

Joint Defra / EA Flood and Coastal Erosion Risk Management R&D programme

Background to R&D project

The Freiston Shore Managed Realignment is one of the largest sites to be created in the UK, to date. The site was formally reclaimed agricultural land owned by the HM Prison Service (HMP), and the outer embankment was at risk of failure. The Environment Agency (EA) found repairing and strengthening the existing landward defence, to bring the bank into alignment with the adjacent defences, to be the best option. The Royal Society for the Protection of Birds (RSPB) was keen to use this opportunity to create a new wetland habitat and purchased the land from HMP. The inland bank was strengthened, and the seaward bank breached in the summer of 2002 to provide a 1:200 year level of defence to over 80,00 ha of low lying fen land. The monitoring programme started at the end of 2001 and finished in September 2007.

The aims of the scheme were:

- To create a sustainable flood defence scheme through the establishment of salt marsh
- To establish a salt marsh community of botanical value, and to provide a suitable habitat for invertebrates and birds
- To avoid adverse impacts on existing habitat on adjacent salt marsh and mudflat
- To establish new brackish water habitat by creating a lagoon landward of the realignment site (monitored by RSPB)

A joint EA and Defra R&D project enabled a monitoring programme undertaken by the Centre for Ecology and Hydrology (CEH) as main contractors, with the following objectives:

- To monitor the natural development of the salt marsh in the realignment site
- To check that there are no adverse impacts of the scheme to the existing adjacent salt marsh

Results of R&D project

- Accretion rates observed within the site are nearly the equivalent to the elevations outside the site.
- Vegetation establishment has been highly successful (where no standing water)
- Mean total vegetation cover is approaching that outside. Estimate equivalent cover between 2008-2010
- Mean species diversity is now similar & all species found outside are now found in the MR site at expected elevations. All common species are widespread in the MR.



- Pioneer annuals were 1st to colonise in 2003; replaced by a succession of expected perennial species, particularly at higher elevations. The MR is approaching equivalent community types to the outside reference marsh. Estimate this could be achieved within 5 more years
- Creeks developing rapidly inside MR
- Invertebrates: increased in abundance and diversity; most taxa outside found in MR by 2006
- Fish utilisation: MR site shown to be a valuable nursery habit for juvenile fish throughout the entire tidal cycle - continuous use of permanently flooded channels and pools

R&D Outputs and their Use

The main outputs of this monitoring programme has been the two R&D Technical Reports FD1911/TR. This report outlines the final year of site monitoring in 2007 and surmises site development based on the previous 2002-2006 monitoring report. The first report describes the aims and objectives of the managed realignment and provides full detail of the monitoring techniques and methodologies employed in the five year monitoring programme carried out at Freiston.

The reports provide an account of site change following initial breaching, through monitoring key indicators of development such as vegetation establishment and accretion rates and to compare these to the existing, surrounding salt marsh as a measure of success. The research will assist in future realignment schemes, and associated monitoring, by considering the balance between available resources and the need to understand the processes associated with salt marsh establishment. It is intended that Defra and Environment Agency staff, coastal managers, partners, and researchers may use learn from Freiston, and use it as a model for future work.

In addition to the technical reports, two PhDs and many papers in conjunction with the monitoring programme have been published in scientific journals including *Marine Geology* and *Journal of Coastal Research*. Papers have also been presented at conferences worldwide including *Littoral Conference 2004*; *Eurocoast Littoral 2006*; *9th International Coastal Symposium* and the upcoming *Defra/EA Flood and Coastal Management Conference 2008*.

This R&D Technical Summary relates to R&D Project FD1911 and the following R&D output:

R&D Technical Report FD1911/TR – Wash Banks Flood Defence Scheme – Freiston Environmental Monitoring 2007. Published October 2008.

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The above outputs may be downloaded from the Defra/EA Joint R&D FCERM Programme website (www.defra.gov.uk/environ/fcd/research).



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