Coastal Development and Restoration in UK

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Coastal Resilience: The Environment, Infrastructure, and Human Systems

New Orleans
21-23 May 2014

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- Centre for Environment Fisheries and Aquaculture Science (since 1997)
- UK Government Marine Science Agency
- Executive Agency of Defra
- Advice to support / inform Policy and Regulation
- Strategic Research and Development to underpin UK and international policy
  - Fisheries
  - Marine Environment
  - Aquaculture / Fish Health

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Overview

- Introduction
  - Coastal development and pressure
  - Making space for water
- Sustainable solutions: case studies
  - **Sediment replacement**
    1. Harwich Haven
  - **Managed realignment**
    2. Wallasea Island
    3. Medmerry
- Benefits
- Way forward

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Pressures on coastal area

- **Natural forces**; tides waves and surges, extreme events
- **Natural processes**; sediment transport, sedimentation, coastal erosion
- **Climate change**; sea level rise, changing wind patterns, storm events
- **Anthropogenic activities**
  - Port development, coastal protection and sea defences, infrastructure project etc.
- **Increasing pressure** on shorelines and coastal landscape
- Highlight need for more **Sustainable Development** in order to meet future demands

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Making Space for Water

- **Storms and seal level rise = unsustainable sea defences**
  - Cannot defend everywhere £
  - Focus on properties

- **Environment Agency**
- **Local authorities**

- **Shoreline management plans**
- **Flood Coastal Risk Management Strategies**

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Shoreline management

- **Shoreline Management Plans (SMPs)**

  Set policy

  – Hold the existing defense line
  – Advance the exiting defense line
  – Managed realignment
  – No active intervention

- **Flood Coastal Risk Management Strategies**
  – Provide greater detail, how to.

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Coastal Development
Environmental considerations

- **Biodiversity 2020**

  ‘’halt overall biodiversity loss, support healthy well functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people’’

  – The government has set a combined target for the recreation of saltmarshes and mudflats, of 3,600 hectares (8,895 acres) by 2015

- **Birds and Habitats Directive**

  Where plans and projects have a significant effect on a protected site it can only proceed if:

  – there are no alternative solutions, necessary for imperative reasons of overriding public interest, and

  – compensatory measures are secured to ensure that the overall coherence of Natura 2000 is protected

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Case studies

- Sediment replacement
  - Harwich haven
- Managed realignment
  - Wallasea island, Essex
  - Medmerry, West Sussex

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Harwich Haven

Site Special Scientific Interest (SSSI)

Special Protection Area (SPA)

Ramsar

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Harwich Haven

- Port of Felixstowe - Approach Channel Deepening (1998-2000)
- Capital dredge to improve navigation
  - -12.5m CD to -14.5m CD
- 18Mm^3 of material (c.30M we tonnes)
- Subsequent port development projects e.g. Trinity III Terminal, Felixstowe South Redevelopment

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Effects of Port Development & Capital Dredging Projects

- **Effects on tidal propagation**
  - Change in cross sectional area of an estuary system can change the way a tidal wave propagates
  - Increase or decrease in intertidal exposure

- **Effects on erosion/accretion rates of intertidal areas**
  - Wave reflection
  - Increasing depths of dredged channels
  - Changes to current speed or direction

Sediment Replacement
(mitigation measures)

- **Subtidal placement of fine material**
  - Fine sediments that were dredged during the maintenance dredging campaigns have been placed on the seabed and act as a feed of material into the estuary system

- **Water Column Recharge**
  - to mitigate the predicted increase in the rate of intertidal erosion of approximately 2.5ha per annum

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Water Column Recharge

- Maintenance dredgings are discharged from the dredger at certain defined locations within the estuary system adjacent to intertidal areas
- Redistribute sediment to provide an increased supply to intertidal areas
- Deposits made under specific tidal conditions that encourage material to disperse over intertidal areas

Source: Harwich Haven Authority

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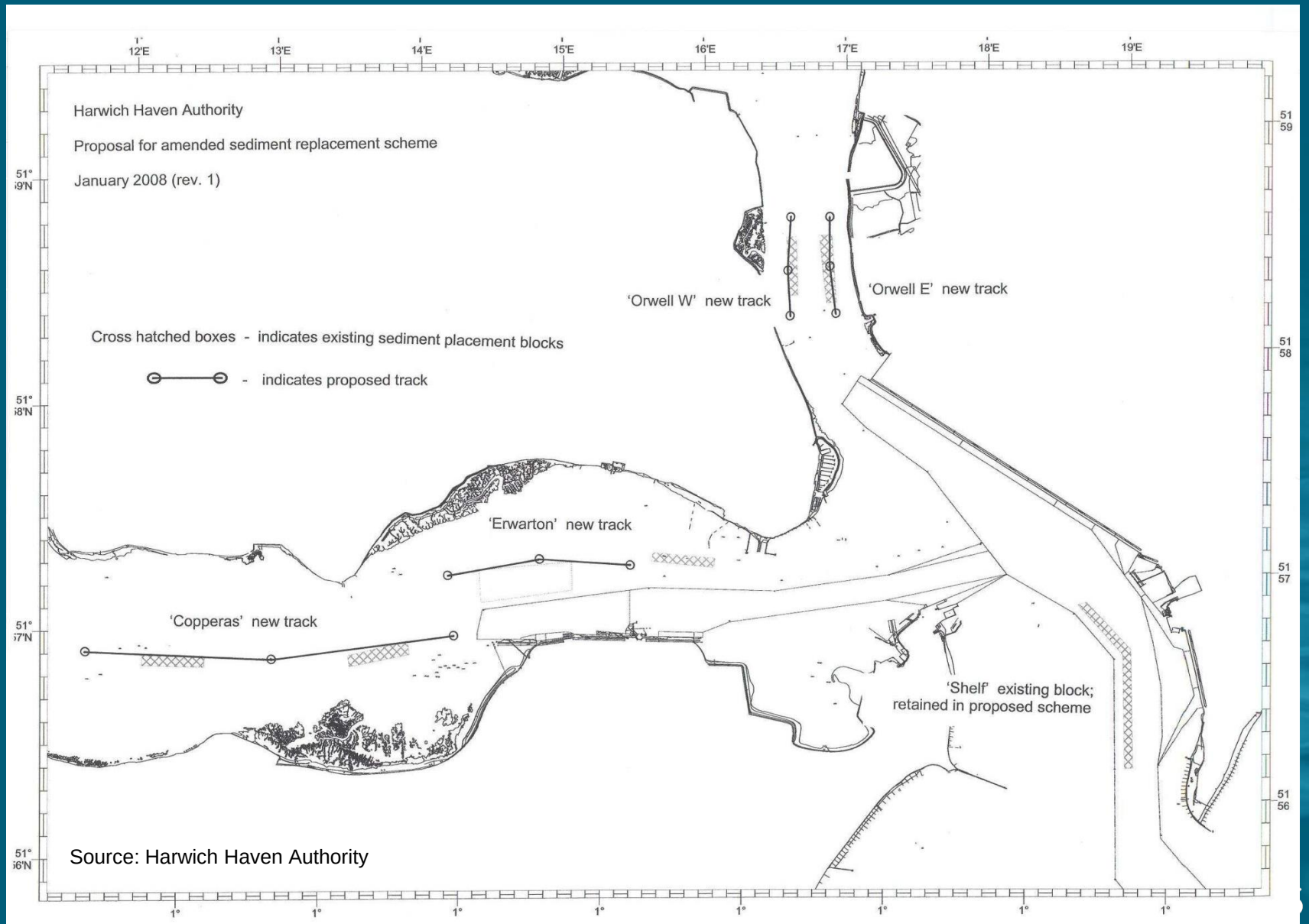
Sediment as the fundamental component of an engineered solution to coastal management



Source: Harwich Haven Authority

Compensatory Measures

Source: Harwich Haven Authority

- Compensating for 4ha of unmitigable ‘loss’ of intertidal
- Managed Realignment
  - Creation of 16.5 ha of additional intertidal area

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Managed Realignment

- **Rationale for management realignment (managed retreat)**
  - Reduced maintenance costs for coastal defence;
  - Space for sea level rise (addressing coastal squeeze);
  - Creating ‘new’ intertidal habitats;
  - Creating more sustainable shorelines and estuaries
- **Extensive practical experience**
  - Over 60 projects completed in UK

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Wallasea Island (Allfleet's Marsh)

- New wetland on the North shore of Wallasea Island, Essex 2006
- Compensatory habitat for port developments
- Enhance the coastal protection
- 550,000m^3 of maintenance dredge material to an area of saltmarsh within the realignment site
- Seawall breaches

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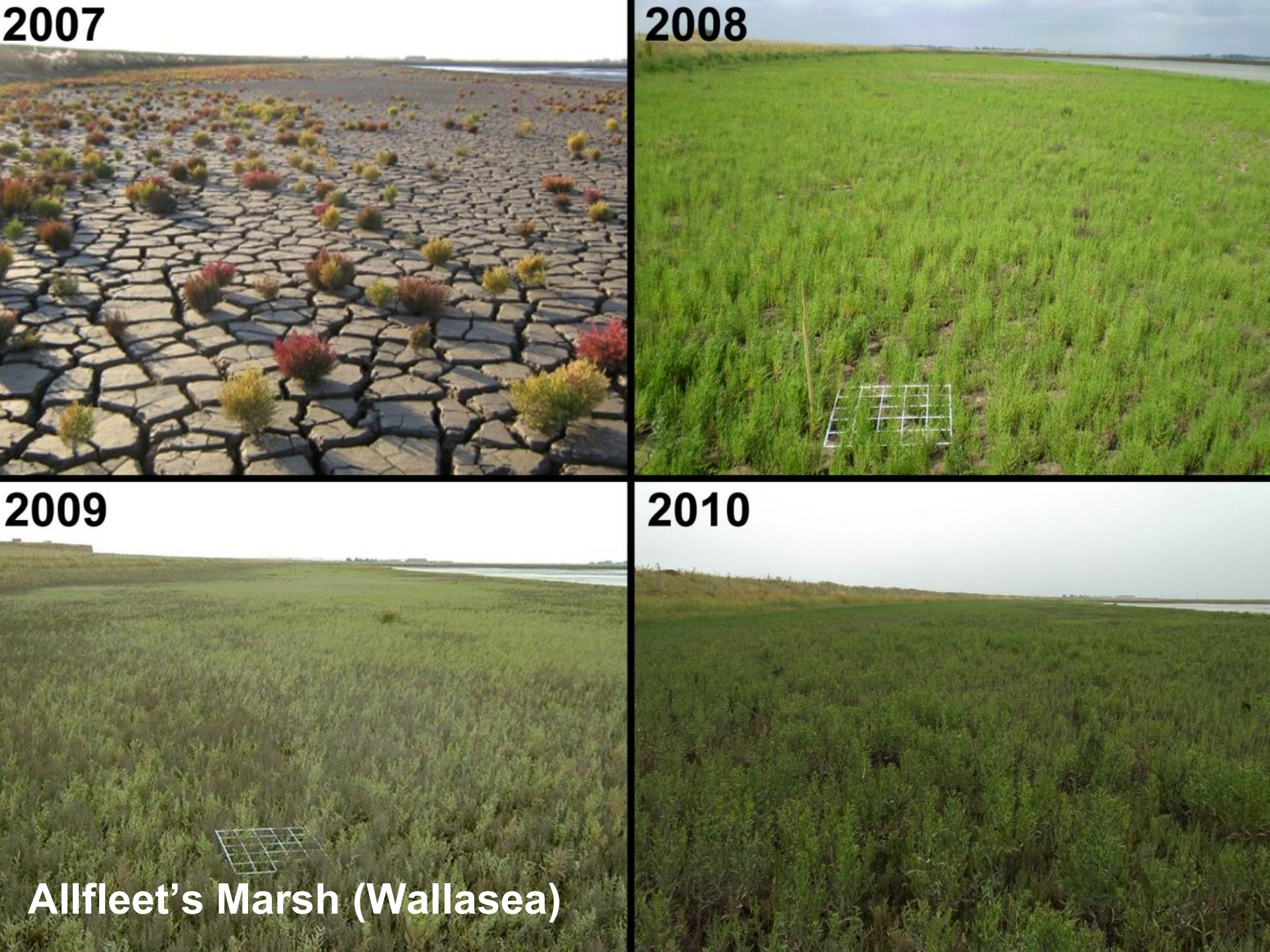
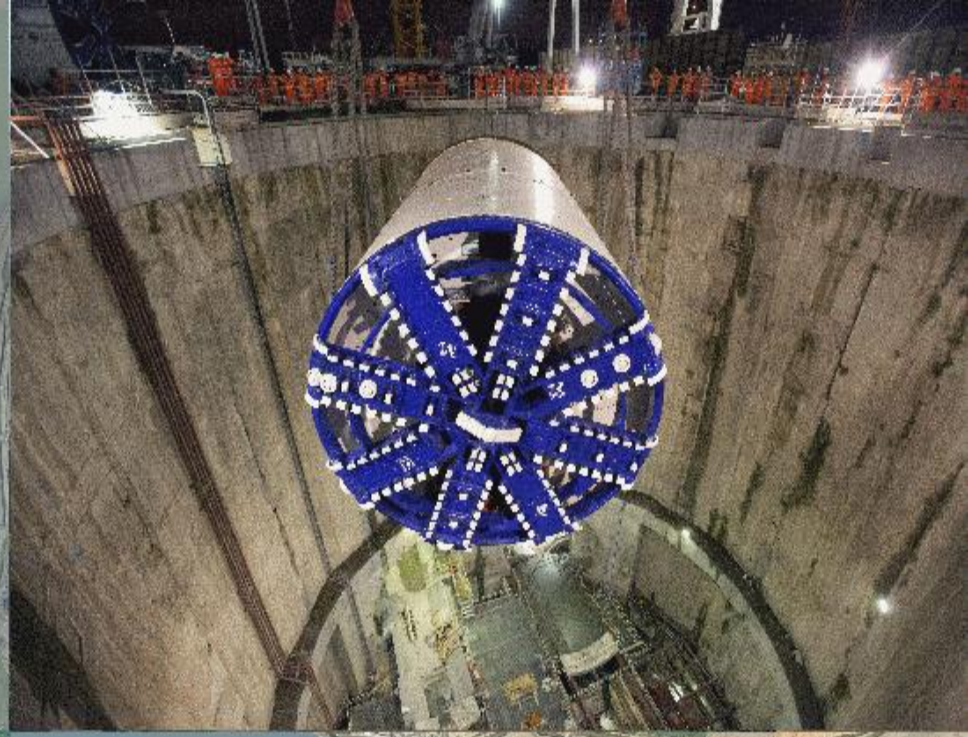
Wallasea Island Wild Coast project

- Landmark conservation and engineering scheme
- Combat the threats from climate change and coastal flooding
- Transformed from levee-protected farmland into a thriving wetland
- 670 hectares of secure habitat for wildlife
- **Regulated tidal exchange**
- Fill material from Crossrail project


Wallasea Island Wild coast
Allfleet’s Marsh
rspb
giving
nature
a home


2007
2008
2009
2010
Allfleet's Marsh (Wallasea)



rspb giving nature a home

Crossrail

Wallasea Island

- Total fill to be 7.5million m3 when completed
- Scheme will reduce future unmanaged flood prism change of 11million to managed prism change of 2.1 million
- Crossrail are currently moving 40,000 tonnes per week from London to Wallasea

Wallasea Island Wild Coast (September 2013)

rspb giving nature a home

Medmerry managed realignment

- **Environment Agency** built major new sea defences in West Sussex following 2008 flodding
- **The Medmerry scheme's overriding objective**
  - greatly improve the standard of flood protection for over 300 homes in Selsey, for the water treatment works, and for the main road into Selsey
- **Win-Win for communities and the environment**
  - create important new wildlife habitat
  - new footpaths, cycleways and bridleways

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Medmerry managed realignment

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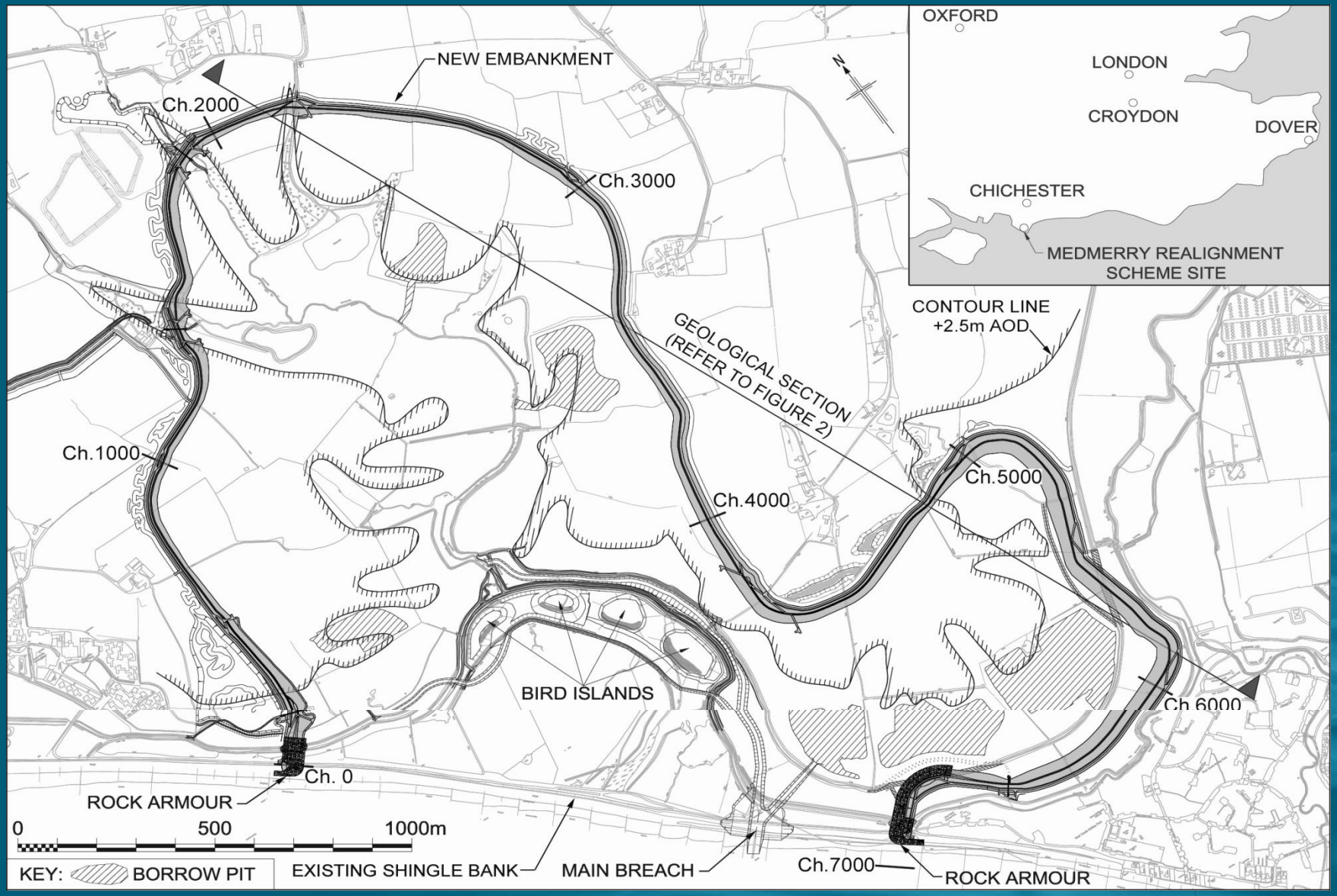
Medmerry managed realignment



Medmerry managed realignment

Medmerry managed realignment

- Breach now evolving towards new dynamic equilibrium
- First coastal shingle managed realignment in UK
- Proved its worth in winter storms 2013/14 when shingle was stripped down significantly
- Win Win for local communities and environment
  - Coastal protection
  - create important new wildlife habitat
  - new footpaths, cycleways and bridleways

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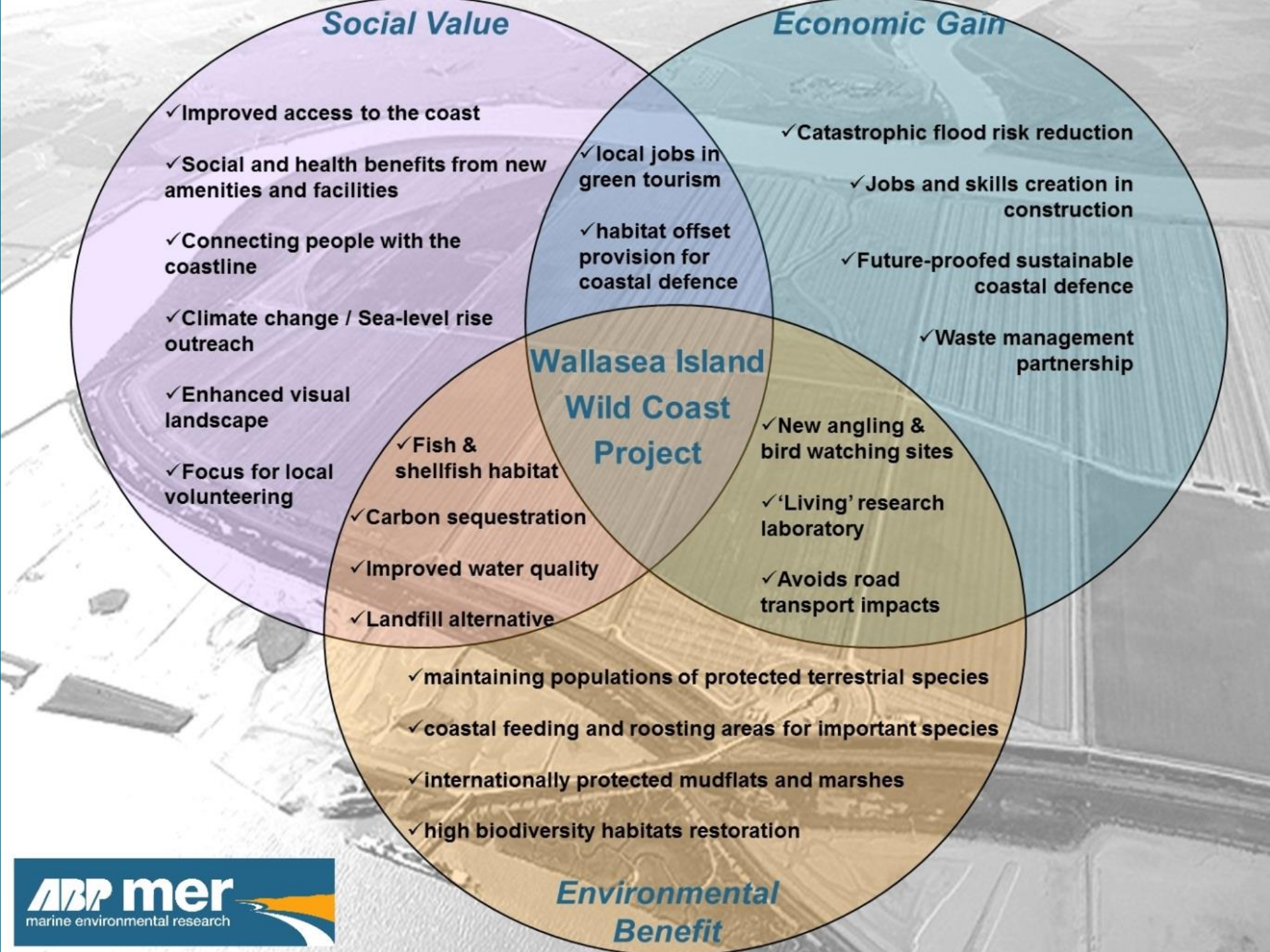
Social Value
✓Improved access to the coast
✓Social and health benefits from new amenities and facilities
✓Connecting people with the coastline
✓Climate change / Sea-level rise outreach
✓Enhanced visual landscape
✓Focus for local volunteering
Economic Gain
✓Catastrophic flood risk reduction
✓Jobs and skills creation in construction
✓Future-proofed sustainable coastal defence
✓Waste management partnership
✓local jobs in green tourism
✓habitat offset provision for coastal defence
Wallasea Island Wild Coast Project
✓Fish & shellfish habitat
✓Carbon sequestration
✓Improved water quality
✓Landfill alternative
✓New angling & bird watching sites
✓'Living' research laboratory
✓Avoids road transport impacts
✓maintaining populations of protected terrestrial species
✓coastal feeding and roosting areas for important species
✓internationally protected mudflats and marshes
✓high biodiversity habitats restoration
Environmental Benefit
ABP mer
marine environmental research

The way forward

- Working with nature and natural processes
  - Building / Engineering with nature
- Beneficial use
  - Dredged sediment valuable resource
  - Sediment as the fundamental component of an engineered solution to coastal management
- Managed Realignment
  - To meet SMPs aims by 2050 - realignment needs to increase 5-fold from 6km/year to 30km/year
  - Need to promote multifunctional benefits
  - What are the incentives/funds: Other than Habitats Regulations…WFD, Biodiversity offsetting, aquaculture? need to think bigger

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The way forward

- Longer term vision
  - Creating more resilient coastlines and delivering ecosystem services and sustainable development
  - Long term solutions will require change
  - Larger projects to help achieve habitat creation/restoration targets, provides services of economic value
- Marine planning
  - Opportunities for regional and local initiatives
- Partnership working
- Communication
  - A challenge for all projects; raising issues such as food security…..need to clarify the multiple benefits.

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Thanks you for your attention

Thanks to Colin Scott – ABPmer

The Online Managed Realignment Guide (OMReG)

http://www.abpmer.net/omreg/

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