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Using sediment as a resource

Brightlingsea Harbour



USAR - Using Sediment As a Resource









Image: courtesy of Brightlingsea Harbour

Using Sediment As a Resource Commitment

- Interreg 2 Seas Programme
- Priority: Resource efficient economy
- Objective: increase the adaptation of new solutions for a more efficient use of natural resources and materials
- Work Package: Use of marine dredged sediment in coastal saltmarshes as coastal defence
- Start date: 01 March 2016
- End date: 30 April 2020

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Using Sediment As a Resource Ecosystem Services

- Natural coastal flood defences
- Internationally important wetland habitats







Image: adapted from Toft et al. 199

Using Sediment As a Resource Dredging and Restoration Sites





September 2015



October 2018





Techniques

- Dredging Techniques:
 - Water Injection Dredging, close to infrastructure on ebbing tides
 - Plough, to obtain level bed for ease of navigation
 - Cutter Suction Dredging, Year 2 only prior to hydraulic pumping
 - Excavator, to maintain mechanical strength for beneficial reuse





Using Sediment As a Resource Techniques

- Restoration Techniques:
 - Construction of traditional brushwood fascine (polder) retaining structure
 - Mechanical placement (excavator)
 - Hydraulic pumping (Year 2 only, St Osyth borrow pits)



Year 1, Oct. '16 – Mar. '17





Main channel west







Trial sites





Trial sites





Trial sites



Using Sediment As a Resource Year 1 Work Outcomes



Successful placement (and retention!) of 400t of dredged material

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Year 2 Work Outcomes – Autumn phase

 Approximately 9,000m³ dredged by Smals and pumped into St Osyth Pits during the autumn phase of this years works





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Year 2 Work Outcomes – Bathymetry (autumn phase)

• Pre dredge and post dredge bathymetry as well as progress bathymetry taken to control the operation





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Year 2 Work Outcomes – Autumn phase (Nov 2017)





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Year 2 Work Outcomes – Monitoring (October 2018)





Working with Nature– Monitoring (October 2018)





Year 2 Work Outcomes – Spring phase

• Approx. 4,500m. cu. Dredged with a long reach excavator and placed in the Cindery West compartments.



Using Sediment As a Resource Year 2 Work Outcomes – Spring phase



-3.00 m -2.80 m -2.60 m -2.40 m -2.20 m -2.00 m -180 m -1.60 m -1.40 m -1.20 m -1.00 m -0.80 m -0.60 m -0.40 m -0.20 m -0.00 m -0.20 m -0.40 m -0.60 m --0 80 m --1.00 m -1.20 m --1.40 m -1.60 m 180 m 200 m 2.20 m 2.40 m 2.60 m -2 80 m 3.00 m

Dredge progress bathymetry: 2nd February 2018, combined with Autumn phase post dredge bathymetry and previous UAV data (contours at 0.5 m intervals, **CD bold**)





Year 2 Work Outcomes – Spring phase

- Approx. 400 m of brushwood fascine was installed to complete Cindery West West point, including oyster shell breakwater artificial reef
- Approx. 70 m of brushwood fascine were installed in Howlands Marsh, St Osyth Creek site, and construction began on Howlands Marsh West site, including use of Christmas trees from the community engagement project.





Monitoring and studies

- Water quality monitoring
- Bird monitoring
- Vegetation monitoring
- Benthic sampling
- Sediment stability
- Method trials
- Pumping trial



Environmental monitoring ongoing



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Environmental monitoring ongoing





Using Sediment As a Resource Christmas trees and brushwood fend



Christmas trees and brushwood fences, Howlands Marsh (March 2019)





Detailed research plan

- Wave attenuation
- Vegetation
- Geotechnical and consolidation
- Bio-geochemical cycling





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Thank you for your attention

