



Reflection on Interdisciplinary research

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Morphology

Dune
formation

Geochemistry

Hydrology

Hydro-
dynamics

Terrestrial
ecology

Marine
ecology

Governance

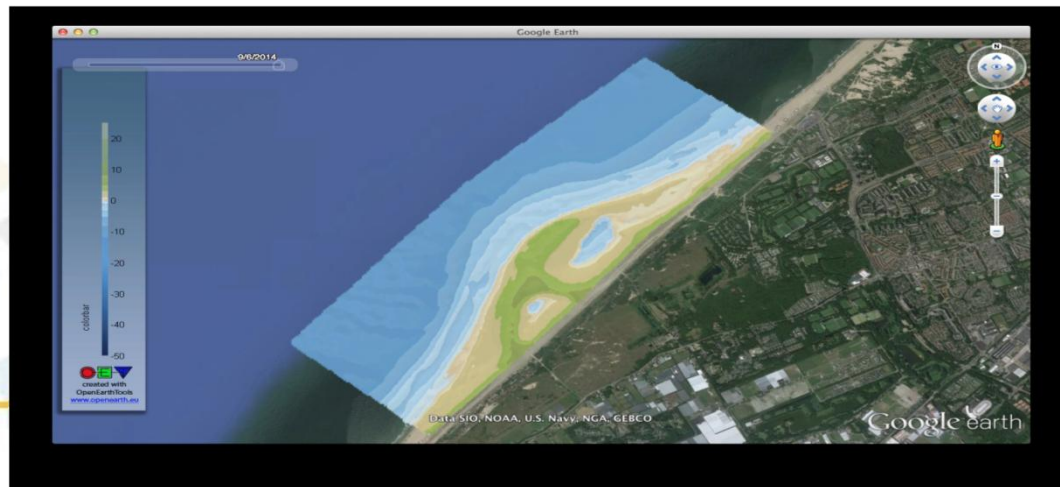
Interaction between researchers

- Collaboration where possible, align research
 - Be on the look-out for opportunities
- Individual research already interdisciplinary
 - Many one-on-one collaborations

Unique 'breed' of interdisciplinary researchers, with specific and all-round knowledge embedded in context of Building With Nature

Unique data collected too!

- Different types of measurements for same process
- Available through Data Management System
- One-of-a-kind & public data set



Science Integration - MegaPEX

Unique collaboration

Multi-disciplinary data set

>40 researchers



Universiteit Utrecht



WAGENINGEN UNIVERSITY
WAGENINGEN UR

UNIVERSITY OF TWENTE.



IMARES

WAGENINGEN UR



UNESCO-IHE
Institute for Water Education

W
UNIVERSITY of
WASHINGTON



OSU
Oregon State
UNIVERSITY



National
Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL



Witteveen

Bos



Shore
Monitoring & Research

EMS
ENVIRONMENTAL
MAPPING &
SURVEYING

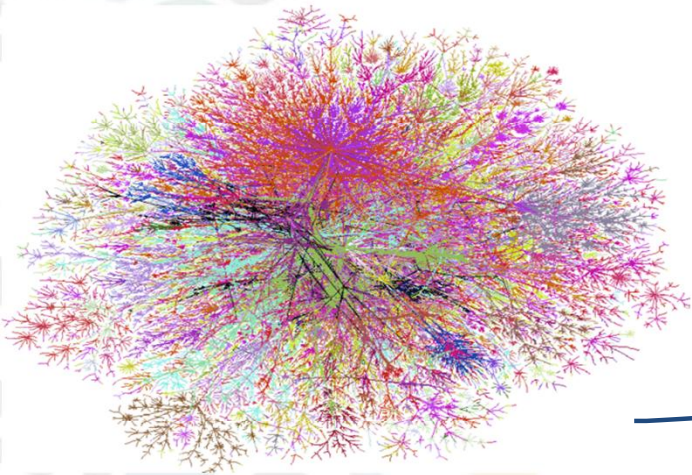
PhD's during MegaPEX



Interdisciplinary research

Big data

1. Behavioral data
2. Process data

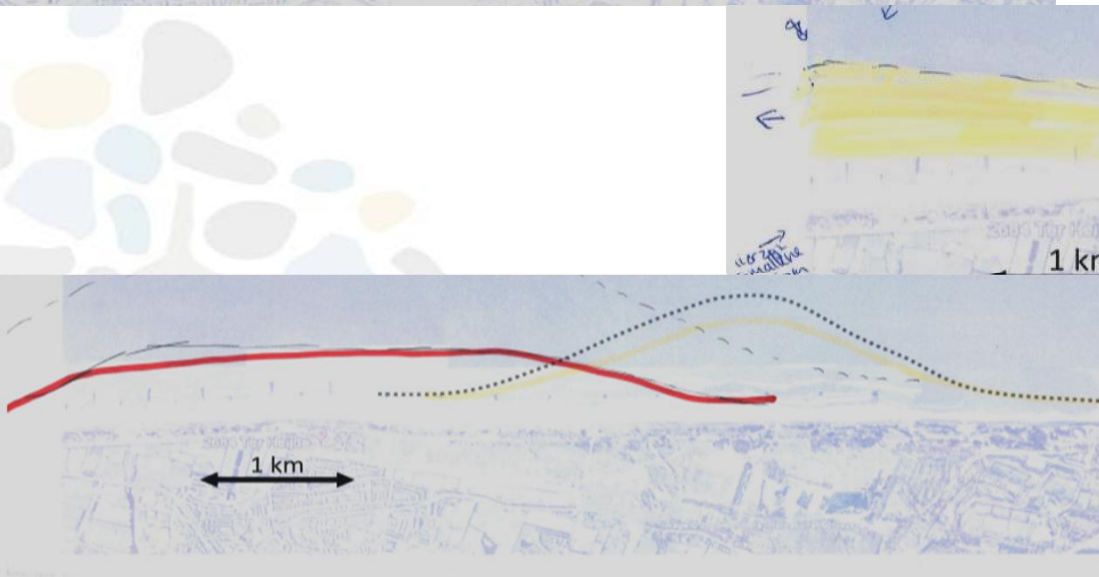
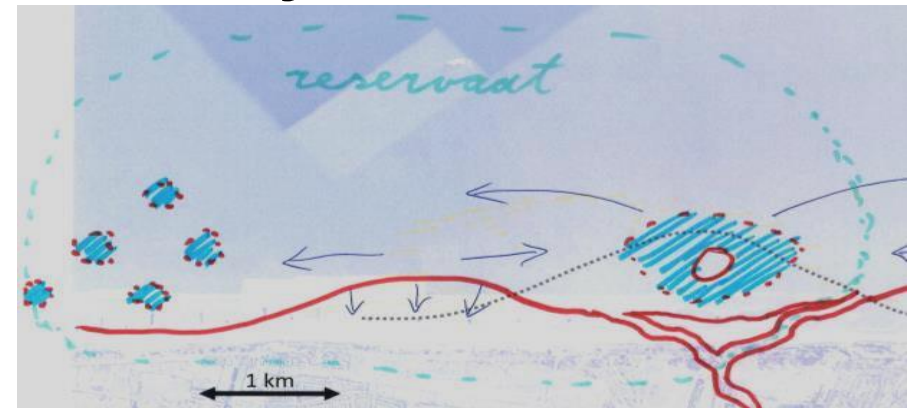
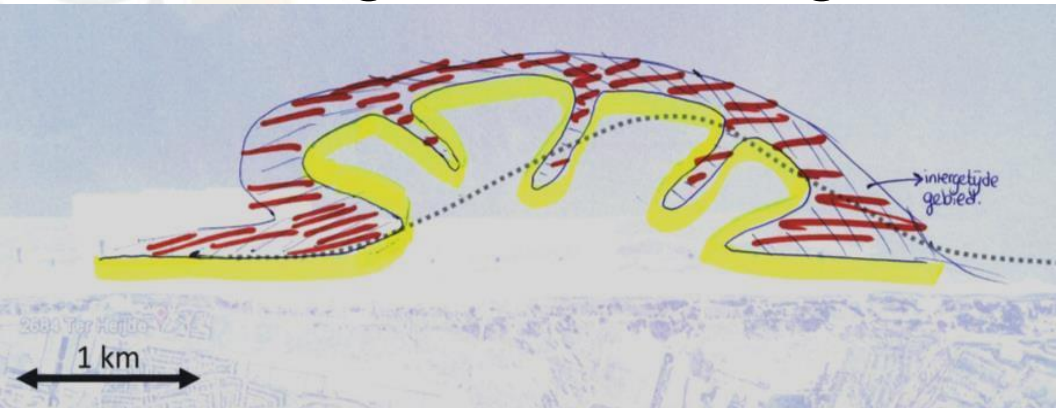


Interdisciplinary
knowledge
development

End-user ambitions that
require generic knowledge
usable for design



Design: building blocks of Sandy Solutions



Hence, today's themes

1. Expanding morphological models – towards predictions

- Arjen Luijendijk, Bas Hoonhout, Jantien Rutten, Simeon Moons, ...

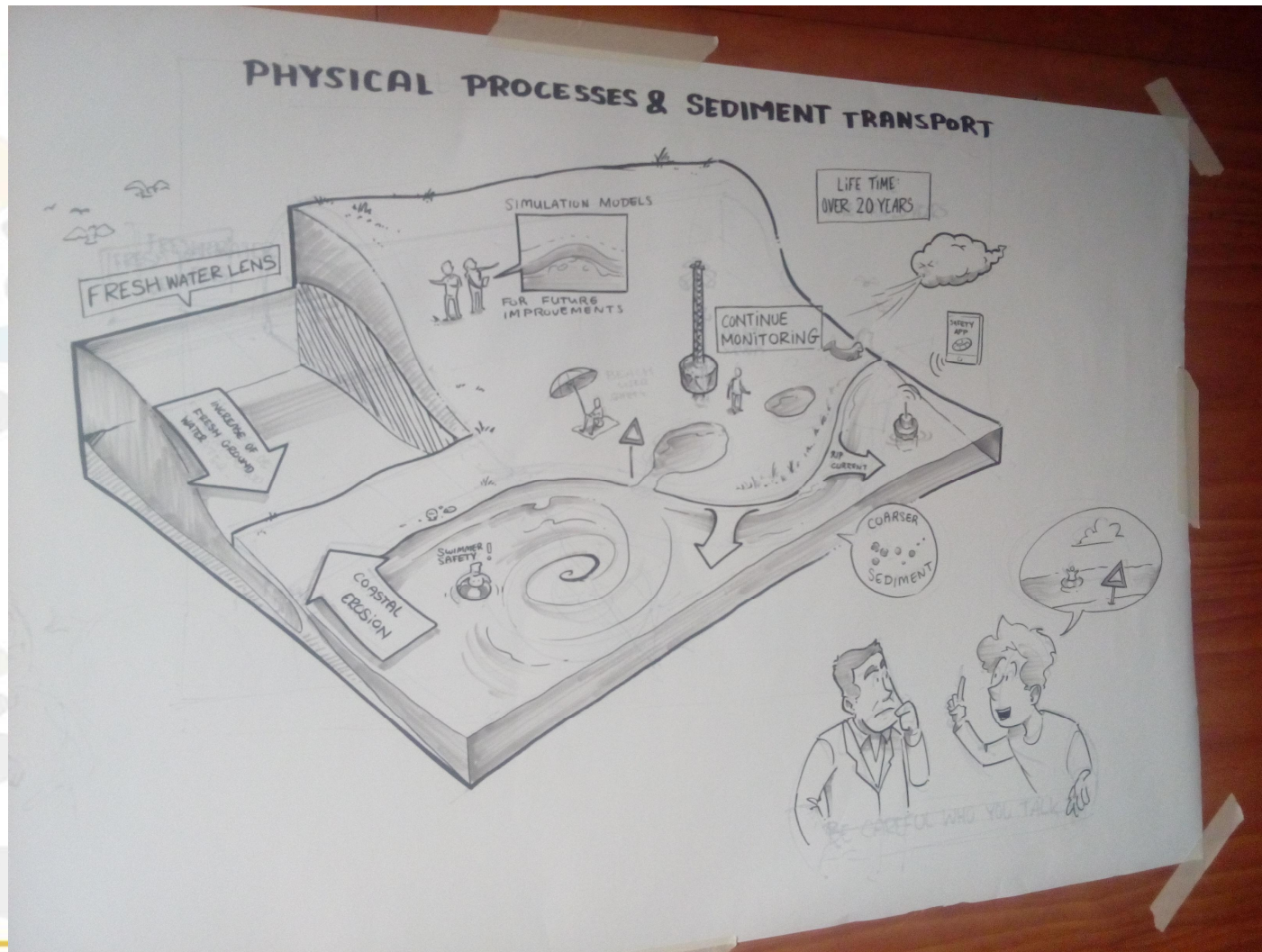
2. Dune formation & aeolian transport

- Kathelijne Wijnberg, Michel Rickson, Corjan Nolet, Marinka van Puijenbroek, Isaac Williams

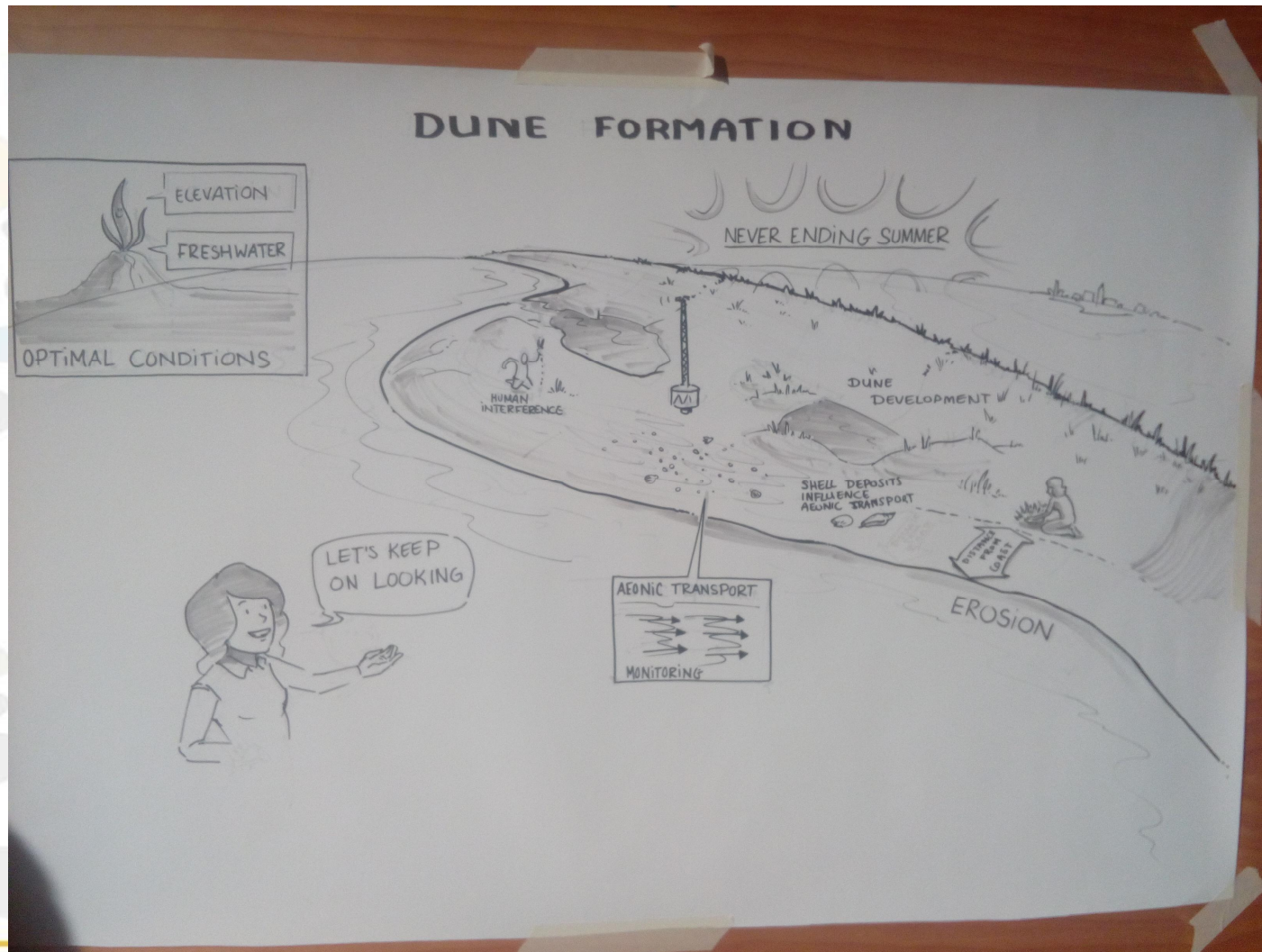
3. Towards a nature-friendly (mega-)nourishment

- Peter Herman, Simeon Moons, Marjolein Post, Iris Pit, Emily van Loon – van Egmond, ...

** Applications of sandy strategies*



Thanks to JAM Visual Thinking

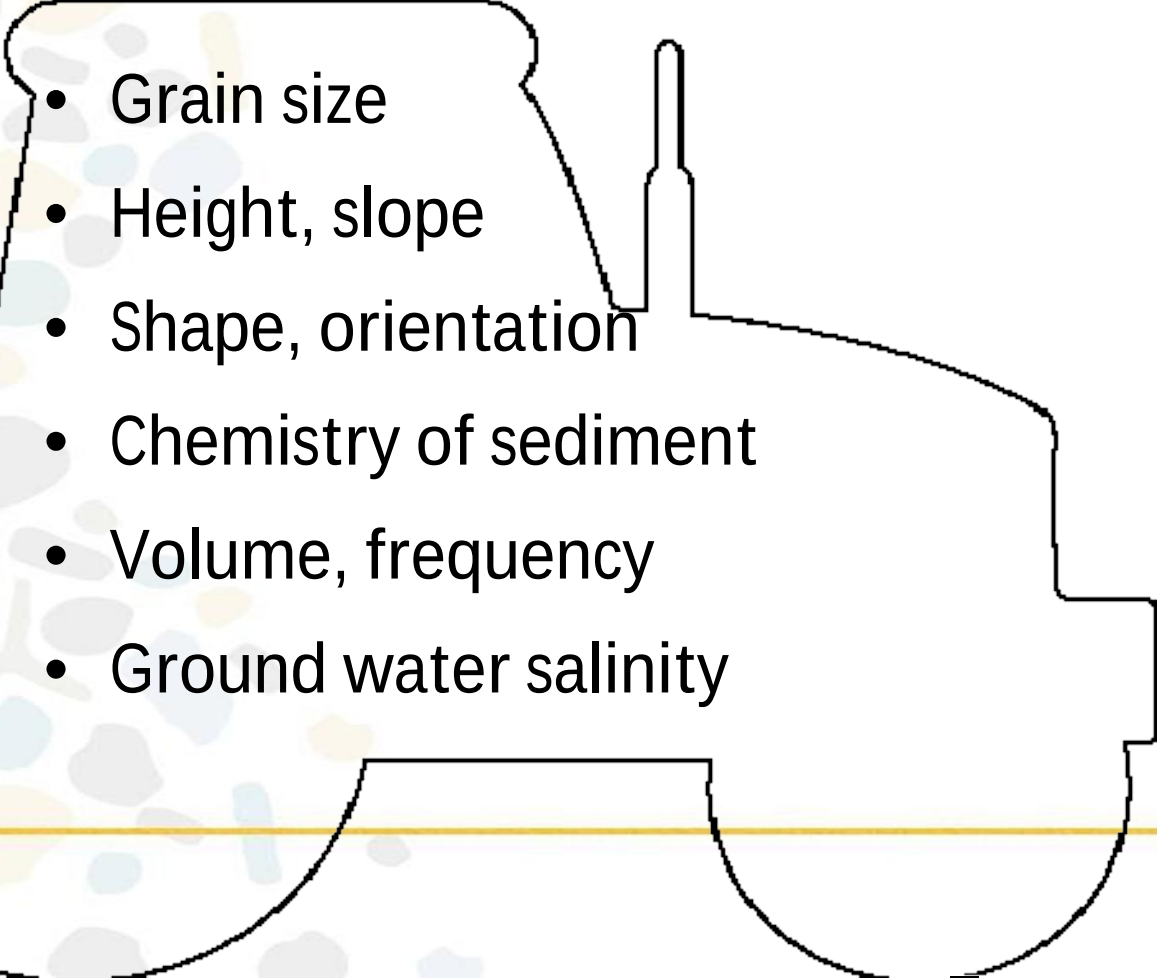


Thanks to JAM Visual Thinking



Thanks to JAM Visual Thinking

Design for what, for whom?

- 
- Grain size
 - Height, slope
 - Shape, orientation
 - Chemistry of sediment
 - Volume, frequency
 - Ground water salinity

- Dune development
- Safety
- Recreation, Nature
- Innovation

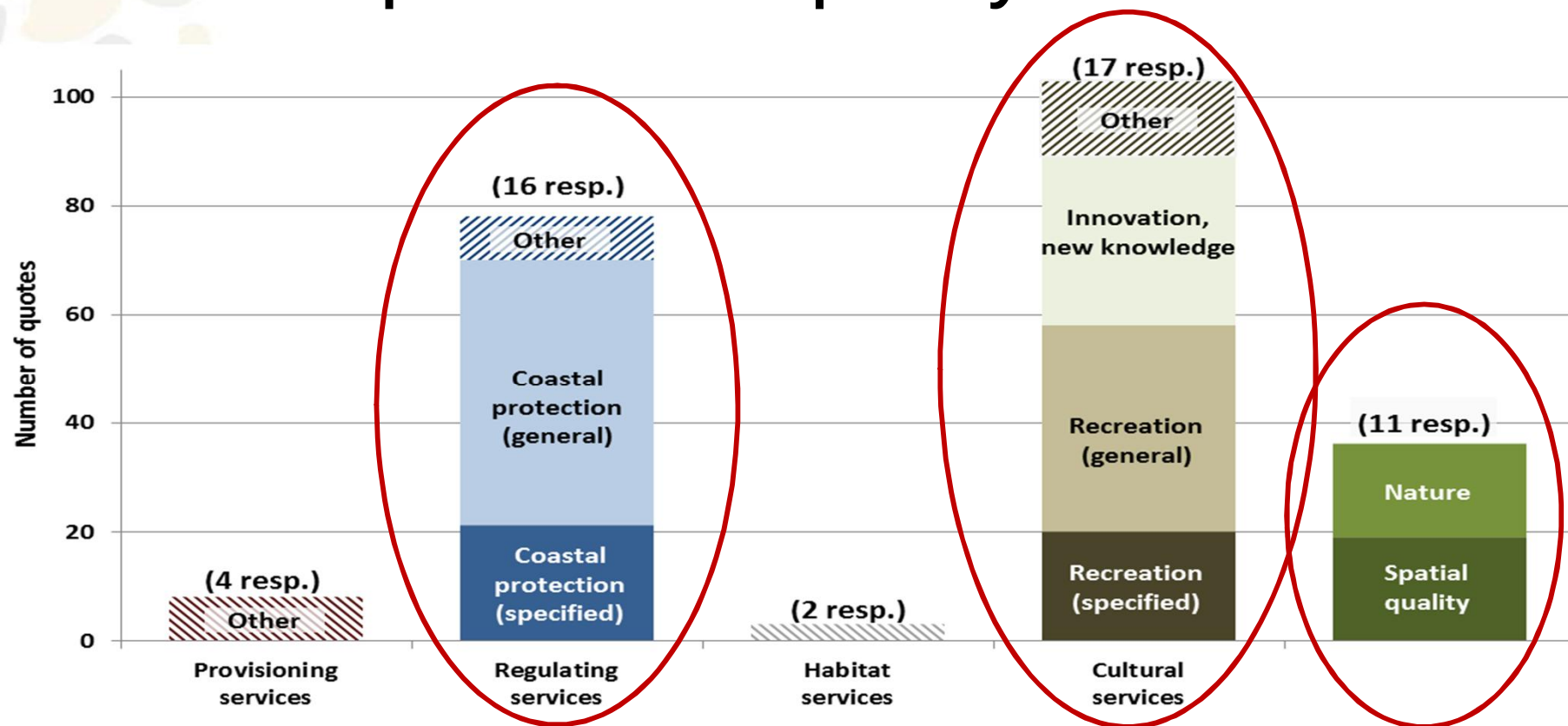
Ecosystem services

- “Contributions of ecosystems to human wellbeing – arising from interactions between biotic and abiotic processes”

Haines-Young & Potschin (2013)

- The sea, beach, lagoon, dunes contribute to safety, health, welfare, happiness, art, identity, innovation

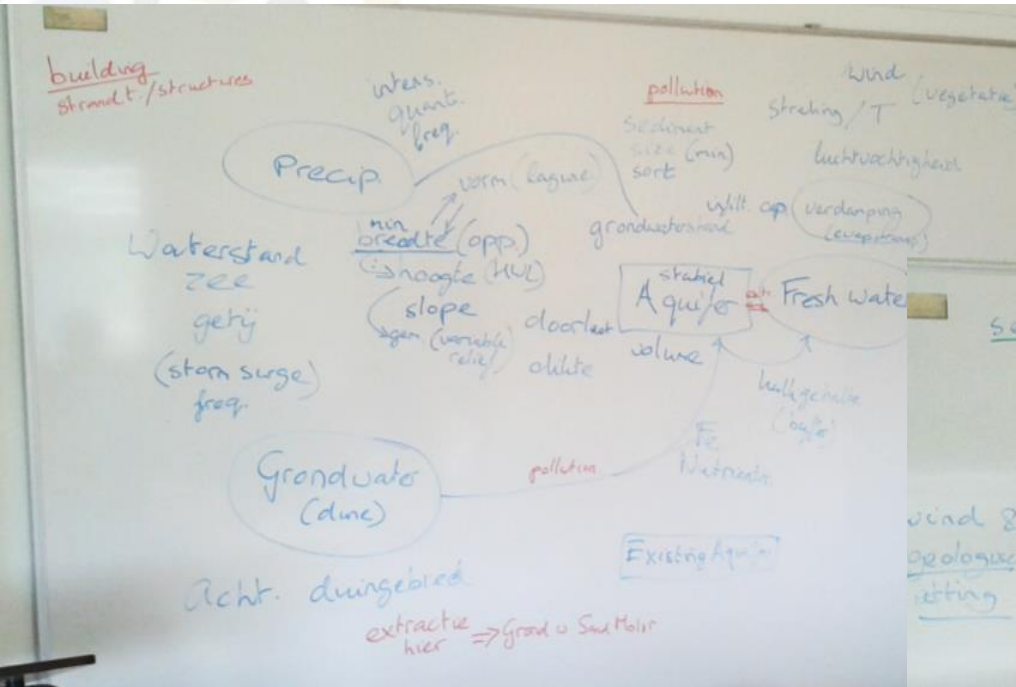
Important for policy actors



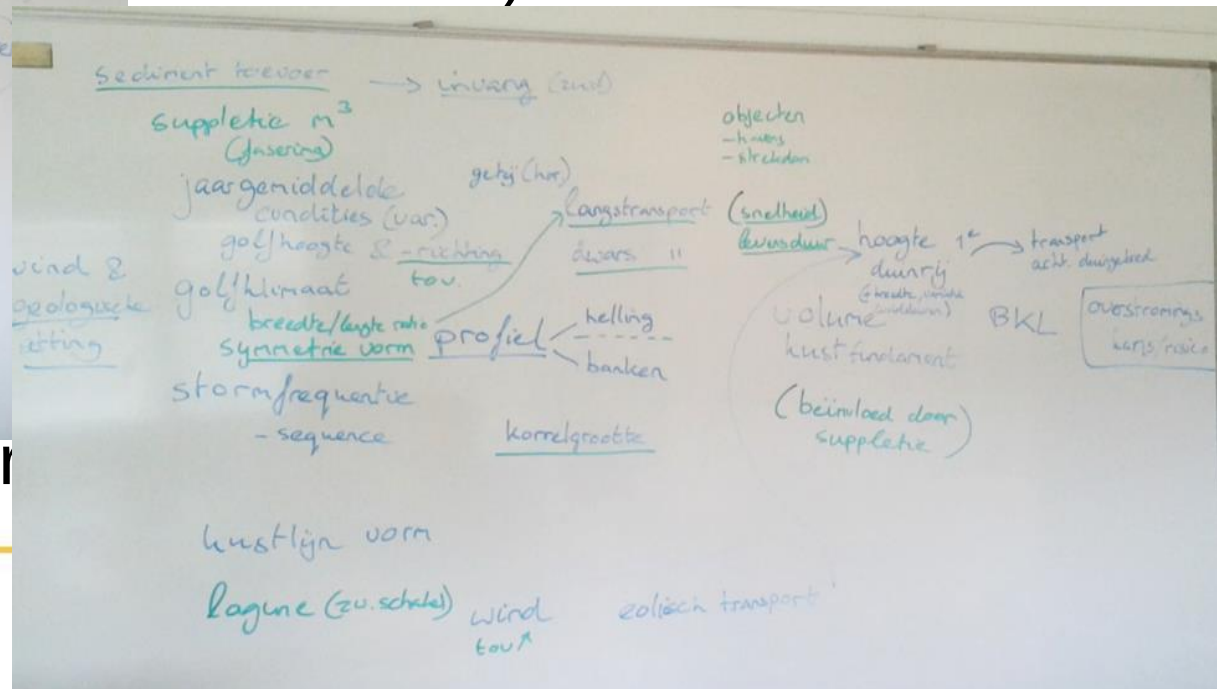
Alexander van Oudenhoven, Ewert Aukes, Lotte Bontje, Vera Vikolainen, Jill Slinger, *Environmental Science & Policy* (in prep.)

Ecosystem services not targeted

ther animals?)



The Sand Motor



Spreading the word across disciplines

Scientific community

- To *Coastal Engineering* – consider ecosystem services
- To *Ecological Applications* – framework ecological engineering

Practitioners and policy actors

- What are relevant ecosystem services, what drives them?
- Can we evaluate Sandy Solutions differently?

Journal of Sea Research



- *Uses natural processes*
- *Integrates nature and development goals*
- **Creates added value for nature and society**

By optimizing ecosystem services!

Towards engineering the Ecosystem Services (& other goals) of the Sand Motor (& beyond)



Rijkswaterstaat
Ministerie van Infrastructuur en Milieu



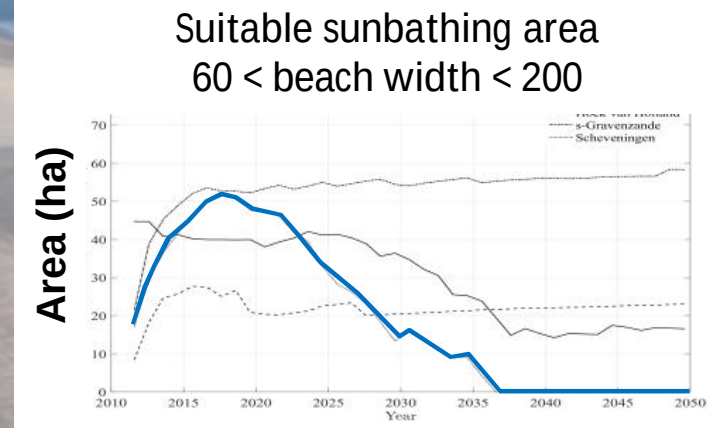
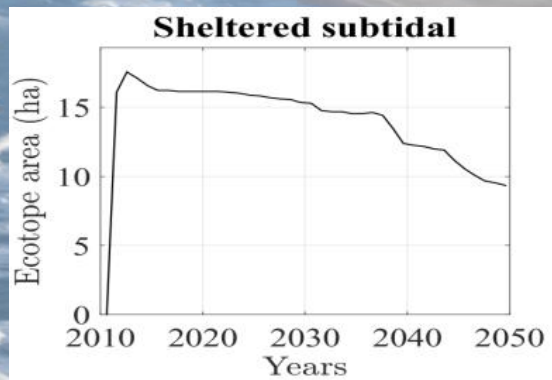
Kansen
voor West
G4P4



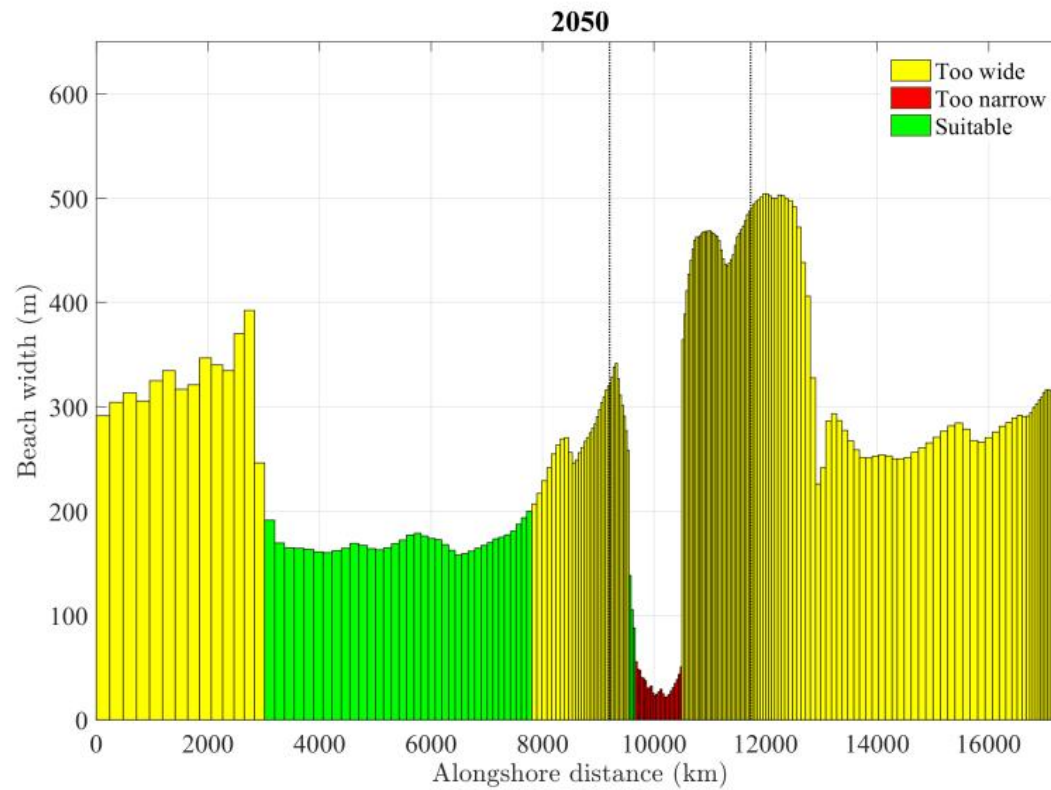
Integrated tools for ESS quantification

Towards engineering the ecosystem services of a mega-nourishment

- Coastal protection
- Recreation:
 - * kite surfing,
 - * strolling,
 - * sunbathing
- Habitat provision by dynamic ecotope mapping

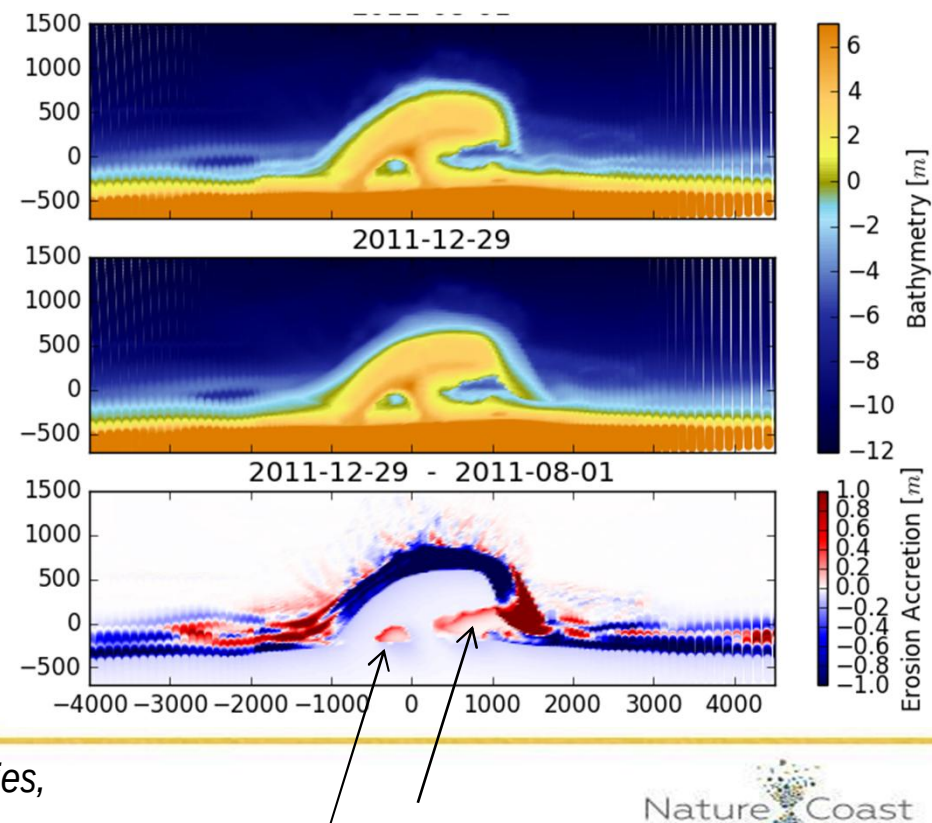
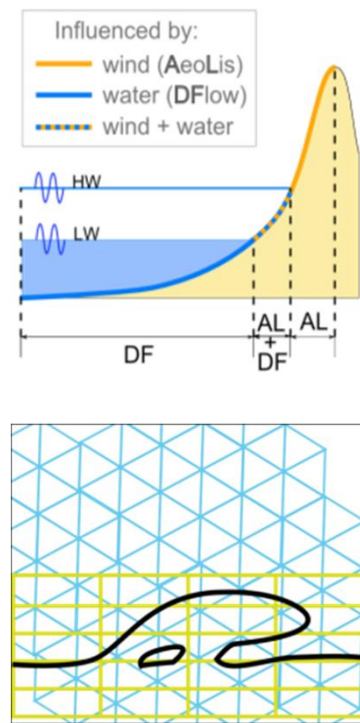


Predicted beach width (recreation)



Integrated morphodynamic model for the dry beach and subaerial

- Intertidal area is resolved by Delft3D and Aeolis model
- Deposition of dune lake and lagoon is now incorporated in the morphological simulation.



Arjen Luijendijk, Bas Hoonhout, Rufus Velhorst and Sierd de Vries,
Coastal Dynamics, 2017

Outlook



Room for improvement

- Bridge governance & other NC research
 - Socio-economic research should be strongly embedded
- Emphasis on design (implications) earlier on
 - Key chapter for each PhD researcher
 - Actively involve end-users, sessions organized by them

The final NatureCoast year

Our story of the Sand Motor will be told

Multifunctional design of Sandy Solutions explored

Basis for new interdisciplinary research within BwN

Successful aspects of Sand Motor

