

# *Building with Nature*



EcoShape

## **Resilient Sandy Strategies**

*Thinking, acting and interacting differently*

*Jaap van Thiel de Vries*

*Ecoshape | Boskalis – Hydronamic*



**Boskalis**

**Van Oord** 

Marine ingenuity

June 14, 2016

# The need for resilient systems...



# New challenges to marine infrastructure

*What if we are so focused on minimizing negative effects that we miss opportunities to maximize positive effects?*



Engineering with Nature



US Army Corps of Engineers

Building with Nature

Working with Nature

Eco-engineering



Rijkswaterstaat  
Ministerie van Infrastructuur en Milieu

# The philosophy

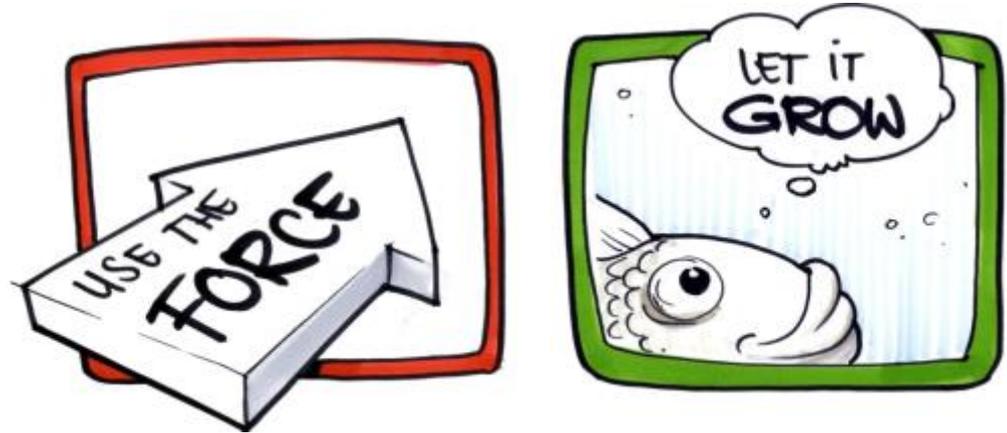
From: Building *in* Nature



Via: Building *of* Nature



To: Building *with* Nature



Develop infrastructure  
and at the same time  
*use and create*  
*opportunities* for nature &  
society



# EcoShape

*building with nature*

- Develop **ecosystem knowledge** for infrastructure development
- Develop scientifically sound **design rules and norms**
- Make the concept tangible by creating practical **BwN-examples**
- Bring the BwN-concept forward in society and **make it happen**

# Learning by doing

soft solutions

hard solutions

Temperate

Tropical



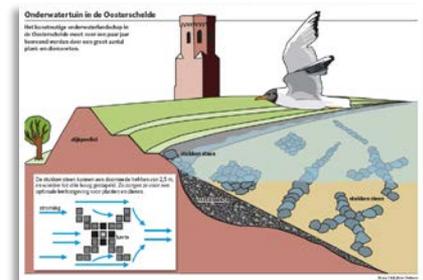
*Pilot Sand Motor  
Delfland Coast*



*Dike with Sandy foreshore  
Markermeer*



*Oyster reefs  
Oosterschelde*



*Underwater garden  
Eastern Scheldt*



*Coastal protection  
Sea grass*



*Securing mangroves coasts  
(North Java Indonesia)*



*Coral reef restoration*



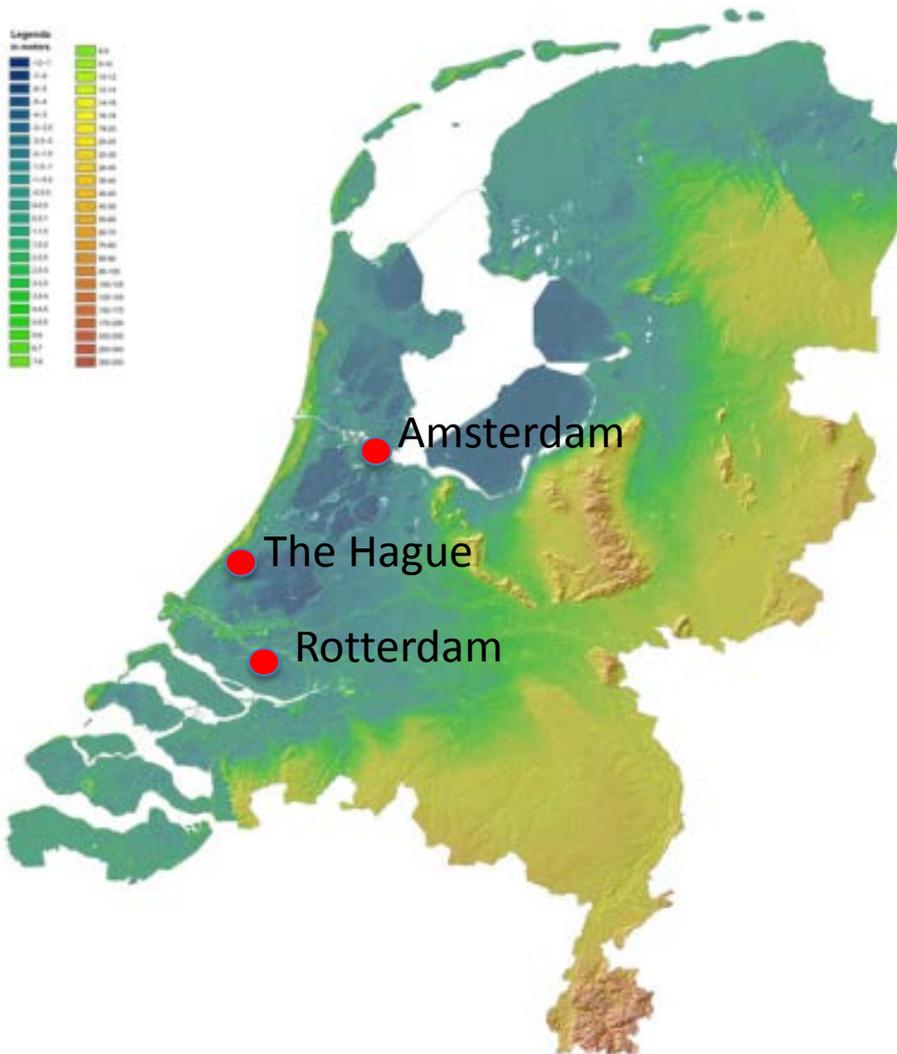
*'rich levee'  
Singapore*

focus on  
ecosystem  
functioning

focus on  
infrastructure  
development

# Opportunities for resilient sandy strategies

The Dutch context



Sandy Beaches and Dunes



Dikes and Dams

# Opportunities for resilient sandy strategies



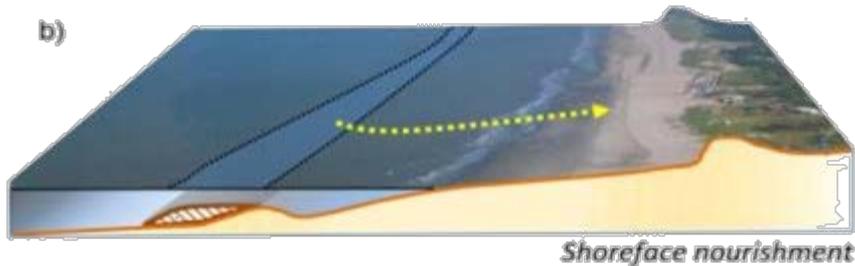
Sandy Beaches and Dunes



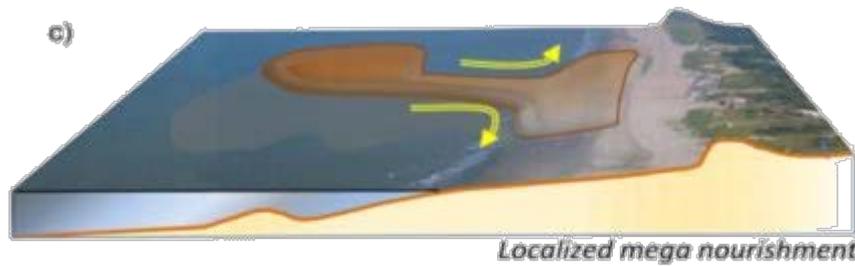
Dikes and Dams



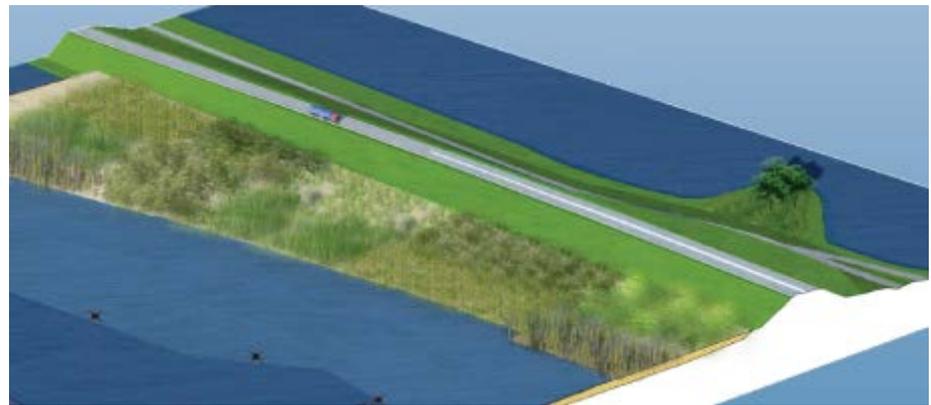
*Traditional beach and dune nourishment*



*Shoreface nourishment*



*Localized mega nourishment*



Sandy strategy as alternative for conventional dike reinforcement

# The Sand Motor

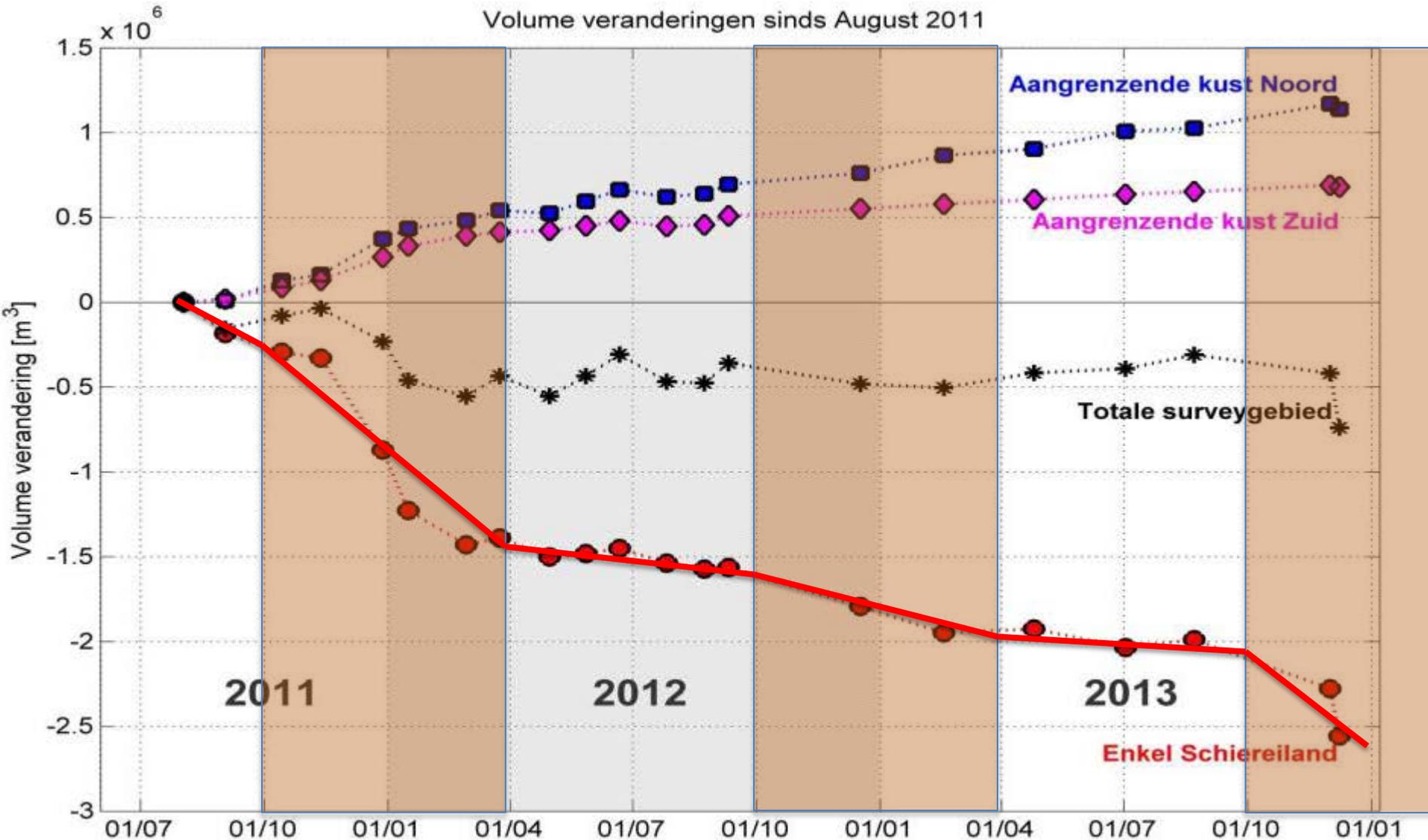


January 2016



# Use nature to create resilience...

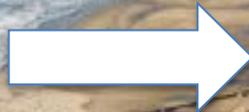
Enhanced spreading to adjacent coastal sections during storm season



# The Pettemer Sea Defense

Increasing resilience by introducing a sandy beach and dune system

Sandy beach & dunes



Sea dike



# Creating multifunctional landscape's

Influence nature with initial condition to get desired landscape properties



# Pilot sandy foreshore Houtribdijk:

Sandy vegetated foreshore as alternative for conventional dike reinforcement

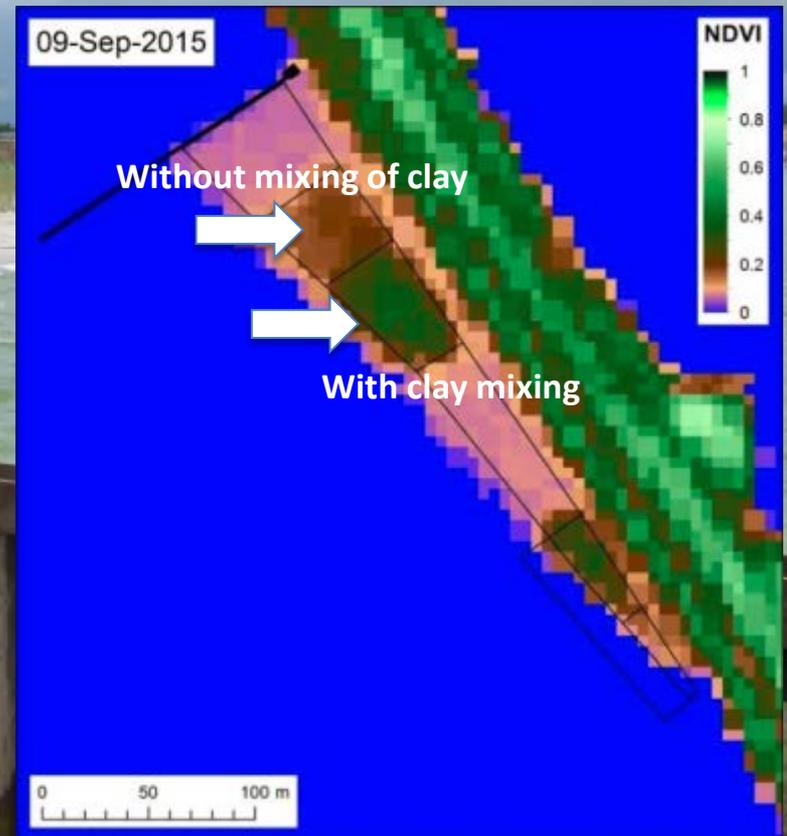


Hoogwaterbeschermingsprogramma



# Engineering with vegetation

First findings...





**Copy  
&  
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# BUILDING WITH NATURE

Thinking, acting and interacting differently

Jaap.vanthieldevries@ecoshape.nl

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Guideline

