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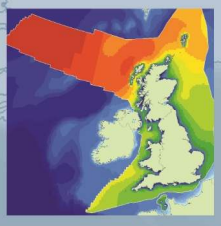
Wallasea (North) Managed Realignment Scheme (England)

Case Study

March 2011

Creating sustainable solutions for the marine environment


Basic Statistics

Location	Coordinates (long; lat)	Area (ha)	First Tidal Inundation Date	Years Embanked	Previous Land Use	Tidal Range
North Bank of Wallasea Island, Crouch Estuary, Essex	51.6163120916752; 0.83645559218361	115	Over two phases in June and July 2006	>400	Arable	5m (spring)

Plate 1. The managed realignment along the north bank of Wallasea Island (at high tide) – Bing Maps derived aerial view

Design and Management

For this scheme a new secondary wall was constructed (in 2005) about 400m back from existing sea defences. This new wall was an extension to one that had been constructed three years previously by the landowner. The majority of the site fronting these walls was at an elevation half way between Mean Low Water (MLW) and Mean High Water Neap (MHWN) and thus was suitable for mudflat development. To also create an area of saltmarsh, 550,000m^3 of maintenance dredge arisings (from the Port of Harwich) were placed on the seaward side of the walls. This was deposited in a 45m-wide strip – it was contained by the new sea wall and a clay bund to its seaward side. The topography was raised to a level just below the Mean High Water Springs (MHWS) level using this sediment recharge approach. In addition, within the site, seven island features were created. A new borrow dyke (soke dyke) was excavated on the landward side of the new counterwall. No new internal creeks needed excavated to promote effective site filling and draining on each tide because the existing field drains and borrow dyke on the site fulfilled the function very effectively without manipulation. One new channel did have to be introduced though to connect one of the breaches directly back to a flood management sluice in the new sea wall.

(Taken by: ABPmer)

Plates 2 & 3. Dredge sediment recharging in November 2005 and May 2006

In early Summer 2006, six breaches were made through the existing seawall to flood this 115ha site. The total width of the breaches is 590m, with one breach being 210m wide and the others being either 60m or 100m. The final breach arrangements were selected based on a range of factors; they were positioned to provide the requisite flows through the site and also to minimise the losses of saltmarsh habitat in front of the existing seawall. They were also located to integrate well with the existing foreshore. For instance, Breaches 1, 2 and 3 in (the most easterly) Area A were located on prominent headlands to ensure that the narrow intertidal areas either side of the breaches continued along a relatively unaltered parallel alignment with the seawall. This ensured that there was no significant creek formation across the fronting intertidal after realignment. Analysis was undertaken to check whether stable regime channels would form at the centre of the unaltered parallel alignment with the seawall. This ensured that there was no significant creek formation across the intertidal after realignment. Analysis was undertaken to check whether stable regime channels would form at the centre of the breaches.

(Taken for Defra, July 2006)

Plate 4. Construction of Breach 4 (8,000m^3 of material was moved during a 7h tidal window)

The proposed breaches are much wider than the minimum width suggested by the modelling and, as such, the flows were dissipated sufficiently to ensure that there is no significant scouring of the

sediment. The site as a whole is separated into three discrete areas with no exchange of water flow between them so that it acts like three individual but contiguous realignment sites.

The site is now managed by the Royal Society for the Protection of Birds (RSPB) on behalf of the Department for Environment Food and Rural Affairs (Defra).

(Taken for Defra, July 2006)

Plate 5. The site on the final day of breaching (view east)

Promoters and Objectives

Promoted by Defra to create new mudflat and saltmarsh in compensation for losses of similar coastal habitats following port developments at Lappel Bank (in the Medway Estuary) and Fagbury Flats (in the Orwell Estuary). Also to enhance the coastal protection afforded the island, because its north bank was at risk of natural and unmanaged seawall breaching.

Funding

Funded mainly by Defra who commissioned an extensive site investigation/selection programme as well as all the legal, public consultation and scheme-build elements of the project. The landowner, Wallasea Farms Ltd, assisted throughout and was responsible for the submission of the Planning Application and, post-construction, will be responsible for site maintenance.

Planning Requirements and Consultation

An extensive consultation with statutory authorities and locals was carried out in the early stages of the process (prior to the final selection of the Wallasea site when two or three potentially viable options had been identified) to seek opinions and also to help scope any future assessment

process. During the Planning Application the following the planning/consent issues were encountered:

1. Town and Country Planning Act 1990 – Planning permission was required and obtained from Local Authority (purpose: (1) Control of construction to mean low water; (2) Temporary and permanent footpath diversions; (3) Evaluation of archaeological impacts.)
2. Town and Country Planning Act (EIA) Regulations 1999 (the EIA Regulations) - Proposal classed as infrastructure project comprising coastal works capable of altering the coast under under Schedule 2 of EIA Regs. An Environmental Impact Assessment (EIA) was required to accompany planning application.
3. Habitats Regulations (1994) - Appropriate Assessment required for impacts on Natura 2000 areas (information required for this assessment was provided in the Environmental Statement).
4. Wildlife and Countryside Act 1981 – EIA included assessments of impacts to species protected under Schedule 5 and impacts on Sites of Special Scientific Interest.
5. Land Drainage Act 1991 - Consent from the Environment Agency was required because existing drainage systems and coastal defences were affected. It was agreed with EA that a single Land Drainage application could cover all the works and future maintenance of the seawall.
6. Water Resources Act 1991 - Consent from the Environment Agency Flood Defence Committee was required for proposed works affecting tidal flood defences. A discharge consent was not required (there will be no discharge from the site to the estuary & the dredge arisings were dewatered entirely within the realignment). A water abstraction licence was not needed because the scheme involved altering the coast to allow "natural" abstraction.
7. Highways Act 1980 - Separate consents were needed from the Local Authority for temporary and permanent footpath diversions.
8. Harbour Works Licence – the Harbour Authority required details of the plans to provide a works licence under Crouch Harbour Act 1974 responsibilities.
9. Crown Estates – a consent was sought to safeguard land ownership (otherwise it reverts to the Crown after breaching). Must include definitive map of before and after.
10. Coast Protection Act 1949 (CPA) - Agreed with the Marine Environmental Consents Unit (MECU) that no consent was needed under Section 34 (as amended by Section 36 of the Merchant Shipping Act 1988) for construction, works below mean high water Springs (MHWS) or for temporary blocking of navigation during the recharge operations.
11. Food and Environment Protection Act 1985 (FEPA) – Agreed with the MECU that construction or sediment deposition licences under Part 2 were not needed. With respect to the sediment recharge works, although a formal FEPA consent is not required (because arisings will not be deposited below MHW), the quality of the material was still double-checked and subject to FEPA-standard studies as if a consent was being applied for.
12. Waste Management Licensing Regulations 1994 - A waste management licence or an exemption under Regulation 17 of the Waste Management Licensing Regulations 1994 was not required.

(NB: The new Marine Licensing System introduced by the Marine and Coastal Access Act 2009, and launched in spring 2011, transferred responsibility for Marine Licences (FEPA and/or CPA) to the new Marine Management Organisation (MMO)).

Monitoring

An initial five-year monitoring programme is being undertaken to describe the ecological development of the site and determine whether it meets compensation targets. This 'site success' monitoring includes surveys of overwintering waterbirds, benthic invertebrates, saltmarsh vegetation growth, sedimentation/erosion patterns and the settlement characteristics of the recharge area. To confirm the findings of the assessment work and test the effectiveness of the mitigation measures, this five-year programme also includes 'impact verification' monitoring with surveys of flow speeds, shoreline topography and channel bathymetry in the estuary.

Findings and Lessons

This project has benefited from detailed investigative work and consultations that were undertaken as part of the site selection, scheme design and impact assessment work as well as for the preparation of the monitoring programmes. However, the need to find such a large site that met all the requirements was a long-term and costly exercise.

There has been a full time project manager with supporting teams including representatives from statutory and non-statutory authorities and these aspects have enabled problems to be foreseen and rapidly addressed. The team approach has also allowed innovative new design elements to be identified which should provide high value at low cost (e.g. the island features in the site and a new 'heterogenic' borrow-dyke design).

(Taken by: ABPmer, 2007)

Plate 6. View of mudflat within site, showing drainage creeks formed as sediment has accreted

The initial monitoring is still ongoing, and the full results from the first five-year monitoring programme have not been reported yet. However, from the interim progress reports that have been produced by ABPmer and Jacobs up to the end of 2010 (i.e. up to four years after the breaching), the following general observations have been made:

Breaches and channels

The breaches and channels through them are very stable which confirms the effectiveness of the approaches that were taken to design them.

Accretion

Within the site, sediment accretion has occurred relatively consistently and evenly due to the slow flows and stable internal creek/channel configurations. In the first year after breaching (2006 to 2007), accretion was around 10cm (of which about 50% is considered internally relocated materials and 50% externally imported sediments). In each subsequent year, the annual accretion is considered to be predominantly related to imported sediments and amounted to 3 to 5cm on average (specifically 5cm in both 2008 and 2009, and 3cm in 2010).

Invertebrates

The accretion and the relatively stable and depositional nature of the environment has helped to promote rapid benthic invertebrate colonisation of the mudflat (approx. 80ha in extent). After the first year, invertebrates abundance was at 20,000 organisms/m^2 and has ranged between 10,000 and 20,000 organisms/m^2 in each successive year. The benthic assemblages have been dominated by large numbers of mud snail (*Hydrobia ulvae*) and although the patterns of organism recruitment are clearly complex and variable, there is evidence that the assemblages are maturing over time. This is indicated by the bivalve species becoming an increasingly important component over time (representing 2%, 4%, 14% and 26% of the populations in each successive year).

Birds

The bird monitoring (by CJT Ecology) shows that over the course of the four completed years of the monitoring programme the site has been supporting very good numbers of waterbirds. This was the case even from the first winter survey (2006/07) when the site supported around 7,000 waterbirds and included good numbers (i.e relatively high in a national or international context) of many key species such as shelduck, dunlin, black-tailed godwit, ringed plover and golden plover. In the following two winters the value of the site continued to improve as the abundance of waterbirds increased to around 10,000 and then 12,000. For the most recent winter (2009/10) however the overall abundance levels declined slightly. These broad trends are strongly influenced by some major inter-annual changes in the abundance of certain species which, in turn, are likely to be influenced by the weather conditions (e.g. particularly bad weather conditions were experienced in 2009/10 when compared with other years) and/or a range of other factors that influence the natural dynamics of bird populations (e.g. breeding success, timing of migrations, national population trends and inter-annual or inter-generational changes in roosting/feeding site selection). It is of note however, that the numbers of birds using the site as a roost reduced in 2009/10 while the number of birds feeding increased. This may indicate that the habitat and the relationship with migratory birds is still maturing and developing or that under adverse weather conditions the site's value as a feeding site as opposed to a roosting site increases.

Saltmarsh

Saltmarsh coverage of elevated areas of the sites (approx 25ha in extent) has occurred relatively rapidly. On average plant coverage (i.e the amount of marsh plant compared to bare mud at any given location) has rapidly increased from less than 1% in 2007 to 6% in 2008, 60% in 2009 and finally at or around 100% in 2010.

(Taken by: ABPmer)

Plate 7. Fixed-point photographs showing the rate of saltmarsh development on the recharge sediment

Contacts

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References

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Website

Project website (incl. monitoring): www.abpmer.net/wallasea