



*Building
with
Nature*

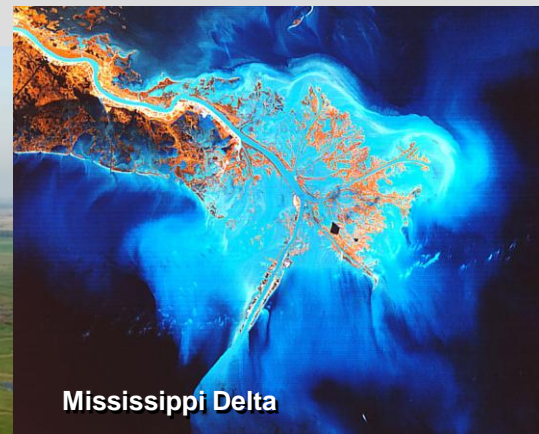


EcoShape

working with
nature
beyond
restoration

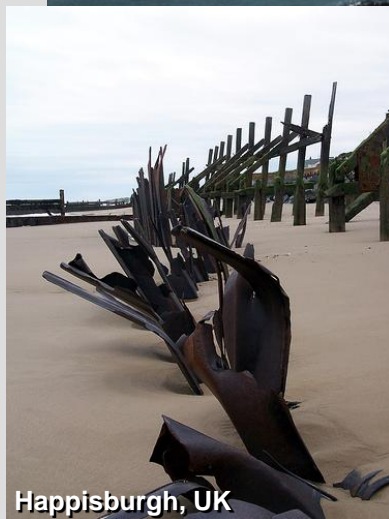


enhanced Afsluitdijk?



Mississippi Delta

MUST WE CARRY ON LIKE THIS?



Happisburgh, UK



12.34 uur



Deep Water Navigation Channel
Yangtze Estuary, China

BUILDING WITH NATURE?

- development of water-related infrastructure**
- in **harmony** with the natural environment
- respecting the natural system's **dynamics**
- **utilising** these dynamics
- creating **new opportunities** for nature

PROBLEM AREA: HOLLAND COAST



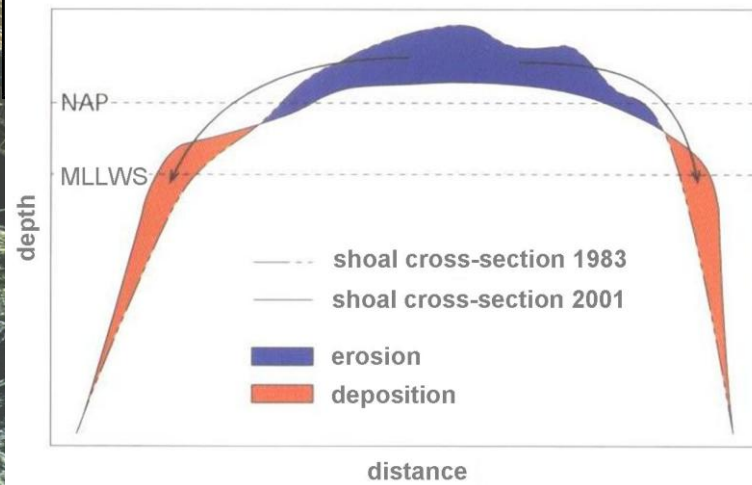
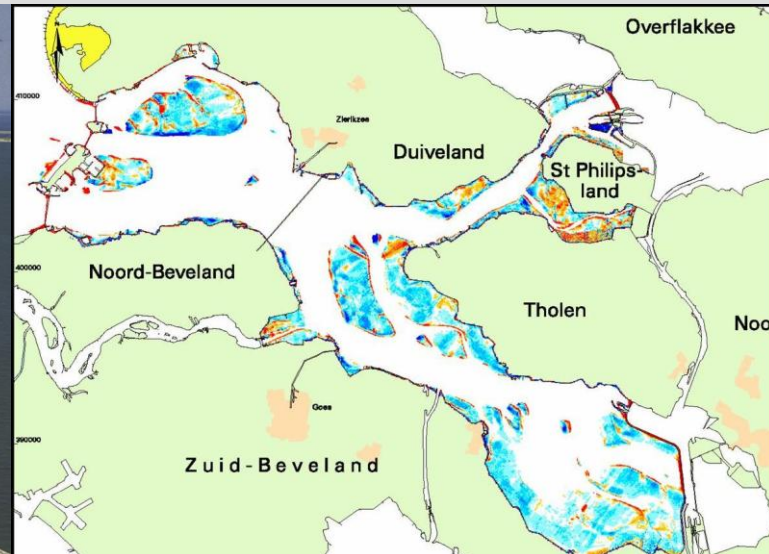
BwN-SOLUTION: SAND ENGINE DELFLAND

- **primary function:** to have sand onshore ⇒ coastal safety
- **other functions:** recreation (beach, swimming, surfing), enlarged freshwater lense in dune area stance for birds and sea mammals
- **natural dynamics:** wind, waves, tide, surges, vegetation
- **dynamics utilised:** nature distributes sand alongshore and cross-shore; vegetation fixes sand / forms dunes
- **nature opportunities:** pioneer vegetation on the sandy hook, temporary beach lagoons, juvenile dune formation ⇒ dune growth



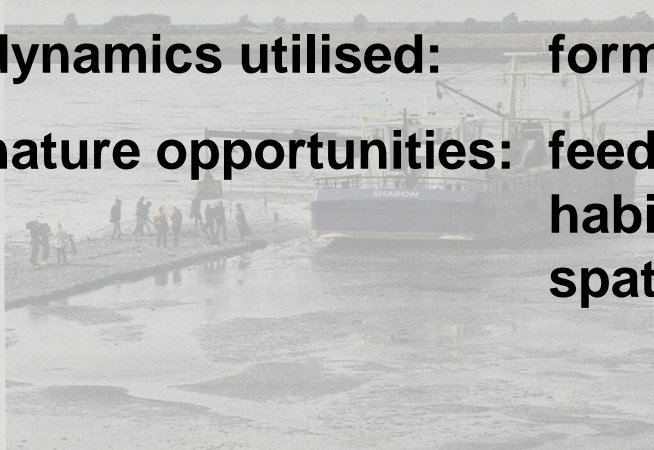
Delfland Sand Engine - June 28 2011

PROBLEM AREA: EASTERN SCHELDT

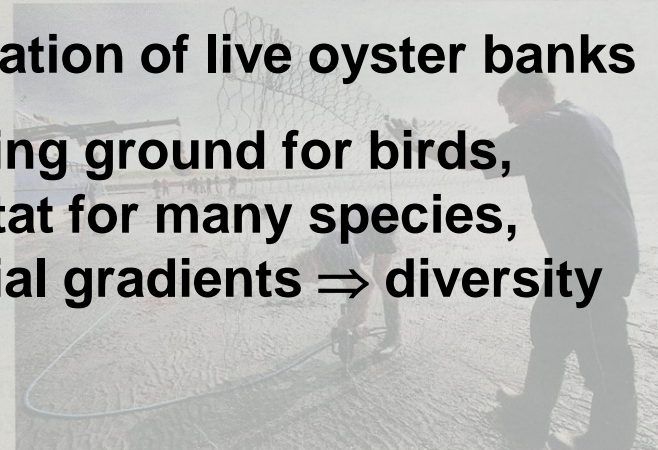


BwN-SOLUTION: OYSTER REEFS

- **primary function:** shoal (edge) stabilisation
- **other functions:** substrate for living oysters, wave attenuation > lower dikes
- **natural dynamics:** wind, waves, tide, benthic comm.
- **dynamics utilised:** formation of live oyster banks
- **nature opportunities:** feeding ground for birds, habitat for many species, spatial gradients \Rightarrow diversity



In de Oosterschelde in Zeeland worden zogeheten oesterriffen aangelegd. Dat zijn lage korven met een totale lengte van 200 meter en 10 meter breed, gevuld met oesterschelpen. Ze moeten de enorme jaarlijkse zandafslag van de slikken en platen in de zee-arm, de zogenoemde zandhonger, tegengaan. Elk jaar verdwijnt tussen de 50 en 100 hectare aan slikken definitief



onder water. Dat heeft grote gevolgen voor onder meer zeehonden. De bij eb droogvallende delen vormen rustplaatsen voor de dieren. Dat oesterriffen het verdwijnen van slikken kunnen tegengaan, is bedacht door wetenschappers van de Wageningen Universiteit en het kennisinstituut voor ecologisch onderzoek NIOO-KNAW. Foto's Arie Kievit



Oyster reef construction near Viane (Zeeland)

BwN-solutions

soft solutions

hard solutions

tidal



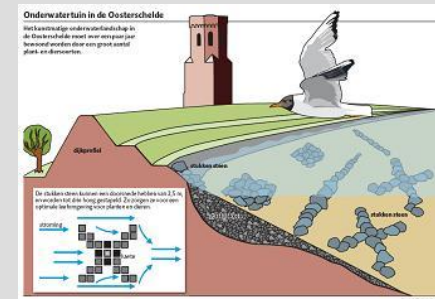
**Galgeplaat
shoal nourishment**



**Delfland coast
Sand Engine**



**ES: oyster reefs
as shore protection**



**Eastern Scheldt
underwater garden**

non-tidal



**IJsselmeer
foreshore nourishment**



**Markermeer
eco-levee**



**Noordwaard: willow
forest foreshore**



'rich levee'

focus on
ecosystem
functioning

focus on
infrastructure
development

drivers of change

- **government:** seeks to become more agile via better informed decision making
- **industry:** seeks to realise growth at the high end of the market
- **consultancies:** seek competitive advantage by offering new concepts
- **RTO's:** seek added value via rapid transfer of relevant new knowledge
- **academia:** seeks fast valorisation of new knowledge and ideas
- **NGO's:** seek reconciliation of economical development and ecological sustainability

consortium

NGO's

INDUSTRY
dredging firms
consultancies
offshore industry

GOVERNMENT
I&E – DG Water
I&E – Rijkswaterstaat
Municip. Dordrecht

> 20 partners



2008-2012

RESEARCH INST.
Deltares
IMARES
Alterra

ACADEMIA
TUD/UT/WUR
NIOZ
NIOO-CEME



CONSORTIUM

**govern-
ment**

**private
sector**



**research
institutes**

academia

THE 'GOLDEN TRIANGLE'

**govern-
ment**

**private
sector**



research sector

our mission

**to show that it's possible,
developing infrastructure
and at the same time
creating opportunities for nature**

approach

- connecting to **'live' cases**
- filling knowledge gaps
- experimenting in **pilot-applications**
- **inter**disciplinary, integrative
- aiming at **knowledge sharing**
- aiming at **practical use**

programme set-up

**scientific research
programme**

**19 PhD-students
in
(biogeo-)
morphology
ecology
governance**



**case & pilot
programme**

**4 'live' cases
each
with
2 or more
pilot
experiments**



**manual & tools
programme**

**application
guideline
portfolio
of examples
tools
lessons learned**



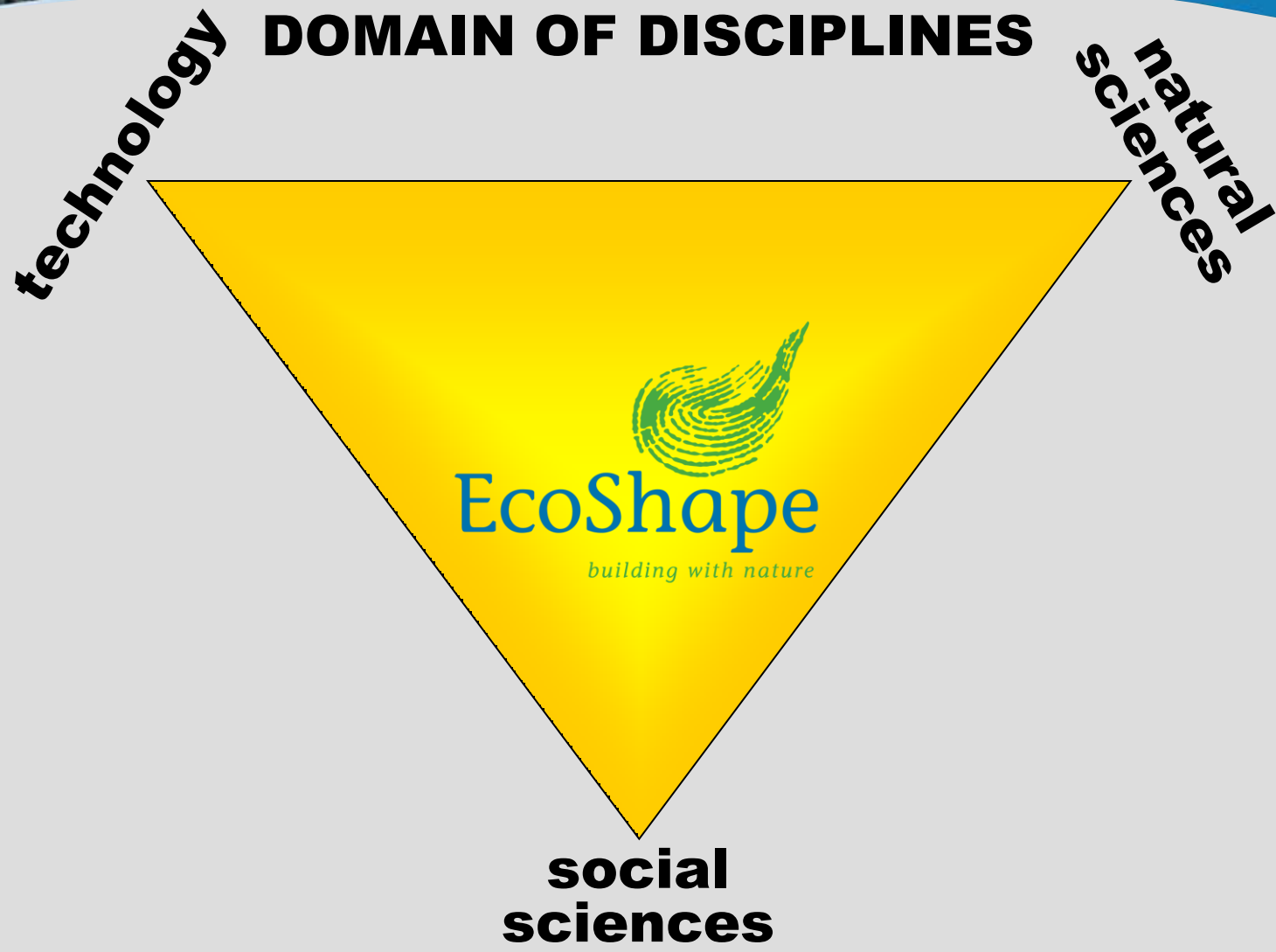
DOMAIN OF OPERATION

building

nature



society



interactive mode of operation



workshops, design ateliers, discussion sessions

PILOT EXPERIMENTS

SAND ENGINE



- **construction: first half of 2011**
 - **monitoring during construction: data \Rightarrow BwN**
 - **monitoring after construction (6 à 7 M€):**
 - **effect-monitoring: Rijkswaterstaat**
 - **scientific monitoring: PZH + EFRO (?)**
 - **analysis & interpretation: joint PhD progr. (?)**
- collaboration: PZH, RWS, contractors, NGOs**

ECOLOGICAL BORROW PIT



- **sand ridges in 2 borrow pits MV2**
- **monitoring with Rotterdam Harbour Authority**
- **first monitoring data: indicate rapid recovery of habitat and biodiversity**

collaboration: RHA, contractors, RWS

EASTERN SCHELDT SHOALS



- monitoring Galgeplaat shoal nourishment (video, in situ) \Rightarrow slow ecosystem recovery
- small-scale oyster reef test: successful (morphologically and ecologically)
- larger-scale reefs: built (Viane, de Val)
- monitoring schemes: ongoing

collaboration: RWS Zeeland

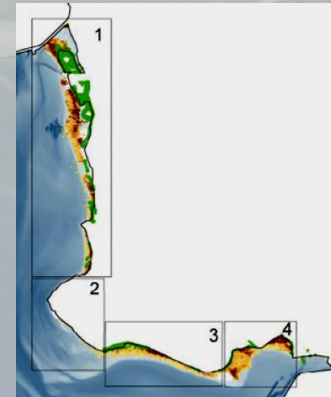


LAKE IJSSEL

FRISIAN COAST LAKE IJSSEL

- 3 nourishment sites identified
- work started at Workumerwaard site
- monitoring plan W'waard ready
- agreement It Fryske Gea (NGO)

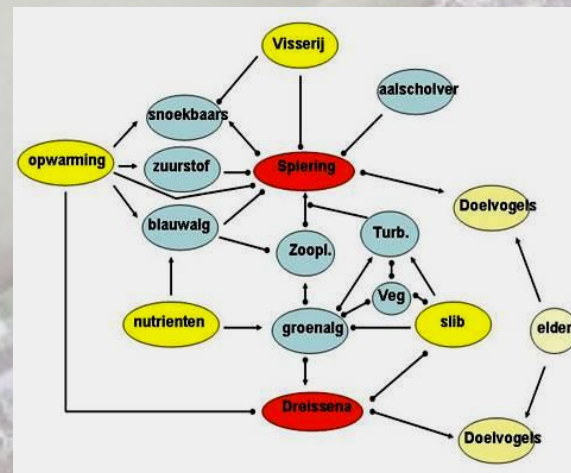
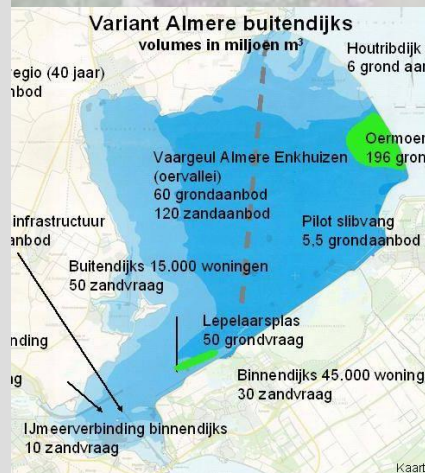
collaboration: It Fryske Gea, Prov., Wetterskip,
CNK (coalition of NGOs)



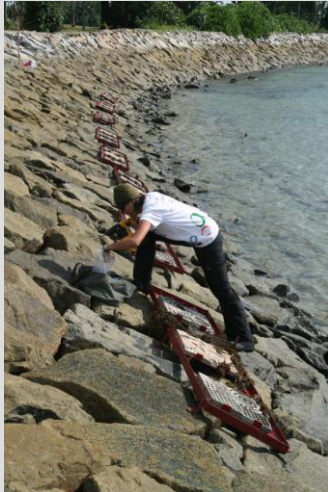
LAKE MARKEN

- ecosystem analysis ongoing (4 PhDs)
- soil balance > soil bank?

collaboration: RWS, TMIJ, NMIJ



SINGAPORE

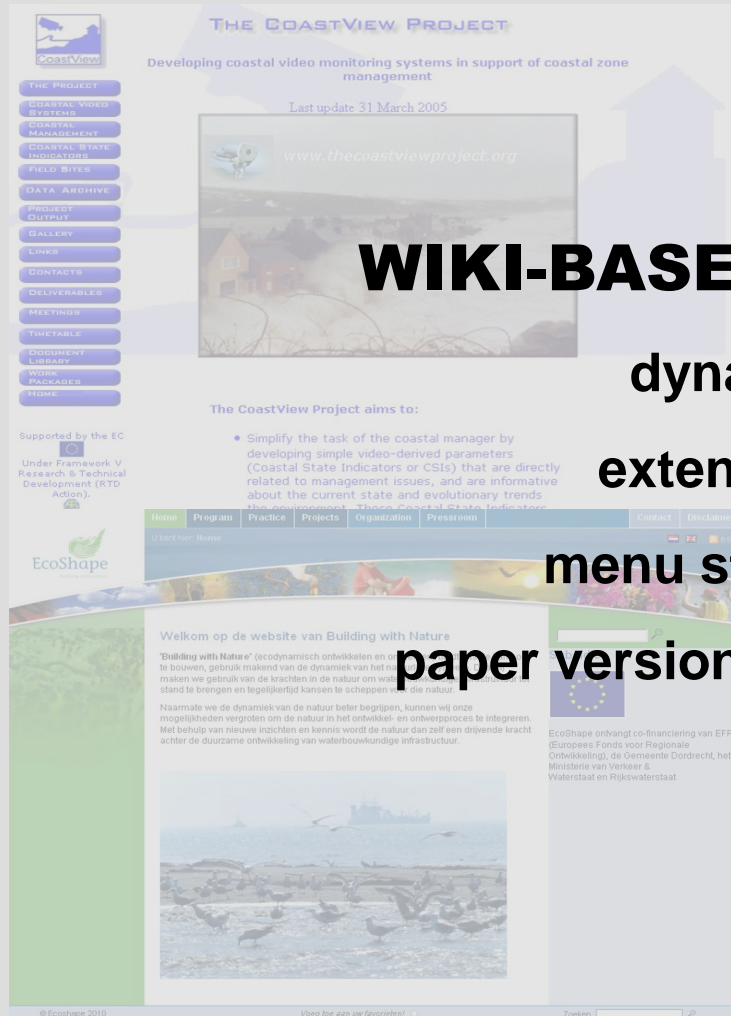


- **monitoring / analysis coastal water turbidity**
- **how much turbidity can the ecosystem have?**
- **bioarchitects for coastal protection**

collaboration: SDWA, Nat. Un. Singapore, PUB

GUIDELINES AND TOOLS

FOCUS ON OUTCOME



THE COASTVIEW PROJECT
Developing coastal video monitoring systems in support of coastal zone management

Last update 31 March 2005

www.thecoastviewproject.org

The CoastView Project aims to:

- Simplify the task of the coastal manager by developing simple video-derived parameters (Coastal State Indicators or CSIs) that are directly related to management issues, and are informative about the current state and evolutionary trends

Supported by the EC

Under Framework V Research & Technical Development (RTD Action)

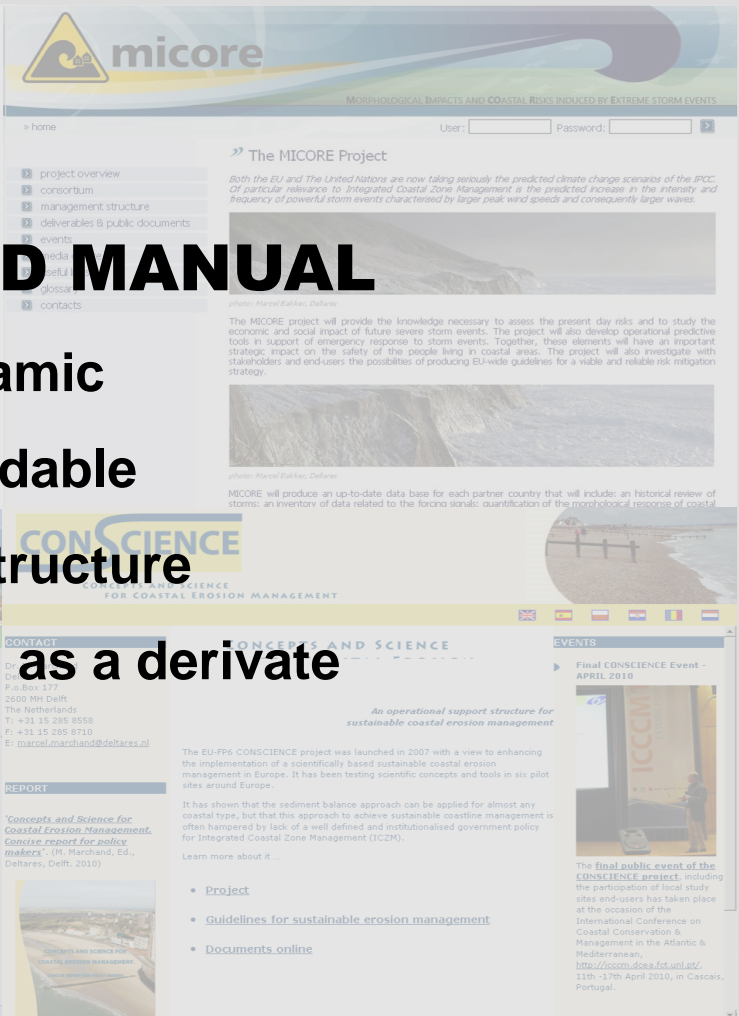
Home Program Practice Projects Organization Pressroom Contact Disclaimer

Welkom op de website van Building with Nature

"Building with Nature" (gedynamisch ontwikkelen en bouwen, gebruik makend van de dynamiek van het water) maken we gebruik van de krachten in de natuur om waterstand te brengen en tegelijkertijd kansen te scheppen die natuur

Naarmate we de dynamiek van de natuur beter begrijpen, kunnen wij onze mogelijkheden vergroten om de natuur in het onwikkelen- en ontwerpproces te integreren. Met behulp van nieuwe inzichten en kennis wordt de natuur dan zelf een drijvende kracht achter de duurzame ontwikkeling van waterbouwkundige infrastructuur.

EcoShape ontvangt co-financiering van EFRO (Europees Fonds voor Regionale Ontwikkeling), de Gemeente Dordrecht, het Ministerie van Verkeer & Waterstaat en Rijkswaterstaat



micore
MORPHOLOGICAL IMPACTS AND COASTAL RISKS INDUCED BY EXTREME STORM EVENTS

home User: Password:

The MICORE Project

Both the EU and The United Nations are now taking seriously the predicted climate change scenarios of the IPCC. Of particular relevance to Integrated Coastal Zone Management is the predicted increase in the intensity and frequency of powerful storm events characterised by larger peak wind speeds and consequently larger waves.

The MICORE project will provide the knowledge necessary to assess the present day risks and to study the economic and social impact of future severe storm events. The project will also develop operational predictive tools in support of emergency response to storm events. Together, these elements will have an important strategic impact on the safety of the people living in coastal areas. The project will also investigate with stakeholders and end-users the possibilities of producing EU-wide guidelines for a viable and reliable risk mitigation strategy.

MICORE will produce an up-to-date data base for each partner country that will include: an historical review of storms; an inventory of data related to the forcing agents; quantification of the morphological response of coastal

project overview
consortium
management structure
deliverables & public documents
events
media
crosslinks
contacts

CONSCIENCE
CONCEPTS AND SCIENCE FOR COASTAL EROSION MANAGEMENT

CONTACT
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REPORT
"Concepts and Science for Coastal Erosion Management. Concise report for policy makers". (M. Marchand, Ed., Deltras, Delft, 2010)

Final CONSCIENCE Event - APRIL 2010

An operational support structure for sustainable coastal erosion management

The EU-FP6 CONSCIENCE project was launched in 2007 with a view to enhancing the implementation of a scientifically based sustainable coastal erosion management in Europe. It has been testing scientific concepts and tools in six pilot sites around Europe.

It has shown that the sediment balance approach can be applied for almost any coastal type, but that this approach to achieve sustainable coastline management is often hampered by lack of a well defined and institutionalised government policy for Integrated Coastal Zone Management (ICZM).

Learn more about it ...

- Project
- Guidelines for sustainable erosion management
- Documents online

The final public event of the CONSCIENCE project, including the participation of local study sites end-users has taken place at the occasion of the International Conference on Coastal Conservation & Management in the Atlantic & Mediterranean. <http://icomm.dcea.ftd.unl.pt/>, 11th -17th April 2010, in Cascais, Portugal.

WIKI-BASED MANUAL

dynamic
extendable

menu structure

paper version as a derivate

OpenEarth: data & model access

- application under GoogleEarth > georeference
- 4D (space + time)
- compliant with international standards
- fast and easy access
- data sources from all over the world
- measured data and model results
- wide range of spatio-temporal data (+ metadata)
- open source

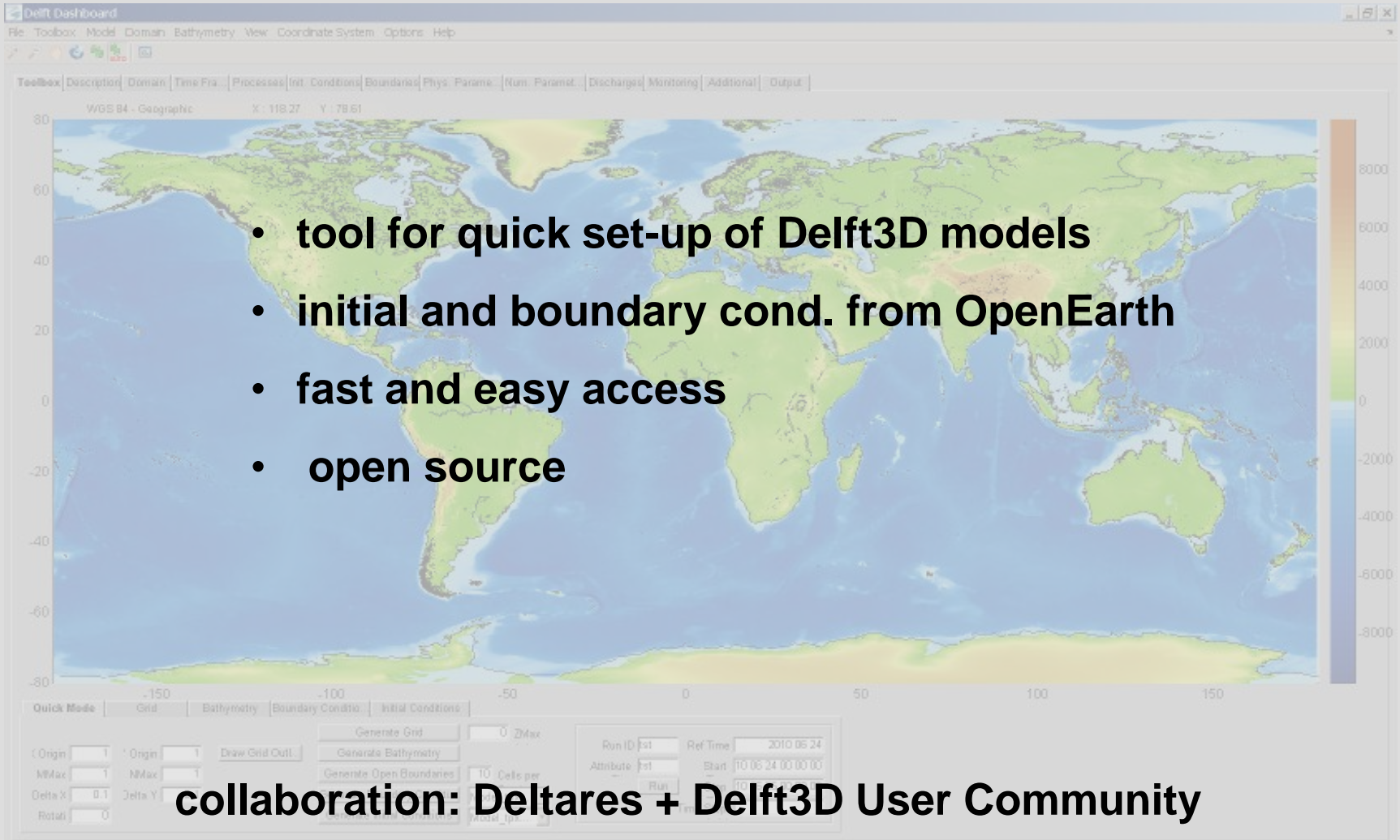
collaboration: TUDelft Library, Deltares, NOAA

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2009 Aerodata International Surveys

53°02'24.28"N 4°42'46.40"E

Ooghoogte 127 m

Delft Dashboard



The screenshot displays the Delft Dashboard software interface. The main window shows a world map with bathymetry data, color-coded from blue (deep) to green/yellow (shallow). The map is overlaid with a grid. The interface includes a menu bar (File, Toolbox, Model, Domain, Bathymetry, View, Coordinate System, Options, Help) and a toolbar. Below the map, there are several control panels: 'Quick Mode' with buttons for Grid, Bathymetry, Boundary Conditions, and Initial Conditions; a 'Generate Grid' panel with fields for ZMax, NMax, Delta X, Delta Y, and Rotat; and a 'Run' panel with fields for Run ID, Ref Time, Attribute, and Start, along with a 'Run' button. A vertical color scale on the right side of the map ranges from -8000 to 8000.

- tool for quick set-up of Delft3D models
- initial and boundary cond. from OpenEarth
- fast and easy access
- open source

collaboration: Deltares + Delft3D User Community

**Building with Nature:
worth developing from an
innovation project to a
broad international movement?**