

# Case Studies on Using Dredged Material for Mitigating Marine Navigation Works

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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

# Navigation Works Legislative Requirements

- Dredging activity
  - **Local Harbour Act**
  - **Coastal Protection Act 1949**
- Disposal of dredged material in UK waters licensed under **Food and Environmental Protection Act 1985 (FEPA)**
- International Conventions - **London Convention 1972**
  - **OSPAR**
- European Directives
  - **EIA Directive**
  - **Habitats and Birds Directives**
- **Beneficial use of dredged material**

# Case Study 1.

# Harwich Haven



- SSSI
- SPA
- Ramsar

# Harwich Haven

- Approach Channel Deepening (1998-2000)
- Port of Felixstowe
- Capital dredge to improve navigation
- -12.5m CD to -14.5m CD
- 18Mm<sup>3</sup> of material
- Subsequent port development projects e.g. Trinity III Terminal.

# Harwich Haven

- **Environmental Impact Assessment**
- **‘Appropriate Assessment’**
  - Reg 48 Conservation (Natural habitats &c.) Regulations 1994.
  - Assess implications of proposed development for the designated status of ‘European sites’ (SPA).
  - Drives need to develop appropriate mitigation and compensation measures in light of predicted effects.

# Channel Deepening - Effects on hydraulic and sedimentary regime

- Increase in intertidal erosion

- Approx. 2.5ha yr<sup>-1</sup>

Mitigation

- Muddy material trapped in deepened channel.

- Maintenance dredging result in fine material being lost from the estuary system.

- Decrease in tidal range

Compensation

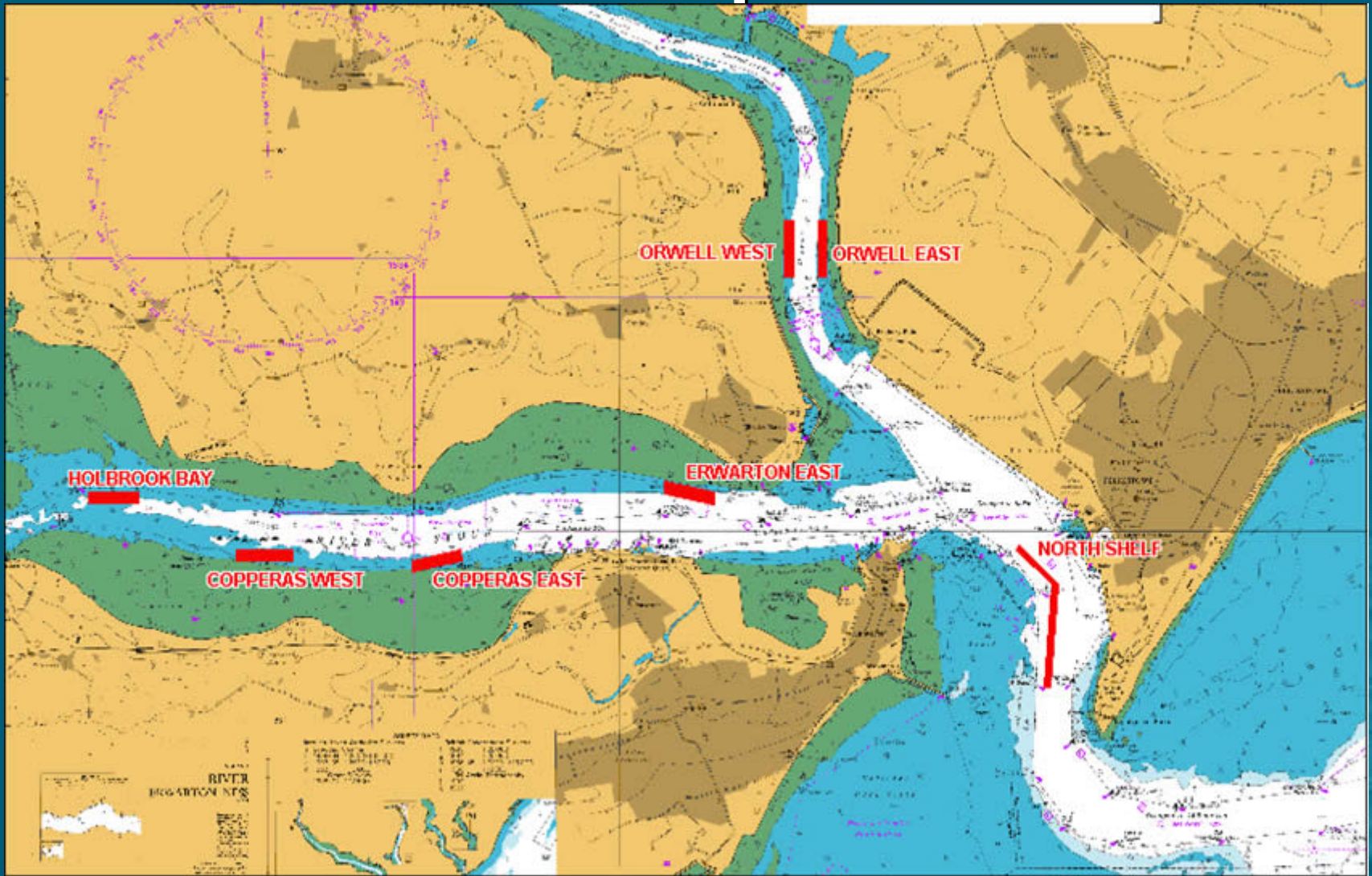
- Decrease in exposure of approx. 4ha intertidal area.

# Mitigation Solutions

- **Sediment Replacement**
  - **Subtidal placement of fine material**
  - **Water column recharge**



# Sediment Replacement



# 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**

# Beneficial use schemes

- **Habitat enhancement schemes**
  - Higher ecological value intertidal habitat
  - Increased stability of flood defences



## Case Study 2.

# Humber



- SAC
- SPA
- Ramsar

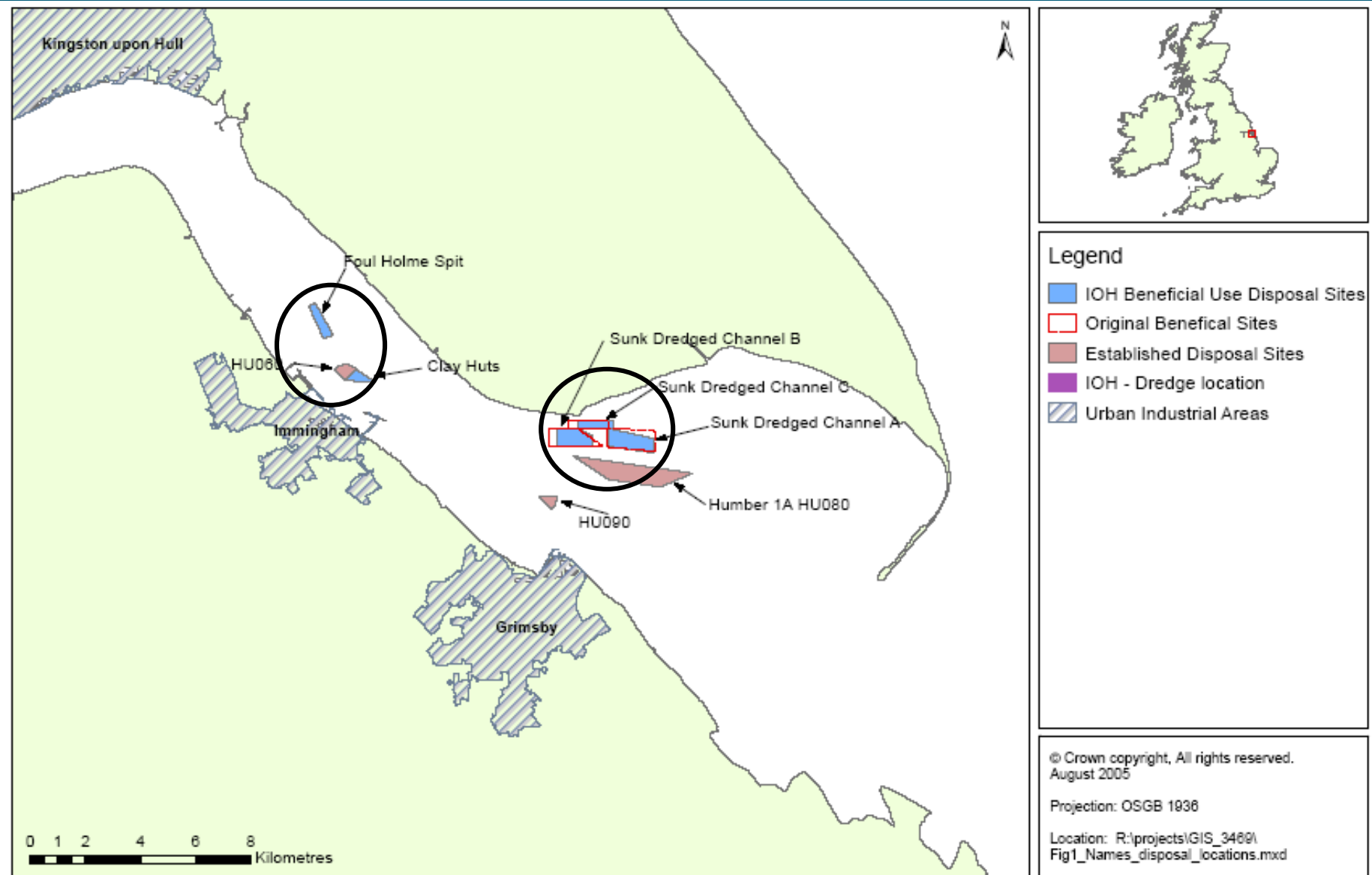
# Immingham Outer Harbour

- **Roll-on Roll-off terminal**
  - 5 berth Ro/Ro tidal harbour
- **Capital dredge** - 2.7Mm<sup>3</sup>
- **Maintenance dredge** - 600,000m<sup>3</sup>
  
- **EIA, Appropriate Assessment**
- **Direct loss of 22ha of intertidal area**

# Mitigation/Compensation Solutions

- **Beneficial use disposal sites**
  - Redistribute sediment to provide an increased supply to intertidal areas
  - Positive benefit to estuary system
- **Habitat enhancement**
  - Doig's Creek
- **Managed realignment schemes**
  - Chowder Ness & Welwick

# Disposal Site Locations used for Immingham Outer Harbour



# Summary of UK Dredged material Disposal 2000-2003

## Wet Weight Disposed of in Year

	2000	2001	2002	2003
Total disposed	33,052,575	35,298,840	31,063,613	32,406,004
Internal waters disposed	19,435,923	18,146,836	18,817,135	21,034,912
% Internal waters	59	51	61	65

**50-60% of the total amount of dredged material disposed of in the UK marine environment is disposed of in 'internal waters' and thus likely to contribute to sediment budgets in estuaries and embayments**

**Around 55% of disposal sites used are in 'internal waters'.**

# WFD & Hydromorphology

- **Recognise and accommodate the important role of sediments in estuarine and coastal systems**
- **Need to ensure potential conflicts with sediment management regimes under EU Birds & Habitats Directives are avoided**
- **Recognise and accommodate the effects of activities such as maintenance dredging, beneficial use of dredged material etc. in setting GEP targets**



# WFD & Hydromorphology

- **Need to balance the nature conservation desirability of retaining dredged sediment within the system with the requirement to meet achieve good ecological and chemical status.**

