



Building with Nature

EcoShape

Utilizing the Full Potential of Dredging Works: Ecologically Enriched Extraction Sites

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EcoShape
building with nature



MY DIVISION: DREDGING!



GREEN TAPE OR JUSTIFIED CONCERN?



What if we are so focused on minimizing negative effects that we miss opportunities to maximize positive effects?



PARADIGM SHIFT

FROM: BUILDING *IN* NATURE



VIA: BUILDING *OF* NATURE



TO: BUILDING *WITH* NATURE



 **Boskalis**
Dredging & Marine Experts



- | | |
|------------------------------------|--------------------------------------|
| 1: Zandmotor Delfland | 14: Groene Poort, Rotterdam |
| 2: Oosterschelde, Oesterrif | 15: Kop van 't Land, Dordrecht |
| 3: Oosterschelde, Oesterdam | 16: Hondsbossche en Pettemer Zeewing |
| 4: Ruimte voor Rivier, Noordwaard | 17: Havenontwikkeling Den Helder |
| 5: Markermeer, rietmoerassen | 18: Prins Hendrikdijk, Texel |
| 6: HWBP-2, Oeverdijk | 19: Vismigratierivier Afsluitdijk |
| 7: Zandmotor IJsselmeer | 20: Suppletie Workumerbuitenwaard |
| 8: Eco-beton, pier IJmuiden | 21: Marconi, Delfzijl |
| 9: Oosterschelde, Rijke Dijk | 22: Havenontwikkeling Harlingen |
| 10: Hangende structuren, Rotterdam | 23: Waterberging Groningen |
| 11: Strand Maasvlakte | 24: Waterberging Breda |
| 12: Ecologische Zandwinput | 25: Ooijen-Wanssum |
| 13: Oosterschelde, Sophia strand | 26: Markerwadden |

BUILDING WITH NATURE

Thinking, acting and interacting differently

*To show that is possible,
to develop infrastructure,
while creating opportunities
for nature and, where possible,
utilizing natural processes*

30 M EUR research programme 2008-2012

BUILDING WITH NATURE – PILOT PROJECTS



EXAMPLE: EXTRACTION SITES



SITUATION:

Guidelines on sand extraction sites unclear

RISK:

Conservative approach (improbable prediction of effects and related mitigation measures)

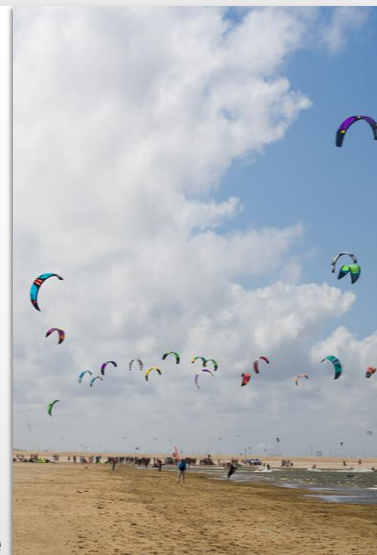
HOWEVER – THERE ARE CLEAR BENEFITS:

Potential for ecological development and mutual benefits:

- habitat diversity (benthos)
- Positive effect on populations of fish, birds & mammals
- increase economical value of a dredging area (e.g. fishing)



Need for pilot ecological extraction site



AIM OF PILOT PROJECT



1. Increase **awareness** of benefits in the design
2. Investigate **opportunities** ecology vs. economy
3. Identify **physical design parameters** for functions (nature, fisheries, recreation, sand mining)
4. Search for **technically feasible** and low cost solutions
5. Ultimately **reduce procedures** and speed up project execution by creating social support
6. Set up an **pilot site to test design** (theory and practice)



START WITH GOVERNANCE



Open and transparent cooperation between stakeholders from start of project.

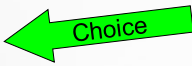
Input from all stakeholders for creation of design



TECHNICAL CONTENT

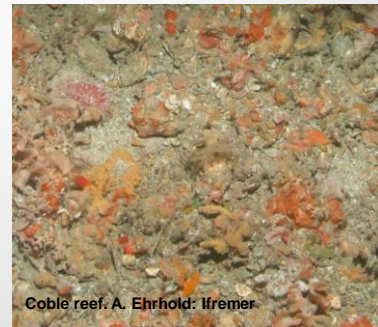
Design scenario's discussed based on functionality and selected:

1. Nature (Benthos, Fish, Birds, Sea mammals)

- recovery of habitat
- increasing biodiversity 
- protection of threatened or endangered species

2. Economy (commercial fish & shellfish fisheries, sand mining)

3. Social (recreational fishing and diving?)

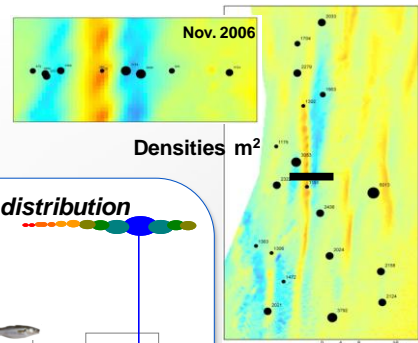
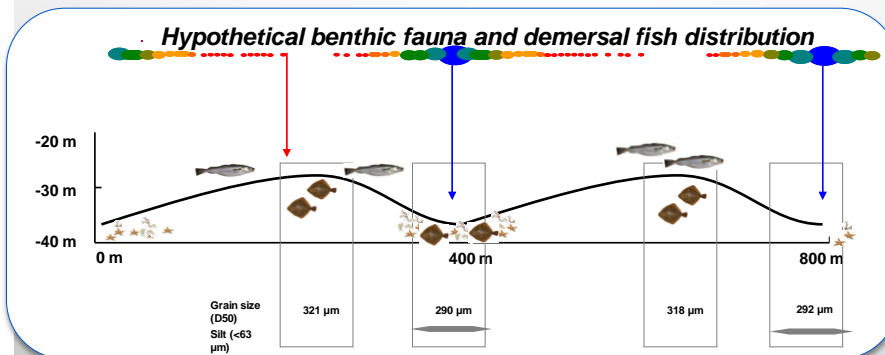


Coble reef. A. Ehrhold: Ifremer

DESIGN JUSTIFICATION

Strong relation between:

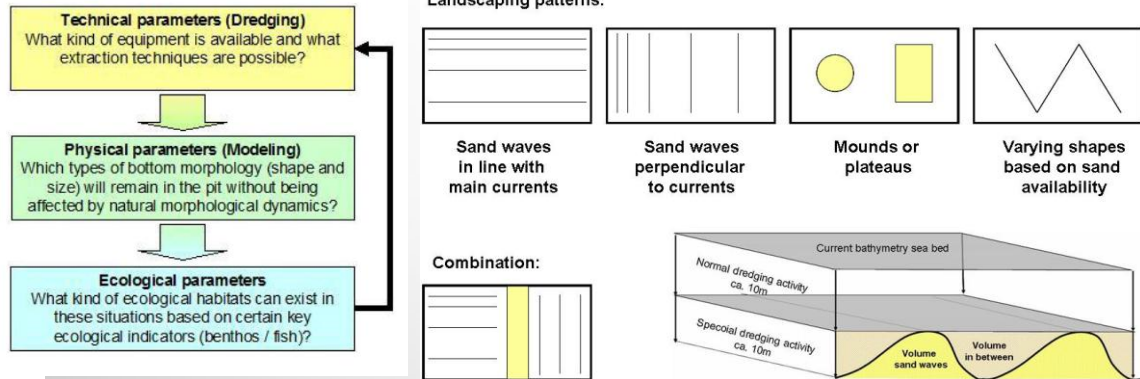
- hydro-morpho-dynamics
- sediment composition &
- benthic communities



DESIGN OPTIONS

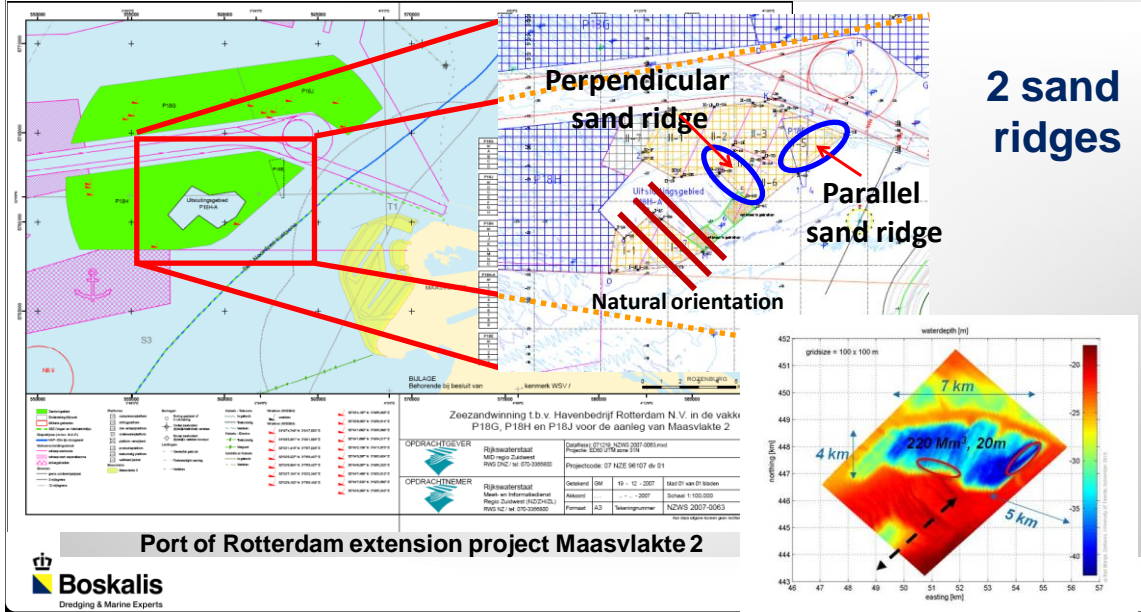


Search for operational, ecological, hydraulic/morphological parameters

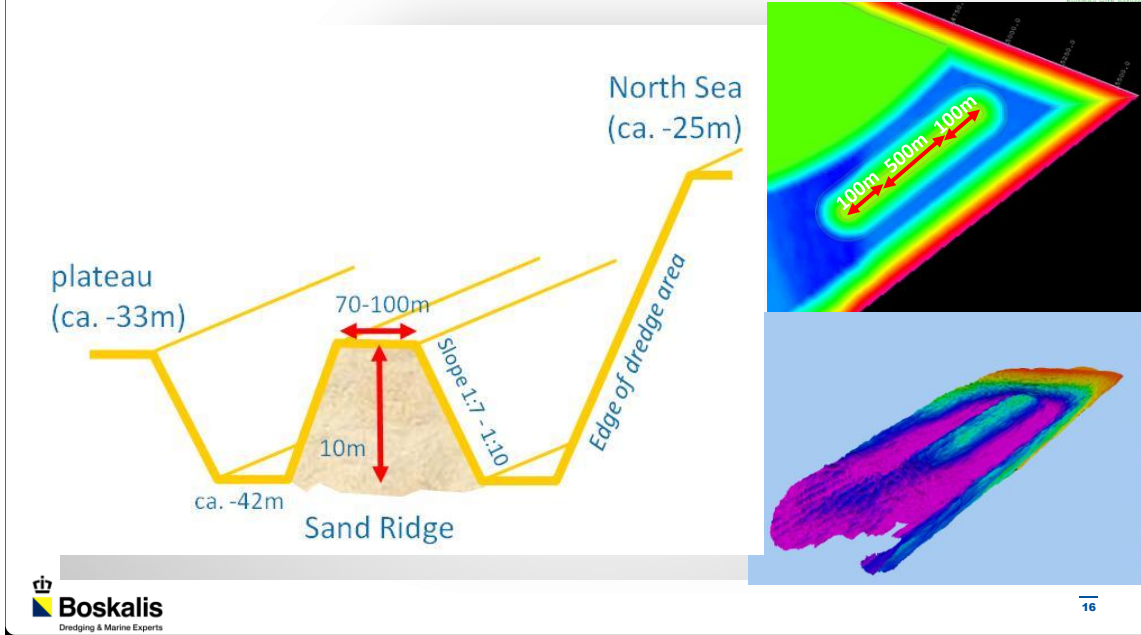


Theory or reality?

LOCATION OF PILOT SITE



CREATION OF 'PARALLEL RIDGE'



CREATION OF 'PARALLEL RIDGE'

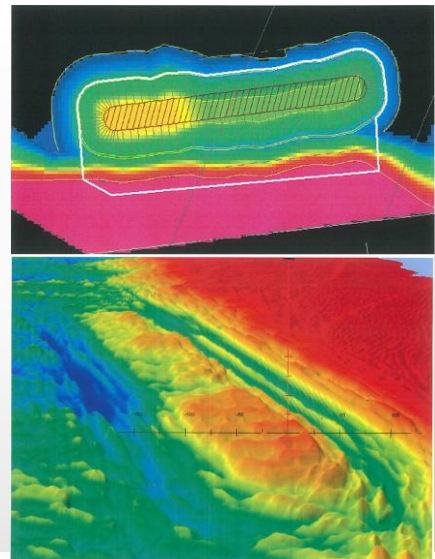
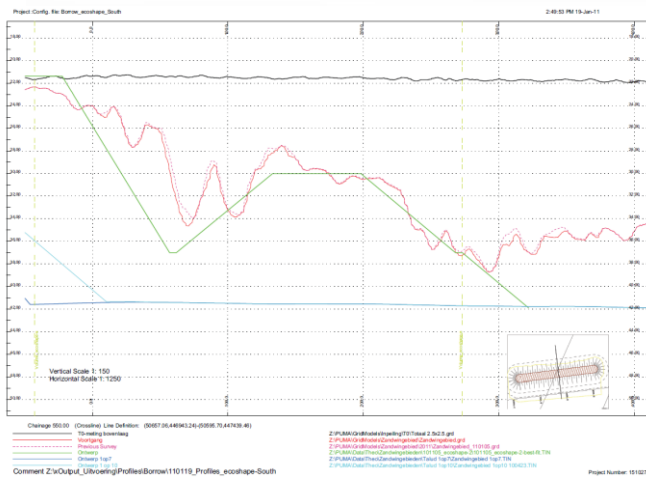


25 June 2010



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CREATION OF 'PERPENDICULAR' RIDGE

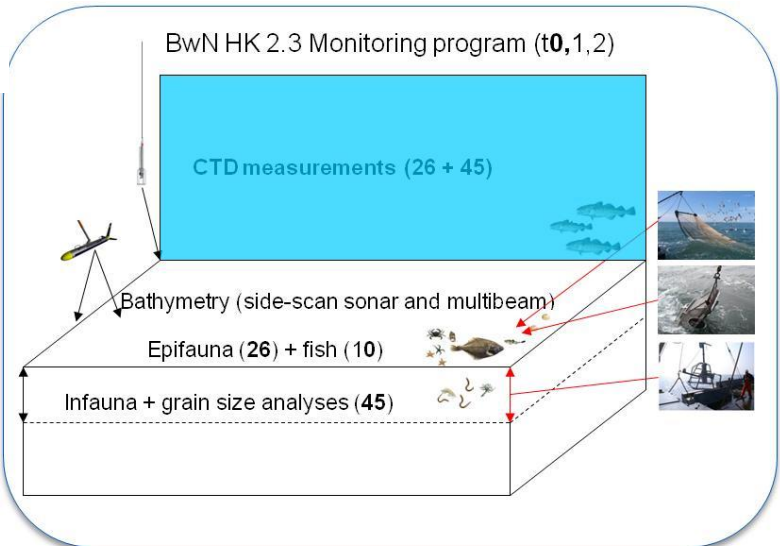
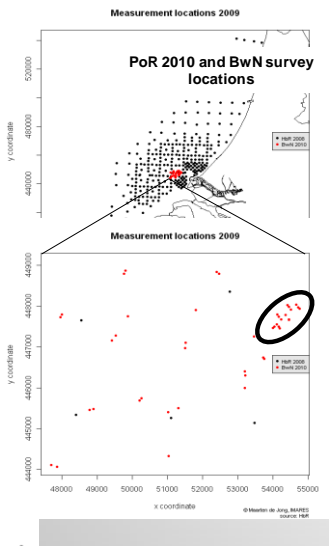


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CREATION OF 'PERPENDICULAR' RIDGE



MONITORING PROGRAMME



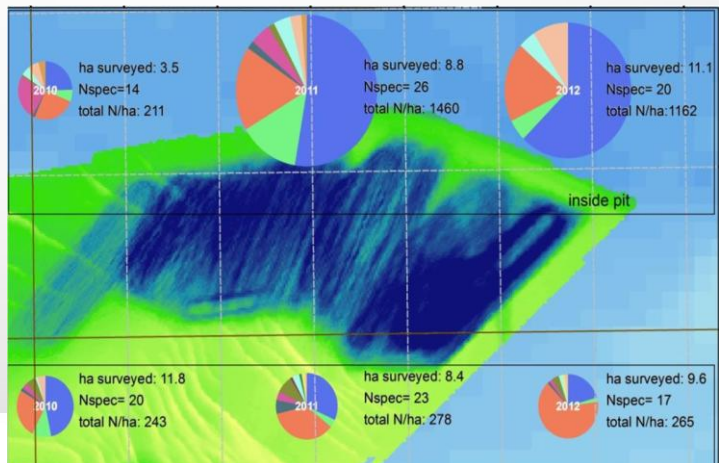


Monitoring, Monitoring, Monitoring, Monitoring!!

RESULTS (UP TO NOW)



1. Benthos and pelagic and demersal fish quickly entered the extraction site
2. 4-5x increase of fish density in the extraction site at comparable species diversity
3. Sand ridges are morphologically stable



CONCLUSIONS AND LESSONS LEARNED



1. Ecological landscaping has high potential
2. Stakeholders changed perception into a positive view on opportunities
3. Better to refer to „establishing of habitats“ instead of „recovery of habitats“
4. Base design on existing ecosystem and local physical conditions
5. Cooperate with ecologists, morpho- and hydrodynamic experts, fishermen, dredging contractors, permitting authorities beforehand

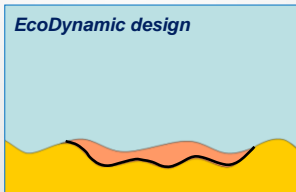


CONCLUSIONS AND LESSONS LEARNED



1. Involve contractor during design: minimize influence on production rates and thus time and cost
2. Link to size and volume of the extraction site
3. Also beneficial for selective extraction
4. Landscape during extraction process

Ready to be used globally! *EcoDynamic design*





Questions?

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