Analysis of past experiences with ecodynamic design and defining lessons learnt (MIJ 4.2)

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Objectives project

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- To develop morphological, ecological and governance principles for an effective ecodynamic project design in the lake IJsselmeer area.

- To design future visions for the Markermeer /IJsselmeer area and the role of building with nature in it.

Focus presentation

- Analysis of past experiences with ecodynamic design and defining morphological, ecological and governance lessons for the BwN pilots Frysian coast.

Approach

- Principles are developed on basis of 10 historical cases (EDD manual)
- Selection from inventory of > 80 projects with potential for future ecodynamic design
- Analytical framework reflects needs of stakeholders BwN pilots Frysian coast
- Additional use of literature and experiental knowledge

Analytical framework

Morphology

How to stimulate sedimentation in shallow water and neighboring terrestrial areas using morphodynamic processes supplemented with sand nourishment? And in a situation when water level will rise?

Ecology

How can existing habitat(s) be conserved and new habitat(s) be developed under changing conditions?

Governance

What aspects contributes to good collaboration between stakeholders and to an effective admin./legal trajectory?

Morphological lessons (1)

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Effects of sand nourishment

- Can create new sand bars and sand flats
- Can result in shallowing deep and shallow water areas
- Does not result in an increase or heightening of the (never inundated) **land areas**
- Leads in shallow, low dynamic conditions usually to local sedimentation
- Is in shallow, highly dynamic conditions less predictable
- Artificial constructions can help to control/direct the sedimentation

Morphological lessons (2)

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Sand nourishment Workummerbuitenwaard

- Constructed: Sept 1992
- 20 ha above water level (150m width x 2 km length)
- Nature development objectives: increase in marsh land and resting place for waders and breeding birds

Results

- Sediment transport to the (deeper) west, but hardly not towards the coast
- Increase in Black-headed Gulls and Common Terns

Morphological lessons (3)

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Effects of sand nourishment combined with higher water levels

- Higher water levels will result in erosion of the shallow water area, the shoreline and terrestrial zones
- Sand nourishment can probably compensate (part of) the erosion in shallow water zones (Coarse sand seems most appropriate)

Morphological lessons (4)

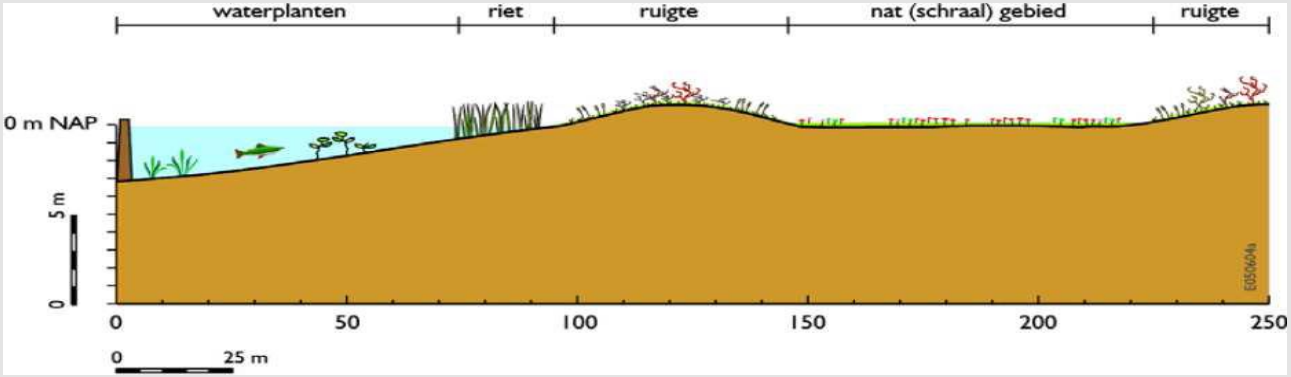
Steering with sand nourishment, higher water levels and constructions

- The current morphological processes are not strong enough to compensate the negative effects of higher water level
- An appropriate sand nourishment strategy can reduce the effects in the shallow water zone and perhaps at the shoreline
- The use of ‘hard’ and ‘soft’ constructions can make sand nourishment more efficient

Ecological lessons (1)

Present habitat:

- Gradient varying from deep and shallow water, shores and dry land.



Future habitat (sec):

- Detailed projections are difficult to provide

Ecological lessons (2)

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Effects of water level rise *and* sand nourishment on habitat

- Water level rise results into loss in ecological value of submerged aquatic, emergent and lower terrestrial vegetation
- Dynamic water level management improves ecological conditions for emergent vegetation
- Sand nourishments have a (temporarily) negative effects
- Sand nourishment can pos. contribute in combination with dynamic water level management

Governance lessons (1)

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Laws and regulations

- Environmental impact assessment, ‘Voorschrift Toesten op Veiligheid (2011), Dutch ‘Water Act (2009)’, ‘Spatial Planning Act (2008)’
- Natura 2000 area → Flora and Fauna Act, Nature Conservation Act 1998

Strategies to address difficulties

- Long term monitoring of ecological impacts
- Adaptive management strategies
- Good timing of the submission of permit requests
- Combining multiple permit requests
- Networking with authorities during permit request procedure

Lessons to be drawn from pilots Frysian coast

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- What is an appropiate sand nourishment strategy when water levels will be raised to reduce negative effects? (frequency, amount of material, moment of supply)
- Sand nourishment at dynamic locations: with or without artificial constructions?
- What is the most effective phasing in water level rise in combination with sand nourishment to develop robust habitats?
- How to manage large expectations?