Ecological Landscaping of Extraction Sites: Opportunities for a Second Life

SedNet, Venice, 8 April 2011

Daan Rijks
Royal Boskalis Westminster
Presentation

- Situation (motivation)
- Building with Nature programme
- Pilot project Ecological Landscaping
  - Basis
  - Creation pilot sites
  - Results and lessons learned
Situation and trends: motivation for a BwN approach

- “Busy” coastal zones = increasingly complex projects
- Development of large-scale projects characterized by uncertainties and delays
- Focus on threats and risks instead of opportunities leads to restrictive requirements (interpretations)
- Extensive environmental management plans and monitoring requirements

Overall acknowledgement for need of sustainable & pragmatic solutions
How does Building with Nature fit in?

Pilot-based, pragmatic research programme, 3 pillars:

- **Dynamics of natural system** as starting point for design and realisation of maritime infrastructure
  - Design fits with natural (eco-)system dynamics
  - Make optimal use of natural processes
  - Explore opportunities to promote nature development

- Mind-shift from defensive (minimize environmental impacts) to **offensive approach** (optimize full economic and environmental potential)

- **Integration** of disciplines: engineering & construction, ecology & environment and governance
Building with Nature Organisation

- Program duration **2008-2012**
- Budget ca 30 mln euro (approx 40 mln $)
- Main outcome: **Guideline & Tools for Ecodynamic Development & Design** based on pilots and monitoring
- All key stakeholders involved!
  - Contractors (initiators): Boskalis, VanOord
  - Industry: IHC Holland, Vereniging van Waterbouwers
  - Consultants: Witteveen + Bos, DHV, Haskoning, Arcadis
  - Scientific Institutes: Deltares, Imares, NIOZ
  - Universities: Delft, Wageningen, Twente
  - Port authority: Port of Rotterdam
  - Government: RWS-DI, City of Dordrecht
Co-Initiator: Royal Boskalis Westminster

- Dredging and marine infrastructure contractor
  - construction & maintenance of ports and waterways
  - reclamation of land
  - protection of coastlines & riverbanks
- New contracts:
  - D&C
  - Early Contractor Involvement

- Investor in Building with Nature programme
Why start with Ecological Landscaping?

• **SITUATION**: No clear guidelines on ecology and sand extraction sites

• **RISK**: Conservative approach can lead to improbable prediction of effects and related mitigation measures

• **BENEFITS of BwN approach**: Large potential for ecological development and mutual benefits for stakeholders
  - habitat diversity (benthos)
  - Positive effect on populations of fish, birds & mammals
  - increase economical value of a dredging area?

Provide answers to ongoing discussion on re-use of dredging sites through innovation and factual research
Background / basis

Strong relation between hydro-morpho-dynamics, sediment composition & benthic communities

Occurrence and diversity per morphological unit of tidal ridges (both banks)

Van Dijk, van Dalffen et al, 2007
Design options
Search for operational, ecological, hydraulic/morphological parameters

Landscaping patterns:

Sand waves in line with main currents
Sand waves perpendicular to currents
Mounds or plateaus
Varying shapes based on sand availability

Combination:
Location of pilot site

- Parallel sand ridge
- Perpendicular sand ridge
- Natural orientation
Creation of ‘parallel’ Sand Ridge

North Sea (ca. -25m)

plateau (ca. -33m)

Sand Ridge

ca. -42m

70-100m

10m

Slope 1:7 - 1:10

Edge of dredge area

100m 500m 100m
>3Mm³ / week !!
Creation of ‘perpendicular’ Sand Ridge

Under construction!!
Monitoring, Monitoring, Monitoring, Monitoring!!
Results and lessons learned

- Gained new insights and created database (learning process)
- Preliminary results show differences in fish population
- New results in summer 2011
- Yes, a second life appears to be feasible!

1. Investigate and understand natural situation
2. Discuss and integrate ecological design at start of project
3. Involve all stakeholders, determine aim and expectations
4. Involve dredgers to test design practicality
5. Landscape during extraction process
Thanks for you attention!

More information on Building with Nature

www.ecoshape.nl