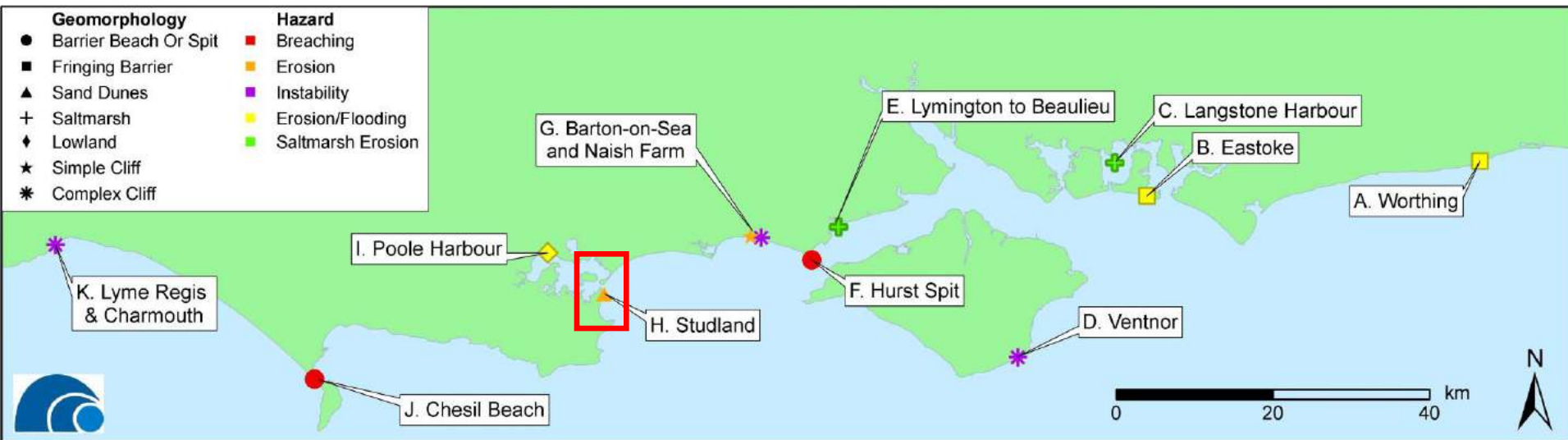
Saltmarshes – management and key issues

Why does saltmarsh loss matter?

Nature conservation



Sand dune case study



Sand dune case study – hazard and predicting erosion



Studland



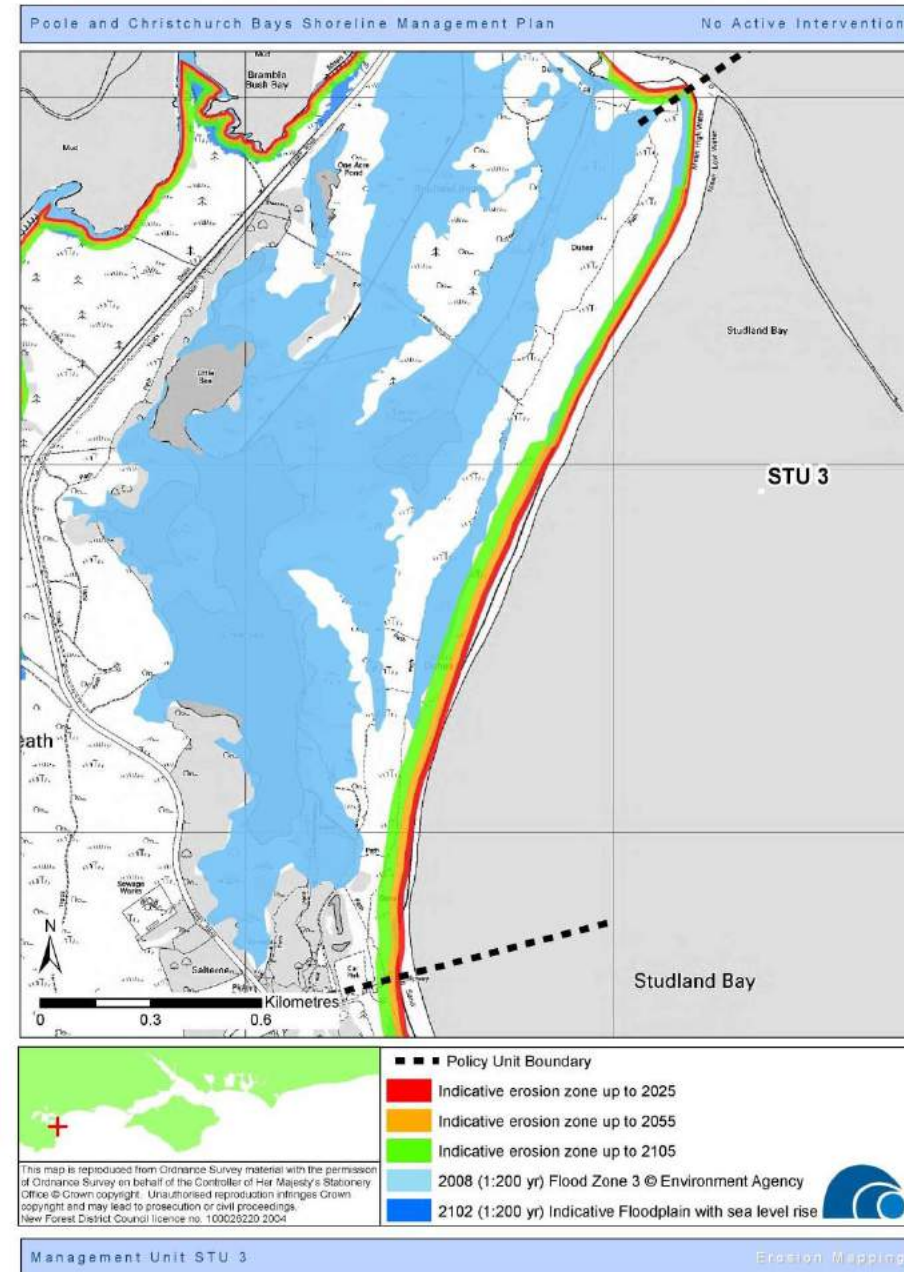
© Sam Cope

Sand dune case study – hazard and predicting erosion

Example of erosion at Dawlish Warren



© 2008 Teignbridge District Council

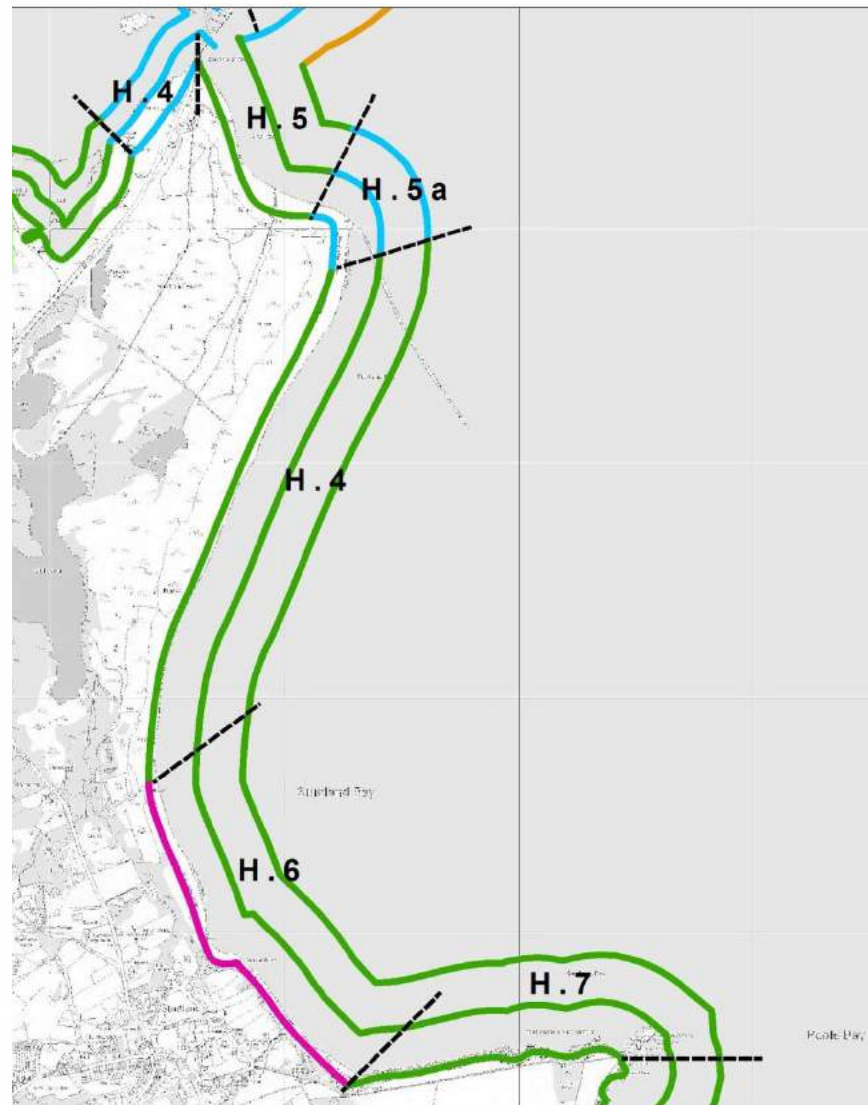


Sand dune case study – management and key issues

Poole & Christchurch Dynamic Coast Project

Poole Harbour

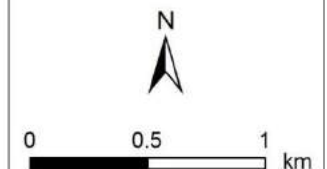
- Long term aim = restore natural functioning of the spit
- SMP2 = HTL for training banks, NAI for unpopulated stretch of beach, MR and NAI for Studland Village.
- Existing defences will fail and fixed assets will be moved or removed (beach huts and car parks)
- Monitoring data paramount in order to better understand the erosion and accretion behaviour of Studland Spit.



POLICY

- Advance the Line
- Hold the Line
- Managed Realignment
- No Active Intervention
- Policy Unit

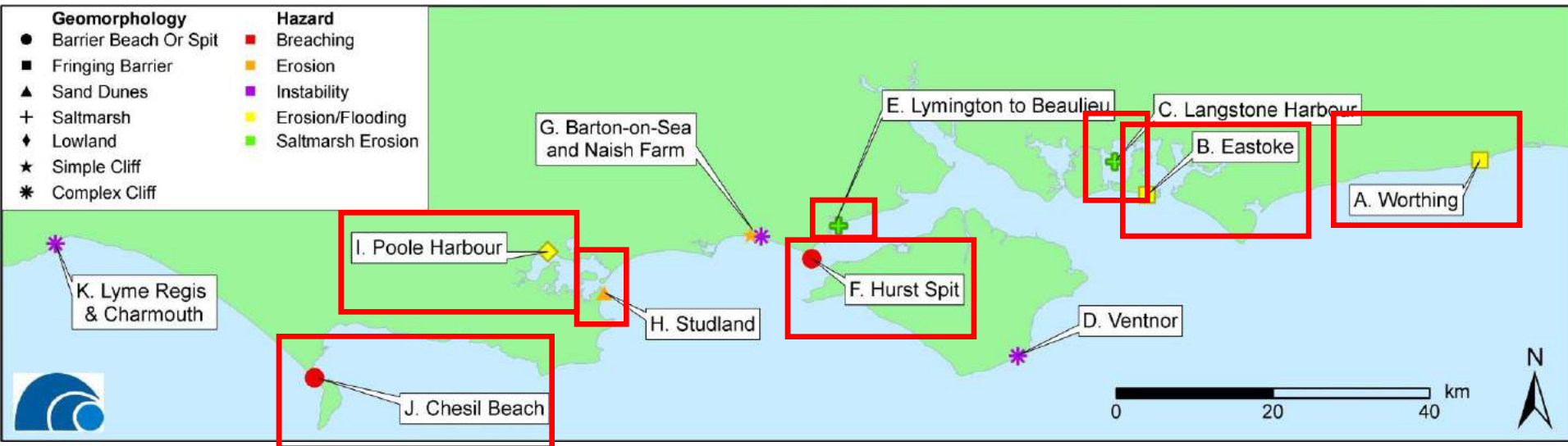
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. New Forest District Council licence no. 100026220 2004



SMP 2 Policies

Studland Spit

Summary of low lying case studies



- High number of assets at risk across the SCOPAC coastline reliant upon management of low lying features as a form of protection
- Requirement for robust assessment of low lying features in national and regional assessments of erosion
- Requirement for ongoing monitoring to form longer datasets