Building with Nature

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IMARES
WAGENINGEN UR

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Maasvlakte 2

Port of Khalifa

Grensmaas

Port of Melbourne

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Building in Nature

- Multiple-stakeholder concern
- Environmental Impact Studies
- Lack of references
- Long lasting procedures
- Mitigation and compensation
- Extensive monitoring requirements

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Building of Nature

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Towards an Ecosystem Based approach:

Ecodesign based on the natural dynamics

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Project

Environmental Impact Assessment

Ecosystem Dynamices & Carying Capacity

Nature

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A turn around

From a defensive approach

(minimize environmental impacts)

To an offensive approach

(optimize full economic and ecologic potential)

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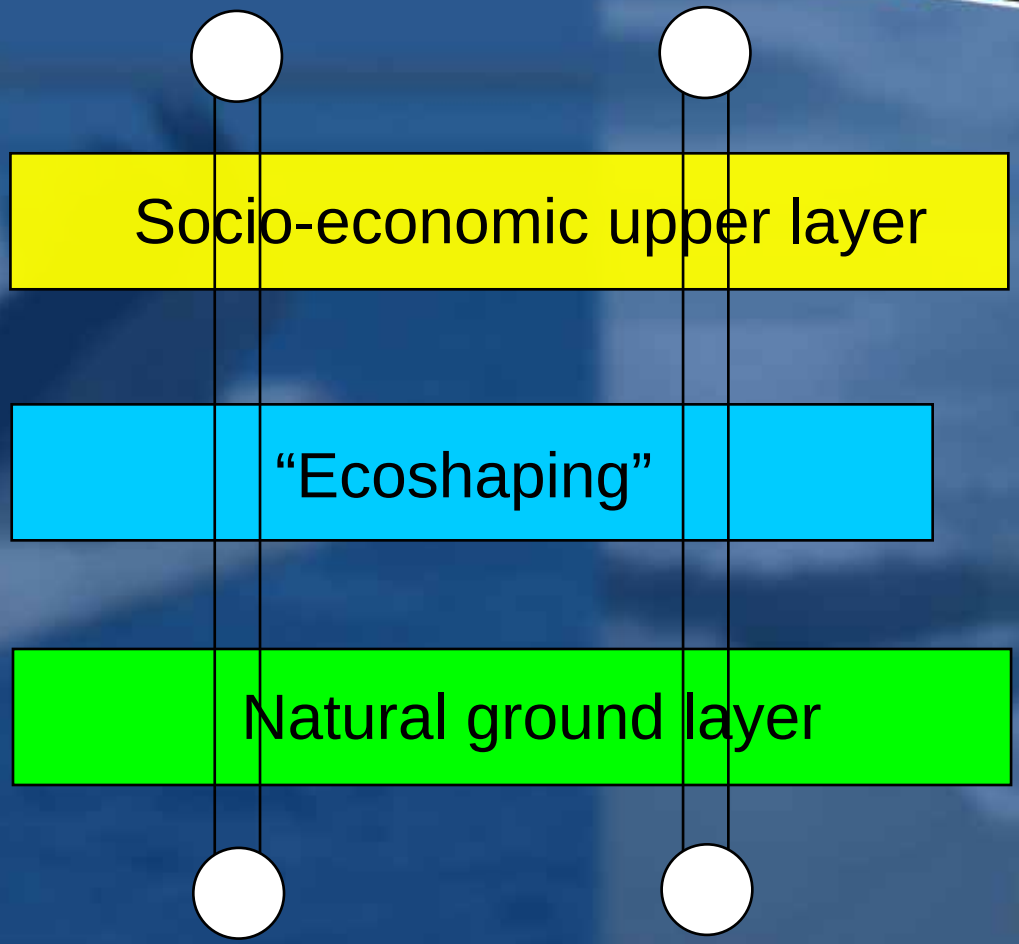

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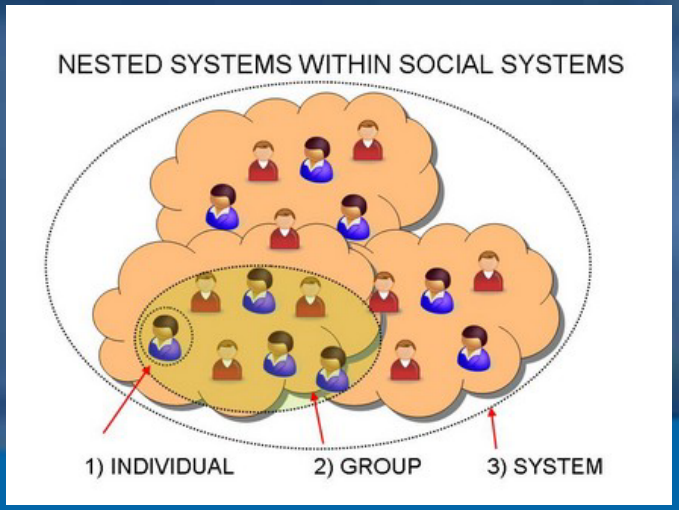
The Paradigm Shift, step 1

Design a project on the basis of understanding the ecosystem dynamics and functioning

As well as on the understanding of ambitions, opinions, concerns and discours amongst stakeholders in the social system



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The Paradigm Shift, step 2

Plan a project or activity in coherence with other functions, such as coastal defense, aquaculture, sand and gravel extraction, land reclamation, nature development or restoration, etc.

Plan a project with multiple stakeholder participation

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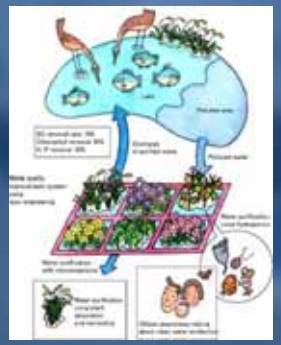
The Paradigm Shift, step 3

Determine how natural processes can be used and stimulated to achieve your goals



Determine how stakeholders can be involved in the project

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The Paradigm Shift, step 4

Monitor the environment
during execution
based on risk-assessment
and statistical analysis
giving room for adaptation of the project

Monitor stakeholders satisfaction

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Dutch National Innovation Programme

- Period: 2008 -2012
- Partners
  - Dredgers: Boskalis en Van Oord
  - Scientific Institutes: IMARES, Deltares, NIOZ, NIOO
  - Universities: Delft, Wageningen, Twente
  - Consultants: W+B, DHV, Haskoning, Arcadis
  - Industry: IHC Holland, VBKO
  - Port authority: Port of Rotterdam
  - Government: Ministry for Watermanagement, City of Dordrecht

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Programme objectives:

1. Develop ecosystem knowledge enabling ‘building with nature (BwN)’
2. Develop scientifically sound design rules and norms
3. Develop expertise to apply the BwN-concept
4. Make the concept tangible using practical BwN-examples
5. Establish how to bring the BwN-concept forward in society and make it happen

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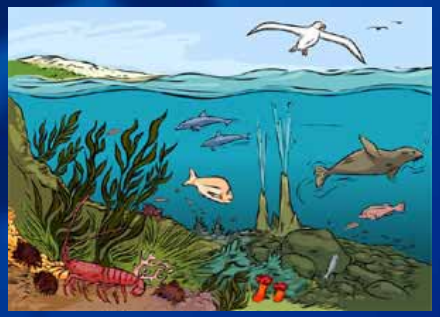
Using the potential of nature

Nature and natural processes perform important functions, but are essentially dynamic

Nature driven designs may be more robust and cost-effective

So far, the natural potential and dimension is seldom fully explored



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Examples

- Soft self-sustaining sea defenses with salt marshes, mangrove, dunes.
- Cost-effective coastal management with additional benefits, using sand-engines and eco-engineers
- Strengthening ecosystems of closed estuaries with land development

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Delflandse kust

Natural dune formation as drive

Strengthening with dunes

Anticipate long term morphological development

Use maintenance as driver for recreational development

Afsluitdijk

Salt marshes as strategic sea defence

Self-sustaining, broad and robust

Recreational landscape and ecosystem strengthening

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Show the principles in real cases:

- Sustainable development Holland coast
- Southwest Delta
- Markermeer – IJsselmeer
- Singapore

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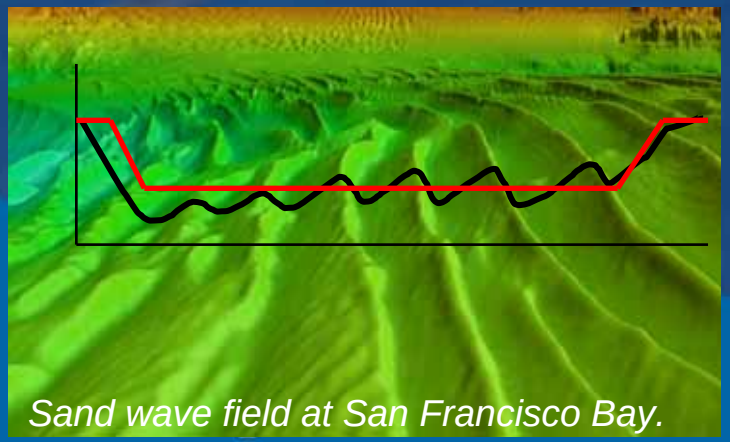
Case 1: Sustainable development Holland Coast

- Coastal maintenance through mega-nourishments
- Ecological landscaping in mining pits
- Sustainable long-term development Holland Coast

Pilot Sand Engine Delfland Coast

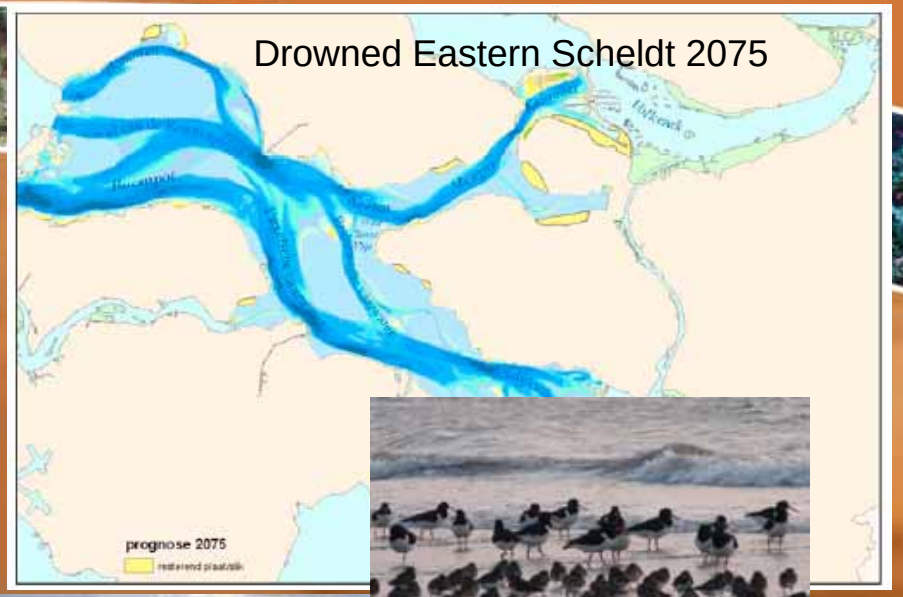
Creation of ecological habitats


Sand wave field at San Francisco Bay.

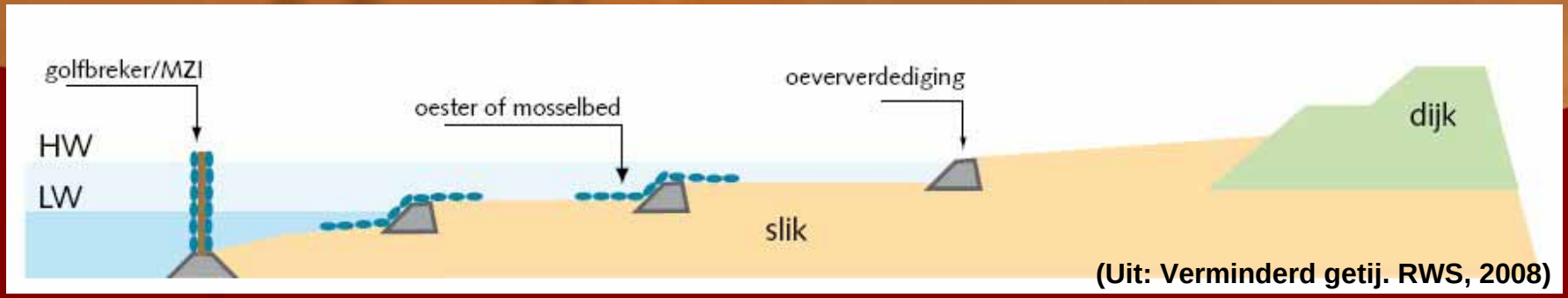

Variant ‘Eiland’ (2008)


Variant ‘Haak’ (2008)

Case 2: Long-term development of South-West Delta



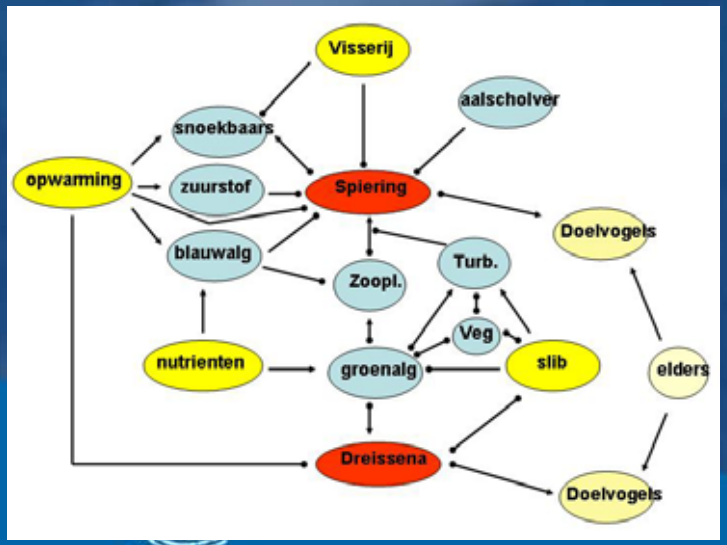
- Ecosystem Engineers as erosion protection
- Ecological and morphologic effects of nourishments on tidal flats
- Long-term coupling between estuary and outer delta
- Public awareness, communication and governance

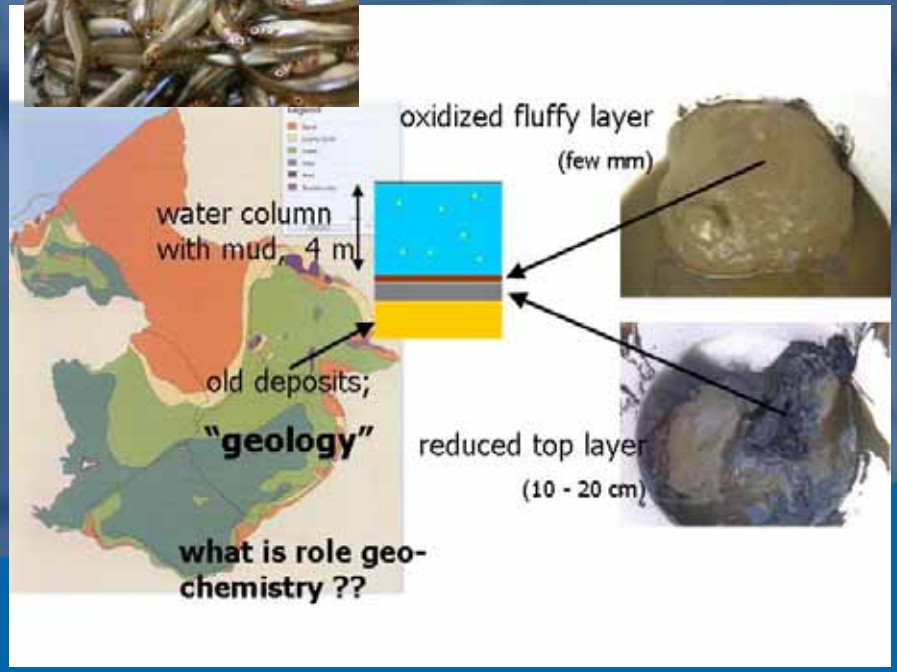


(Uit: Verminderd getij. RWS, 2008)

Case 3:Markermeer / IJsselmeer

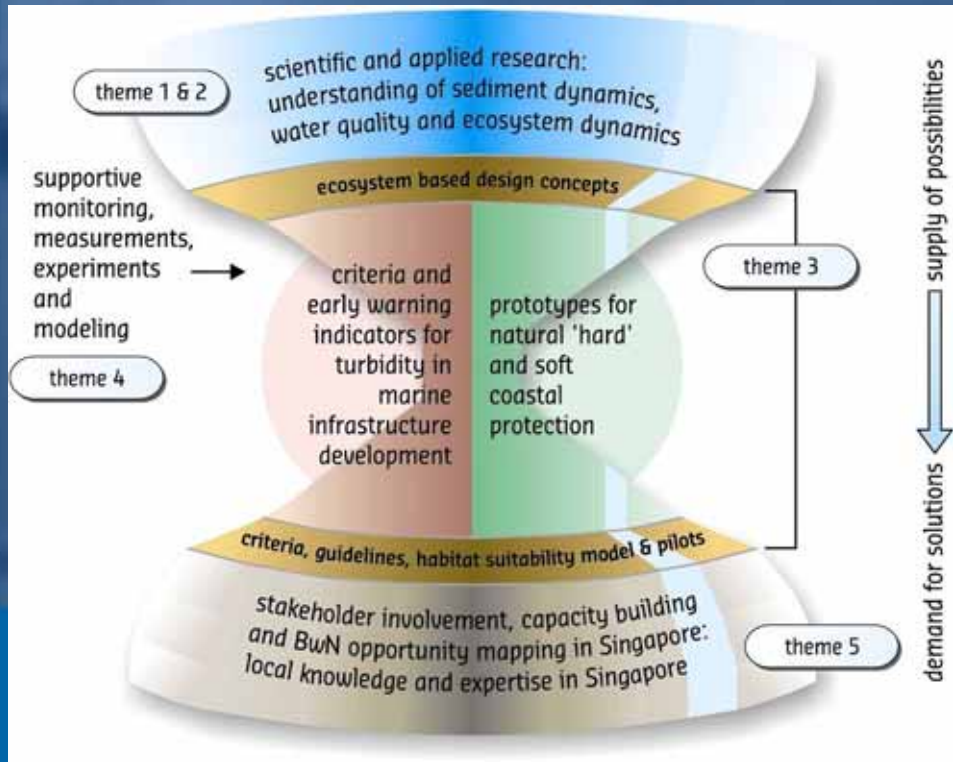
- Decision making, feasibility and uncertainty
- Regime shift Markermeer
- Sustainable development





Case 4:Singapore

- sediment dynamics, water quality and ecosystem dynamics
- ecosystem-based design
- monitoring, field measurements, field and laboratory experiments and mathematical modelling
- Stakeholder involvement



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Frontier Science for Societal Impact

…To explore the potential of nature,

to improve the quality of life…

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WAGENINGEN UR
For quality of life

For more information:

www.ecoshape.nl

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