Building with Nature

Concept, Principles & Program Governance

Gerard van Raalte

18 January 2011

EcoShape | *building with nature*

Motivation & Concept

EDD Principles

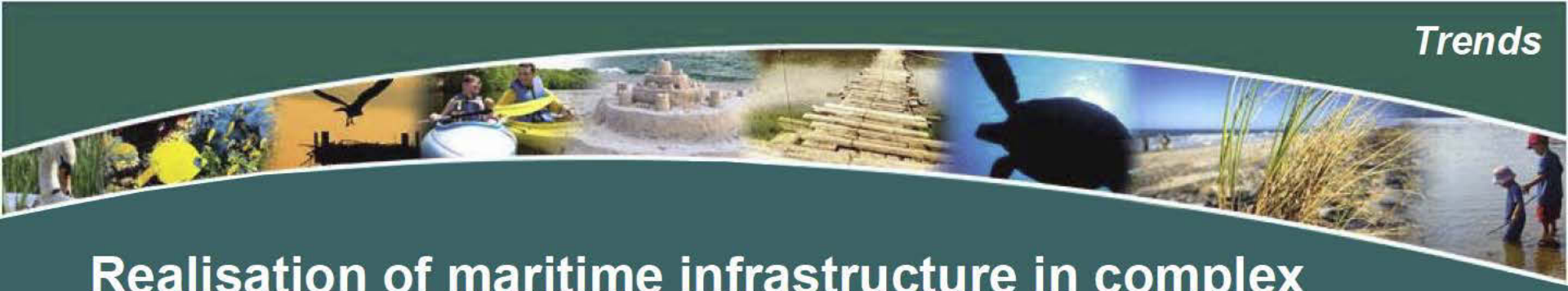
Research Program

Guideline

Governance

Status and Future

EcoShape | building with nature



Realisation of maritime infrastructure in complex environmental settings

Continuous growth of market for maritime infrastructure

Development of large-scale projects characterized by uncertainties and delays

Maasvlakte-2 (NL)

Realisation of maritime infrastructure in complex environmental settings

Extensive Environmental Management Plans and monitoring requirements

Sustainable development increasingly important for clients

Port of Khalifa (UAE)

Port of Melbourne (AUS)

"Sustainable development offers opportunities to make the difference"

Innovation is needed to do things differently!

Building with Nature

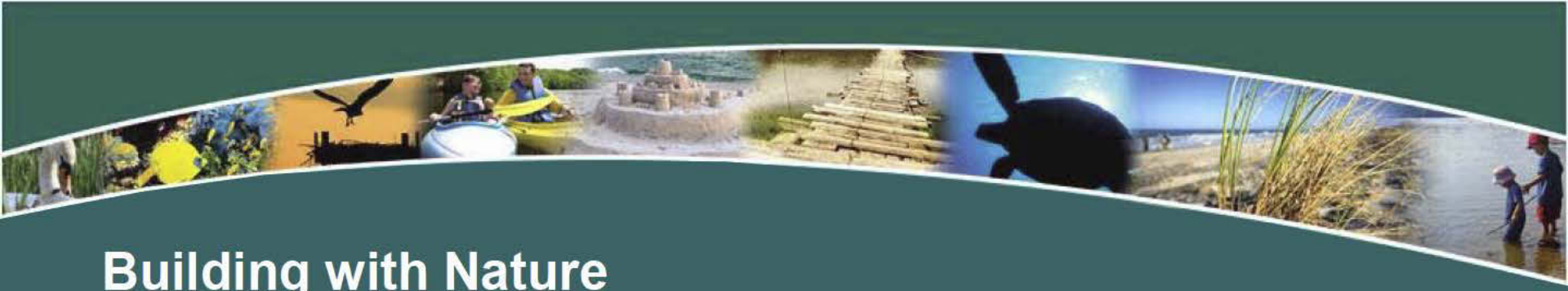
Building with Nature

Utilizing natural processes
(Building by Nature)

Nature Instrumental	Full BwN
No BwN	Nature Integrated

Ecological system optimization
(Building of Nature)

EcoShape | *building with nature*



Building with Nature

- Dynamics of natural system as starting point for design and realisation of maritime infrastructure
  - Make optimal use of natural processes
  - Design fits with natural (eco-)system dynamics
  - Explore opportunities to promote nature development
- From defensive (minimize environmental impacts) to offensive approach (optimize full economic and environmental potential)
- Integration of disciplines: Engineering, Ecology & Governance

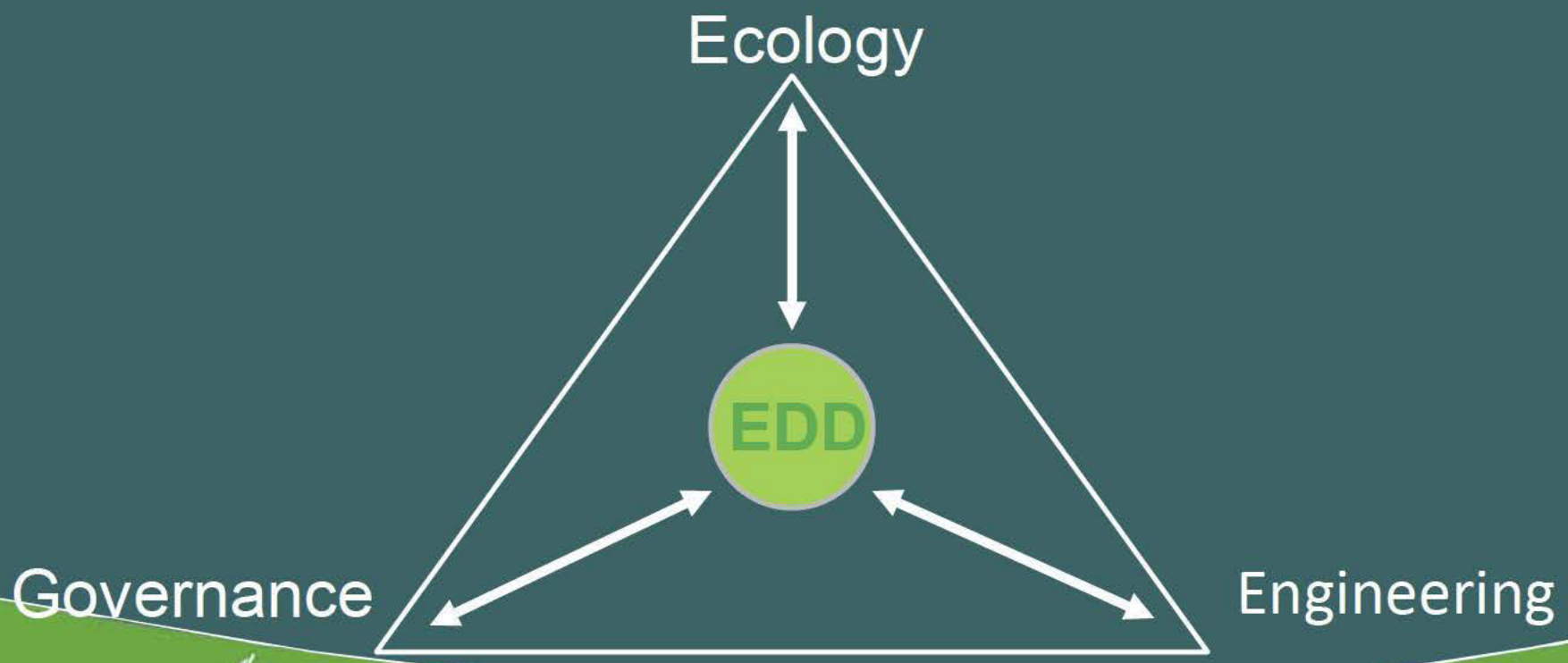
"Eco-dynamic Development & Design"

Figure courtesy of G.M. Jansen

EcoShape | building with nature

EDD Guideline

- Process guidelines vs engineering parameters



Traditional vs Eco-dynamic Design

Eco-dynamic Design

An ecodynamic design of a sand nourishment is characterized by:

- Design serves integral objectives: Guarantee coastal safety, create space for nature development and recreation
- Implementation of a large sand volume (10-20 mln m3 or more)
- Envisaged life span 20 years
- Incidental disturbance of ecosystem
- Use natural processes for distribution of sand. Gradual evolution, ecosystem capable of following morphological changes.

Traditional Design

A traditional design of a sand nourisment is characterized by:

- Primary objective: Shoreline maintenace. Other objectives of secondary importance
- Implementation of a medium sand volume (2-5 mln m3)
- Envisaged life span 5 years
- Frequent disturbance of ecosystem.

Building with Nature program

- Program duration 2008-2012
- Budget ca 30 mln euro (approx 40 mln $)
- Main outcome: Guidelines & Tools for Eco-dynamic Development & Design
- All Dutch key players involved!
  - Contractors (initiators): Boskalis, VanOord
  - Scientific Institutes: Deltares, Imares, NIOZ
  - Consultants: Witteveen + Bos, DHV, Haskoning, Arcadis
  - Industry: IHC Holland, Vereniging van Waterbouwers
  - Universities: Delft, Wageningen, Twente
  - Port authority: Harbour of Rotterdam
  - Government: RWS-DI, City of Dordrecht

EcoShape | building with nature

Building with Nature Program objectives:

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

Motivation & Concept

EDD Principles

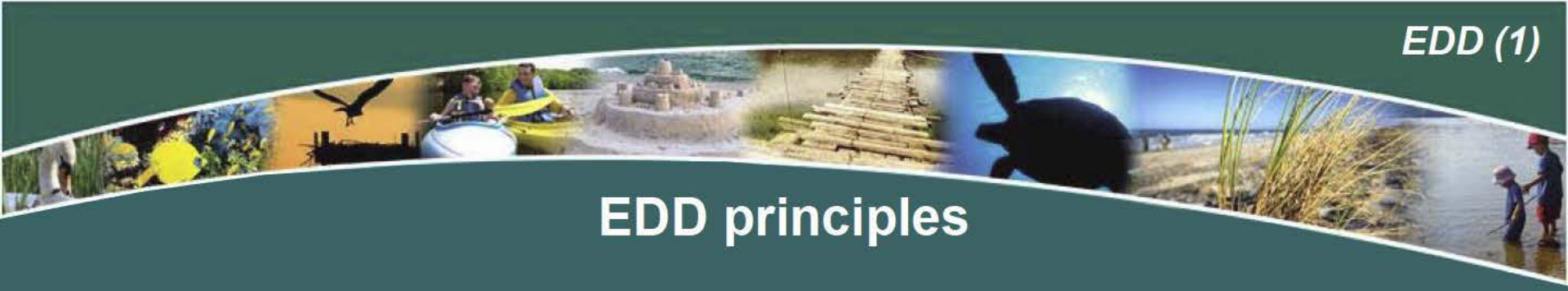
Research Program

Guideline

Governance

Status and Future

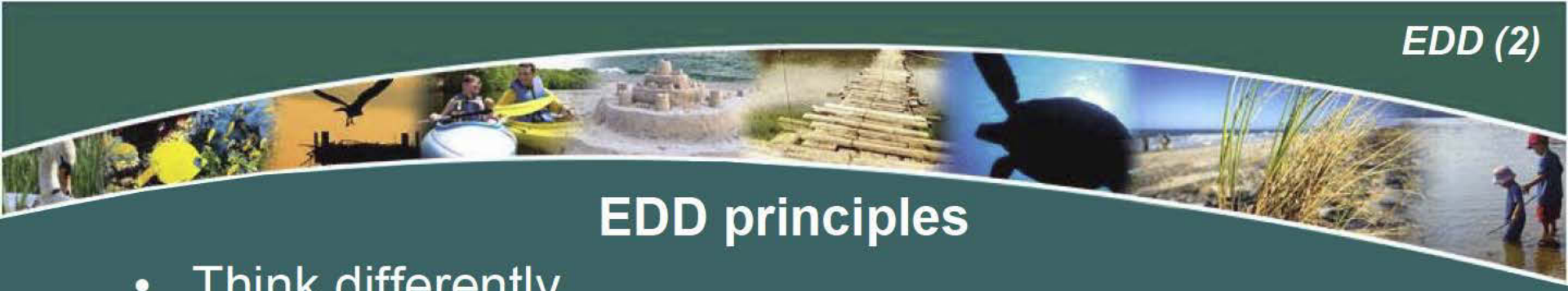
EcoShape | building with nature



EDD principles

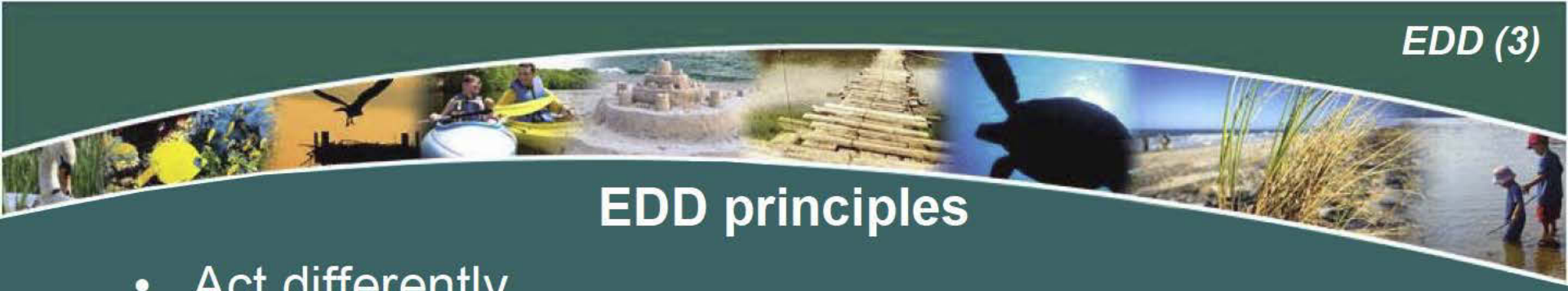
- Paradigm shift required
- 4 aspects all require different approach

	Cognitive aspects	Physical aspects
Aspects in relation to one's self	**Intentions** Thoughts and attitudes	**Acts** Acts and behavior
Aspects in relation to others	**Culture** Norms, values and culture	**Roles** Interaction and roles



EDD principles

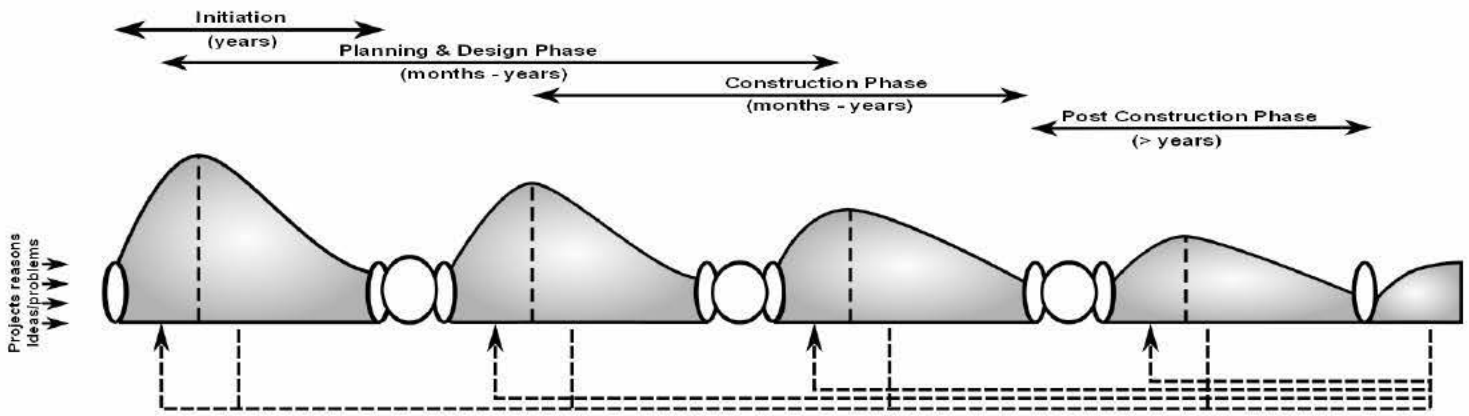
- Think differently
  - Think innovative – think sustainable
  - Understand the dynamic system
  - Seek for integration of disciplines, balances
  - Be able to handle uncertainty
- Behave differently
  - Be open to other opinions
  - Seek engagement
  - Strive for win-win

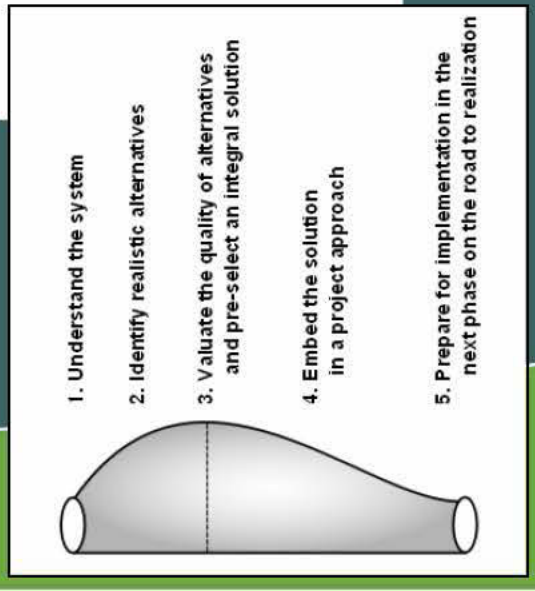


EDD principles

- Act differently
  - Include natural dynamics
  - Integrate EDD in all phases, life cycle approach
  - Manage uncertainties – apply adaptive management
  - Valuate ecology with economy and social aspects
- Interact differently
  - Inform and involve all stakeholders
  - Work interdisciplinary – integrate flexibility
  - Use transparent processes

Project Realisation Phases





EcoShape | building with nature

Motivation & Concept
EDD Principles
Research Program
Guideline
Governance
Status and Future

EcoShape | building with nature

Coastal Zone

BwN Cases

Fresh Water Lake

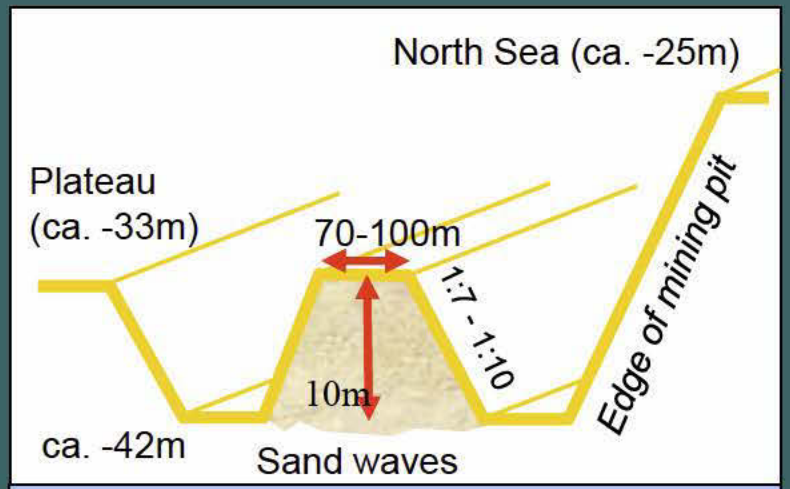
Estuary

Tropical Waters (Singapore)

EcoShape | building with nature

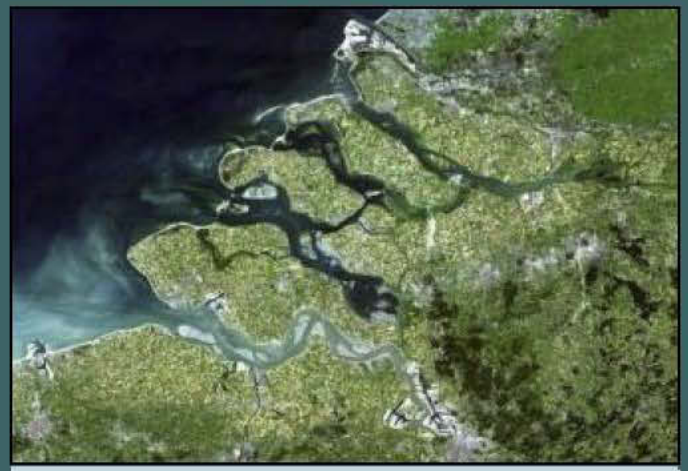
Case 1: Coastal Zone

mega-nourishment pilot 'Sand Engine'



landscaping of sand borrow areas

Case 2: Estuary



long-term regional development

sediment balance: stability of intertidal areas

Case 3: Fresh Water Lake

degradation Lake Marken

adaptation of lake coast to rising water level

BwN approaches in process of being implemented

- soft natural shorelines
- enhancing natural recovery of water quality

Case 4: Tropical waters - Singapore

Innovative coastal defence

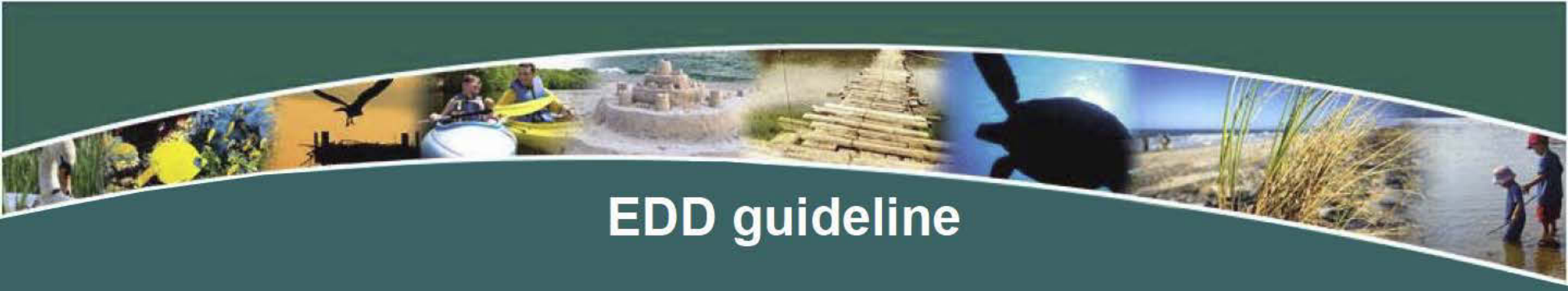
decision making in different settings

Other Research Output

- Generic research – natural sciences (14 PhD's)
  - Dynamics marine / estuarine / coastal ecosystems
  - Interaction between of ecosystem and engineering
- Lessons learned from
  - Previous projects by partners
  - Study of external cases and research programs
  - International cooperation and information exchange
- Development of specific tools
  - Design & decision support
  - Monitoring
  - Data management

Motivation & Concept
EDD Principles
Research Program
Guideline
Governance
Status and Future

EcoShape | building with nature



EDD guideline

- Guideline as future 'reference book' / standards for good BwN / EDD project
  - How to EDD?
  - Lessons from cases (BwN + historic) / pilots / studies
  - Recommendation for tools to be used
  - Links to reports
  - Hard-copy book on "principles and concepts" plus underlying website(wiki) with design rules, standards etc.

Who will use the Guideline?

People responsible for project initiation, organization, design and implementation

- **Reader group (1)**: Project owners / Proponents, Ecologists, Consultants, Wet Infrastructure Contractors with a **stake or responsibility** in project design processes
- **Reader group (2)**: Authorities, Policy Makers, Politicians, Administrators, Standards Institutes, NGO's, Financers that can **potentially influence** the design criteria and thus the challenges posed to the first reader group.

Guideline Delivery

- Drafting / data collection in progress.
- Review process by Review Board starting 1st half 2011
- 'deadline' for new input: mid 2012
- Second half of 2012 for final editing, proof reading
- Publication end 2012 – exact format still to be decided
- Launching event??

Motivation & Concept
EDD Principles
Research Program
Guideline
Governance
Status and Future

EcoShape | building with nature

Governance is ….

the exercise of political, economic and administrative authority to manage a nation's affairs. It is the complex mechanisms, processes, relationships and institutions through which citizens and groups articulate their interests, exercise their rights and obligations and mediate their differences (source: Unifem)

Building with Nature ®

Governance in relation to BwN approaches ?

Law and Order

rather than

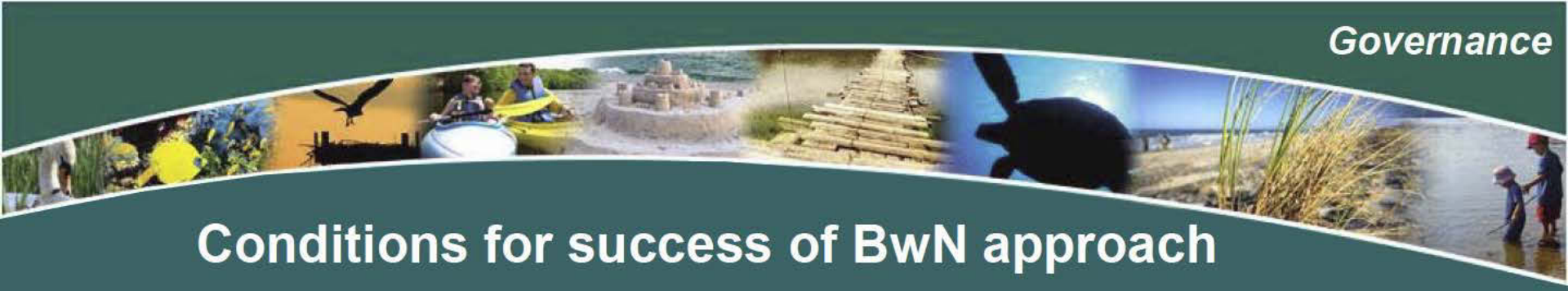
Embracing opportunities

⇒ Generic Governance Research (5 PhD's)

Dharbuiten: Angst voor…

Observed 'issues'

- Differences in local arenas: inter- national –regional – local
- No coordination at ecosystem level
- Different levels of knowledge: to be integrated?
- Dealing with uncertainties at various timescales, not a hobby of politicians



Conditions for success of BwN approach

- Communicate with/between all stakeholders, in early stages of project.
- Understanding each other's interests.
- Tune regulations between various Governance levels.
- Be aware that society is a dynamic system.
- Use available knowledge in defining project boundaries.
- Be able to handle uncertainties: precautionary on the negative – 'benefit of the doubt' on the positive.
- Be honest, transparent and open, at all levels.

Motivation & Concept
EDD Principles
Research Program
Guideline
Governance
Status and Future

EcoShape | building with nature

EcoShape, Building with Nature

- Organization up and running
- Research program established
- All funding in place
- All projects well underway
- Program to be completed by end 2012
- Continuation of program being discussed (internationalization)

Products and timing

- Website www.ecoshape.nl being upgraded to present interim products – open for reactions.
- Conferences for knowledge exchange in Spring 2011 + Fall 2012
  (+ dedicated seminars with specific groups)
- EDD Guideline (peer reviewed) + (wiki) site for background information foreseen for Winter 2012/13
- International cooperation to be continued in next phase of program.