Case Study: Beneficial Use of Sediments

<table>
<thead>
<tr>
<th>Project</th>
<th>Coastal Defence and Habitat Restoration</th>
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<tbody>
<tr>
<td>Classification</td>
<td>R5B_1990_UK</td>
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<tr>
<td>Major Function</td>
<td>Resiliency: Protecting vulnerable sea defences</td>
</tr>
<tr>
<td>Other Function</td>
<td>Restoration: Restoring coastal marsh, mud, and shingle habitat</td>
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<tr>
<td>Location</td>
<td>Horsey Island, Essex, UK</td>
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<tr>
<td>Volume</td>
<td>255,000 m³ (shingle and silt) over five separate campaigns</td>
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<tr>
<td>Technique</td>
<td>Various rainbow &amp; pumped recharge</td>
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<tr>
<td>Contaminants</td>
<td>No/low contamination</td>
</tr>
<tr>
<td>Granulometry</td>
<td>Shingle from capital dredge then silt/mud from maintenance dredge</td>
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<tr>
<td>Scale</td>
<td>Project scale (approximately 15 hectares overall)</td>
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<tr>
<td>Client</td>
<td>Environment Agency (also formerly as National Rivers Authority)</td>
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<tr>
<td>Executor</td>
<td>Ports of Harwich and Felixstowe, Environment Agency</td>
</tr>
<tr>
<td>Research programme</td>
<td>Last campaign of marsh recharging was Interreg Project (ComCoast)</td>
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<tr>
<td>Contact</td>
<td>Collin Scott, ABPmer, <a href="mailto:cscott@abpmer.co.uk">cscott@abpmer.co.uk</a>, 07725 638 620</td>
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<tr>
<td>Year start–end</td>
<td>1990–2006</td>
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Description of the project

Between 1990 and 2006, several beneficial use projects were undertaken at Horsey Island on the eastern coast of England. These involved placing dredged sediment directly onto intertidal habitats to achieve both habitat restoration and coastal protection objectives. They include the first, and also some of the largest, of such projects yet undertaken in the UK.

Horsey Island lies at the centre of the Hamford Water coastal inlet and provides an important coastal protection function for this embayment. It is also important as a feeding, nesting, and roosting habitat for birds. However, it is susceptible to wave attack on its northern side. As a result, by the early 1990s, its northern seawalls had been undermined and large areas of coastal habitat were lost (Dixon 1992).

In response, several beneficial use initiatives were undertaken using sediment from capital and maintenance dredging at the nearby ports of Harwich and Felixstowe. Some novel techniques were
employed and the process was quite complex, with multiple implementation phases and associated monitoring, consultation, consenting, and assessment tasks.

Approximately 255,000 m³ of coarse and fine sediment was used in five main phases. These placed sediment have since been relatively stable. After placement, the coarse shingle and sand initially rolled landwards, however, it was then stabilised when silt was placed behind it. The majority of the imported silt was evidently also retained on site. There have been ecological improvements resulting from this work. Prior to the works, the site had largely been an eroded hard foreshore, however, it was converted into a mix of habitats including mudflat, marsh, and a shingle spit (latter used by nesting birds such as Little Terns).

This work demonstrated the value of beneficially using dredge sediment for both coastal protection and habitat restoration. It has also shown that while some environmental changes must occur in the short-term during such initiatives, long term benefits can be achieved that can persist over at least two or three decades (ABPmer 2016). The work at Horsey has therefore been a valuable precedent for beneficial use work at other sites in the UK.

**Graphical information**

![Graphical information](https://example.com/image.png)

(Source Aerial Image © Jim Pullen UAV Surveys April 2017)

*Figure 1. Location map and aerial view of beneficial use, taken April 2017.*
Figure 2. Change in intertidal elevation at Horsey from 1999 to 2015 (from comparison with LiDAR datasets) (blue areas show raised levels from silt recharge; red areas show reduced elevations or shingle migration over these 16-years).

References/web links