

Building with Nature
in coastal and marine environments

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enhanced Afsluitdijk?

Mississippi Delta

MUST WE CARRY ON LIKE THIS?

Happisburgh, UK

Deep Water Navigation Channel Yangtze Estuary, China

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BUILDING WITH NATURE?

development of water-related infrastructure

- in **harmony** with the natural environment
- respecting the natural system's **dynamics**
- **utilising** these dynamics
- creating **new opportunities** for nature

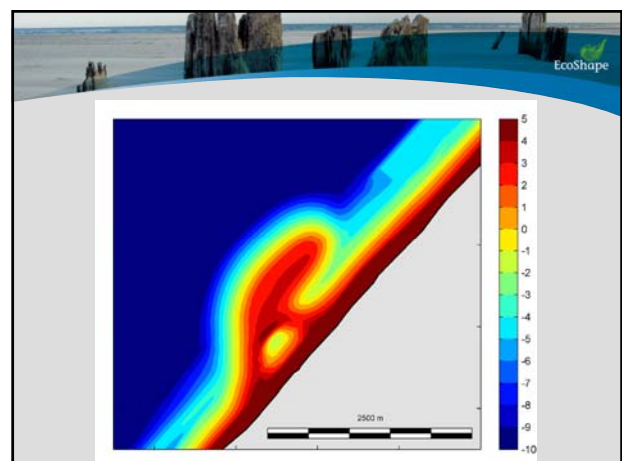
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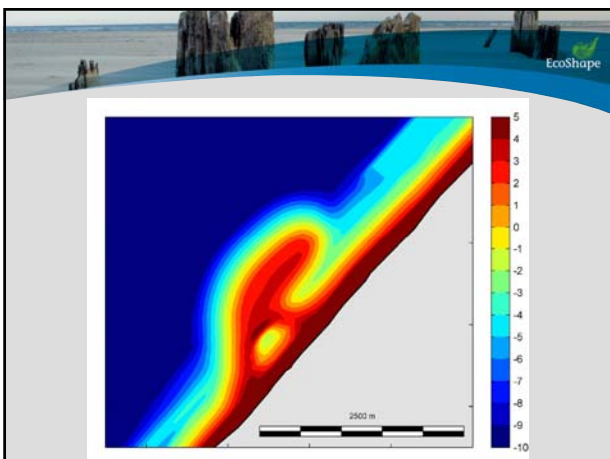
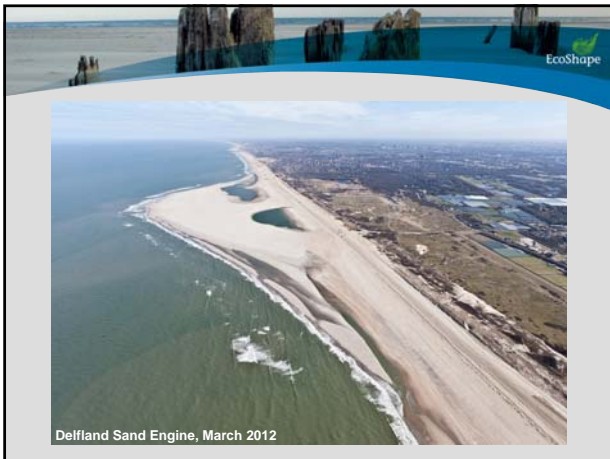
PROBLEM AREA: HOLLAND COAST

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BwN-SOLUTION: DELFLAND SAND ENGINE

- **primary function:** to have sand onshore ⇒ coastal safety
- **other functions:** recreation (beach, swimming, surfing), enlarged freshwater lense in dune area stance for birds and sea mammals
- **natural dynamics:** wind, waves, tide, surges, vegetation
- **how utilised:** nature distributes sand alongshore and cross-shore; vegetation fixes sand / forms dunes
- **nature opportunities:** pioneer vegetation on the sandy hook, temporary beach lagoons, juvenile dune formation ⇒ dune growth





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AND NEXT?

Monitoring


- standard programme for safety (Rijkswaterstaat)
- environmental monitoring programme (EFRD)

Analysis

- scientific research programme (~ 15 PhD's & postdocs)

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OFFSHORE SAND MINING



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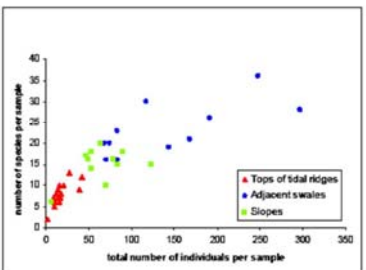


Figure 6: Variation of benthos density and diversity across two tidal sand banks in the North Sea. Maximum benthos density and diversity are found in the trough regions, the bar crest regions give home to poor benthic communities. Figure courtesy of Van Dijk et al. (2007), taken from Van Dalven and Aarinkhof (2009).


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EXPERIMENTAL BORROW AREA MAASVLAKTE-2I




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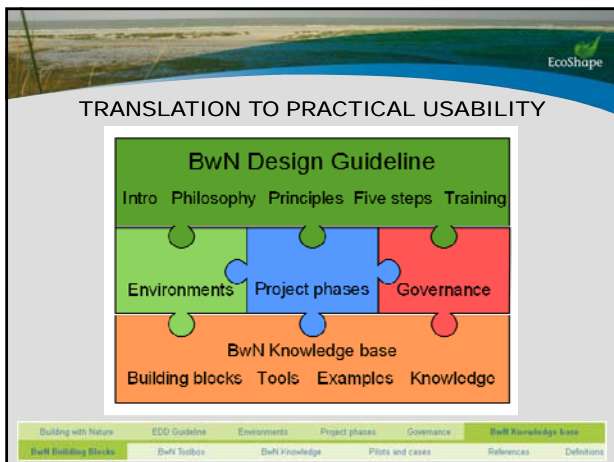
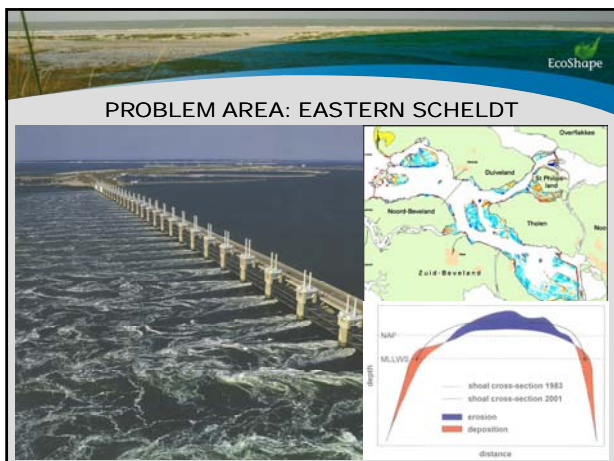
LEAVING A SAND RIDGE BEHIND



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MONITORING





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building with nature

ongoing programme: 2008-2012

time for broadening up?