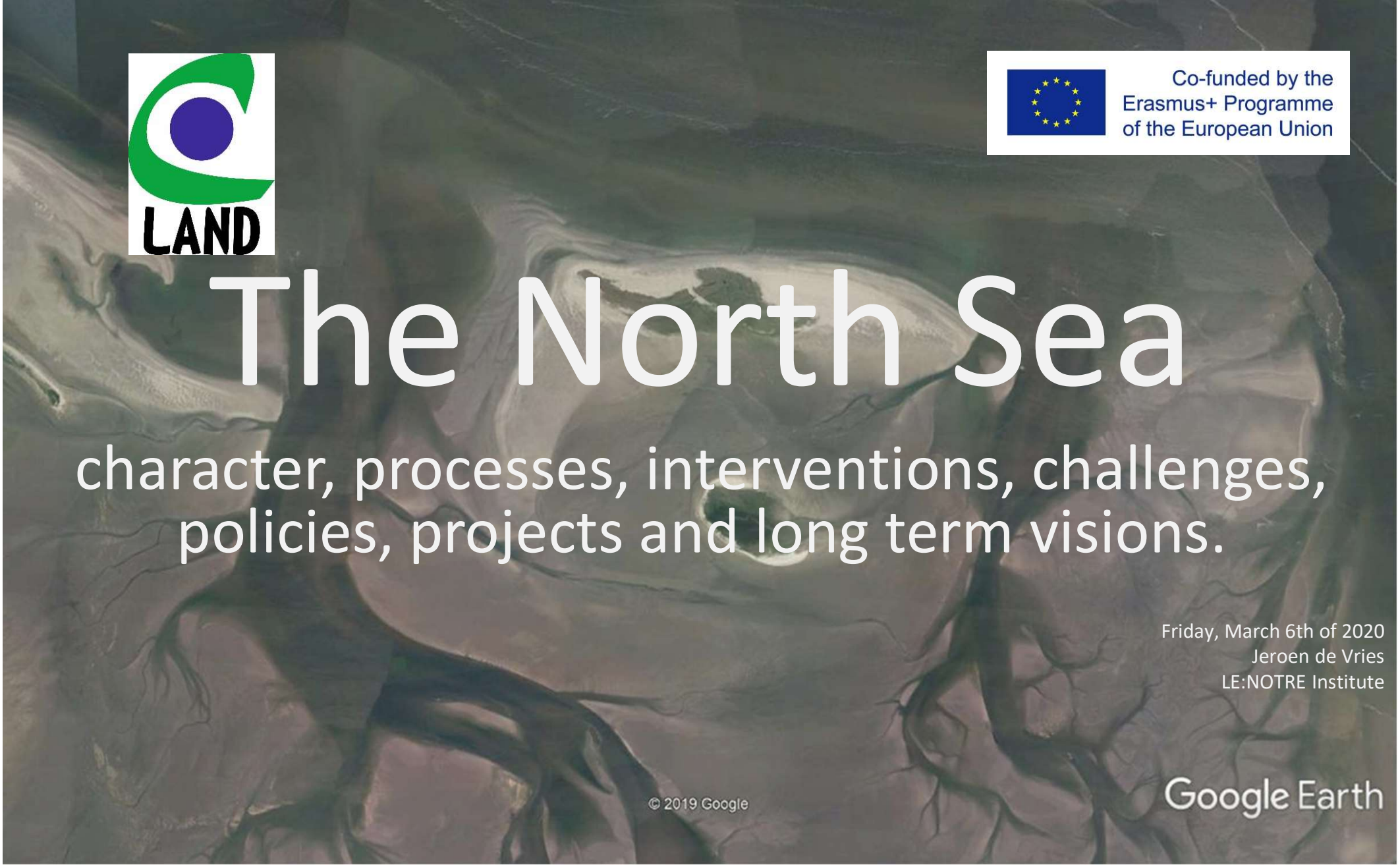

LAND

Co-funded by the Erasmus+ Programme of the European Union

The North Sea

character, processes, interventions, challenges, policies, projects and long term visions.

Friday, March 6th of 2020

Jeroen de Vries
LE:NOTRE Institute

Universitatea de Arhitectură și Urbanism "Ion Mincu"

www.emu.ee
Eesti Maaülikool
Estonian University of Life Sciences

Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen

HOCHSCHULE WEIHENSTEPHAN-TRIESDORF UNIVERSITY OF APPLIED SCIENCES

ULB Faculté d'Architecture La Cambre Horta

LE:NOTRE *Institute*
Linking landscape education, research and innovative practice

ISOCARP
Knowledge for Better Cities

The North Sea

Character

Interventions

Challenges & solutions

Strategy and policy

Landscape plans and interventions

Visionary plans

Photo: Windwerk Terschelling

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North Sea from Centre to Edge

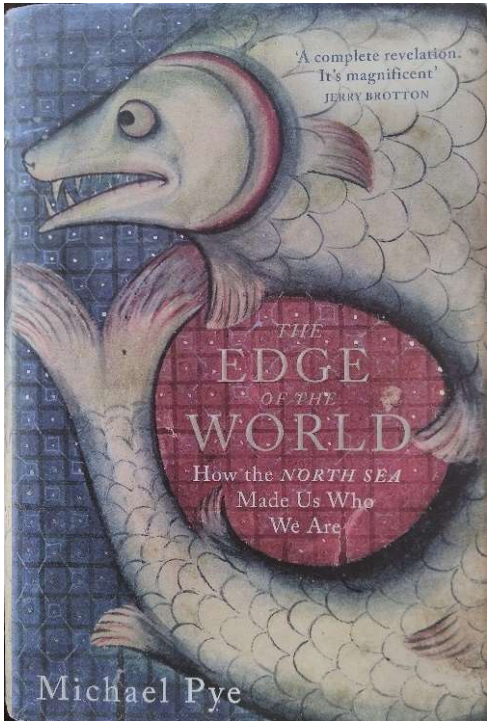
this new idea of seaside came between us and the story of the sea

the seaside was becoming a destination, not a harbour on the way to somewhere else over the water

and it was a playground, not a place of work and war

it was hard to imagine that there had once been a world that centred on the sea itself.

over the years even the coastline was fixed in a place as it never used to be when high winds could make a storm out of the sand, and high tides could break deep into the land



(Michael Pye, 2014)

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North Sea from Centre to Edge

- Trade
- Fishery
- Oysters, Musles and Cockles
- Sand quarrying

Source: Mesdag panorama, The Hague

Wilbers-Vissersophetstrand-Schevingen-1852

- Dunes waterpurification (19th century)
- Polders agriculture production: (also bulbs on „geestgronden“)

History of tidal lagoon landscape NL

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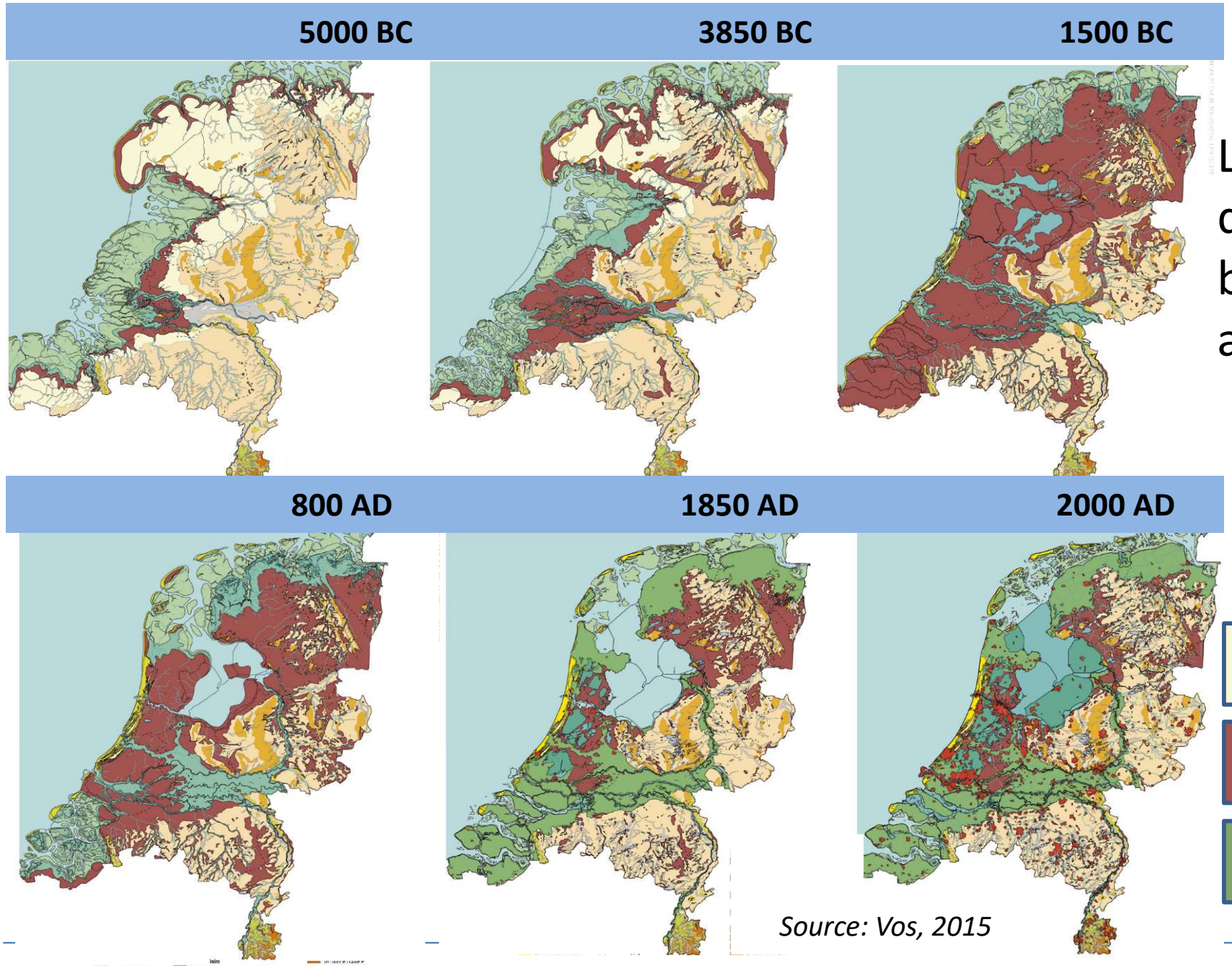

Landscape dominated by tide and floods

sand

peat

clay

Source: Vos, 2015

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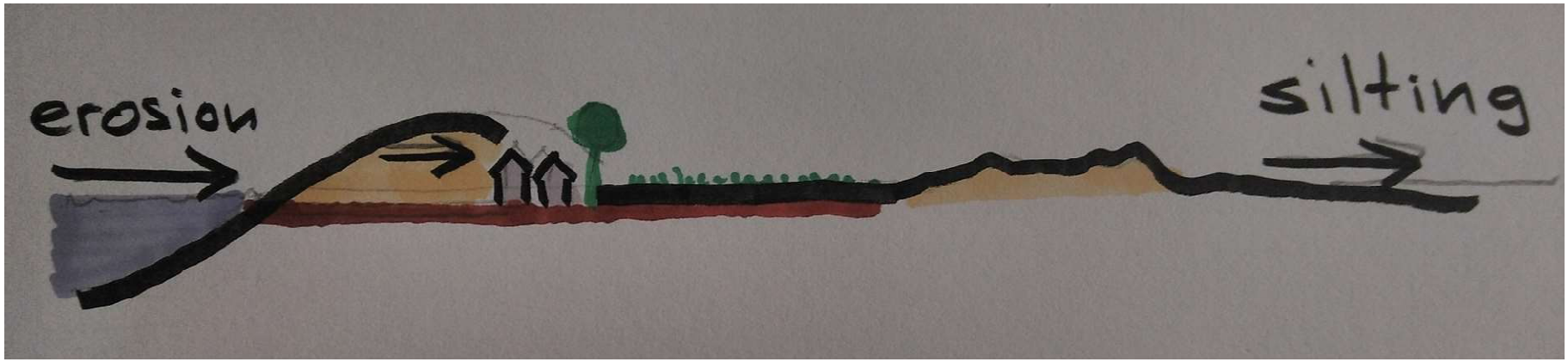
Characteristics of North Sea

- Dynamics coastal landscape
- Processes of silting up of harbours
- Coastal sediment and erosion: dynamic coastline
- Big tidal difference
- Sea is partly quite shallow - Doggersbank
- Effect of the narrow channel -NW wind / Spring tide - > Spring floods

Character of the North Sea

Dynamic landscape

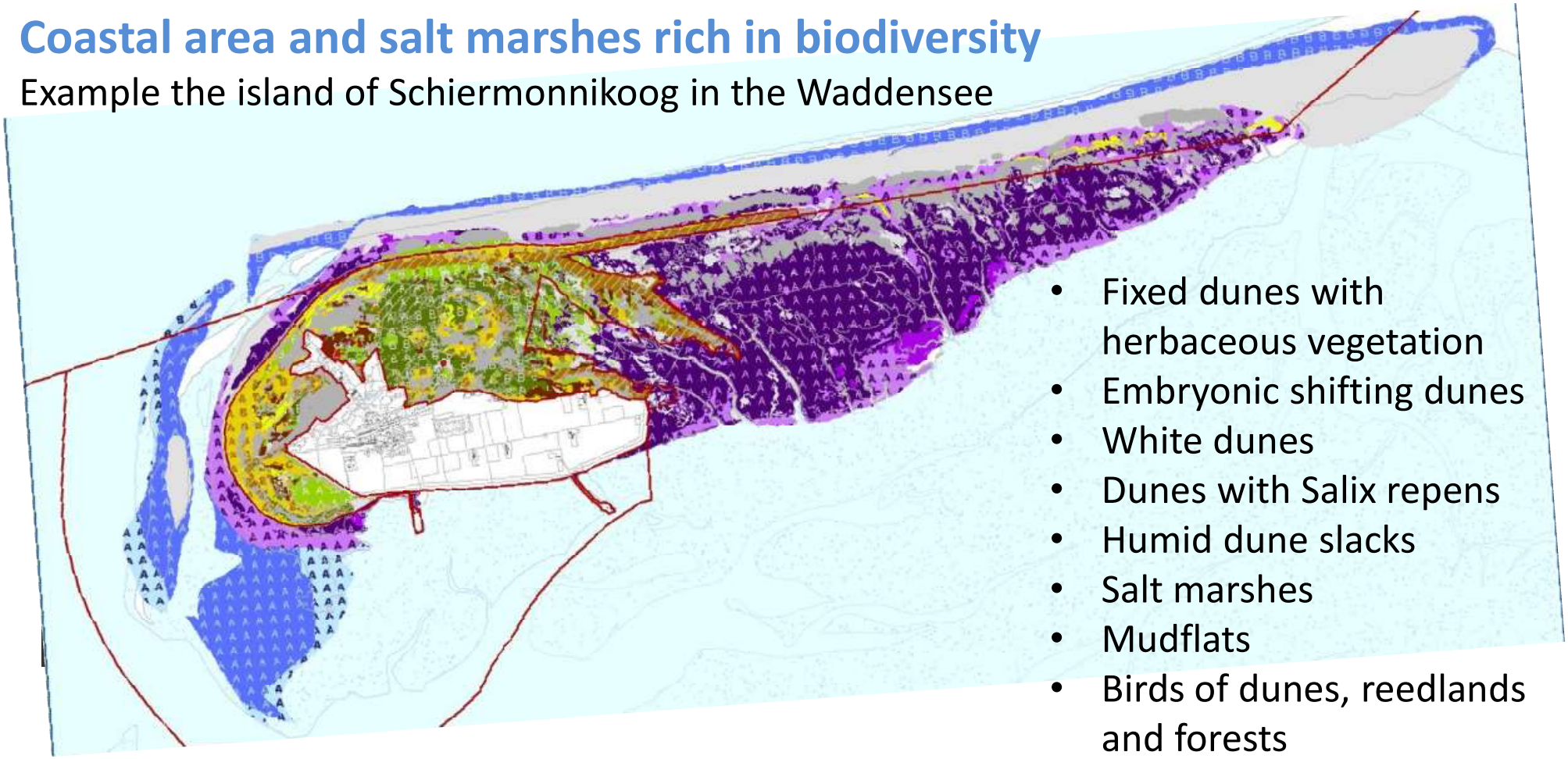
Example the island of Schiermonnikoog in the Waddensee



Character of the North Sea

Coastal area and salt marshes rich in biodiversity

Example the island of Schiermonnikoog in the Waddensee



- Fixed dunes with herbaceous vegetation
- Embryonic shifting dunes
- White dunes
- Dunes with Salix repens
- Humid dune slacks
- Salt marshes
- Mudflats
- Birds of dunes, reedlands and forests
- Roost for many migrating birds (6-12 mill / year)

Map with habitats on Schiermonnikoog,

Source: Dienst Landelijk Gebied / Staatsbosbeheer, 2016. Natura 2000 Beheerplan Schiermonnikoog (6), (Management plan Schiermonnikoog), p 432

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Character of the North Sea - Waddenzee

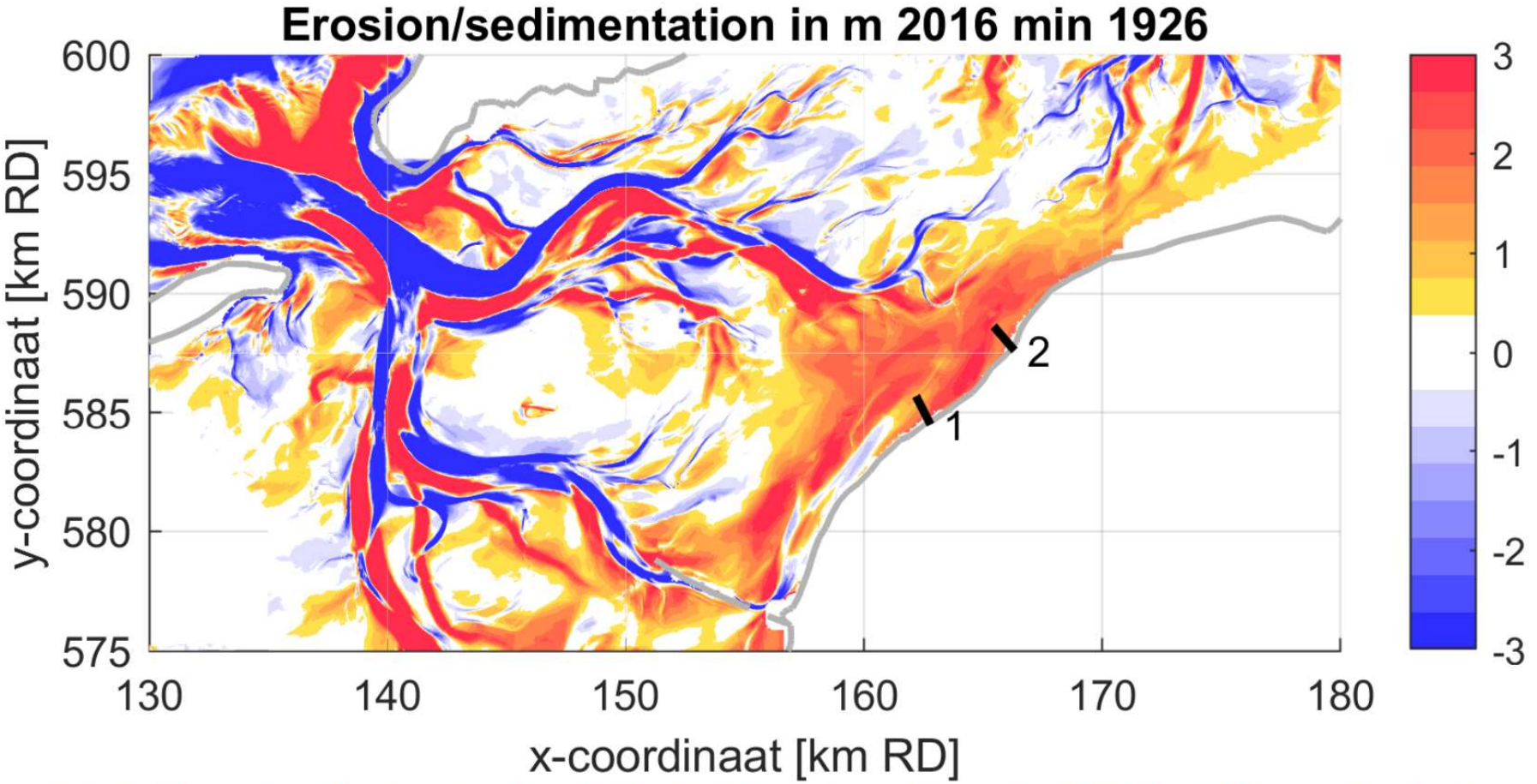

Figure 2-6. Total erosion (blue) and sedimentation (red) in [m] over the period 1926 to 2016 over the study area. The historic bed levels of the two black transects are visualised in Figure 2-7.

Source: Baptist, M. et al. 2019a

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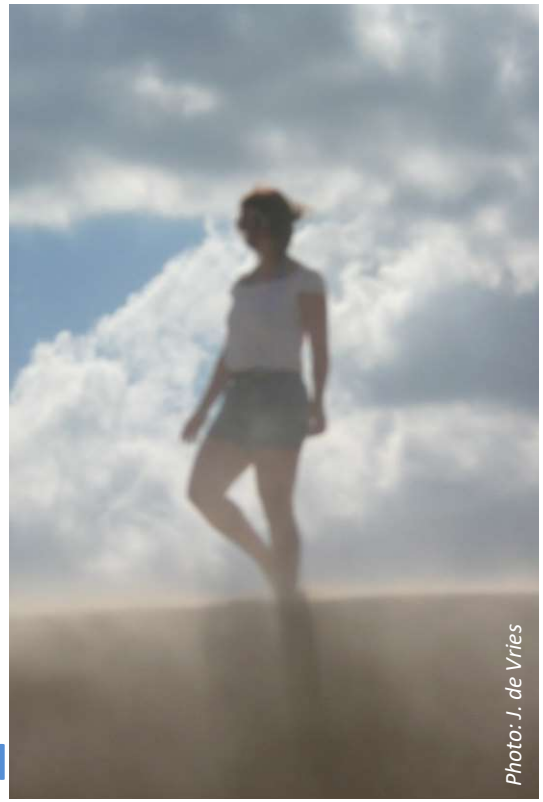
Coastal experience – “Flow”

- experience of complete absorption in the present moment
- caused by complexity of the perceptions
- free from worries, playfulness, relaxation



Dynamic Coastal Landscapes

Unstructured, not organised – not to be grasped by the mind

Sensory experience ; drifting sand, winds, waves

Overwhelming in size, that surpasses the human measures

J. Nakamura, J. , Cszent M. 2012, Flow Theory and Research, DOI: 10.1093 /oxfordhb/ 9780195187243.013.0018

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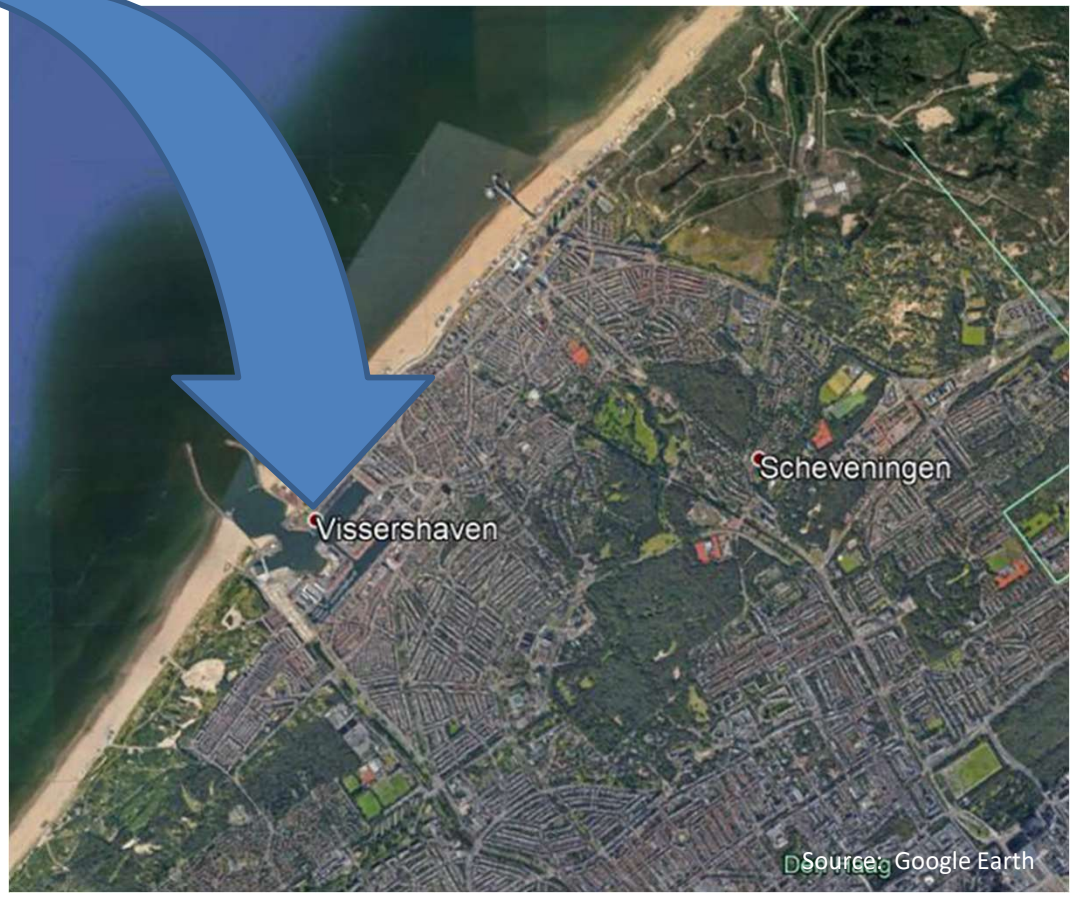
Interventions – Fisher harbours

- Harbours – for fisherboats along the coast, e.g. Scheveningen in 1904



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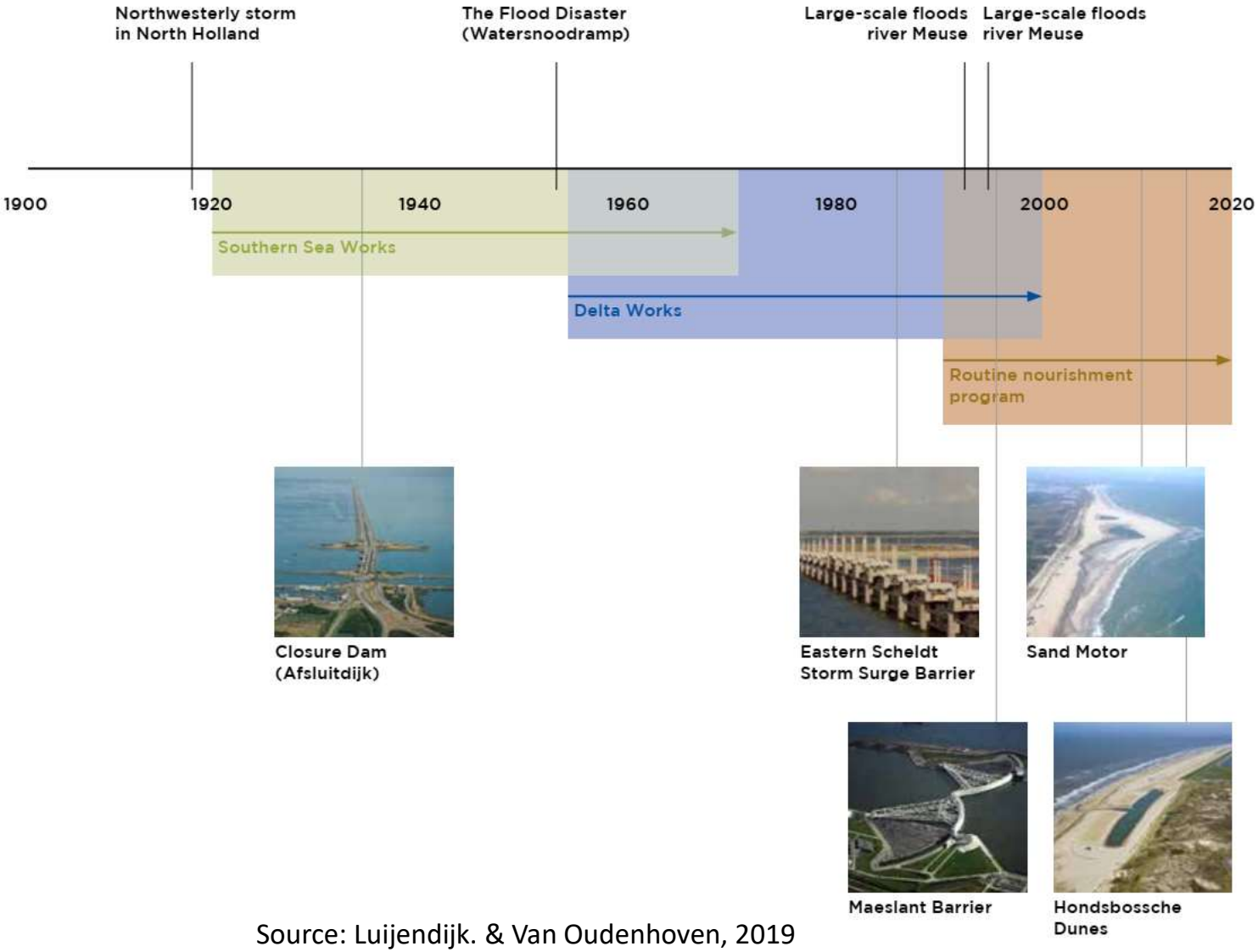
Timeline events and interventions



Source: Luijendijk. & Van Oudenhoven, 2019

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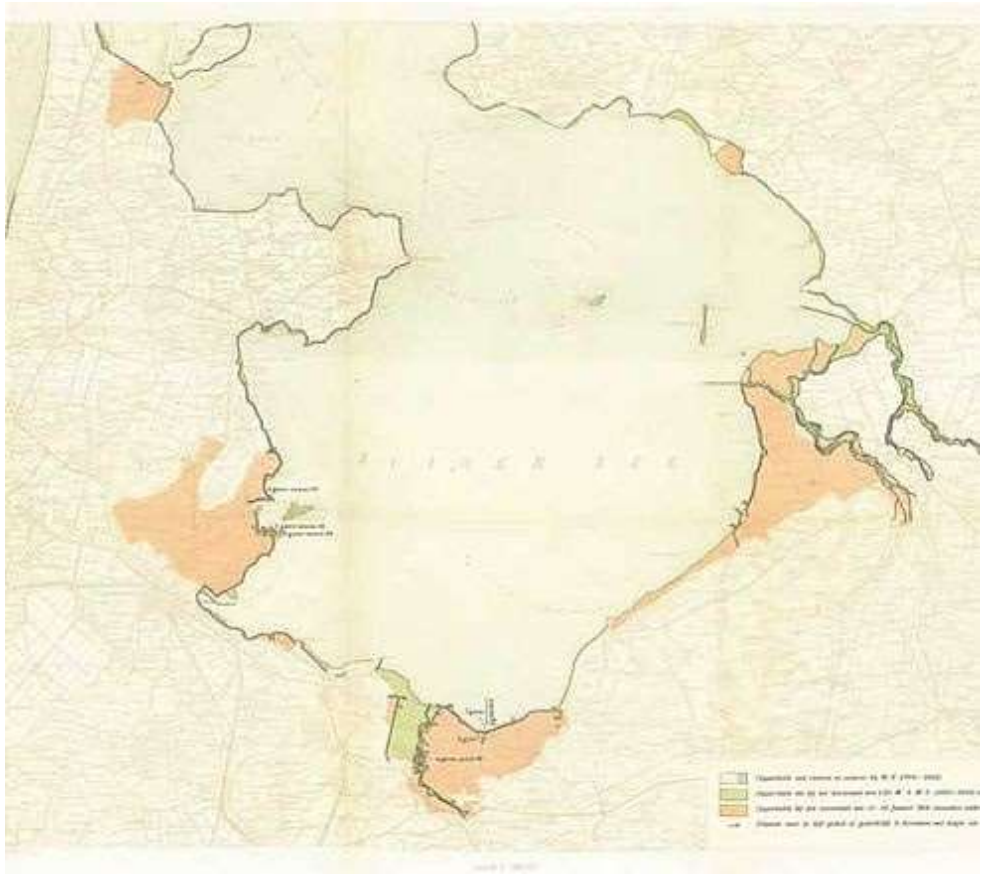
Floods with national impact - 1916

- **Zuiderzee 1916 - > Afsluitdijk - > IJsselmeer**

Kees Hofker (1886-1936) - [SFA022813700, Het Leven, Spaarnestad Photo] The flood of 1916. Soldiers and civilians are deployed to establish emergeny sea defences. Sacs filled with clay and sand are placed and covered with soil. Anna Paulownapolder, Netherlands, 1916.



Source: Rijkswaterstaat: Verslag over den stormvloed van 13/14 januari 1916, 's-Gravenhage (NL) 1916

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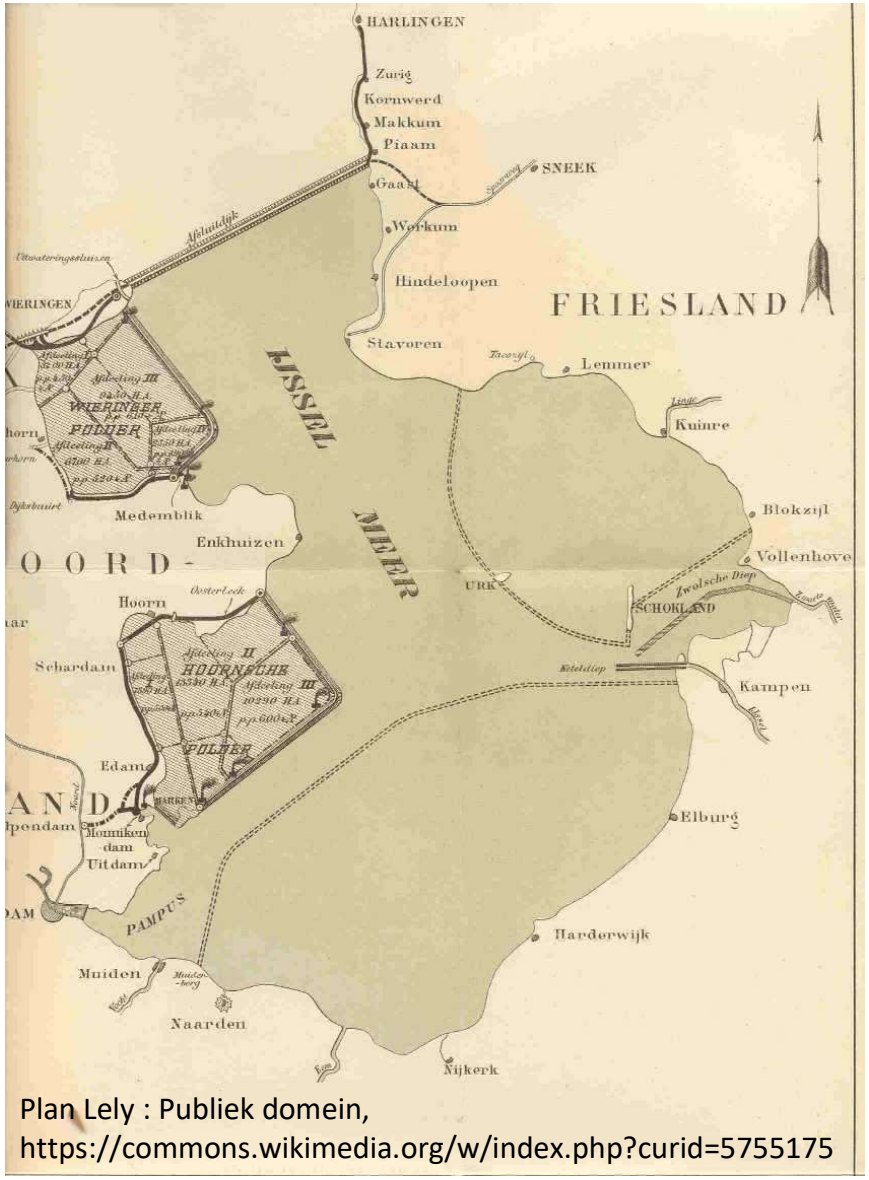
Floods with national impact - 1916

- Zuiderzee 1916 - > Plan Lely
- Afsluitdijk - > IJsselmeer

Kees Hofker (1886-1936) - [SFA022813700, Het Leven, Spaarnestad Photo]
The flood of 1916. Soldiers and civilians are deployed to establish emergeny sea defences. Sacs filled with clay and sand are placed and covered with soil. Anna Paulownapolder, Netherlands, 1916.



Plan Lely : Publiek domein, https://commons.wikimedia.org/w/index.php?curid=5755175

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Floods with national impact - 1953

- Flood disaster 1953

Source images: De Ramp", Nationale Uitgave February 1953, Vereeniging ter Bevordering van het Boekhandelwezen.

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Sea Defences from technical to ecological and nature based

- Dykes – e.g. Hondsbossche zeewering starting from 1880
- 1927 Afsluitdijk
- 1953 Deltaworks
- Slufter on the island of Texel (nature development)
- Sand suppletion, e.g. Hondsbossche Duinen 35 million m3 in 2015; Sand motor
- Dredging to keep harbours accessible – Silt motor near Harlingen
- Stormvloedkering Maaslandkering – Flexible sea defense in river Maas.
- Opening of sea defences (trekvissen – Salmon, brackish water)
- Hedwiger polder

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Interventions

- Deltaplan
- Deltaworks 1958 - 1987
- Storm Surge Defences – Maeslandkering 1997
- Opening of sea defences (migrating fish – Salmon, brackish water)

Source: https://watersnoodmuseum.nl/kennisbank/deltawerken/

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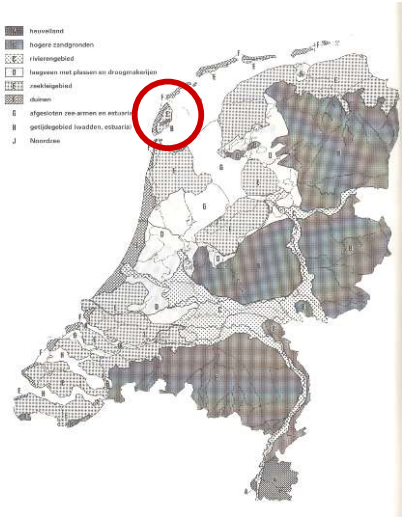
Nature reserves – tidal landscape

- De Slufter – Island of Texel
- 1 million visitors per year



Source: Topografische kaart van De Slufter op Texel, 400 pixels/km. Samengesteld door Jan-Willem van Aalst op basis van de GML open geodata van de BRT/Top10NL (basisregistratie Topografie, Kadaster), vrijgegeven door Kadaster onder de Creative Commons BY licentie. Additionele gegevens uit BAG uit de Open Street Map en uit de Risicokaart.

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Question on Character of North Sea

What do find the most characteristic aspect of the North Sea

when you compare it with your own experiences of coastal landscapes?

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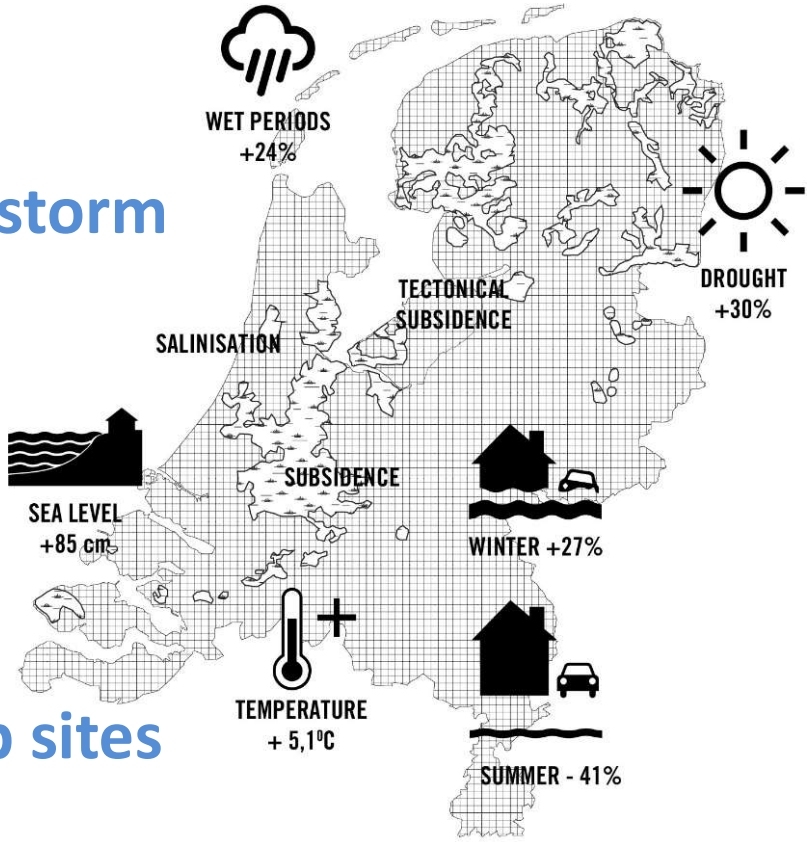
Current challenges

- Sea level rise (climate change)
- More frequent storms (climate change), storm surges
- Salinisation of coastal area
- Riverbed flooding
- Demand for and development of built up sites
- Increasing mass tourism: peak days with traffic jams
- Short season – economic imbalance



Source image: ZUS , 2016

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Sea level rise and storms (climate change)

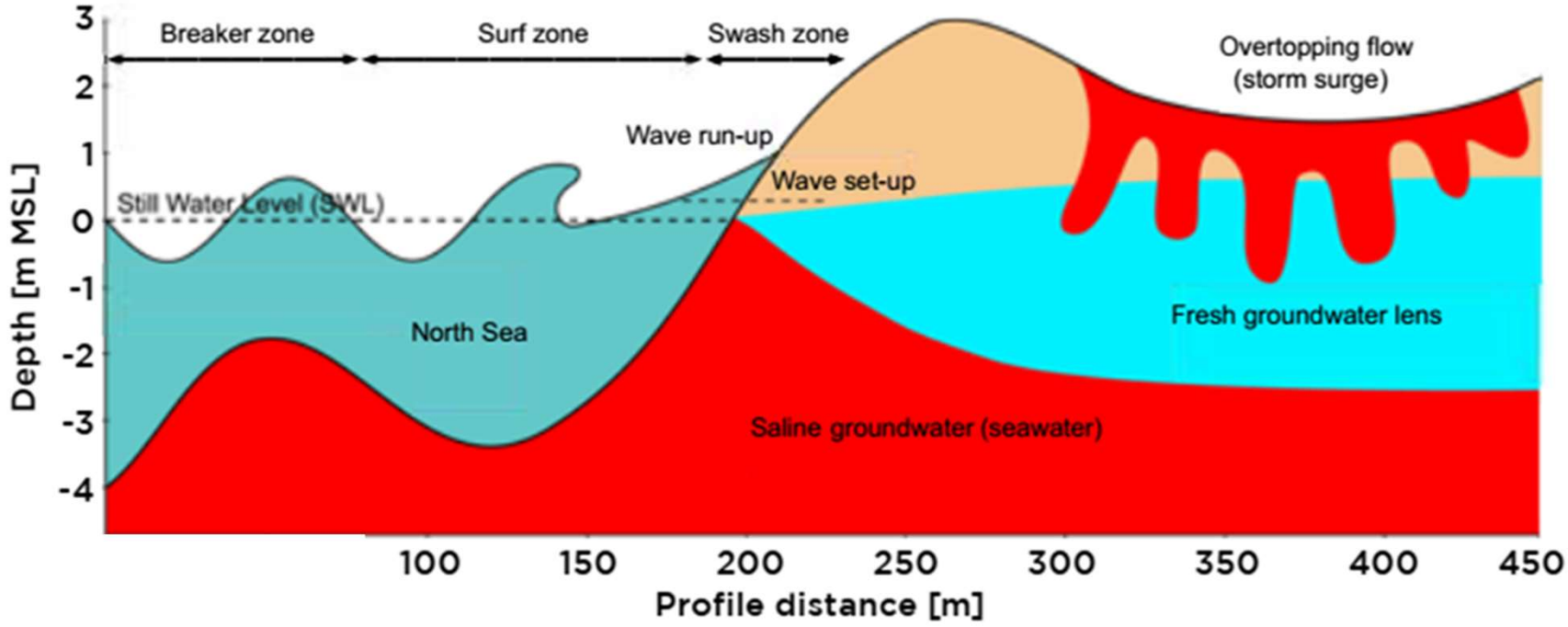
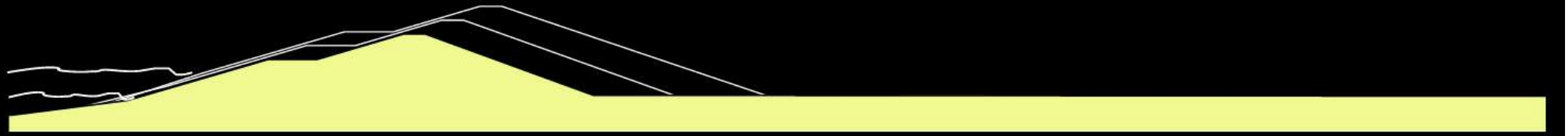


Figure 2. Illustration of coastal hydrodynamic processes at the measurement site.

Luijendijk & Van Oudenhoven 2019

Current challenges

THE RISE OF THE SEA LEVEL AND LAND SINKING REQUIRES INTERFERENCE. THE DIKES ARE MADE HIGHER



REPEATED RAISING OF THE DIKES RESULTS IN AN UNDESIRABLE FUTURE IMAGE

THEREFORE: BROADENING OF THE COASTZONE

Source: OKRA landscape architects

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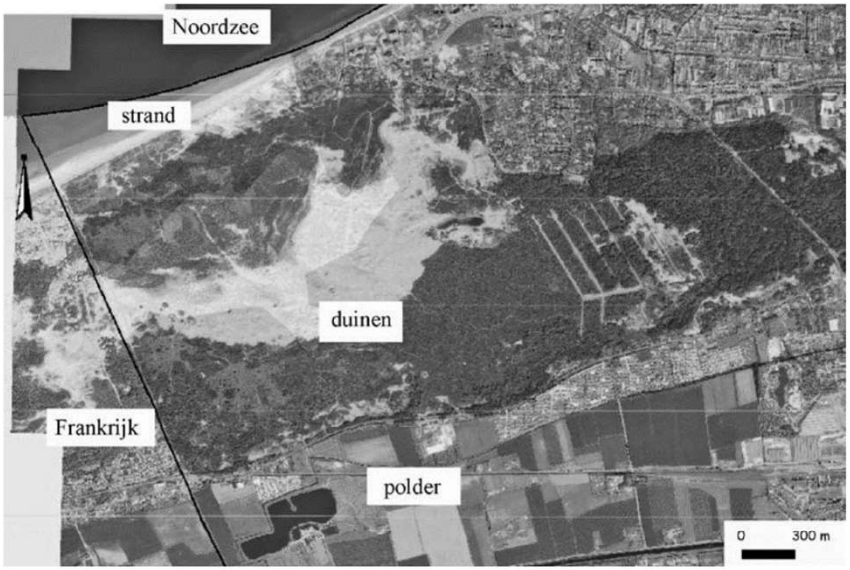
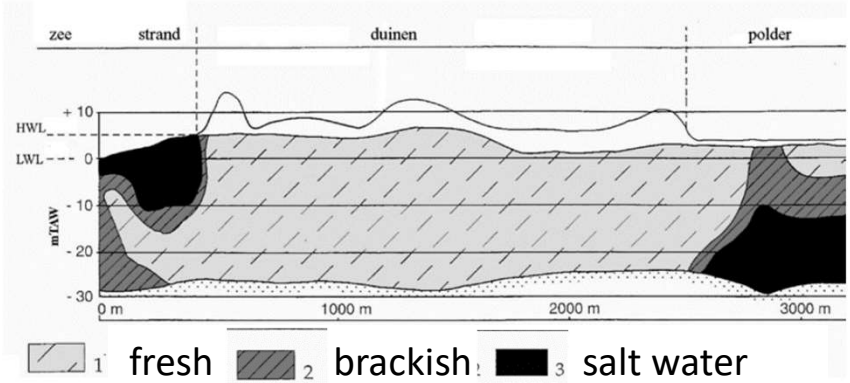
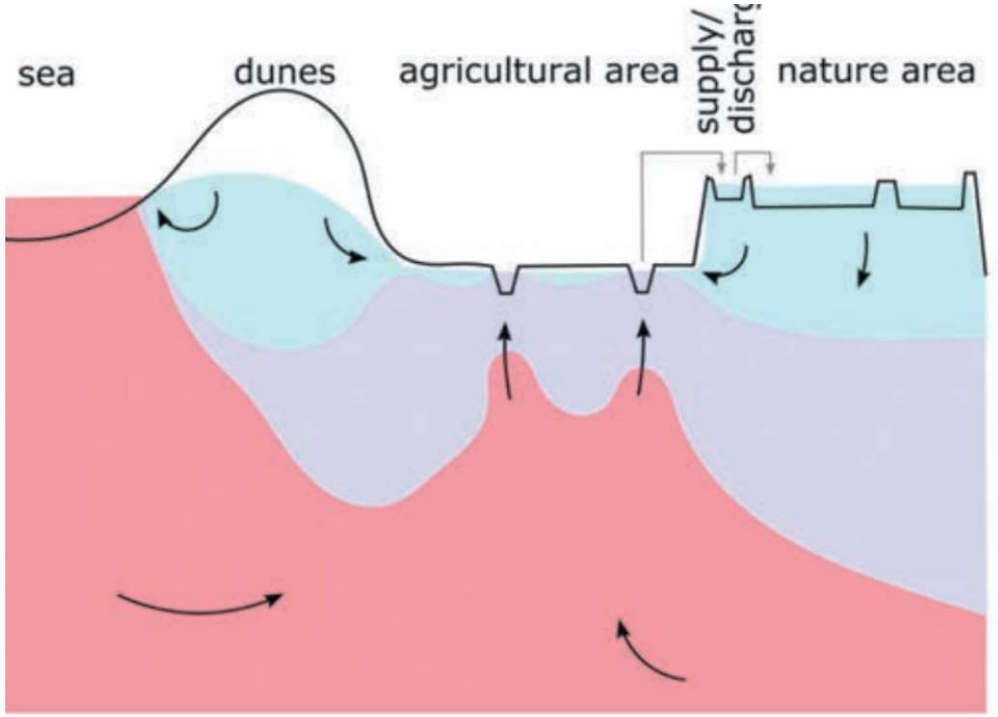
Brackish / salt water



Figuur 1: Luchtfoto van het studiegebied, grenzend aan de Frans-Belgische grens.



Figuur 2: Verdeling tussen zoet (1), brak (2) en zout (3) water onder het strand, duinen en polders van het westelijke Belgische duingebied (naar Lebbe en Pede, 1986). Basis van het freatische pakket is de Formatie van Kortrijk (4), mTAW is het Belgische referentieniveau (2,36 meter onder gemiddeld zeeniveau), HWL en LWL zijn respectievelijk de hoogwater- en laagwaterlijn.



Afbeelding 1: *Schematische illustratie van de saliniteit van het grondwater in laag Nederland. De aanvulling van zoet grondwater (lichtblauw) zorgt voor de vorming van regenwaterlenzen. Deze zijn dun in gebieden met veel zoute (rood) of brakke (paars) kwel. Het oppervlaktewaterniveau in polders wordt beheerd door te bemalen of water aan te voeren via boezems. Gewijzigd naar Oude Essink e.a. (2010) en Witte e.a. (2012).*

4

Vandenbohede, A. Lebbe. L Stromingen 14 (2008) nummer 2: Zoet-zout verdeling onder het strand: niet zo evident als het lijkt.

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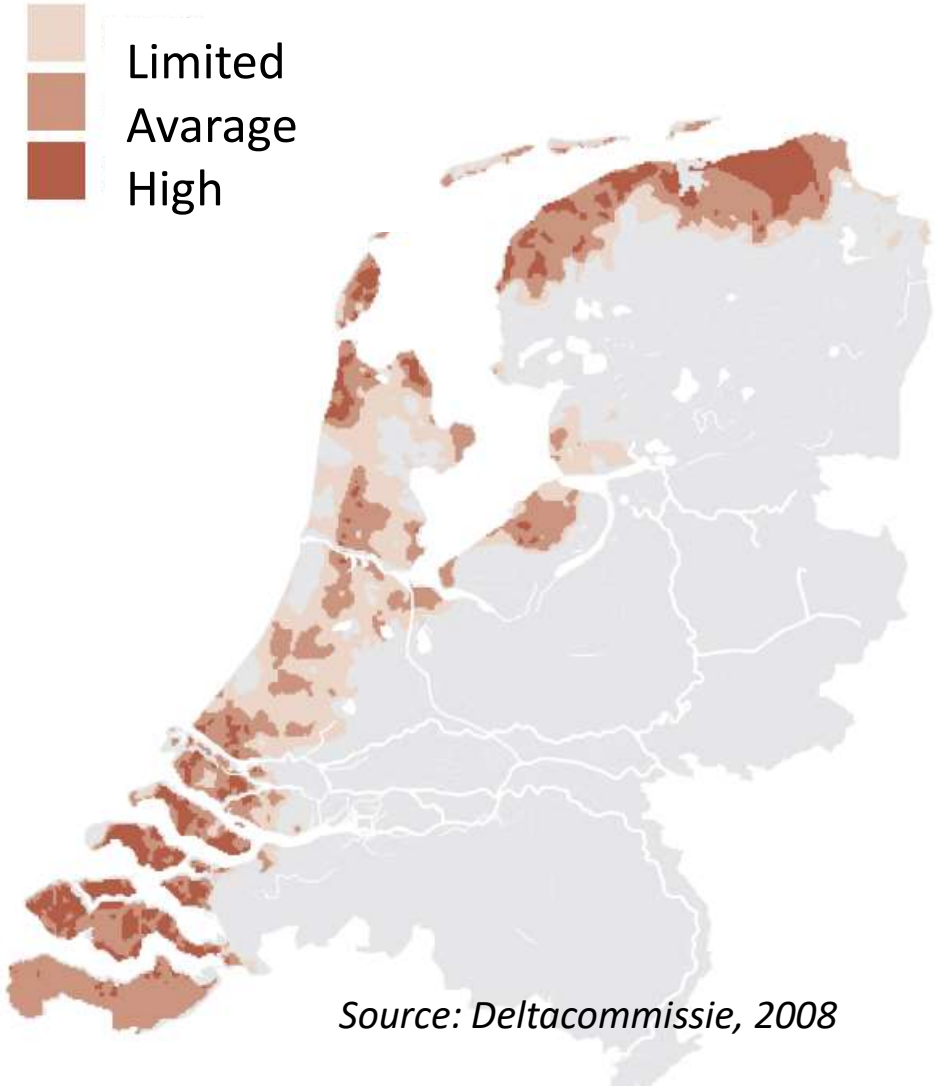
Brackish / salt water- forecast NL 2050



Source: Deltacommissie, 2008

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Measures related to salinisation

- Raising groundwater level in polders: peat soil preservation, more counterpressure fresh water, other types of crops
- Raising waterlevel in nature areas
- Fresh water catchment areas in the coastal zone
- Developing brackish crop production

Cranberry production Canada / USA
Source: Karres and Brands 2016

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Pressure urban and recreational sprawl

De Panne:
leveling the dunes

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Question on Challenges

In what way could you / would you in your role as landscape planner / spatial planner contribute to meeting these challenges?

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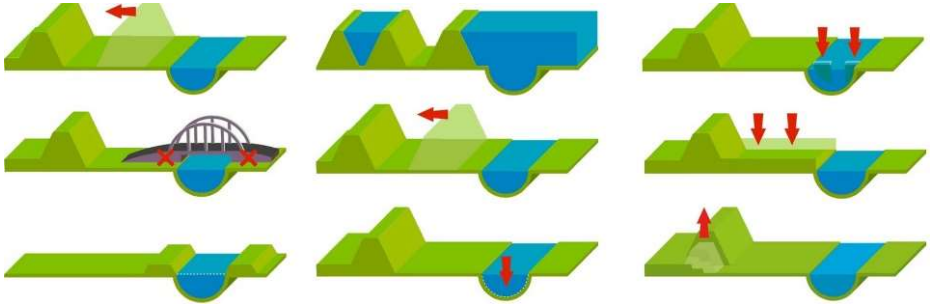
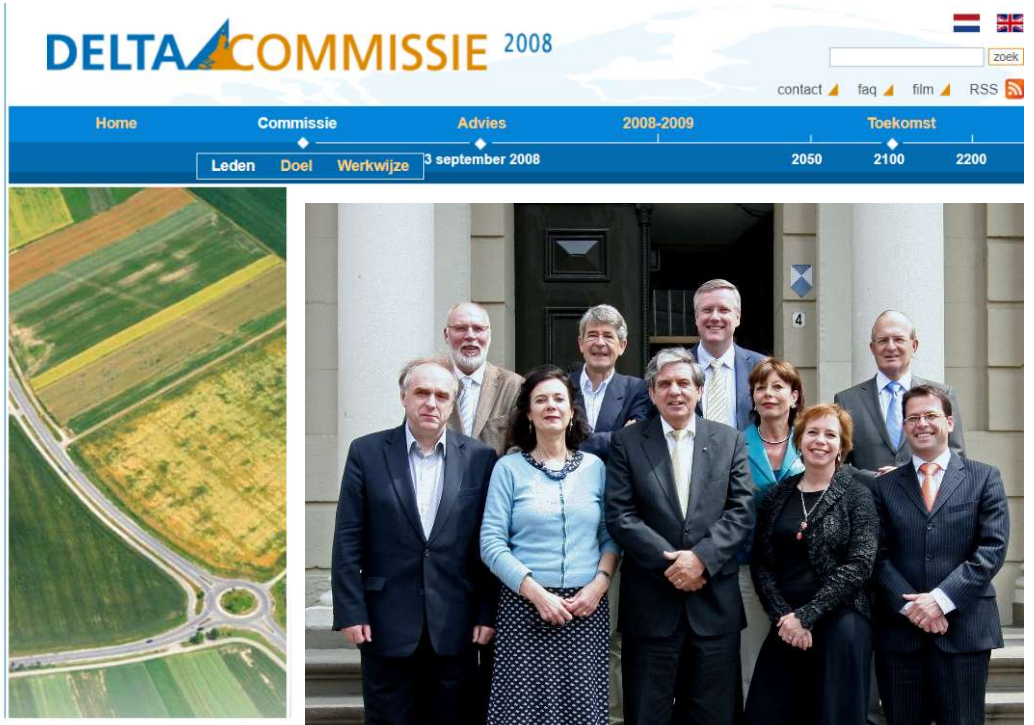
Governance – Policies in the NL

- Deltaplan 1957
- Room for the river 2006 -2017





- Deltacommittee 2007 - 2008
- Deltacommissioner
- Research combination Deltares
- Research for the coast: H+N+S - Kustatelier

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Coastal Defense + Spatial Quality

Atelier Kustkwaliteit – H+N+S

- http://www.hnsland.nl/nl/projects/atelier-kustkwaliteit

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Principles for the Coast NL

- Strenghten the coast in a way that the **natural dynamic** (current, tide, wind, salt – fresh water) can contribute to it (Nature Based Solutions);
- Aim for an **adaptive coastal system** in stead of a fixed situation: soft measures, temporary use and a changeable coastal landscape are preferred;
- From an **ecological and economic** lens the coastal fundament is a very productive and profitable system. Reinforcement of the coast can optimise this.
- Apply coastal defences in a way that these result in **differentiation of coastal towns and landscapes**.

Source: Atelier Kustlandschappen

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Principles for the Coast NL Draft National Strategy 2019

Aim: risk of death due to flooding is equal to or less than 1:100.000.

Tasks

- **Maintaining, strengthening and reserving** sufficient space for primary flood defences, dunes, coastal foundations and storm surge barriers, to prevent flooding
- Reserving sufficient space for **sand dredging** to maintain the coastal foundations and to ensure water safety
- Maintaining and reserving sufficient **space for the rivers** and river-widening measures
- **Mitigating the consequences** of flooding via smart spatial planning and good contingency planning

Source: Draft National Strategy on Spatial Planning and the Environment, 2019.

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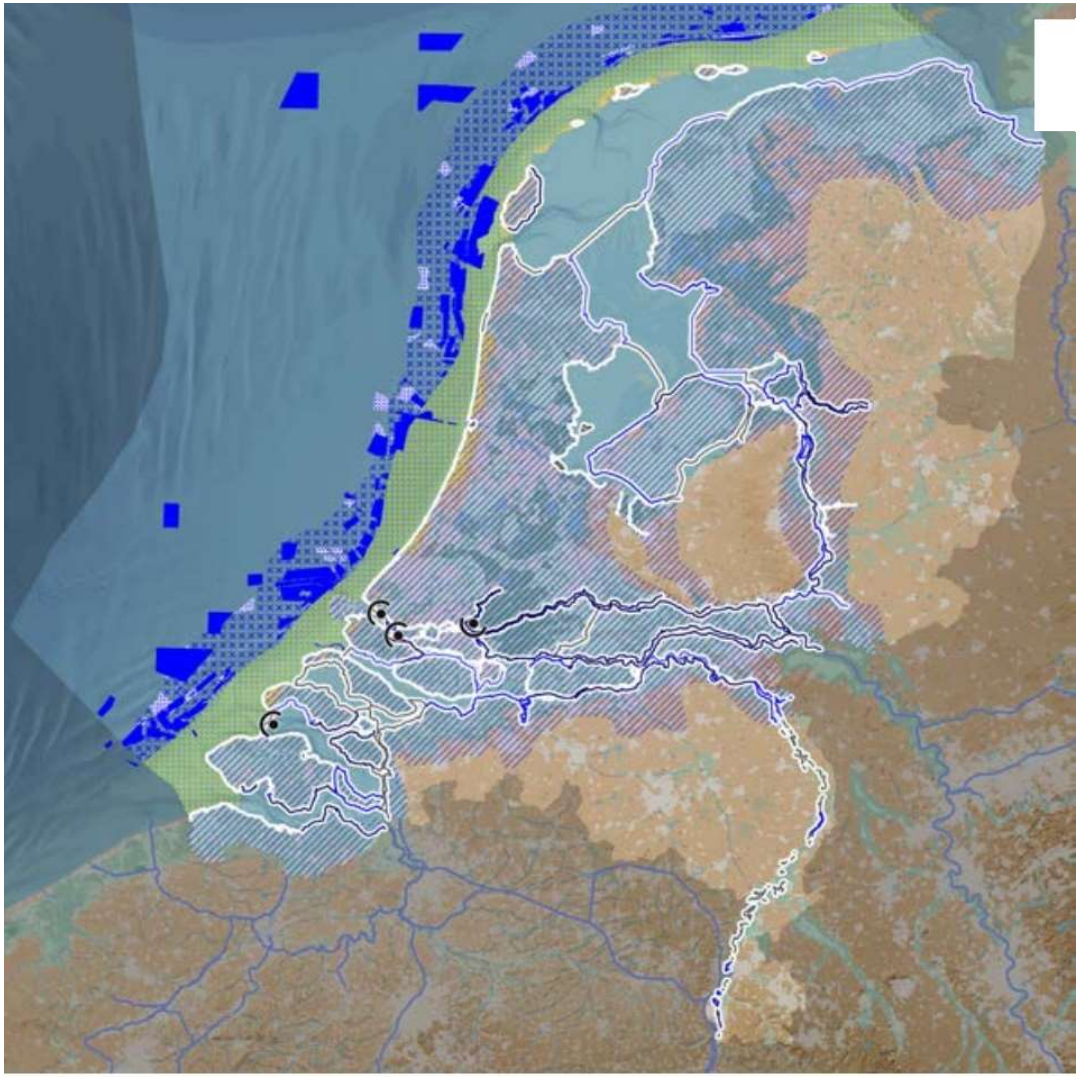
Principles for the Coast NL
Draft National Strategy 2019



National Interest 14: Guaranteeing water safety and climate resilience (including vital infrastructure for water and mobility)

Strengthening task for flood defences and water safety

- Large-scale strengthening task
- Medium-scale strengthening task
- Limited strengthening task
- No strengthening task
- Strengthening task to be determined and/or current project
- Existing storm surge barrier
- Area where consequences of flooding must be mitigated

Coastal foundations and sand dredging

- Coastal foundation
- Allocated sand dredging area
- Search area sand dredging up to and including a
- Reserved sand dredging area for the long term

Source: Draft National Strategy on Spatial Planning and the Environment, 2019.

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Principles for the Coast Belgium

- Resilient systems: the **natural systems** as starting point for adaptation
- Vigorous economy: the demand for a **broader economic carrier**
- **Healthy living**: productive open space as incentive for urban development
- **Social-culturally** connected: a diverse coast for everyone
- **Circular society**: seasonal dynamics and spatial interweaving as an economic opportunity
- **Energy transition**: the harbours as departure point for economic reconversion along the whole coast

Research Project 2017 http://www.hnsland.nl/nl/projects/stedelijk-systeem-kust-vlaanderen

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Landscape planning

- (Inter)national
- Regional
- Thematic / sectoral
- Local
  - Art interventions (Bruno Doedens & Beaufort)
  - Tourism
  - Urban Planning
  - Water Safety
  - Nature development

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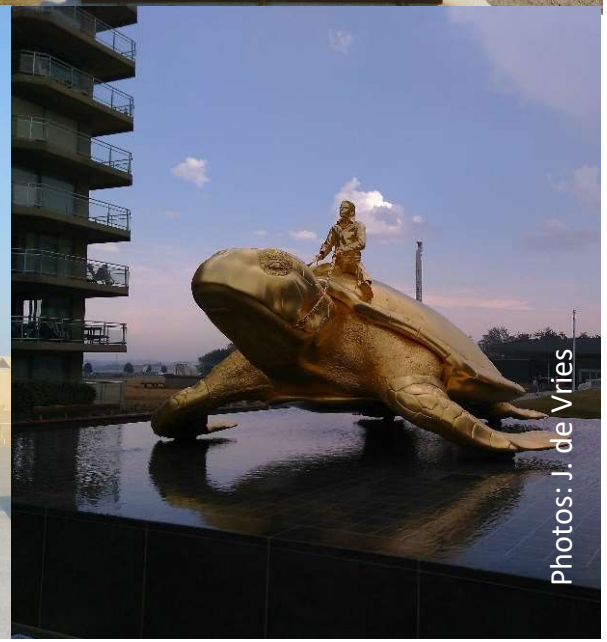
Art interventions: Beaufort, BE



Photos: J. de Vries

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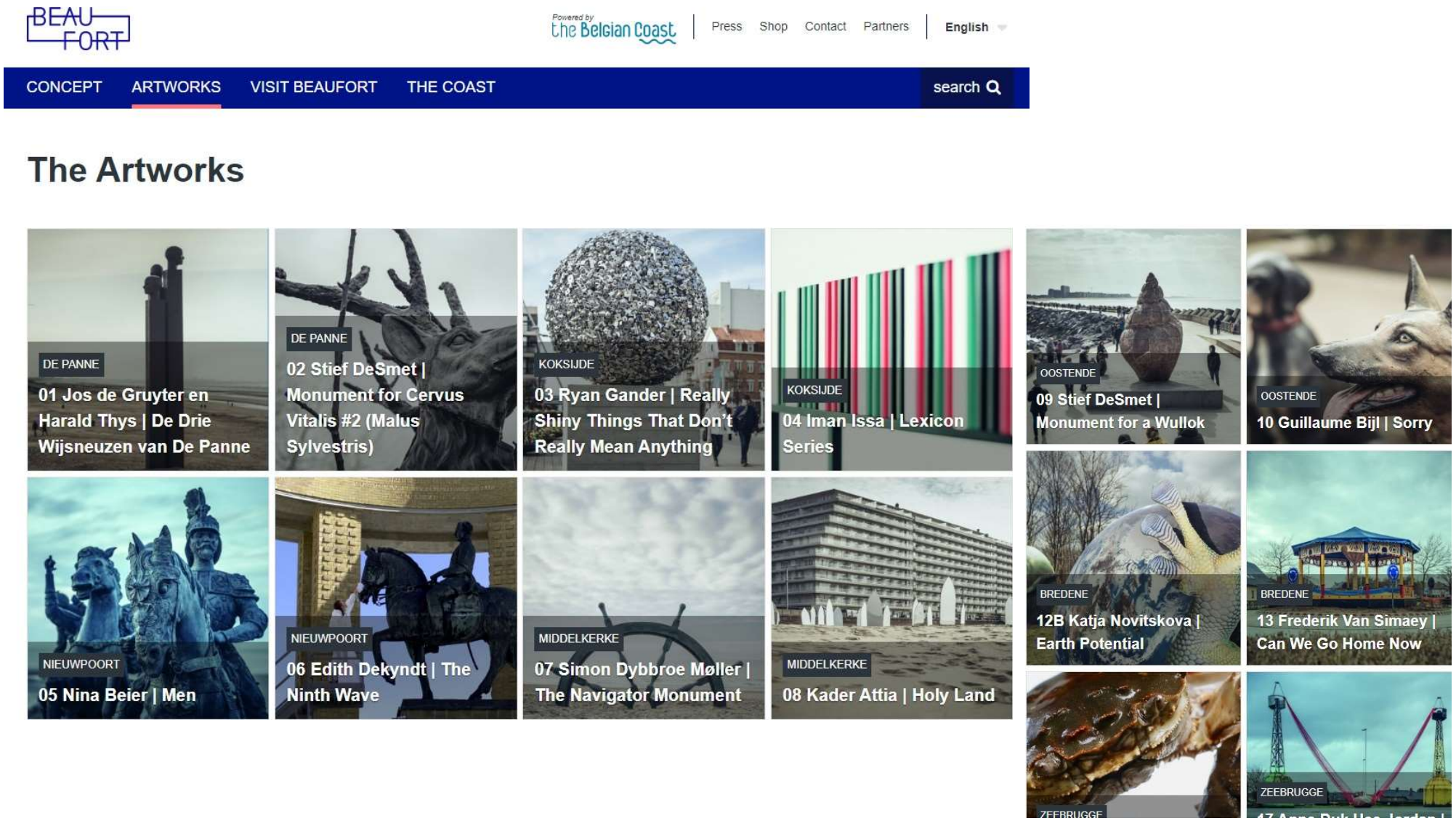
Art interventions: Beaufort



https://www.beaufort2018.be/nl/kunstwerken

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Island of Terschelling ‘Panneland’

SLeM
Bruno Doedens
Dialogue with the landscape
Participation of the public
Oerol festival from 2008 on
Drifting sand
Showing the natural dynamics of landscape
See CO-LAND lecture in 2018:
https://ilias.hfwu.de/ilias.php?baseClass=ilSAHSPresentationGUI&ref_id=21227

Photos: Blauwe Kamer

Co-funded by the Erasmus+ Programme of the European Union

Art interventions SLeM Bruno Doedens

Photos: Ben ter Mull- Van Hall Larenstein Uni

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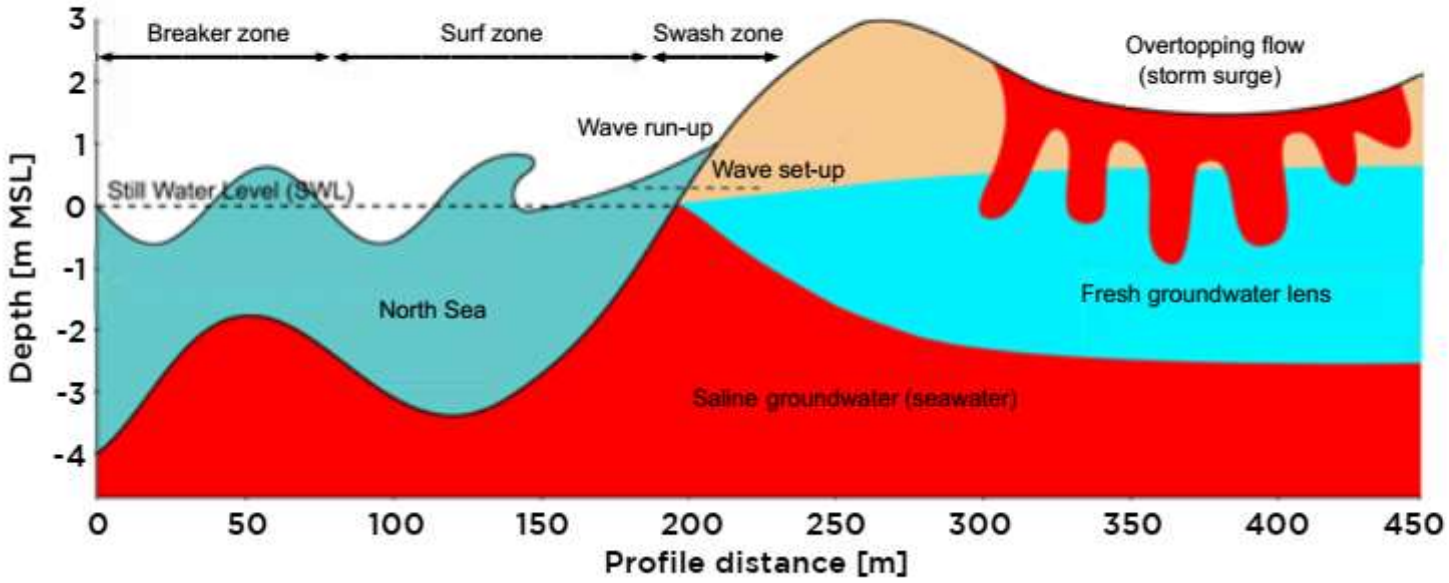
Sea Defense – Sand suppletion

Figure 2. Illustration of coastal hydrodynamic processes at the measurement site.



Luijendijk & Van Oudenhoven 2019

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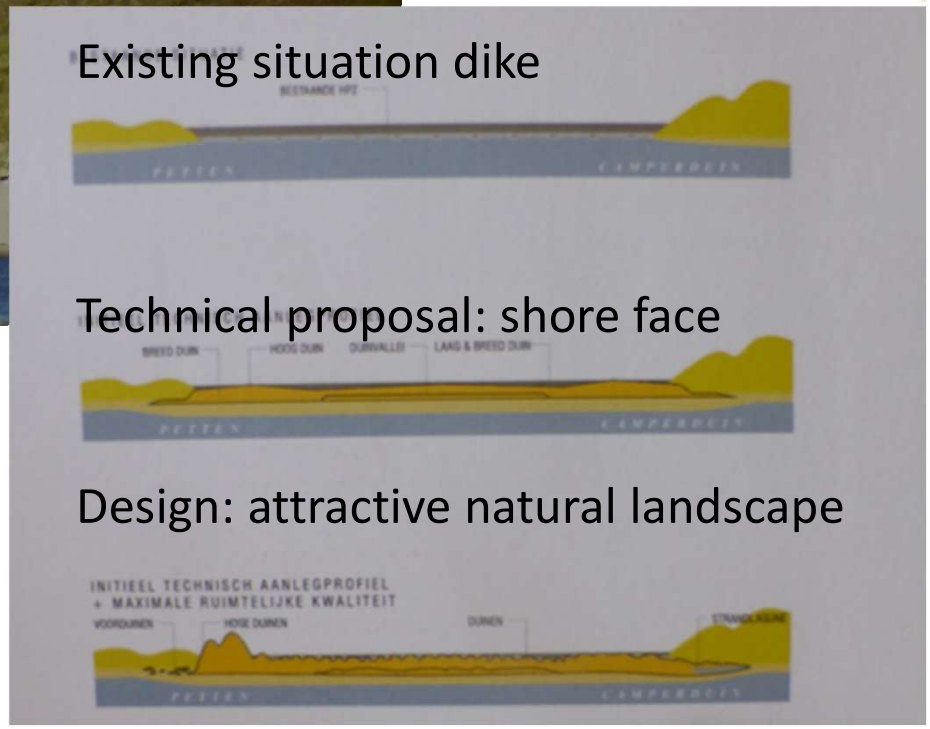
Sand suppletion - Sandmotor

21,5 milllion m3 sand

expected life time 20 yrs

Source: Luijendijk, A. & A. van Oudenhoven (eds), 2019, p 24

New Hondsbossche Duinen



Former dike in concrete and basalt
Natural approach of sea defence
35 million m3 sand
New Dune Landscape – 300 m wide
Coastal foundation broadend
Dynamic landscape

West 8 Urban Design and Landscape in collaboration with Svasek Hydraulics, Witteveen & Bosch, Altenburg & Wymenga ecologisch onderzoek

Universitatea de Arhitectură și Urbanism "Ion Mincu" · Eesti Maaülikool Estonian University of Life Sciences · Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen · Hochschule Weihenstephan-Triesdorf University of Applied Sciences · ULB Faculté d'Architecture La Cambre Horta · LE:NOTRE Institute · ISOCARP Knowledge for Better Cities

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Hondsbossche See Defence

Source: www.petten-aan-zee.nl

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Sea Defense – Mud Motor

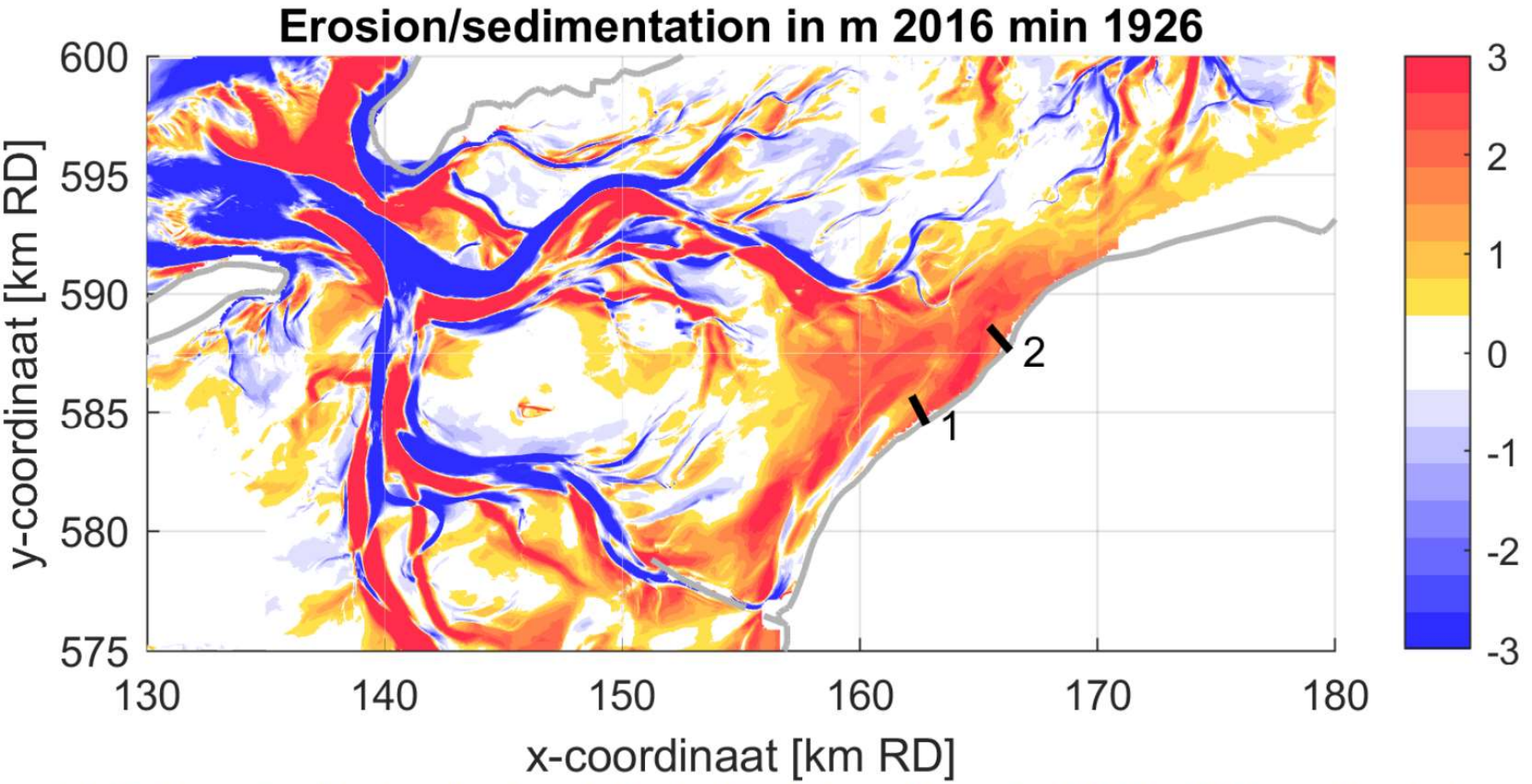

Figure 2-6. Total erosion (blue) and sedimentation (red) in [m] over the period 1926 to 2016 over the study area. The historic bed levels of the two black transects are visualised in Figure 2-7.

Source: Baptist, M. et al. 2019a

Co-funded by the Erasmus+ Programme of the European Union

Sea Defense – Mud Motor

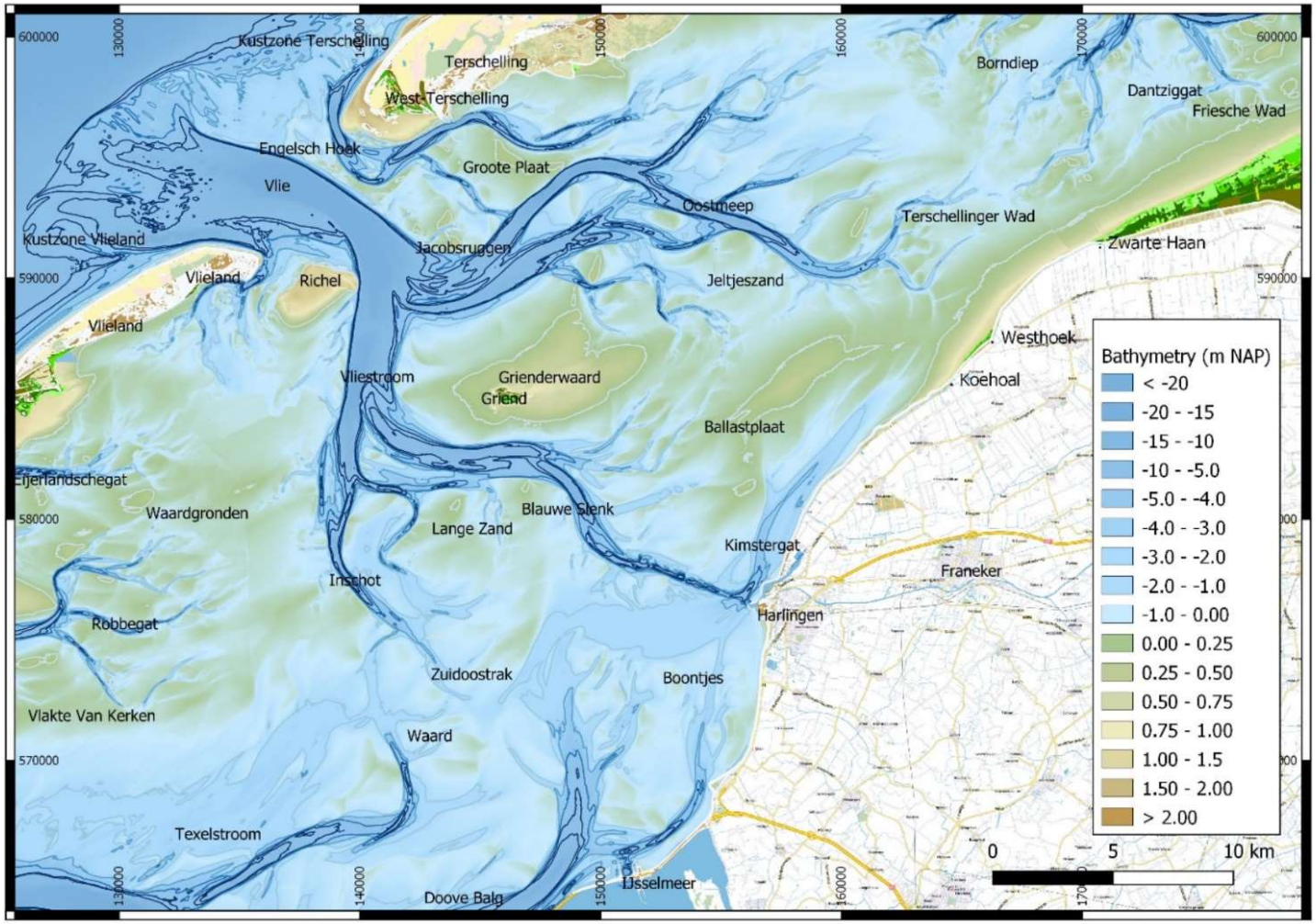

Figure 2-1. Map with names of intertidal flats, channels and salt marsh location in the area of interest. Bathymetry from 2010. The Mud Motor salt marsh is situated between Koehoal and Westhoek, the control salt marsh is situated at Zwarte Haan (in the north east corner of the map). Bright green colour (not in the colour map) indicates vegetation.

Source: Baptist, M. et al. 2019a

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Sea Defense – suppletion – Mud Motor

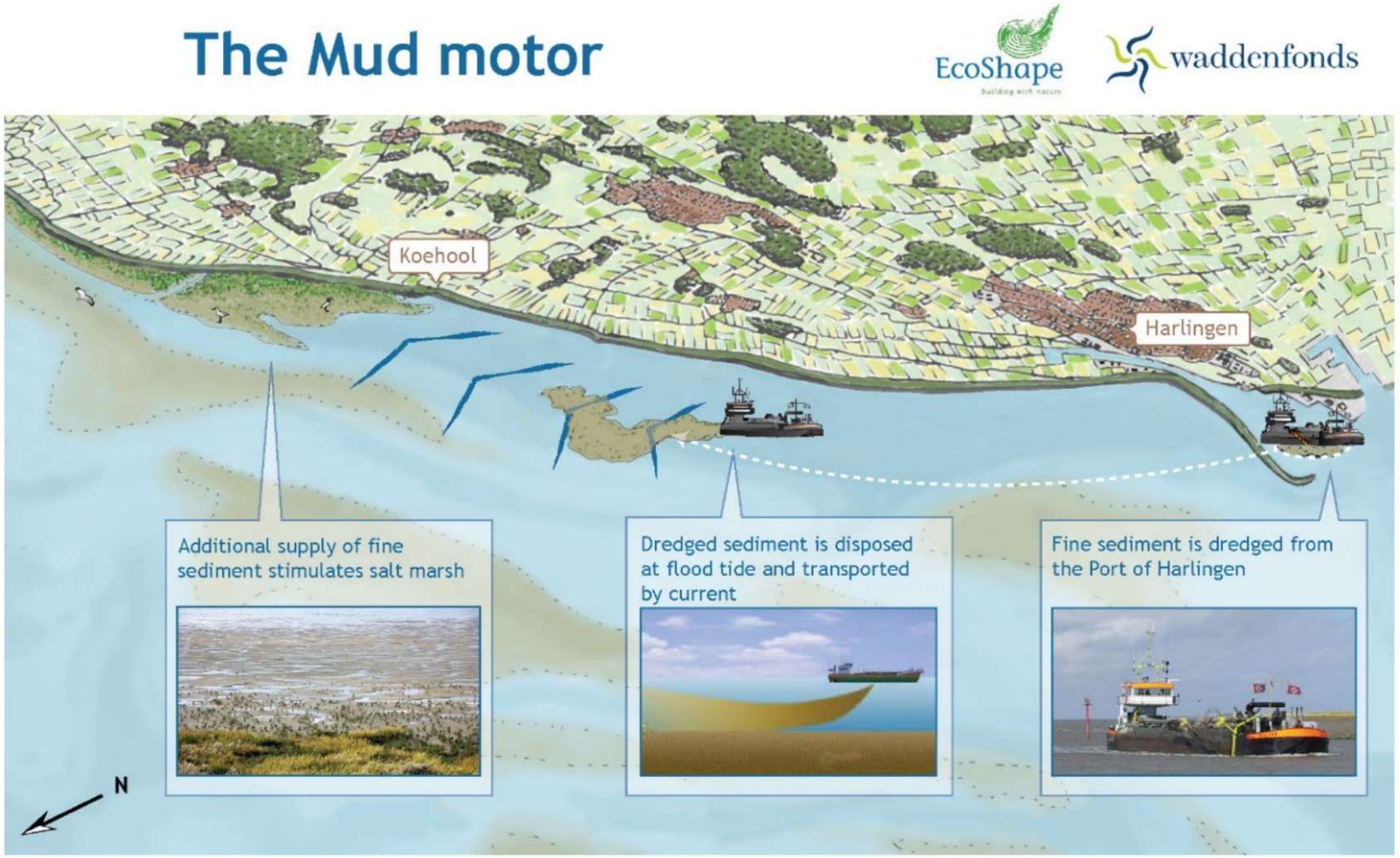

Figure 1-1. The principle of the Mud Motor approach.

Source: Baptist, M. et al. 2019a

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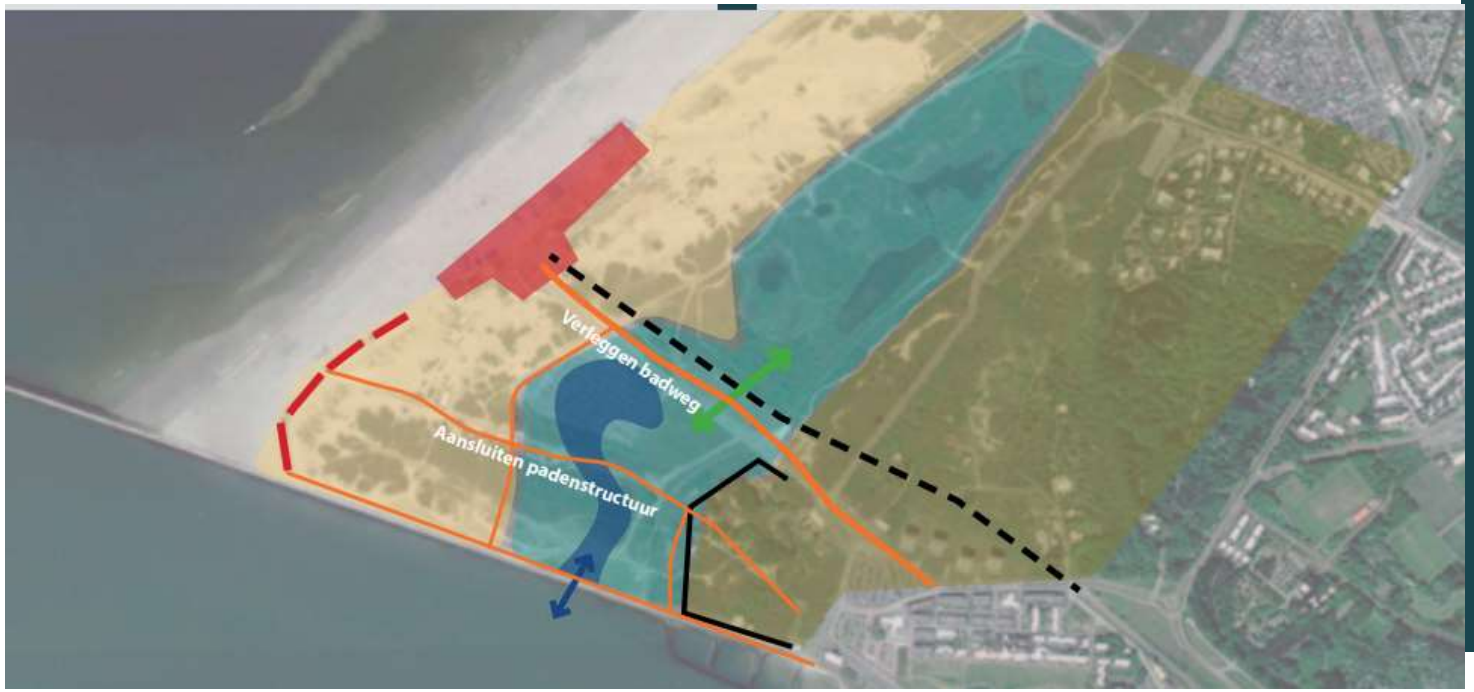
Masterplan Hoek van Holland

- 4 seasons & accessibility & branding
- ecological restoration: marsh, grey dunes
- development: hotel, housing



Design : Ben Kuipers Landscape architect, Jos van de Lindeloof landscape architect, Evert Pronk architect (BINT), Ecology Hans Lucas

Images: 190612-Masterplan-Hoek-van-Holland-aan-Zee

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Masterplan Hoek van Holland

source: https://benkuipers.nl/project/hoek-van-holland-aan-zee/

190612-Masterplan-Hoek-van-Holland-aan-Zee

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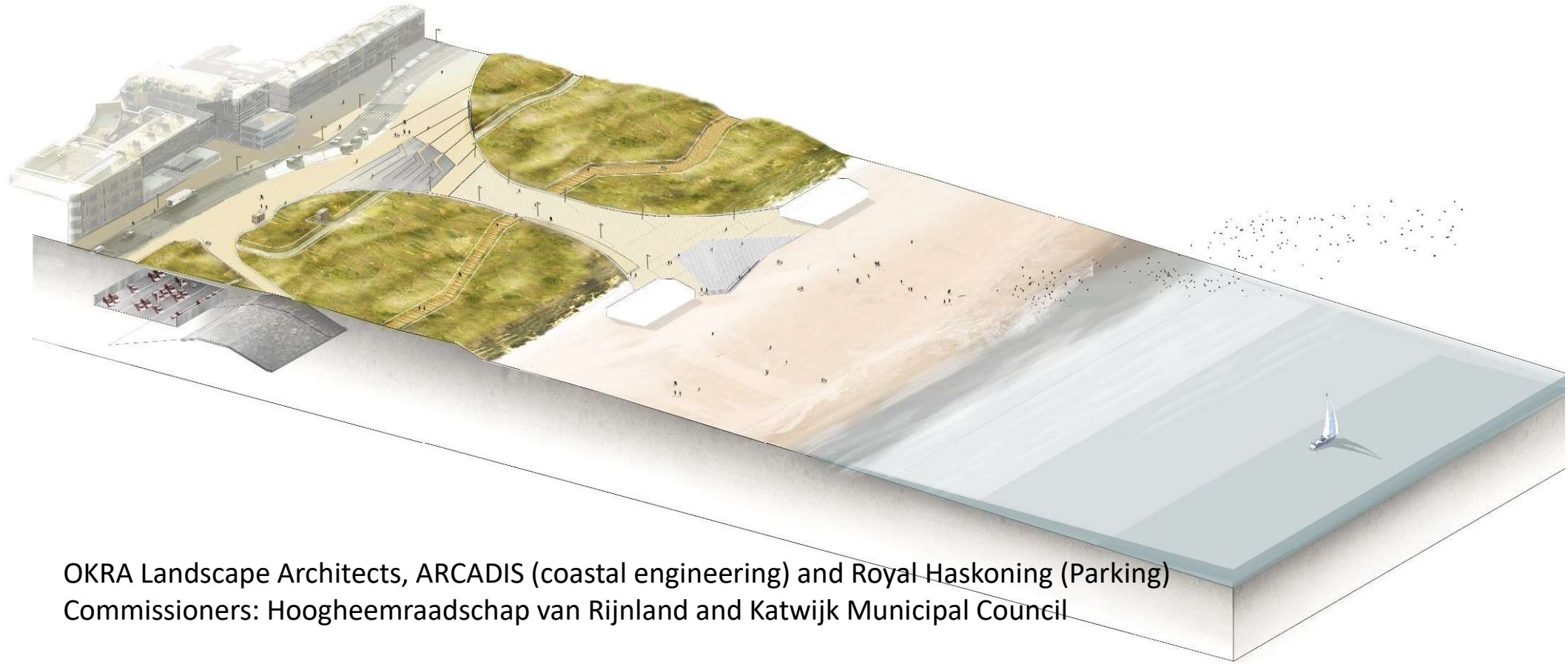
Katwijk aan zee - OKRA

See also lecture by OKRA: https://ilias.hfwu.de/goto.php?target=cat_23393&client_id=hfwu
OKRA Landscape Architects, ARCADIS (coastal engineering) and Royal Haskoning (Parking)
Commissioners: Hoogheemraadschap van Rijnland and Katwijk Municipal Council

Landscape planning and design



OKRA Landscape Architects, ARCADIS (coastal engineering) and Royal Haskoning (Parking)
Commissioners: Hoogheemraadschap van Rijnland and Katwijk Municipal Council

Landscape planning and design

OKRA Landscape Architects, ARCADIS (coastal engineering) and Royal Haskoning (Parking)
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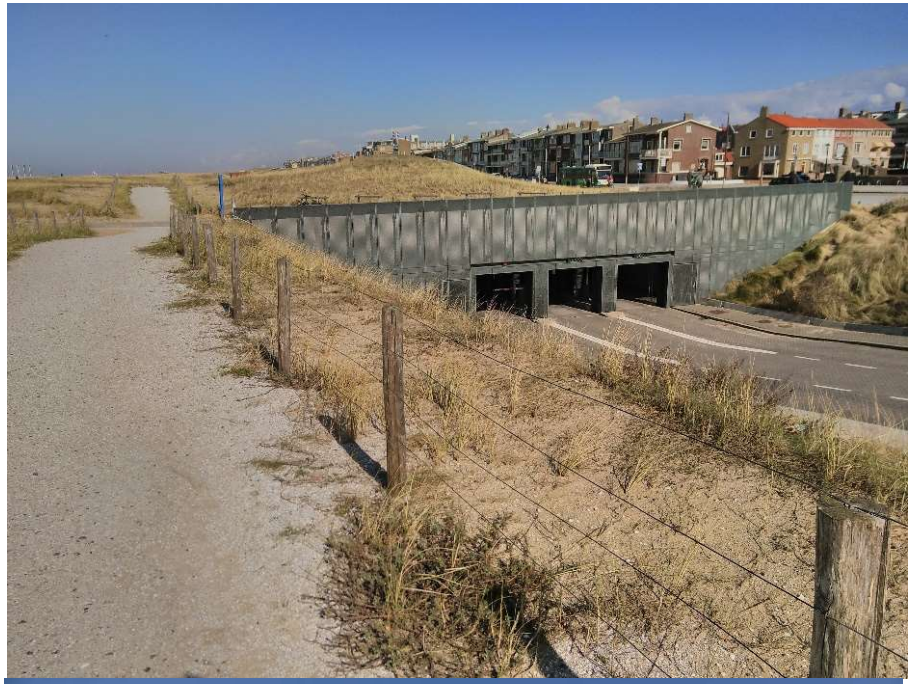

Photos: Jeroen de Vries

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Boulevard Scheveningen

Images: Blauwe Kamer magazine, 2012, nr 6.

Flood prevention: dike in boulevard
Improvement accessibility walking, cycling
Separation of traffic modes
Better connection to sea and pavillions
Splendid views by curving boulevard
Constructive parts less than 700 kilogram: safety

Design: 2006-2010; Construction 2011-2013
Manuel de Sola-Morales, Fluitman Architecten, Ingenieursbureau Den Haag

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Scheveningen Boulevard

Source: Blauwe Kamer magazine, 2012, nr 6.

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Question on landscape plans

What do you appreciate most in the approach of landscape architects in the Netherlands when drawing up these plans for the coastal zones?

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Conclusions LA - projects

- Integral approach: architecture, ecology, mobility
- Nature based: space for natural processes
- Urban development & sea defence financing habitat restoration and tourism
- Improving access: walking, cycling
- Participatory processes
- Monitoring of effects: water management, biodiversity

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Visionary plans:

NL 2120

NL 2070/ 2300

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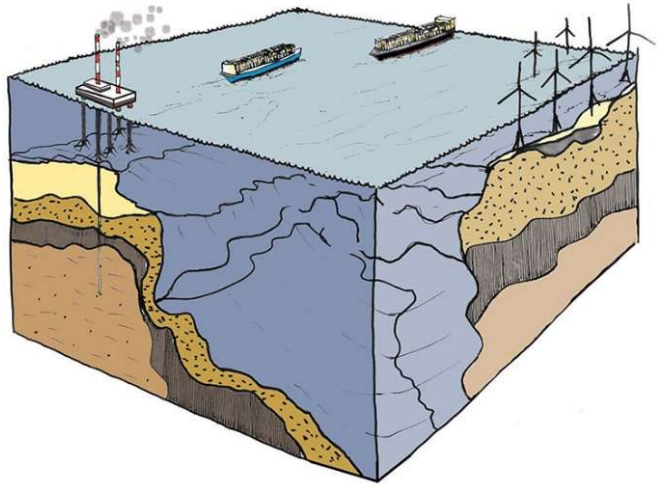
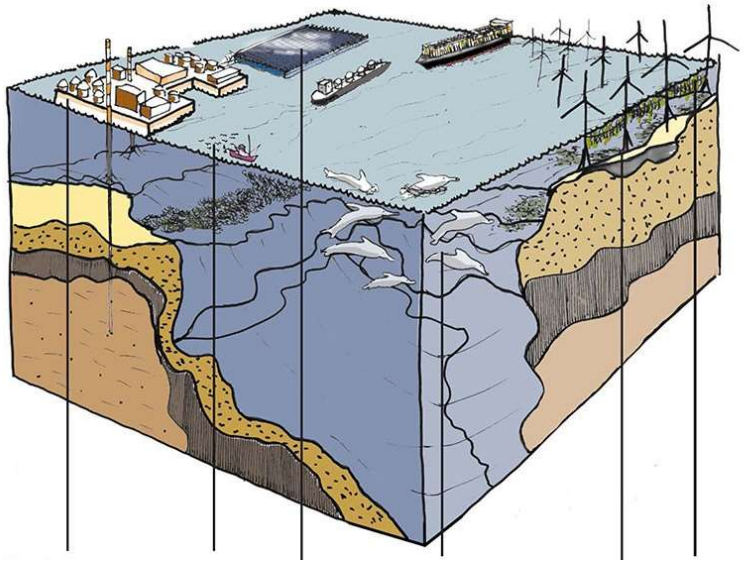
Netherlands 2120



Windparks

Aquaculture in windparks

Floating islands: solar and wind



Seaweed culture along coast

Oysterbanks

Soft coastline defences

Baptist, M. et al, 2019,

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Visionary plans: NL 2300

- Is building higher dikes feasible?
- Should we look for new relations with see, rivers, nature?
- How much can we trust forecasts of climate change?
- Should we plan for adaptive and flexible landscapes?

Call by the Council for the Environment and Infrastructure NL 2027 and call by landscape magazine De Blauwe Kamer:

how will the Netherlands look like in 2070 / 2300?

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Visionary plans: NL 2300

Four types of strategies

- ATTACKERS: ZUS and De Haakse Zeedijk
- LAND CONSOLIDATION: BRO, Karres en Brands
- RADICAL POETS: Buro Lubbers, Rijnboutt
- DEFEATISTS: Ro Koster and Hans van Engen

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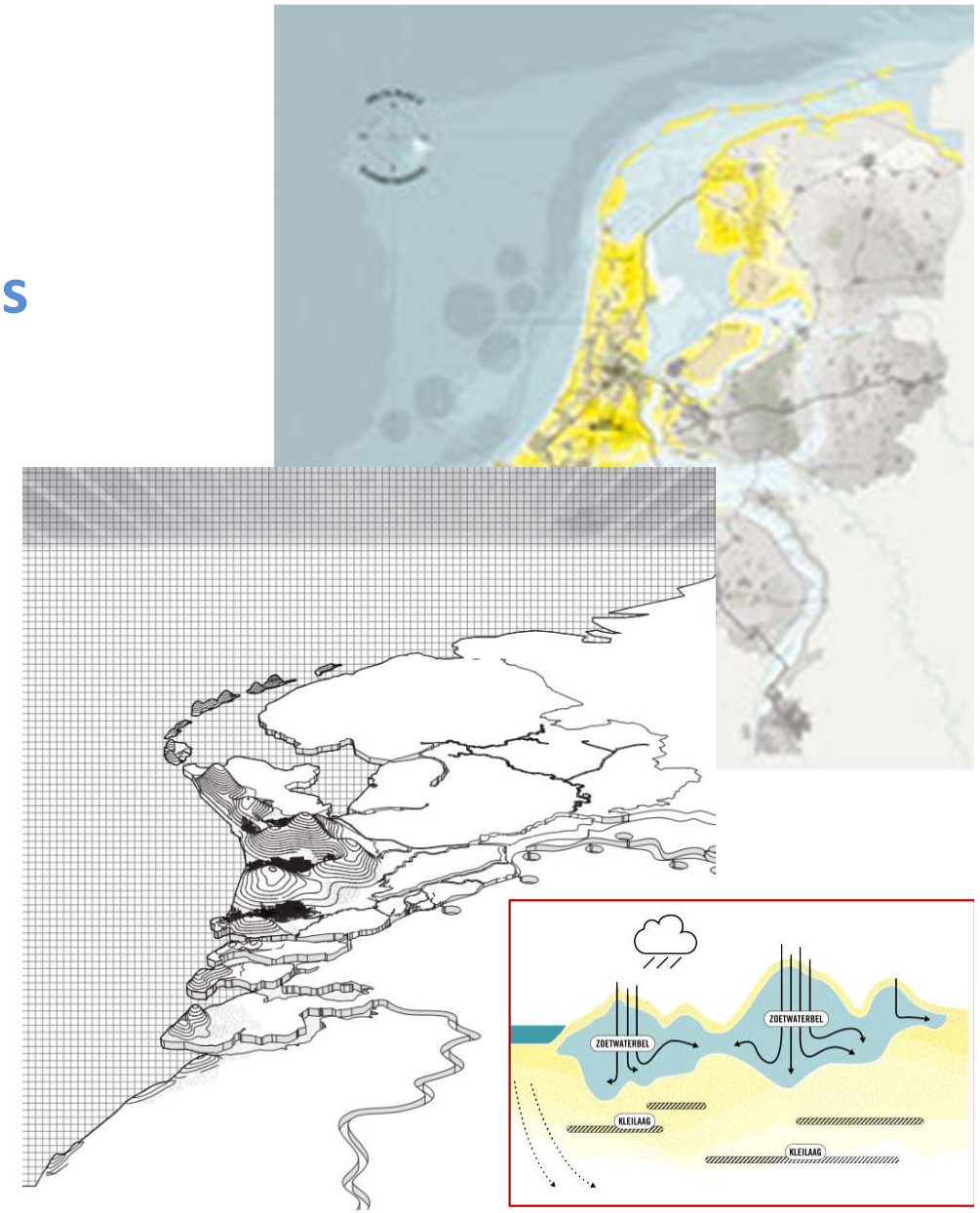
NL 2300 - ZUS / Arcadis, TU Delft-SLIKC, Van Oord

- Dune metropolis
- Polders –> Dunes
- Erosion & sedimentation processes
- Oosterscheldekering open
- Peat polders uninhabitable due to subsidence and salinisation.
- Haarlemmermeer -> super dune riot, fresh water processing
- De Beemster energy hub - intensive vertical agriculture with sustainably produced energy.



Source: ZUS , 2016

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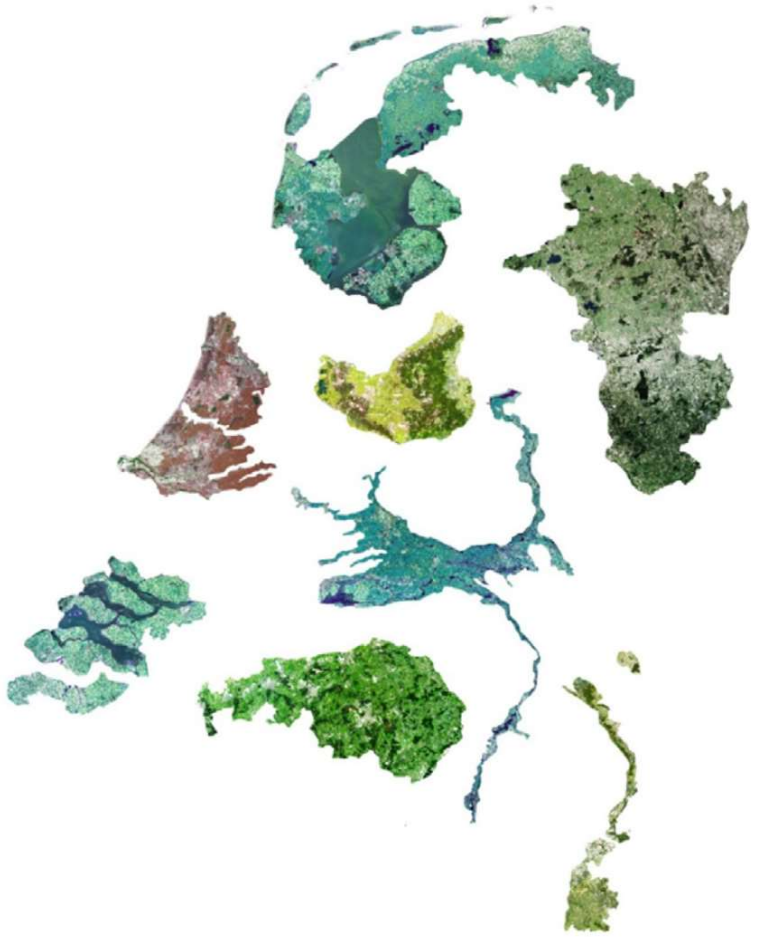
NL 2300 - Karres and Brands Landscape architects

The Seven New Netherlands

More space for natural processes
agriculture that responds to natura
conditions
Wind and solar energy
Relocation of economic functions a
residential areas from the drain to
higher sandy soils.
administrative system of seven
regions.
Each with a specific characteristics of
landscapes and regions.



Source: Karres en Brands, 2016

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NL 2300 - Karres and Brands Landscape architects – part Deltaland

Source: Karres en Brands, 2016

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NL 2300 – BRO + 2.5 meter

Land consolidation

Water gets more space

New line of wadden islands

Small cities moved to higher ground

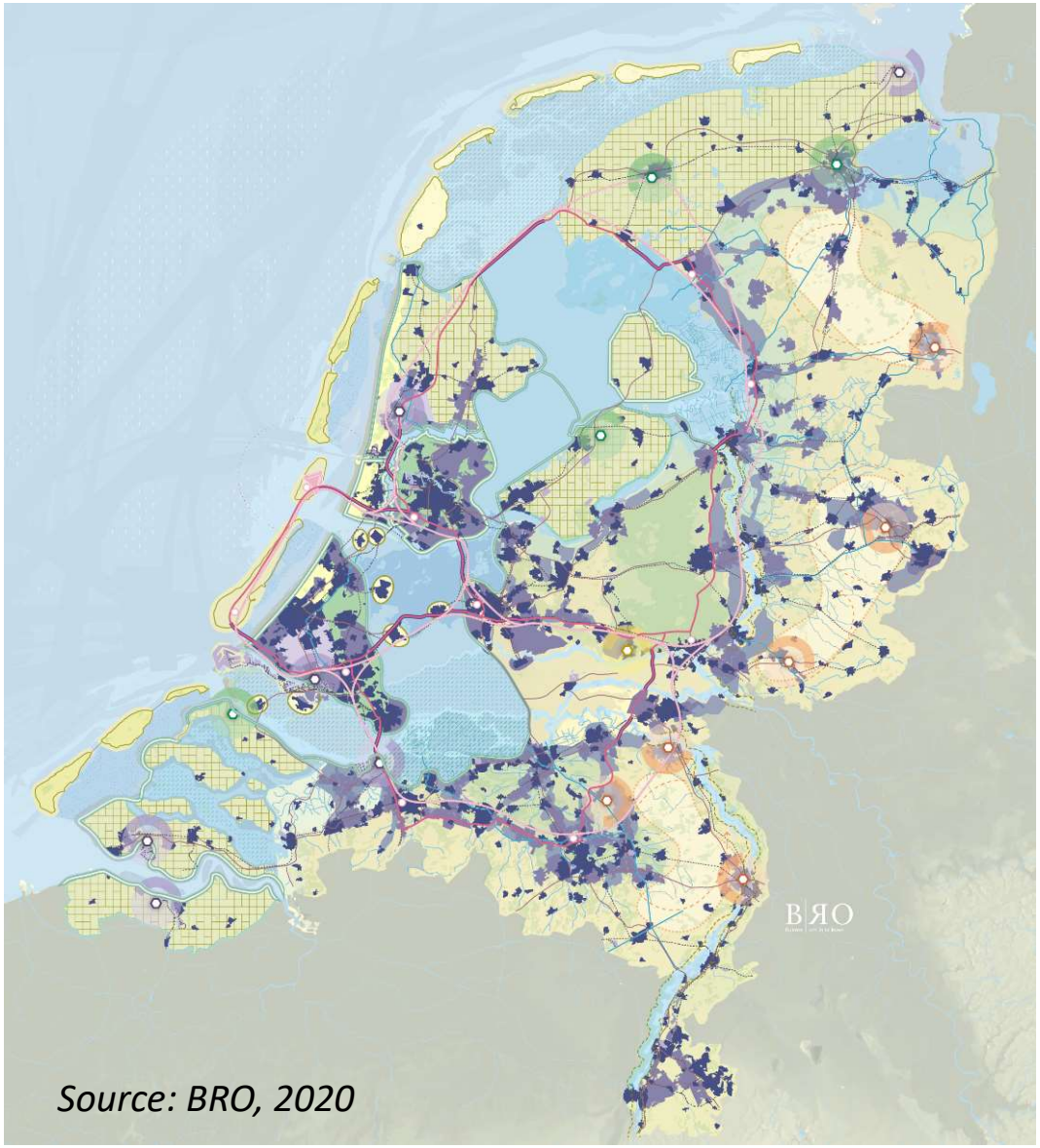
Larger cities are protected

High-speed lines

Industrial food production is given a place in agro-clusters,

Nature is bundled

Landscape parks between cities



Source: BRO, 2020

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NL 2300 – BRO + 5 meter

Land consolidation

Water gets more space.

New line of wadden islands

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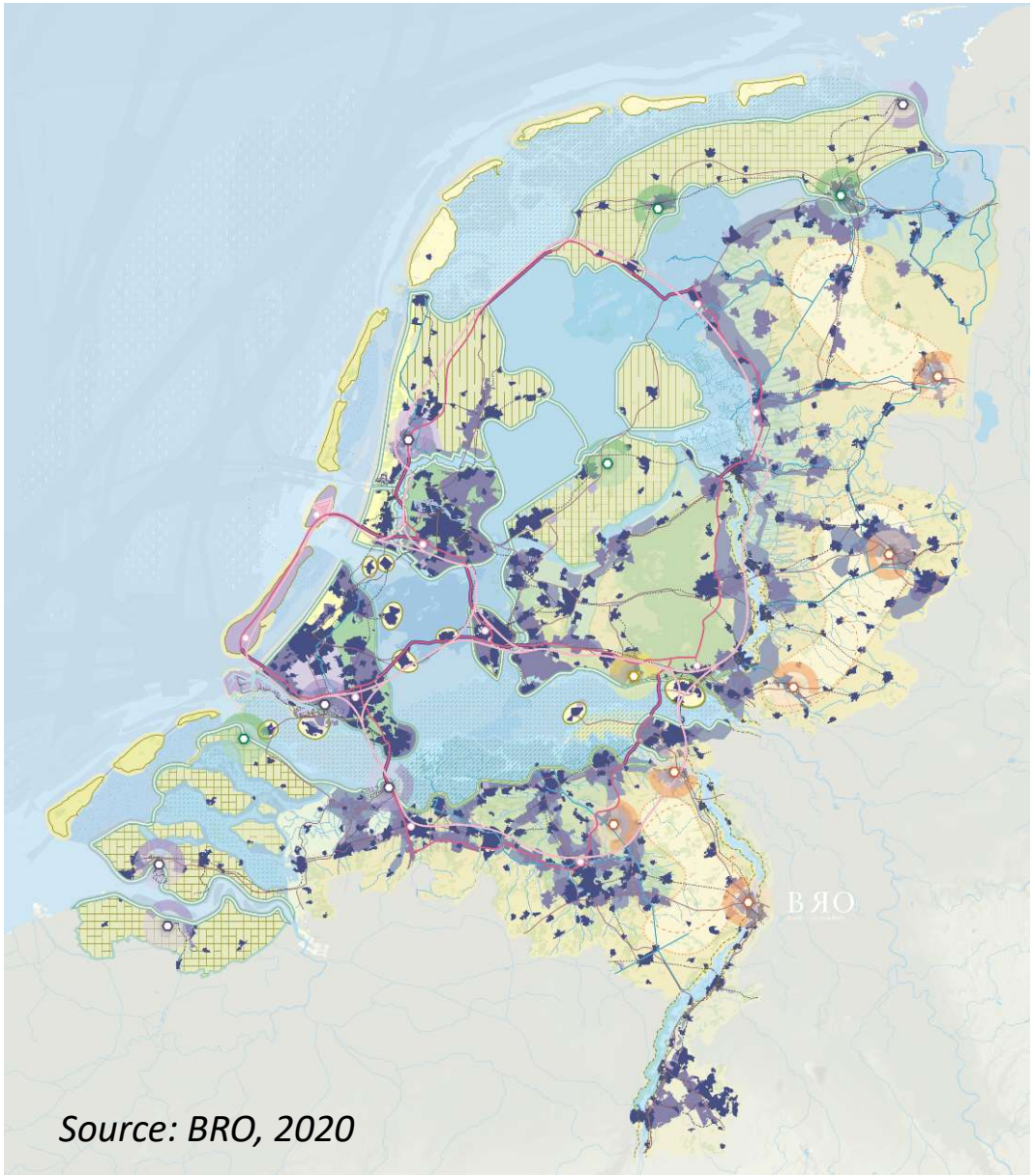
landscape parks between cities



Source: BRO, 2020

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NL 2300 - Buro Lubbers

Mondrian delta

Storm flood in 2038 -> millions of fugitives

Destroyed cities not rebuilt

a Mondrian grid of piers and dikes grows along with sea level rise.

In grid countless functions: ports, industrial areas, aquaculture, energy landscapes and floating residential areas.

Parts of old cities saved as islands:

Amsterdam canals, Vondelpark, Bijlmer flats form ‘The city formerly known as Amsterdam’.

Rest of Randstad under water: New Atlantis.

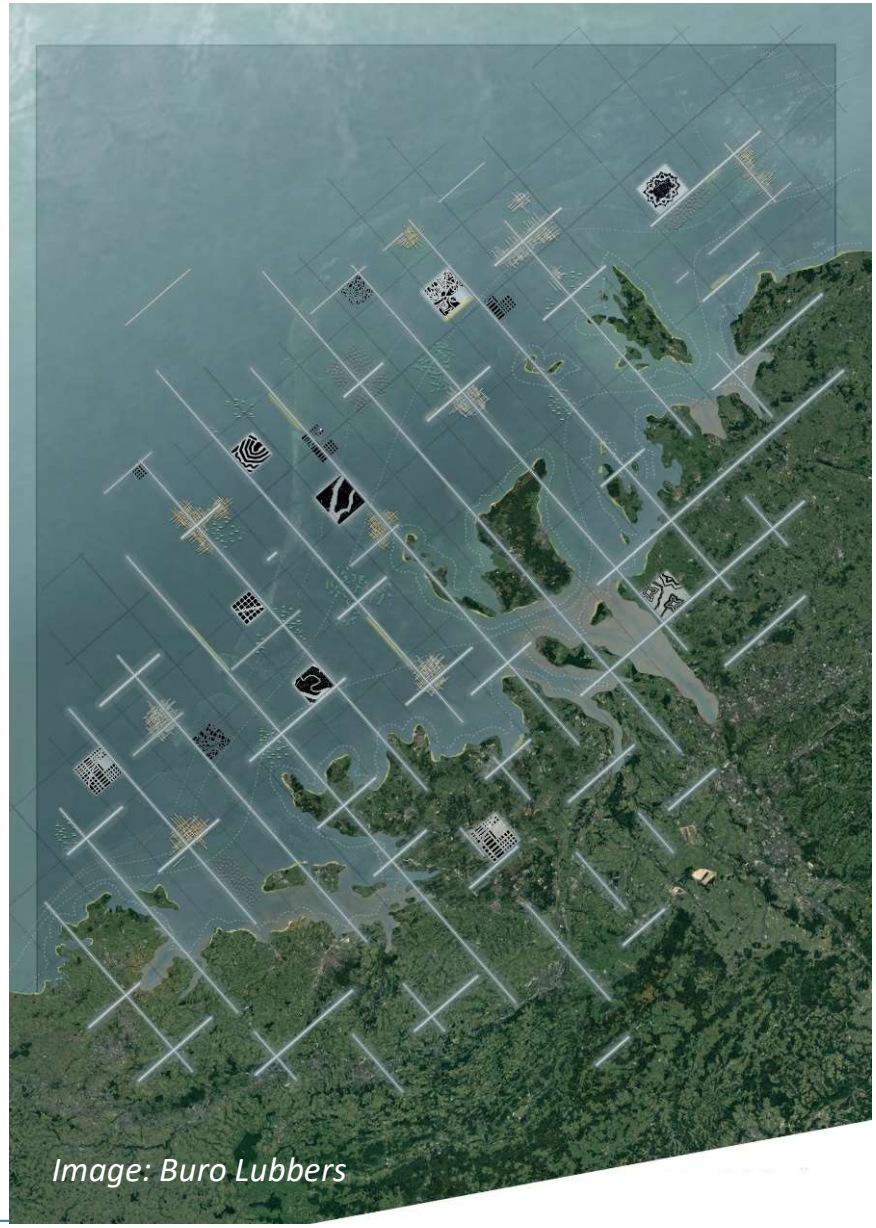

Image: Buro Lubbers

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NL 2300 -Rijnboutt

The abandoned country

No hard border land –water

Coastline of salt marshes, partly new created on the empty farmland

High-tech food production

Flooded polders with marine agriculture & floating greenhouses

Circular agroparks in hinterland.

Concentric cities in east

High-rise clusters with data centers and control rooms, hyperloop network

Sea platforms for solar energy

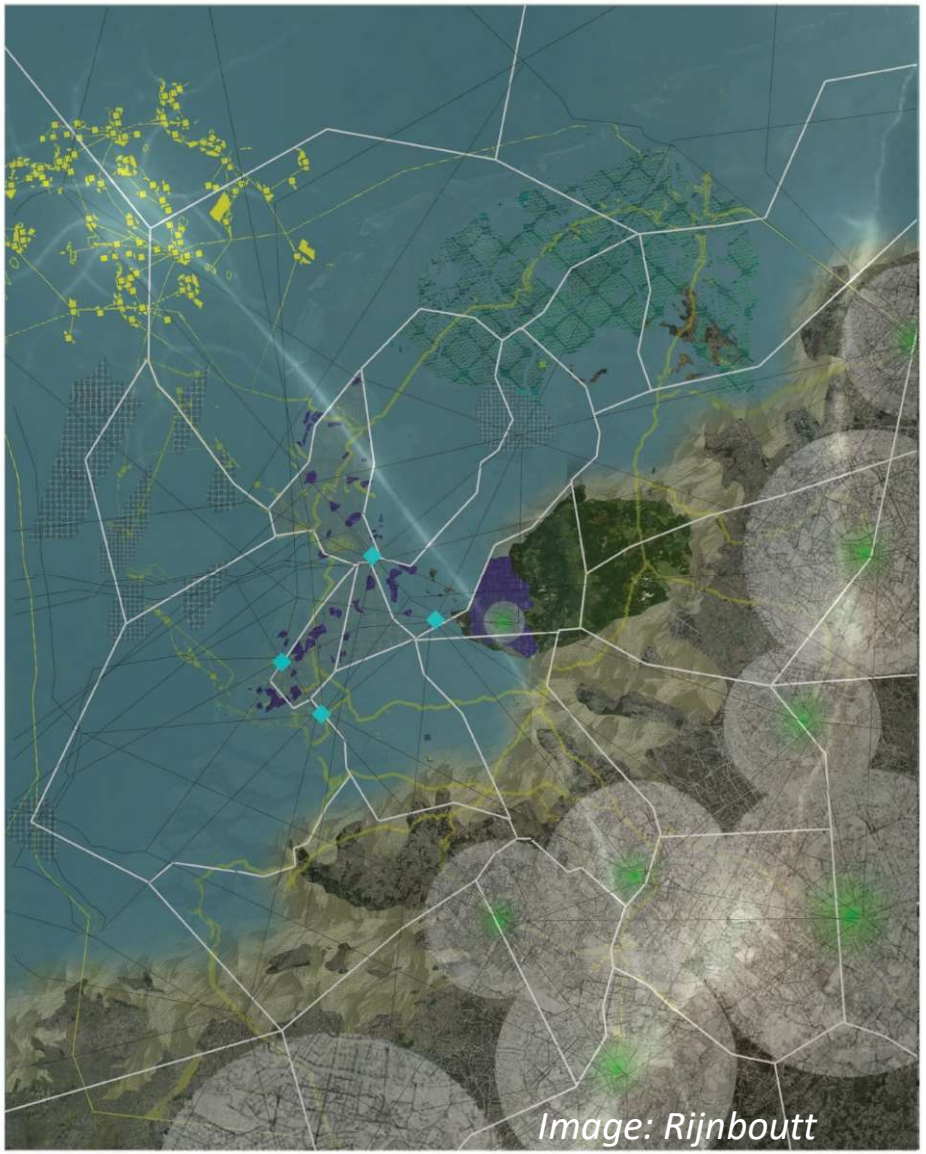

Image: Rijnboutt

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NL 2300 - Jet ten Voorde

Air cities

No development in low lands:

- Densification of the higher-lying city centers and urbanized port areas.
- Critical infrastructure in watertight tunnels
- Travel on elevated monorail and aerial cycle paths and boats

- Castles in the air
- Growing seaweed in salt water
- Floating fields

Image: Jet ten Voorde

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NL 2300 - HZ University of Applied Sciences

Tim Hoogkamp, Gino Schier, Patrick van Zweden supervised by Lukas Papenborg

Elysium

- Coastline moved to higher sandy area
- Half of NL under water
- Subtropical climate
- Economy with a rich elite
- Tourism luxury holidays
- Mega-poles Apelhem, Eindhoven, Brussels and Nijmegen
- Products and goods are imported, processed and exported via new hub

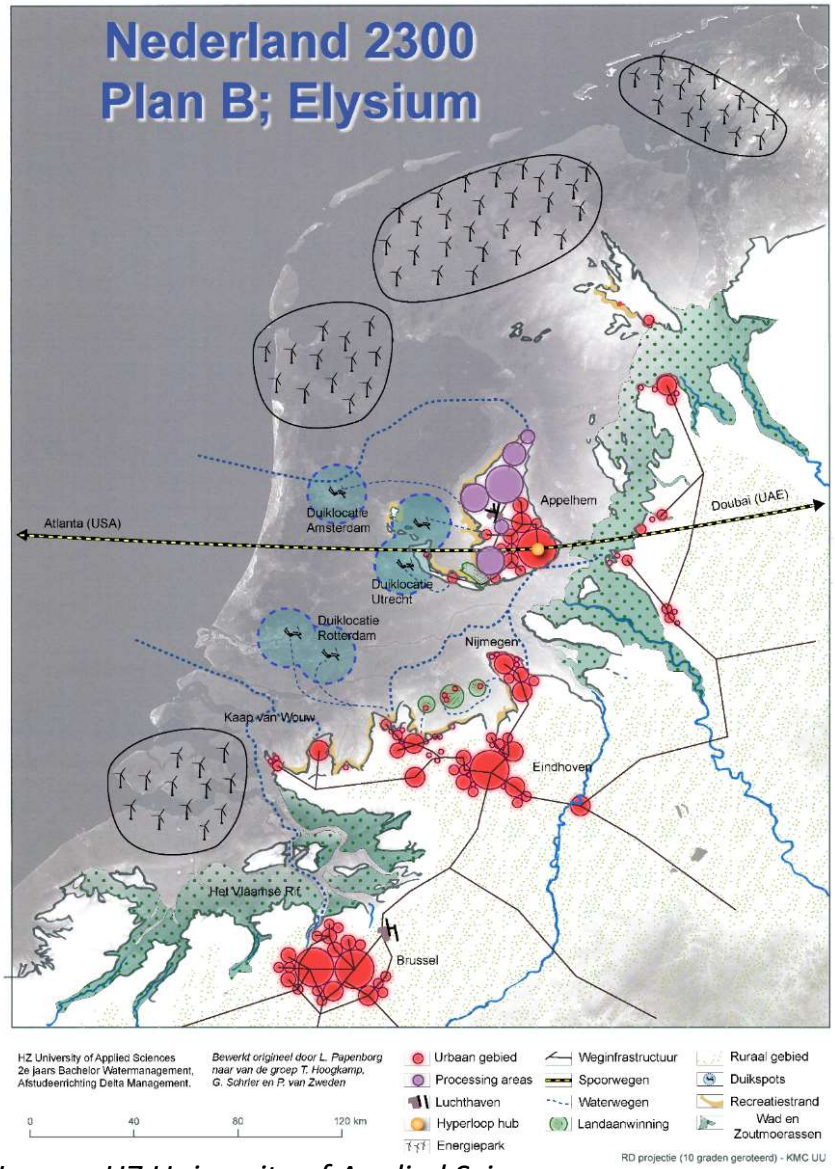

Image: HZ University of Applied Sciences

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NL 2300 - Ro Koster and Hans van Engen

Hello, wake up!

Image: Koster & Van Engen, 2016

country disappear in the waves
migration waves
loss of fertile lands
drinking water shortages
a crisis in biodiversity
social and political disruption

Main focus: CO2 storage by

- massive forestation
- flooding of peat meadows
- agroforestry along infrastructure lines

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Question on long term strategy

What type of strategy would you choose for the coast of Belgium around De Panne?

Universitatea de Arhitectură și Urbanism "Ion Mincu"

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Eesti Maaülikool
Estonian University of Life Sciences

Hochschule für Wirtschaft und Umwelt Nürtingen-Geislingen

HOCHSCHULE WEIHENSTEPHAN-TRIESDORF UNIVERSITY OF APPLIED SCIENCES

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LE:NOTRE *Institute*
Linking landscape education, research and innovative practice

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Knowledge for Better Cities

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