



The Contribution of Nature-based concepts to Sustainable Port Development

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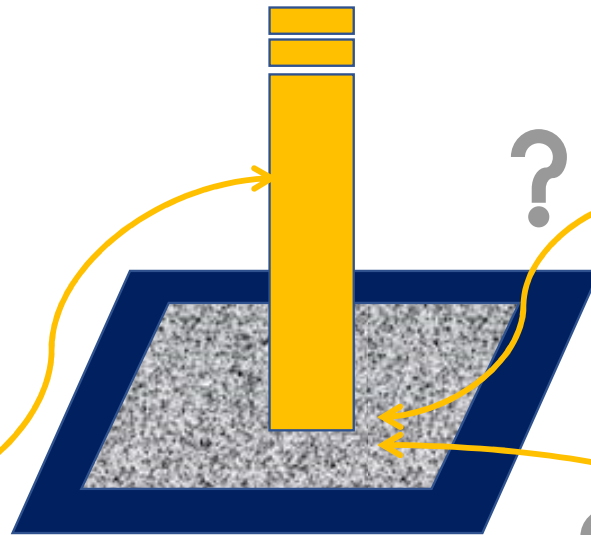


Outline

- Nature-based bed protection (offshore wind turbines)
- From harbour to habitat – from dredge spoil to salt marsh
- Oyster reef as coastal protection
- Port as an element in a coastal system – Tema, Ghana
- Insights

Nature-friendly bed protection

- Effects of a wind farm on North Sea fauna?



North sea cob

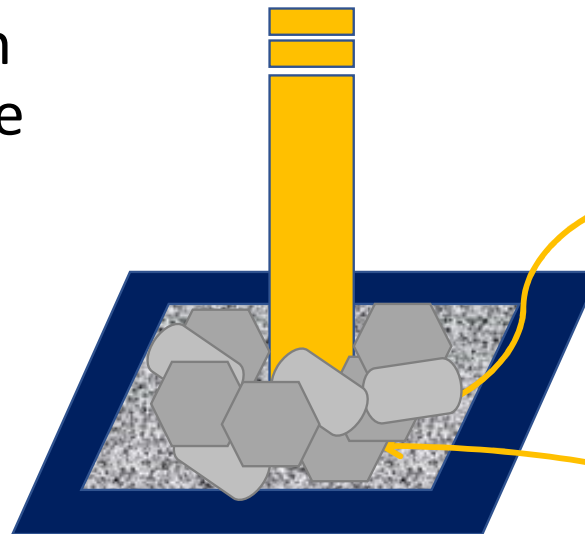


European lobster

Nature-friendly bed protection

- Experimental research - CAT scans of different rock size distributions
- Variation in rock sizes can be chosen to optimize the distribution of holes for sheltering North Sea species

(Buijs, K. W., 2015)



North sea cob



European lobster

From Harbour to Habitat



Siltation problem

Building/working with nature ?



Salt marsh solution



From Harbour to Habitat

- Dredged material is deposited near a mudflat
- Waves and tidal currents deposit the silt
- Gradually a vegetated salt marsh forms
- Overall reduced costs for the harbour, gains for nature

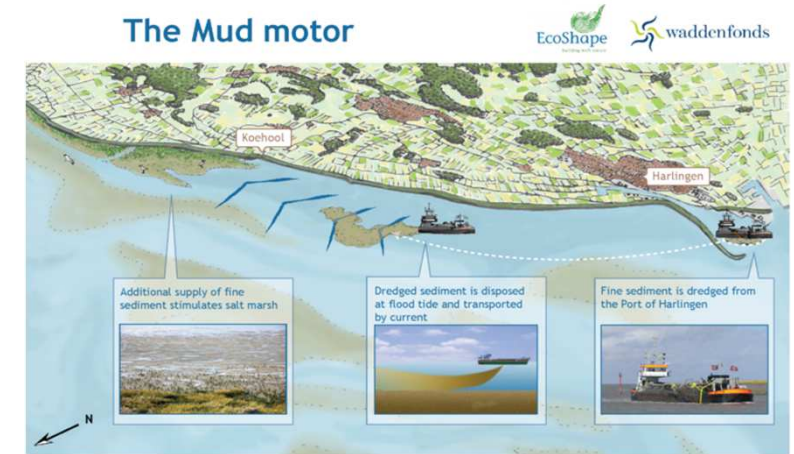


Photo: Waddenfonds

Oyster reef as coastal protection



Port as an element in a coastal system – Tema, Ghana

- Port expansion
- Nearby lagoon entrance currently exacerbating flooding and water quality problems

- Plastic waste



- Investigate ecosystem-based design options



Port as an element in a coastal system – Tema, Ghana



- Sand scarce (limited sediment management)
- Short waves 1-2m (limited downtime with breakwater)
- Hardly LF waves (limited downtime)

- Lagoon entrance – design criteria for coastal road
- Restoration of brackish habitat
- Livelihood significance
- Spiritual significance

(de Boer et al. 2018; Vrolijk, 2015)

Insights

- Potential effects on the environment can form opportunities in the design phase
- Knowledge of ecologists needed
- Listen for possible win-wins with other stakeholders
- A structured approach to design is possible even when you include messy reality (ecology, stakeholders)

