

An aerial photograph of a river delta system. A large, dark blue river flows from the top left towards the center, then branches out into a complex network of smaller, winding channels that meander across a vast, green landscape. The terrain is a mix of vibrant green and brownish-green, suggesting agricultural fields and natural vegetation. The overall shape of the river network resembles a fan or a comb, characteristic of a delta. The title 'Rhythms of the delta' is overlaid in white text across the center of the image.

Rhythms of the delta

Han Meyer, TU-Delft
Robert Broesi MUST Stedebouw
Ed Dammers, PBL
Steffen Nijhuis, TU-Delft

NWO research project IPDD (Integrated Planning and Design in the Delta)

October 11, 2013

1990 - 2010: a lot of plans

Kering en afvoer van water in de Delta

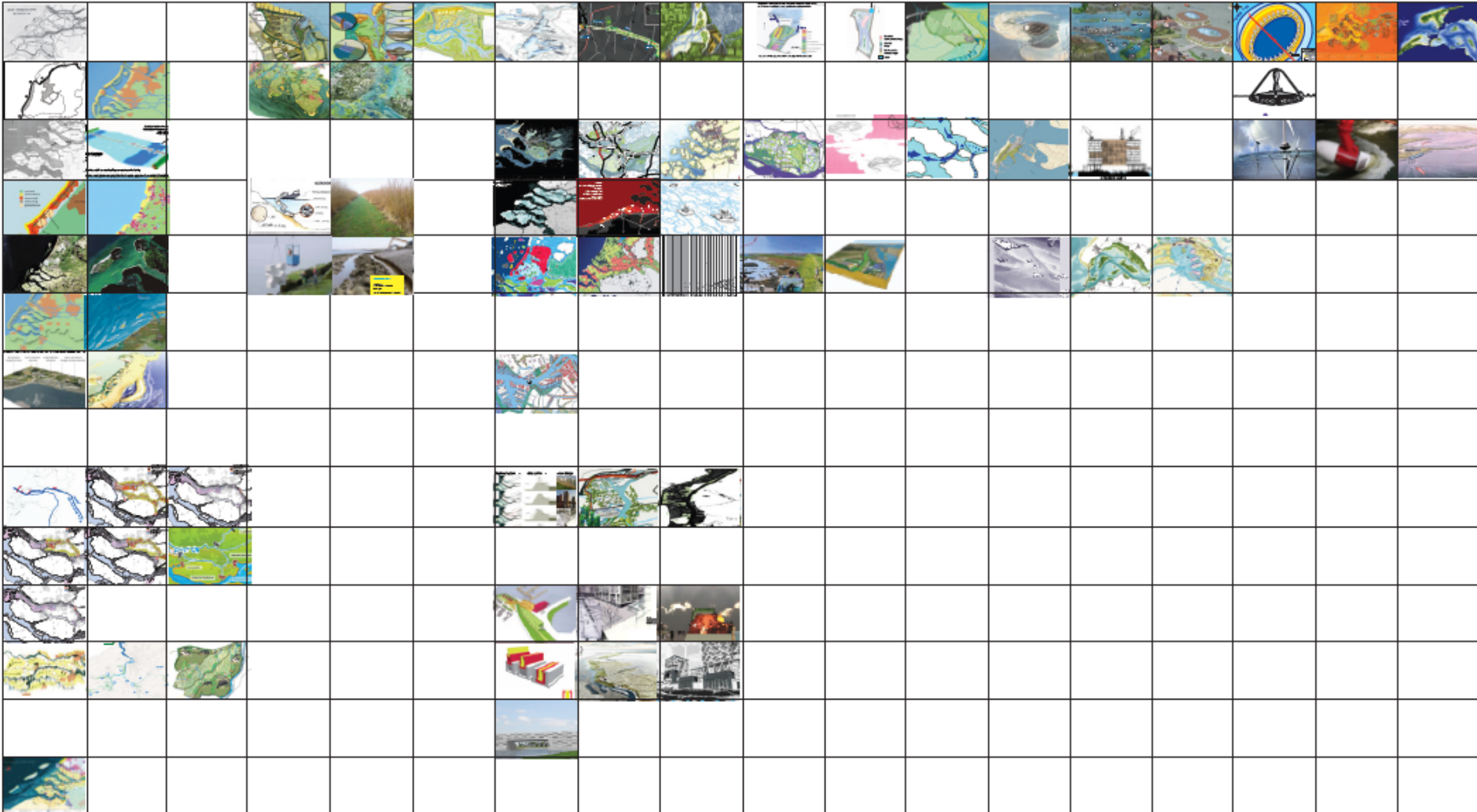
Ecologische Delta

De stad en de Delta

Landbouw en aquacultuur in de Delta

Water als ruimtedrager in de Delta

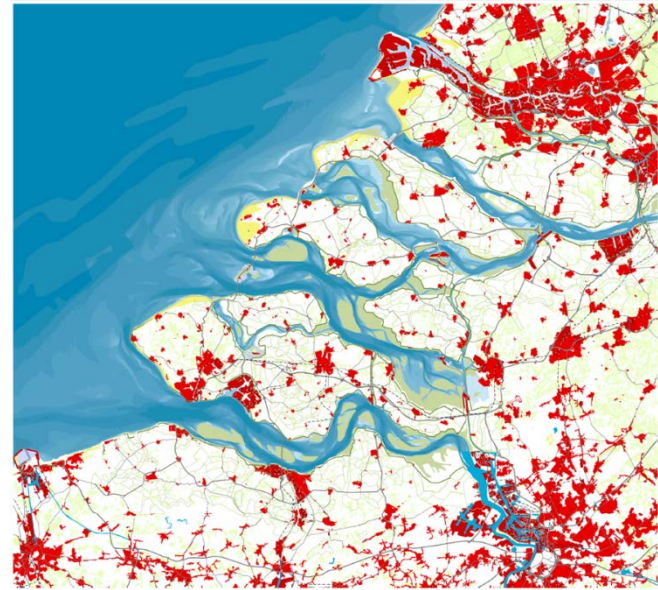
Energiewinning uit de Delta



Different perspectives



Port Vision 2030



Urbanization



WWF: With Open Arms



Delta-program: water-safety and fresh water

2008: start new Delta-program

Working together with water

A living land builds for its future

Findings of the Deltacommissie 2008



An aerial photograph of a river delta, showing a network of blue water channels branching out from a larger body of water on the left into a green, vegetated landscape. The channels are irregular and meandering, creating a complex pattern of water and land.

Rhythms of the delta

Integration . . . ???

Comprehending . . . ???

A complex system



Fishing



Agriculture



Environment



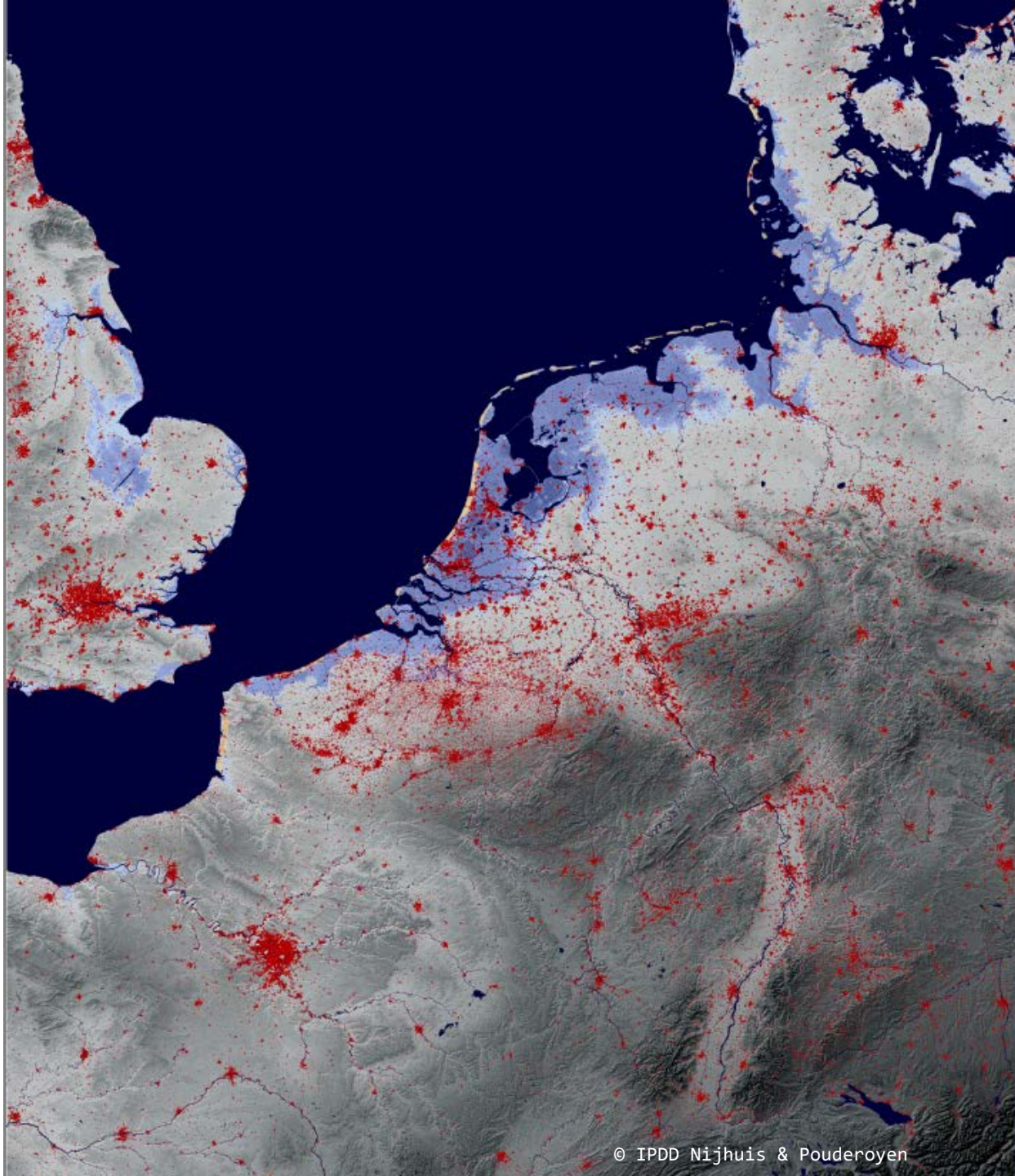
Flood-defense & Water-management

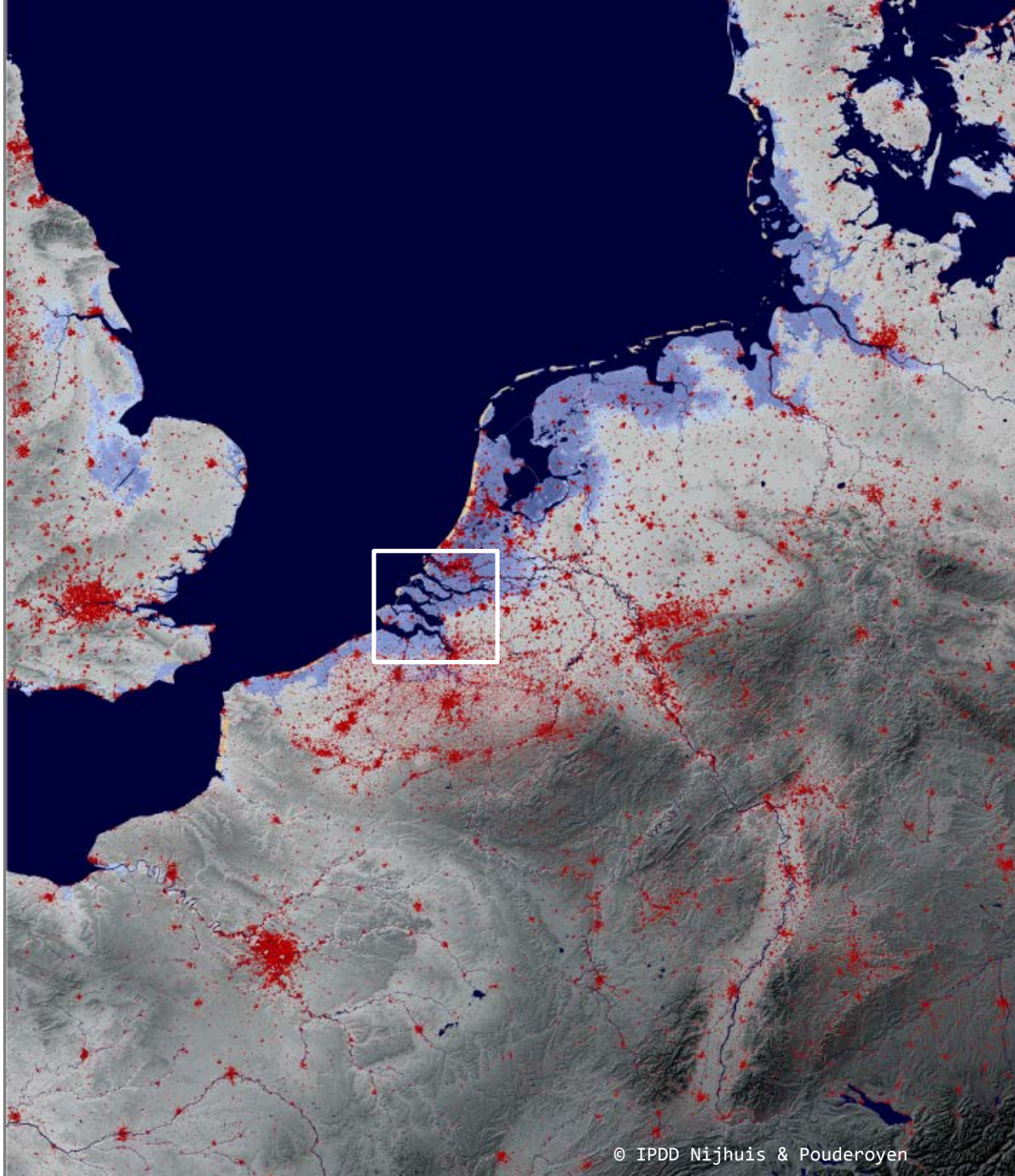


Port-economy

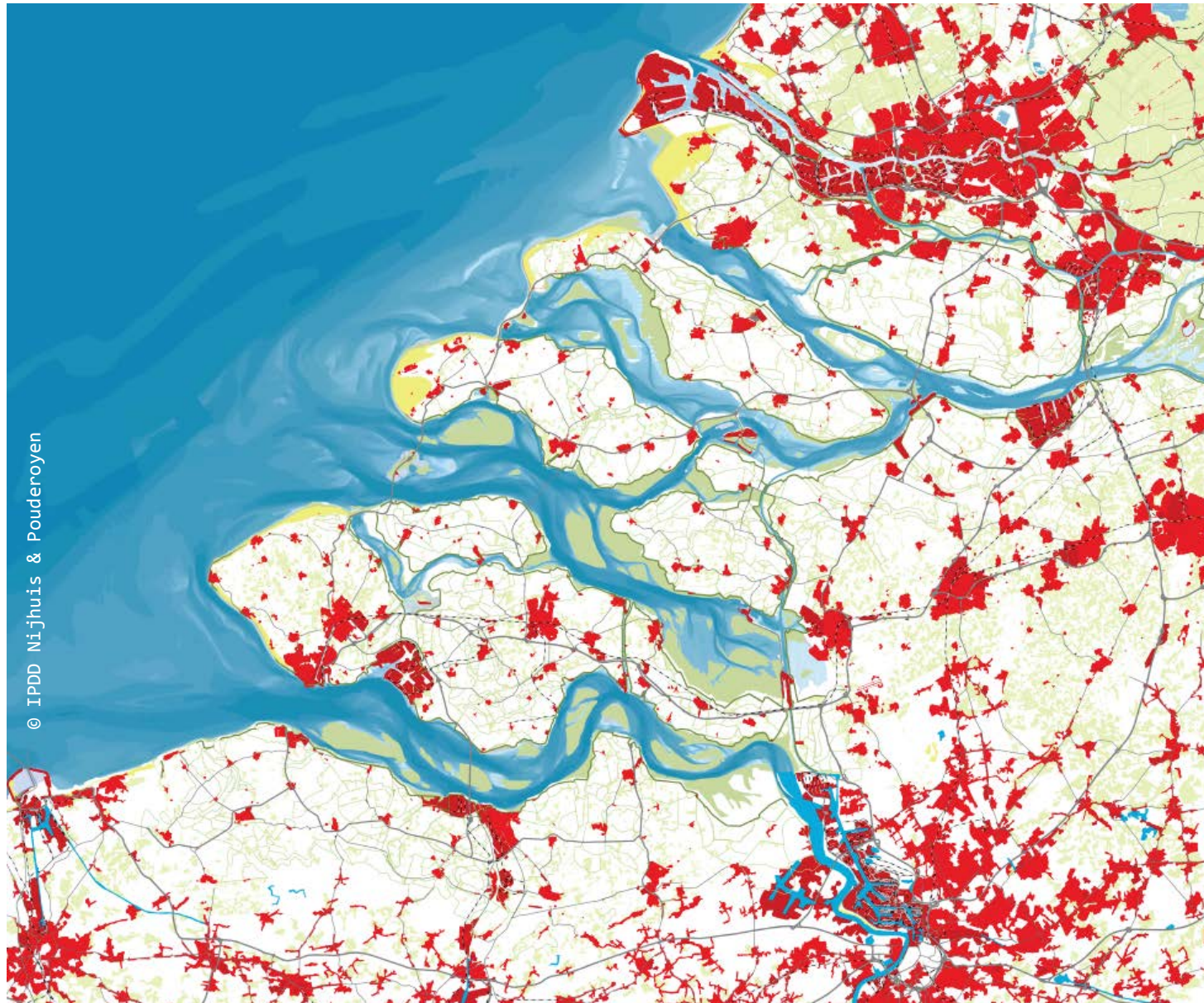


Urbanization





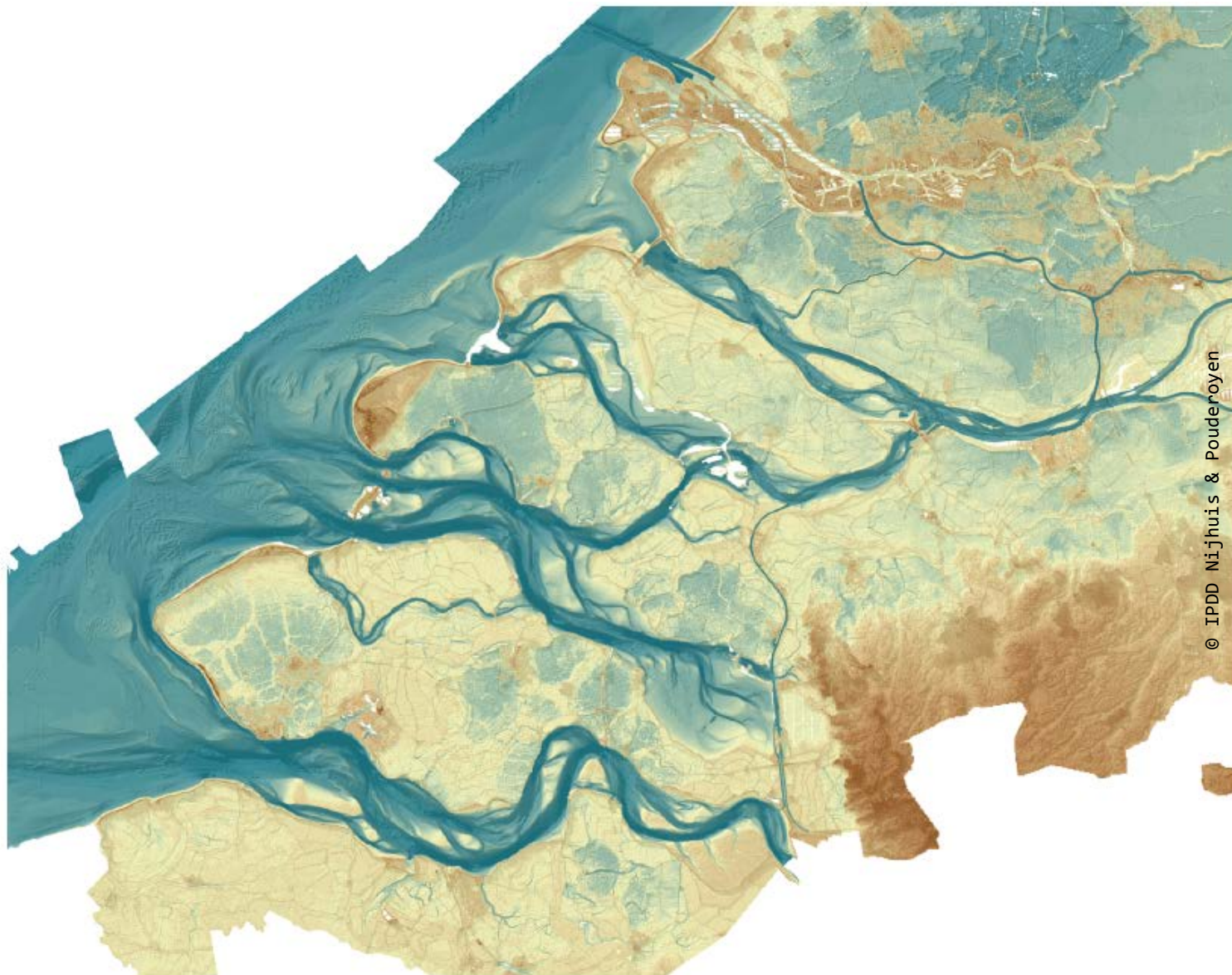
The Dutch South-west delta - a dynamic region



© IPDD Nijhuis & Polderoyen

South-west delta - urban patterns

The Dutch South-west delta - a dynamic region

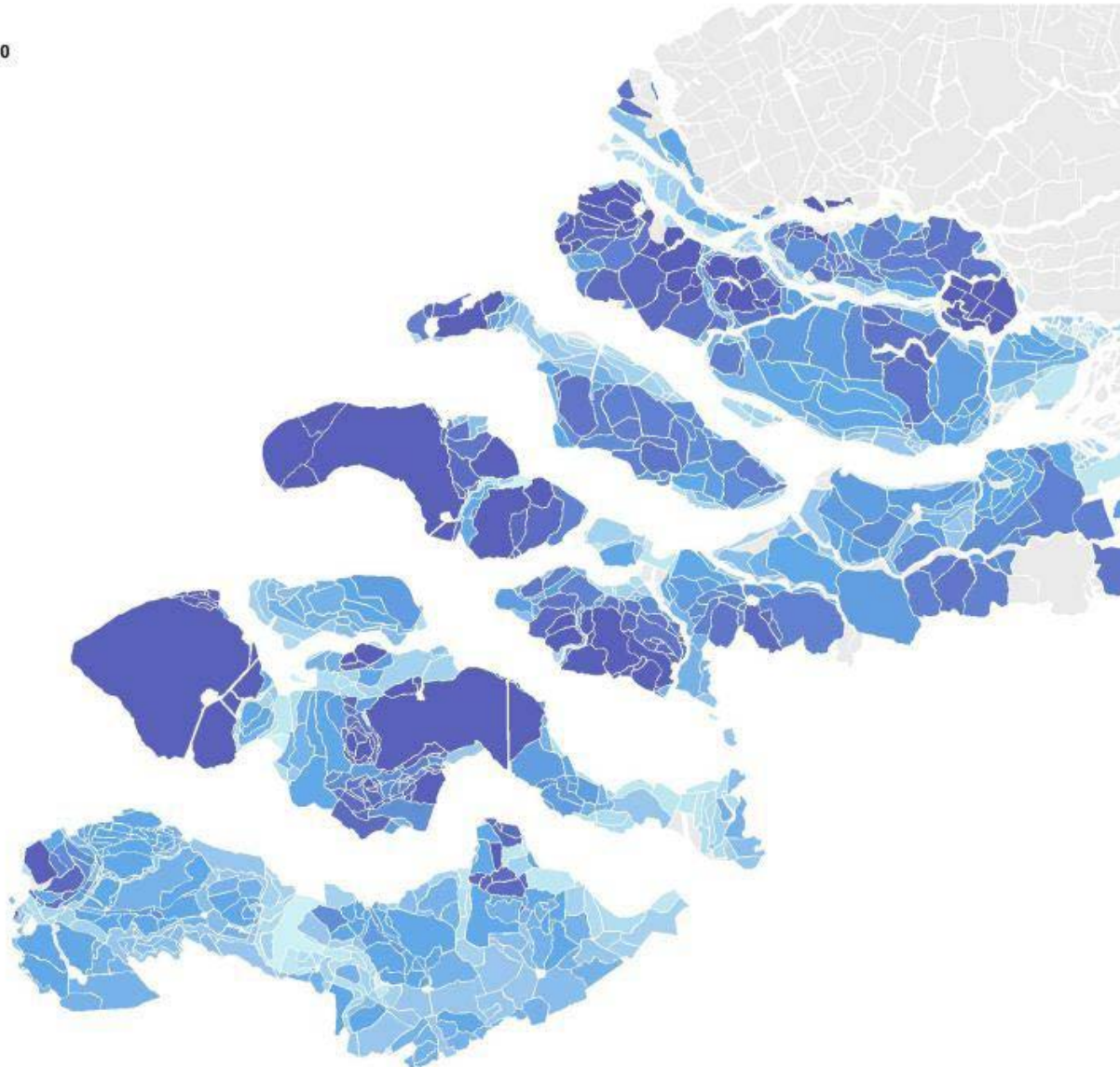
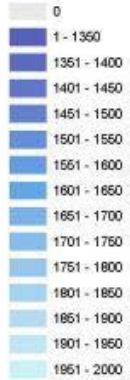


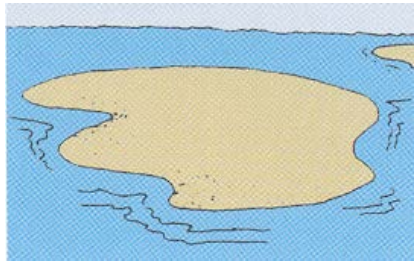
South-west delta - heights and depths

land formation in the delta 1200 - 1800

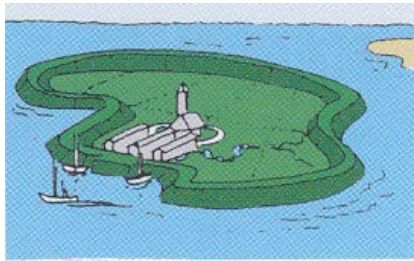
un-going sedimentation, reclaiming and poldering

Zeearmen ca. 1900
(periode)

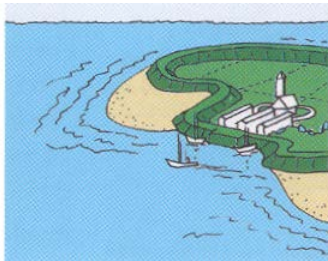




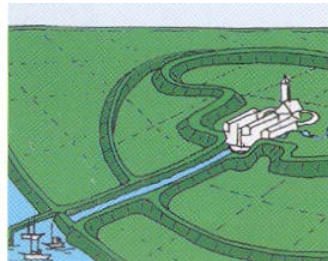
Ringpolders op zandplaten



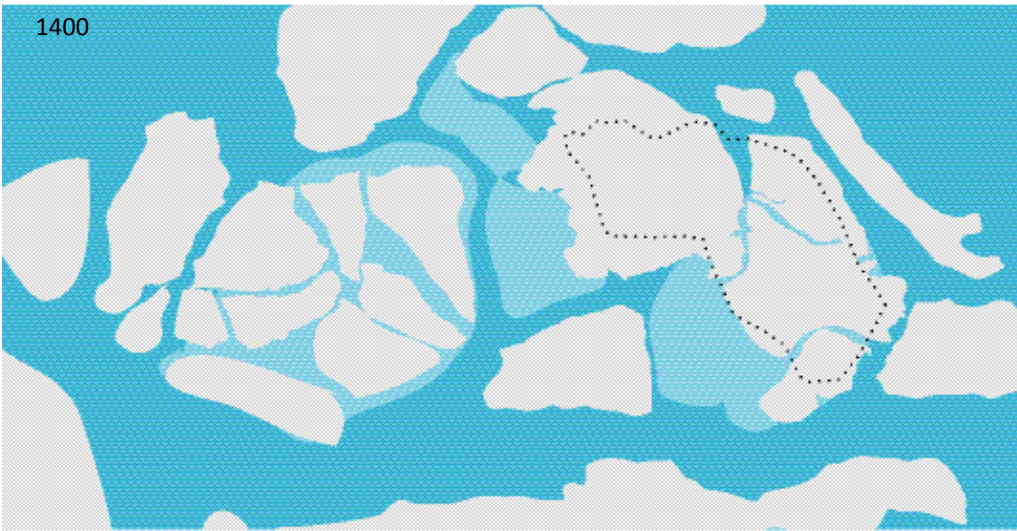
Kernen tegen de ringdijken



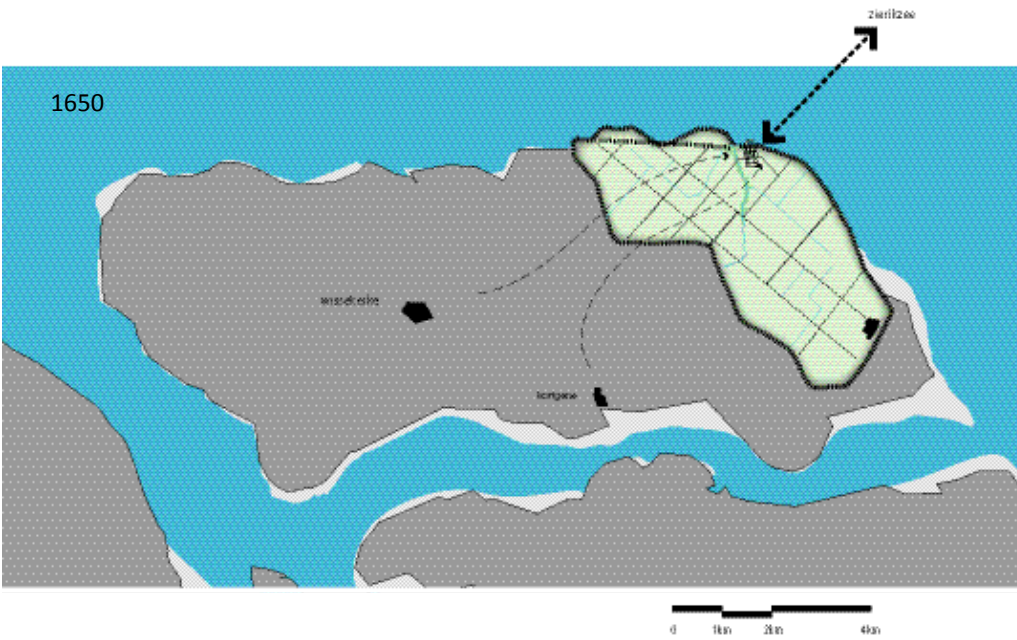
Groei van havenkanalen



1400



1650

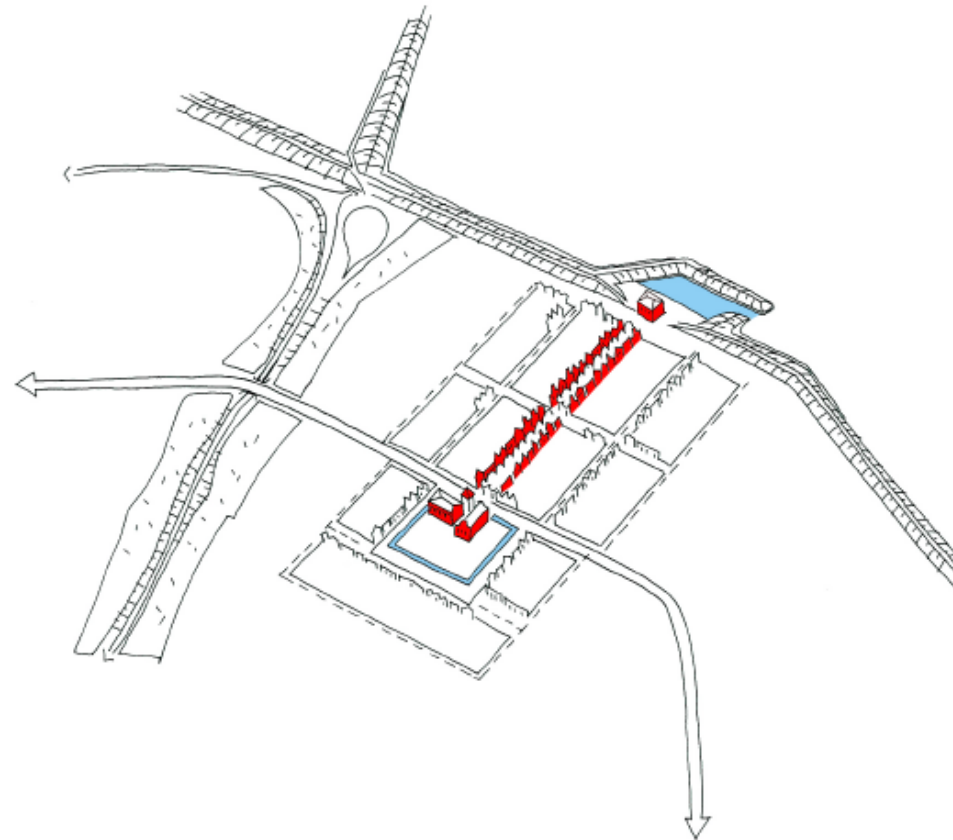


Colijnsplaat



Kaart van de Oud Noord-Bevelandpolder, 1598 (A.R.A. VTH 2803).

Colijnsplaat



Wedding-ceremony, Colijnsplaat 1938

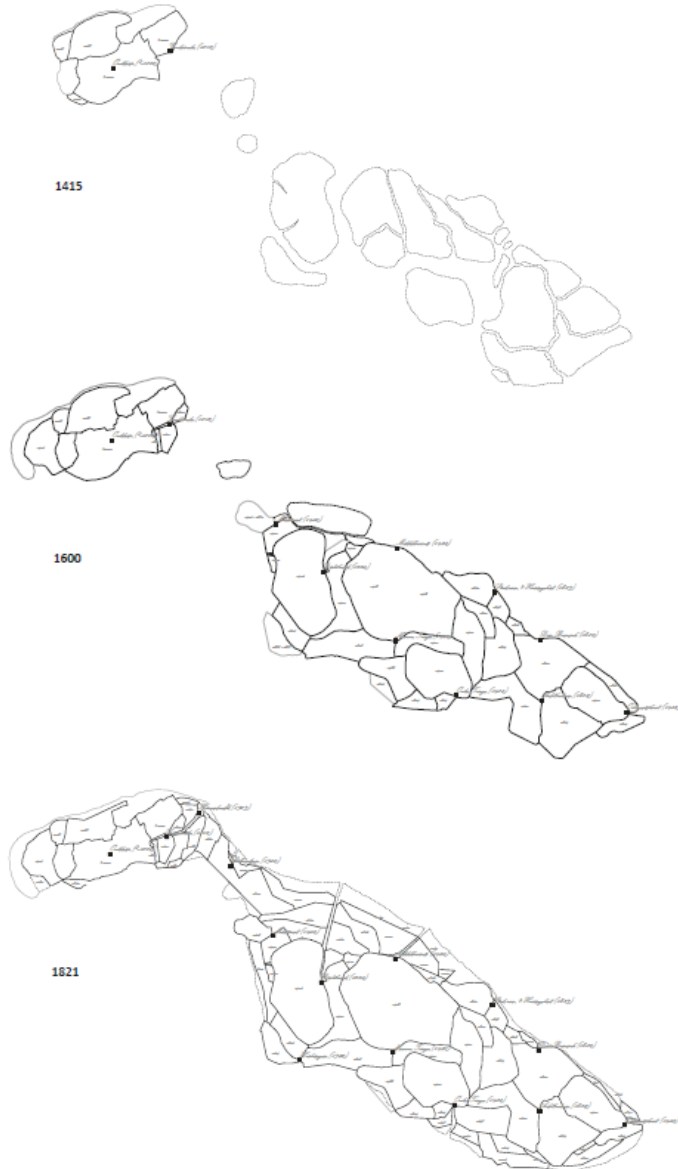


Voorstraat ('Frontstreet') perpendicular to the dike

Colijnsplaat



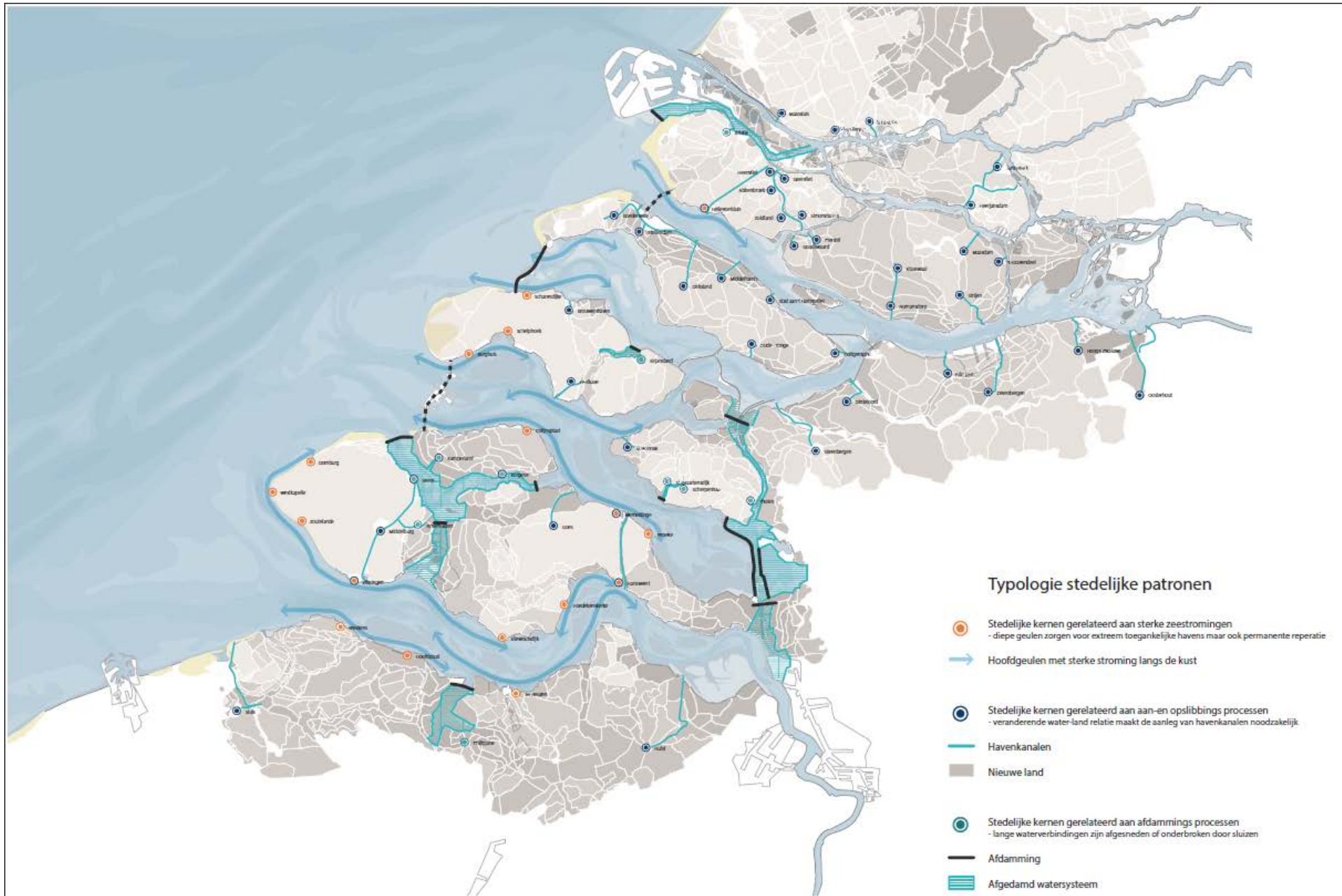
'Integrated area-development' in the delta 1200 - 1800



Reclaiming the land

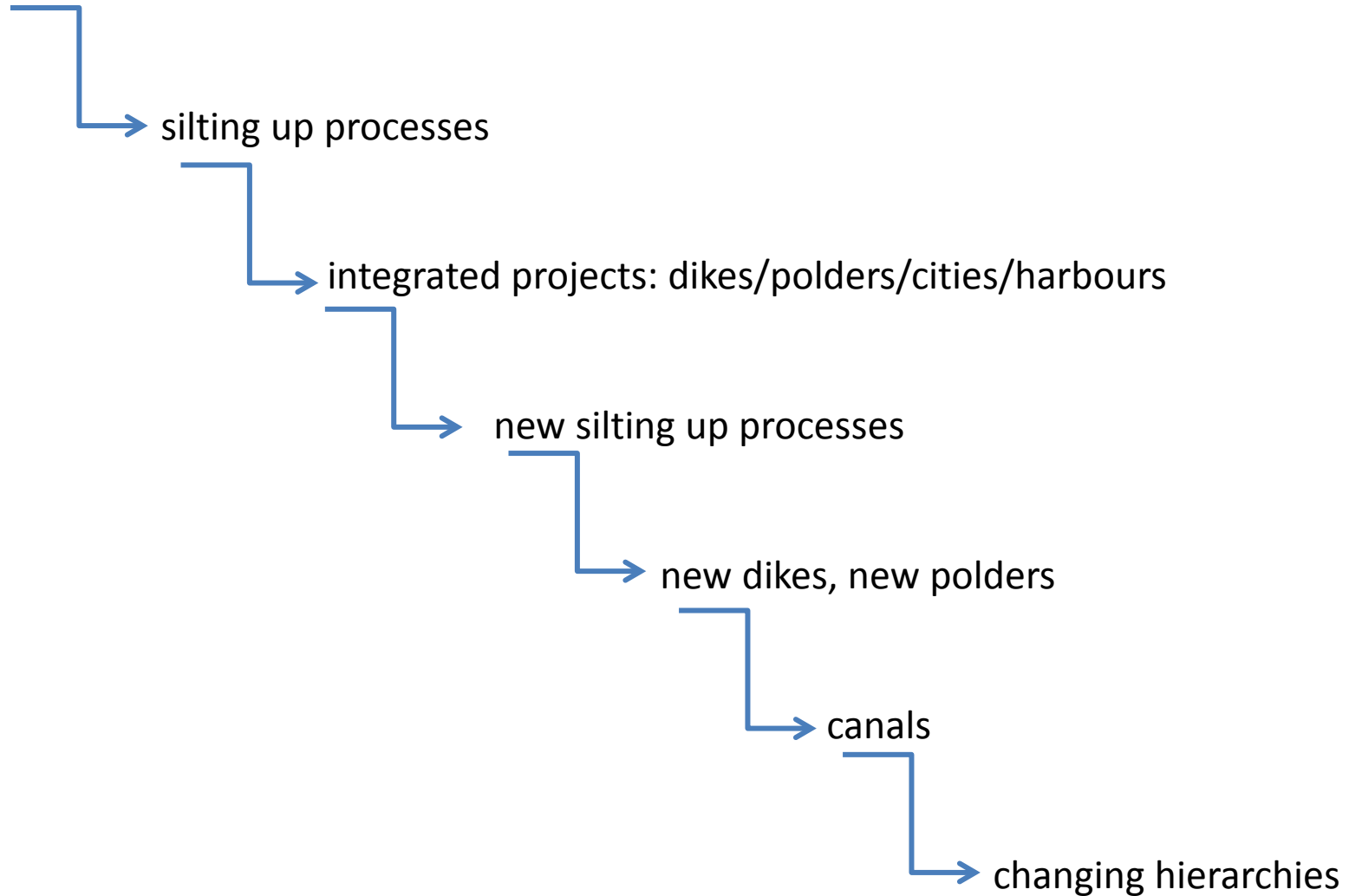


'silt-cities' & 'wear-cities'



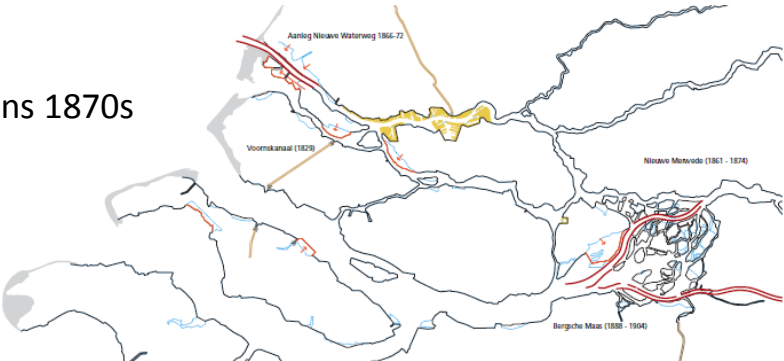
projects and unforeseen effects

Natural dynamics: currents, sedimentation



understanding the behaviour of the system

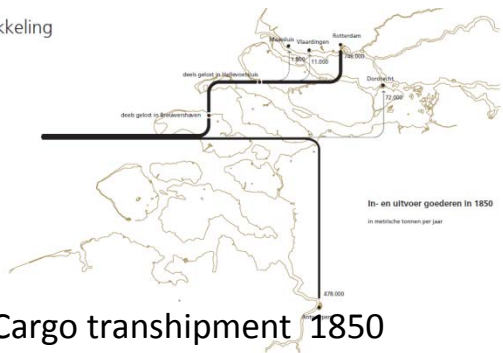
New canalizations 1870s



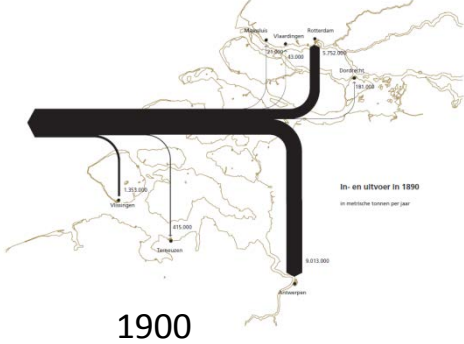
© IPDD MUST Stedebouw

Havenontwikkeling

Havenontwikkeling
(i.B. Broese van Groenou, MUST
Stedebouw)



Cargo transshipment 1850



1900



Urban patterns 1850



1900

DE STORMVLOED

van 1 Februari 1953



- Zeekering
- Dijkdoorbraak
- Binnendijk, die stand hield
- Ondergelopen land
- Drassig land
- Stad, die gedeeltelijk overvoerd geweest is
- ↑ 1-10 doden
- ↑ 10 doden
- + Vliegveld, vanwaar hulpverlening door de lucht plaats vond
- * Geheel of gedeeltelijk geëvacueerde gemeente
- Hoek van Holland
- Weg
- Autover
- Boordienst met autover
- Spoorweg
- Tramweg
- Vuortoren
- Provinciegrens
- Rijksgrens
- Duinen

Schaal 1:250.000



projects and unforeseen effects

River canalizations

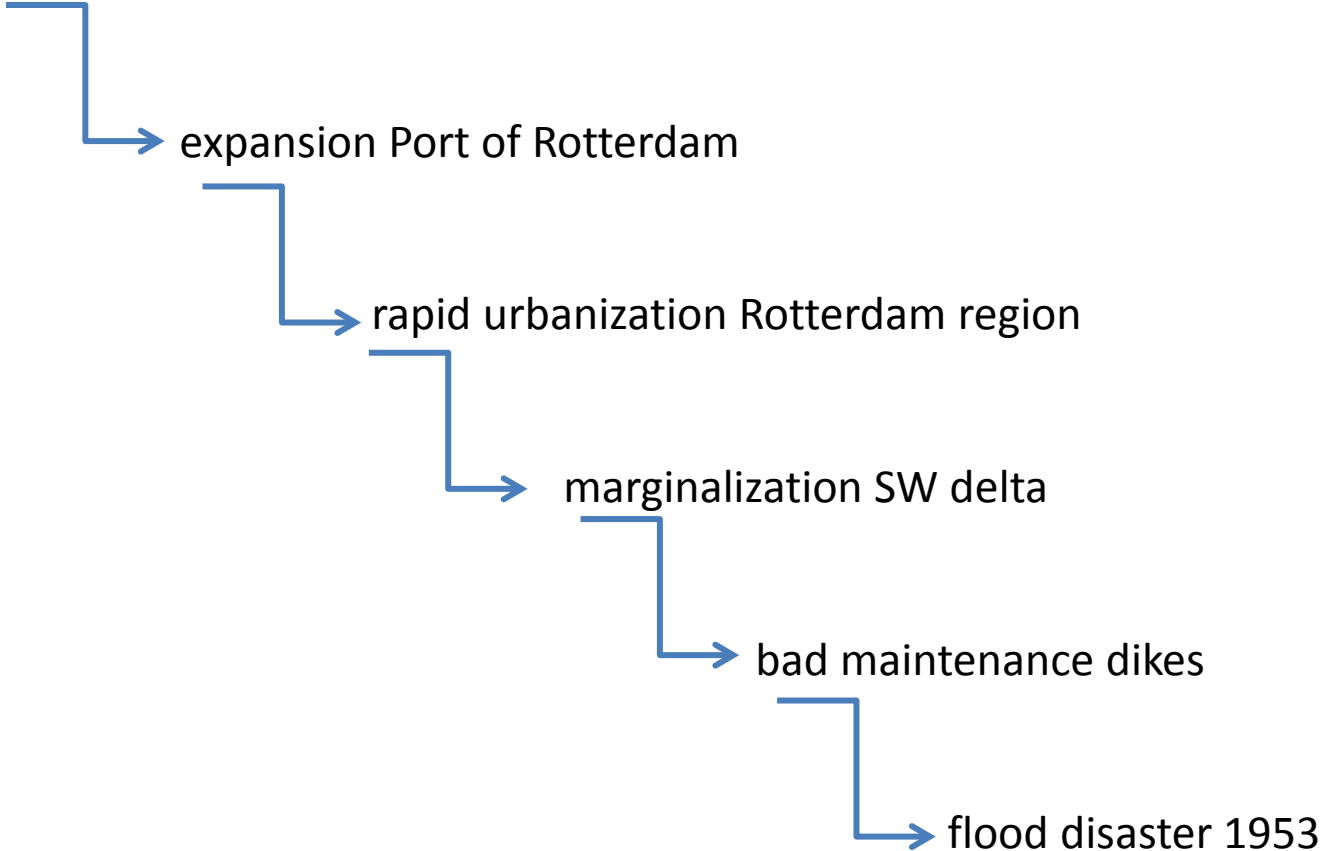
expansion Port of Rotterdam

rapid urbanization Rotterdam region

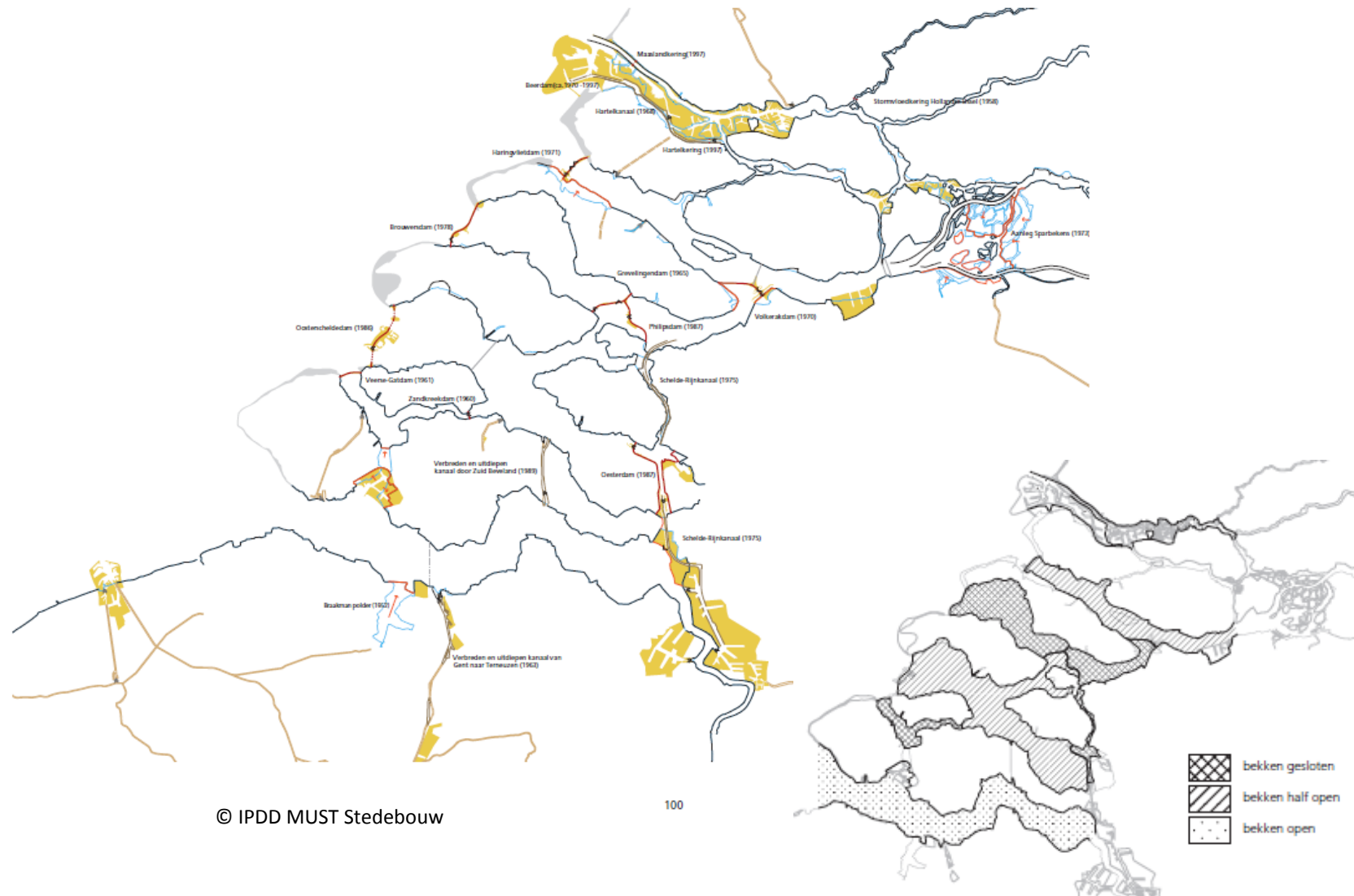
marginalization SW delta

bad maintenance dikes

flood disaster 1953



Closing the estuaries 1960s - 1980s: Delta works



Damming the delta

'Delta-works': Damming the Rhine-Meuse Delta (1950's – 1980's)



The Netherlands as a *Modern Project*

Drain, dredge, reclaim

Dredge Drain Reclaim

THE ART OF A NATION

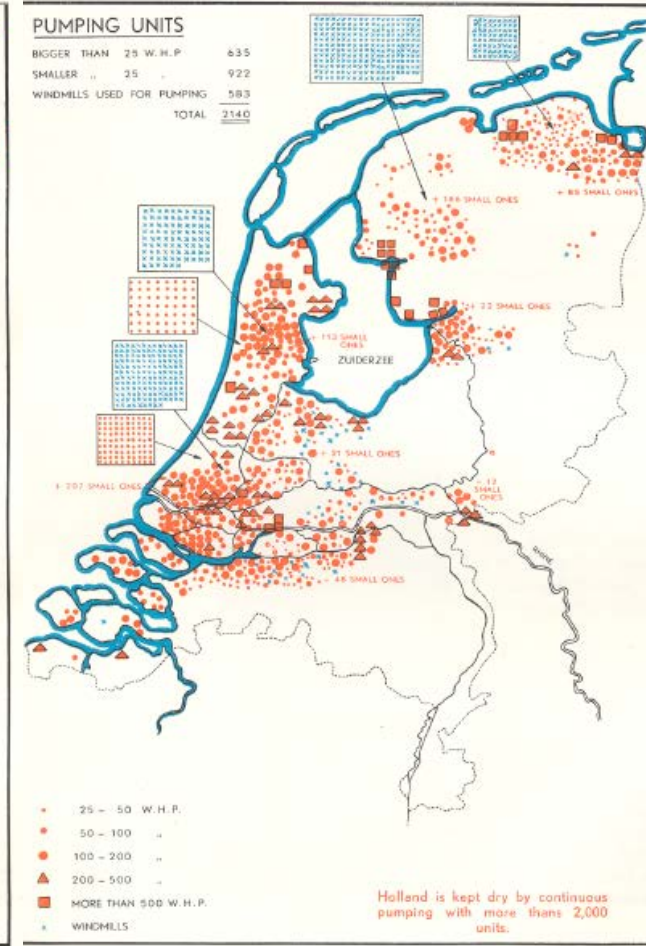
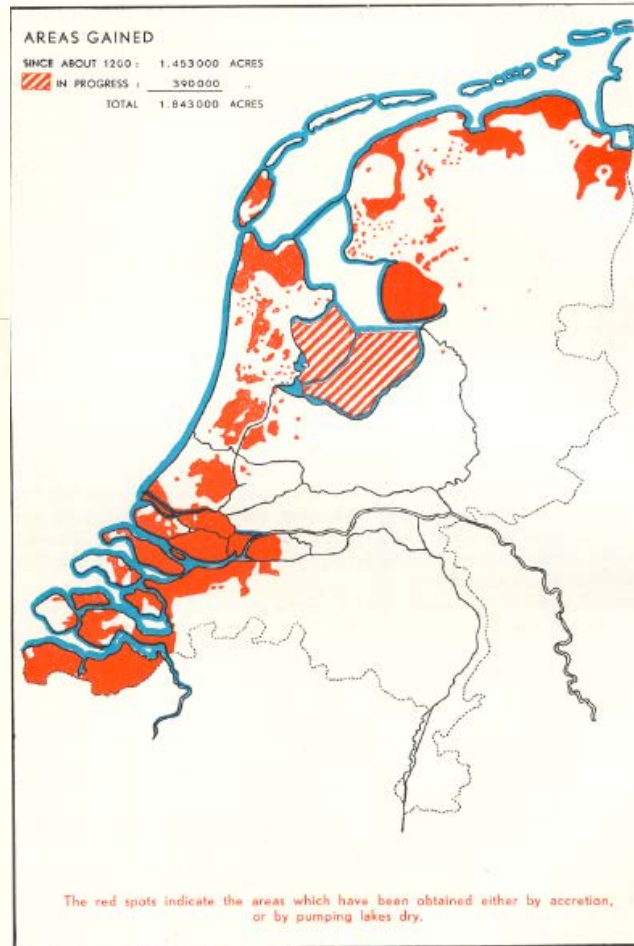
BY

DR JOH. VAN VEEN
CHIEF ENGINEER RIJKSWATERSTAAT

Special edition on behalf of
R. S. Stokvis & Zonen N.V.
Rotterdam - Netherlands



THE HAGUE
MARTINUS NIJHOFF
1950



The Netherlands as a *Modern Project*

Making new land = making new society

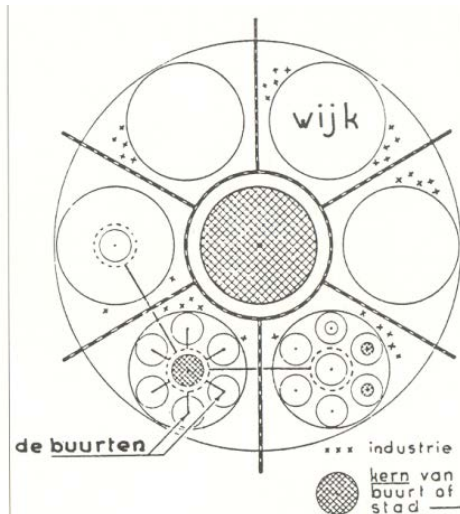
attempts to synchronize different domains



Increasing productivity agriculture



Industrialization

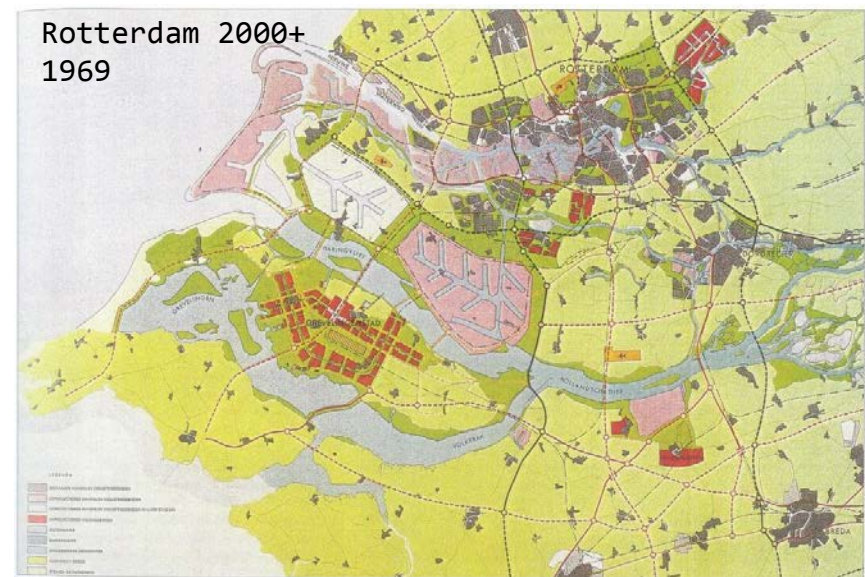
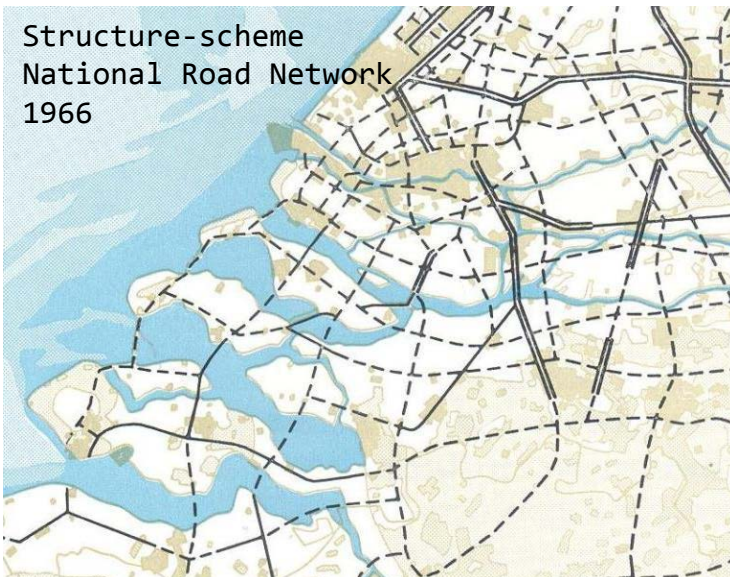
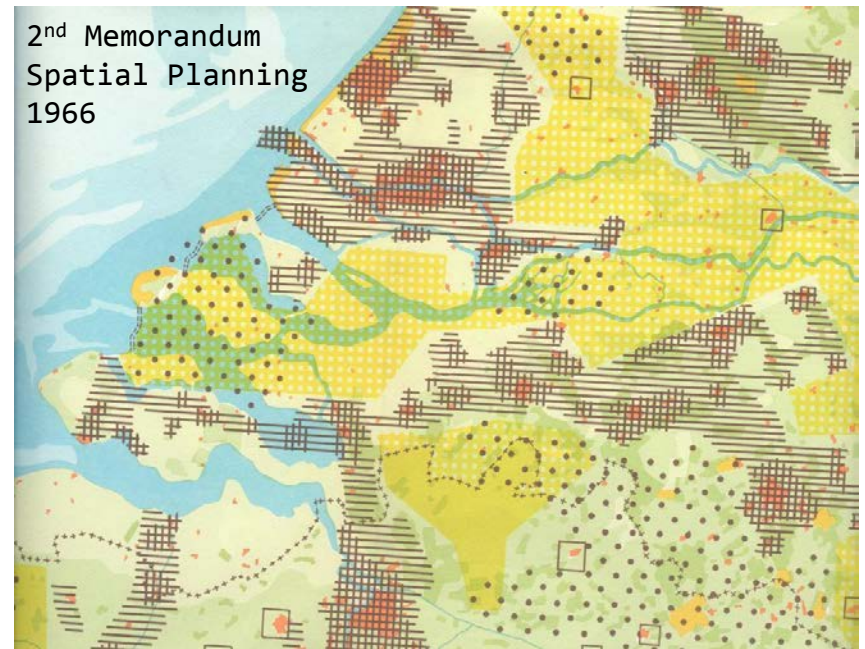


Creating social and spatial cohesion



Restrain the power of nature

1960 - 1980 - attempts to synchronize different domains



However . . .



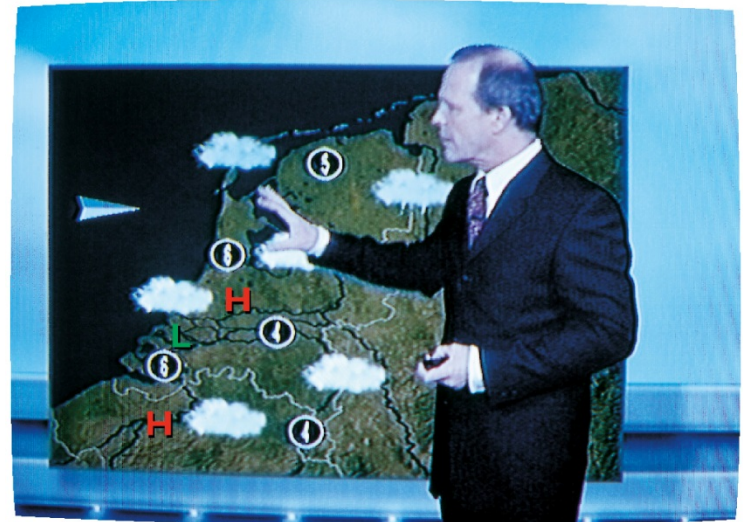
Coastal erosion



land-subsidence; increasing rainstorm-floods

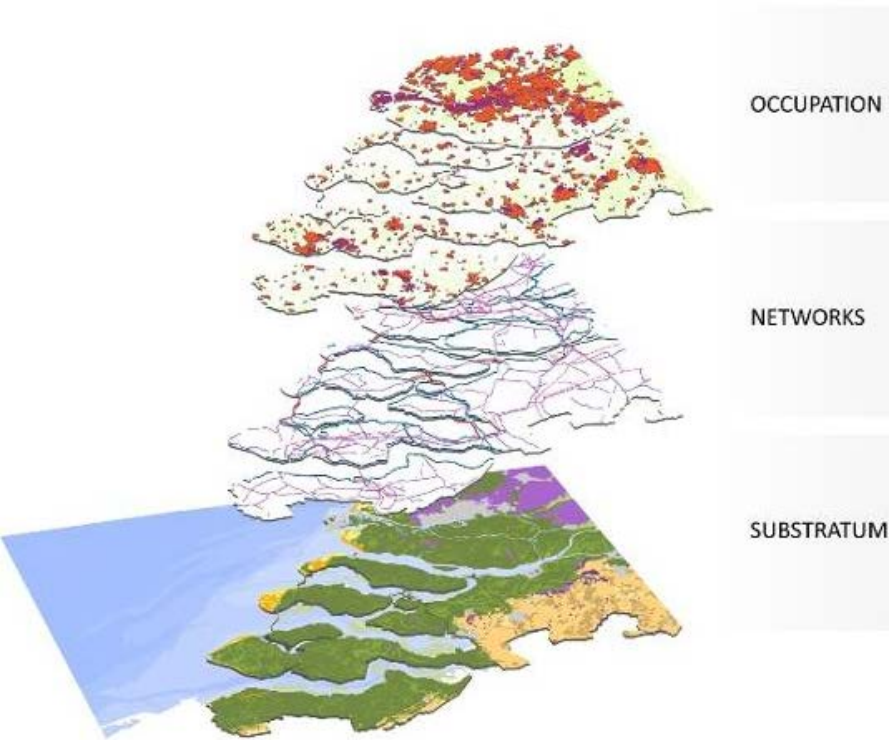


Environmental decay



Climate change

The delta as a layered system; working with water



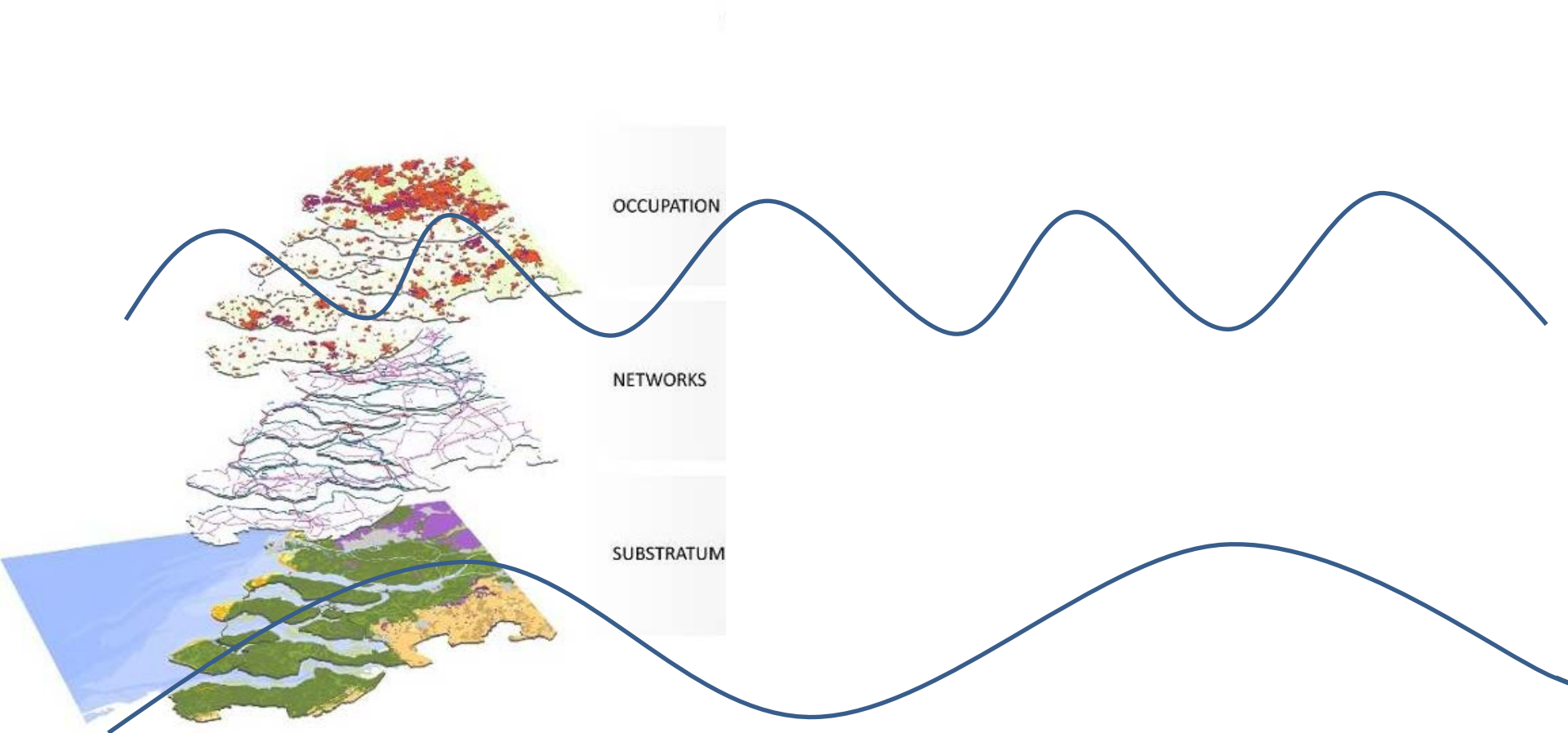
Working together with water

A living land builds for its future

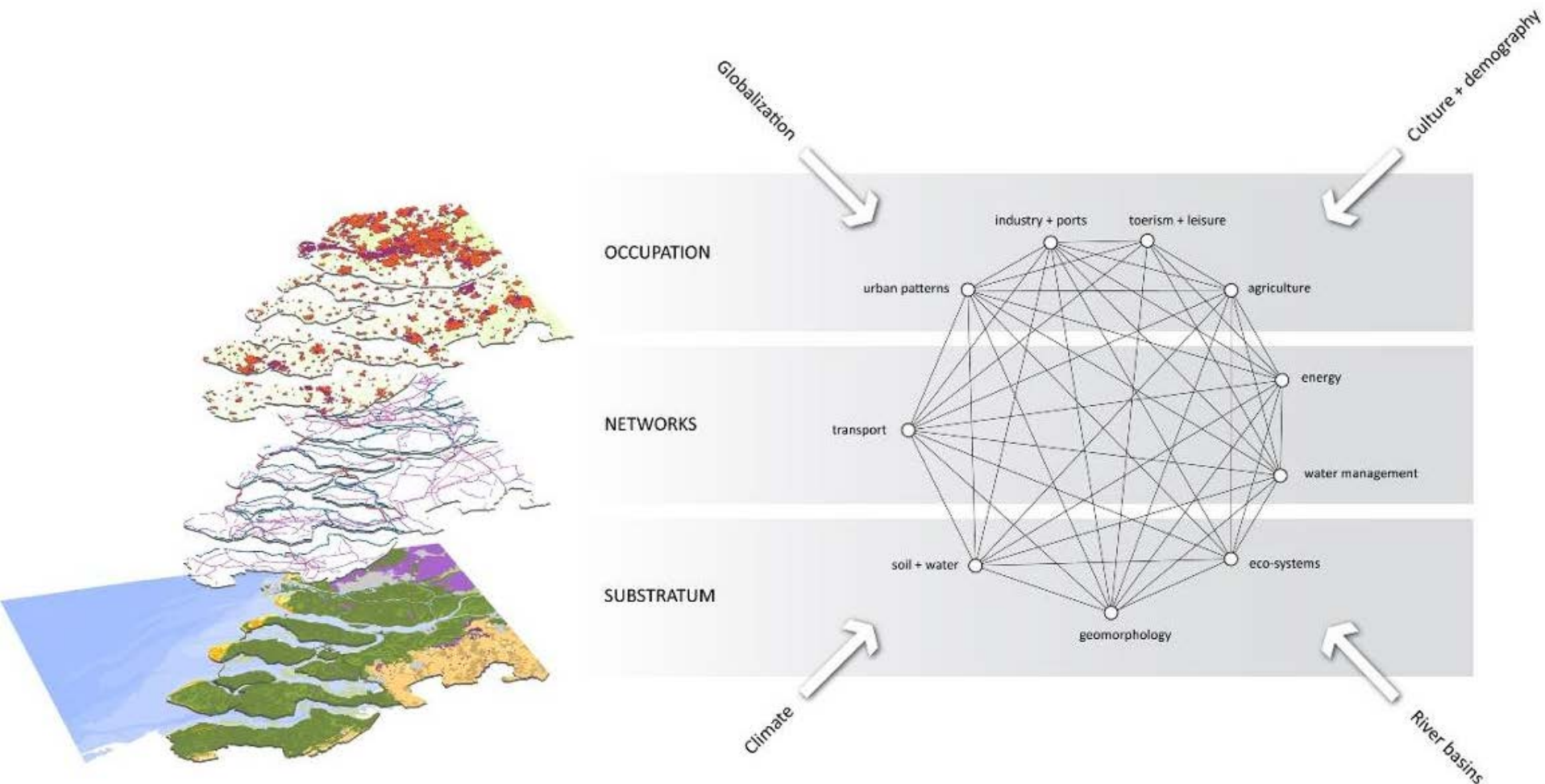
Findings of the Deltacommissie 2008



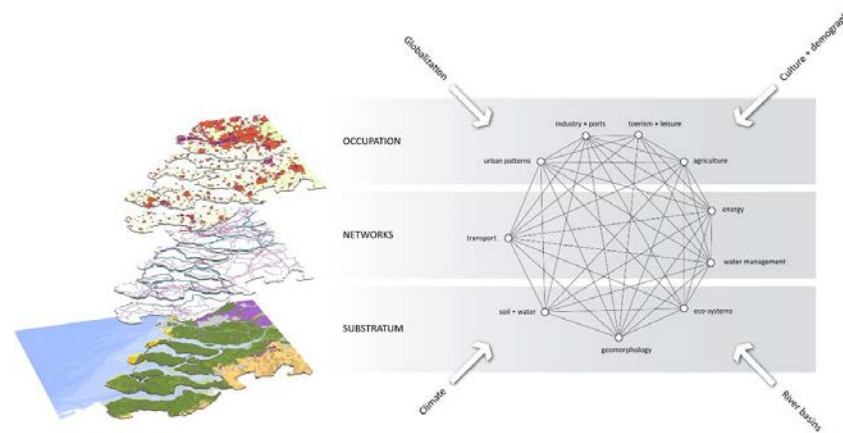
The delta as a layered system; different rhythms of the layers



The delta - a *Complex Adaptive System*



The delta - a *Complex Adaptive System*



2013

Retrospective

Prospective

What is the **behaviour** of the system

how can we **accommodate the behaviour** of the system

Rhythms of the delta

50 AD

Land & Water

1750



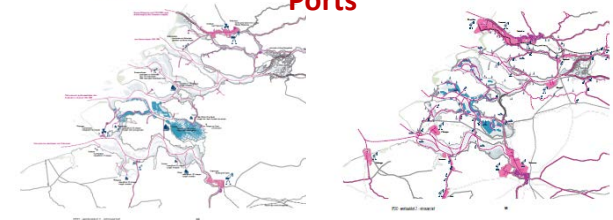
1300

Dikes and polders

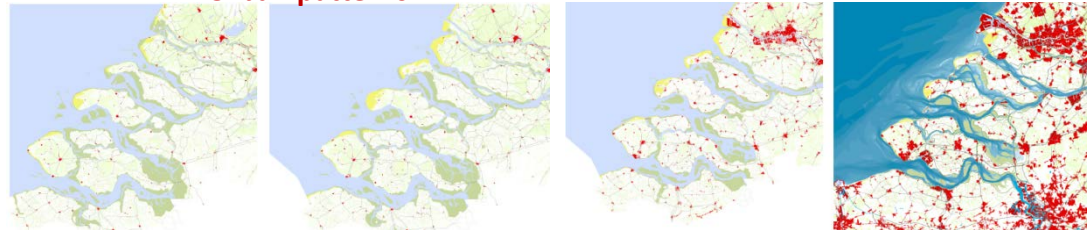
1900



Ports



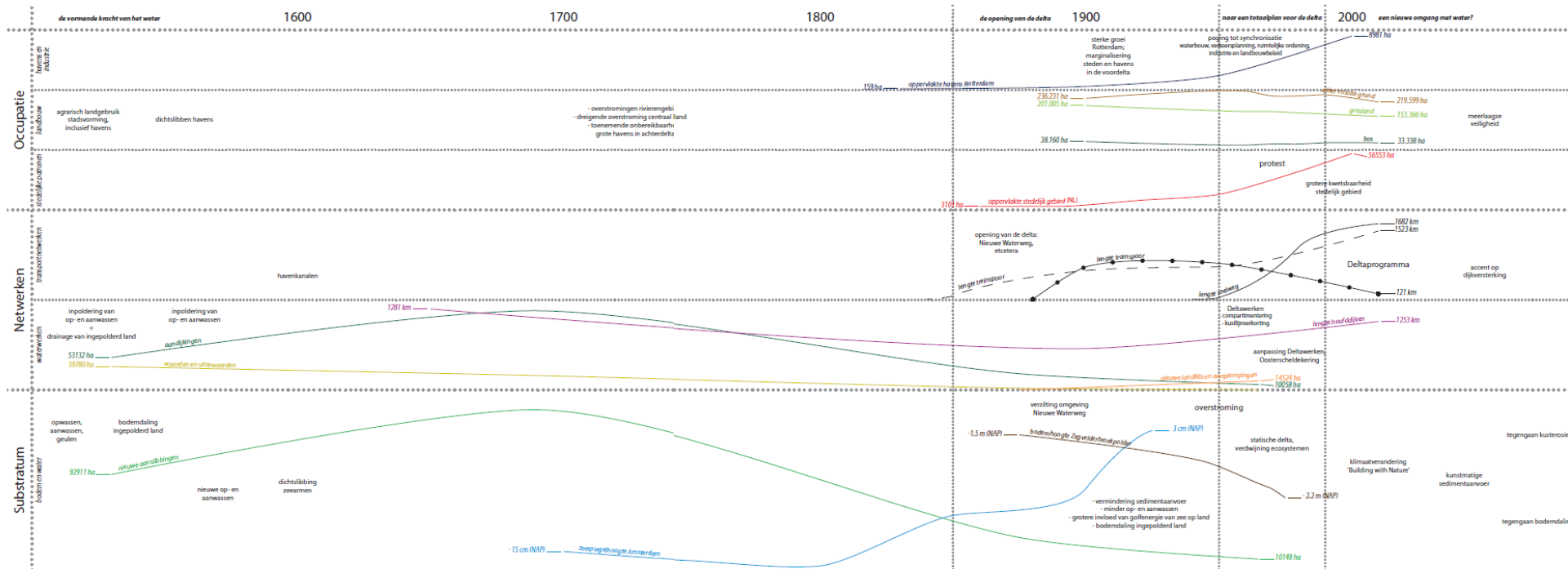
Urban patterns



Agriculture



Rhythms of the delta



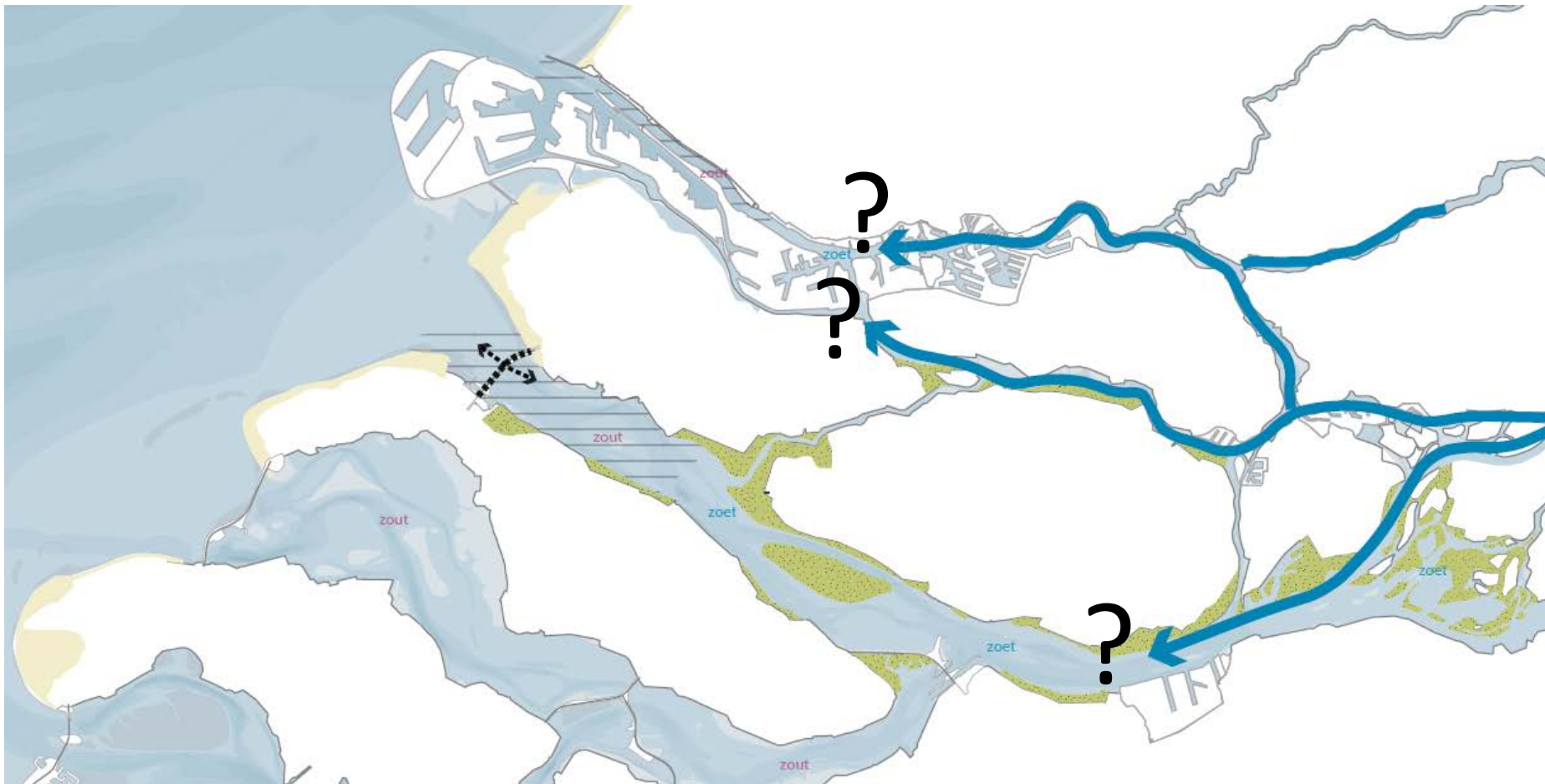
Tijdelijk deelsystemen

Ontwikkelingen van de deelsystemen door de tijd heen

(R. Duinker, MUST / WUR, H. Meyer, TU Delft)

Design & Science: Forecasting the behaviour of the system

Prospective



Future discharges ? 12,000 m³/sec ?
16.000 ?
>18.000 ?

Design & Science: Understanding the behaviour of the system

Current land-use claims



Local scale: many different initiatives

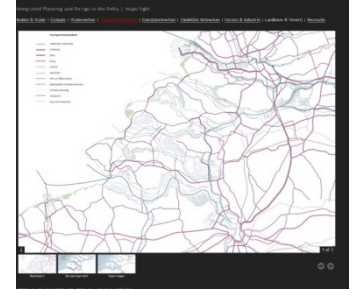
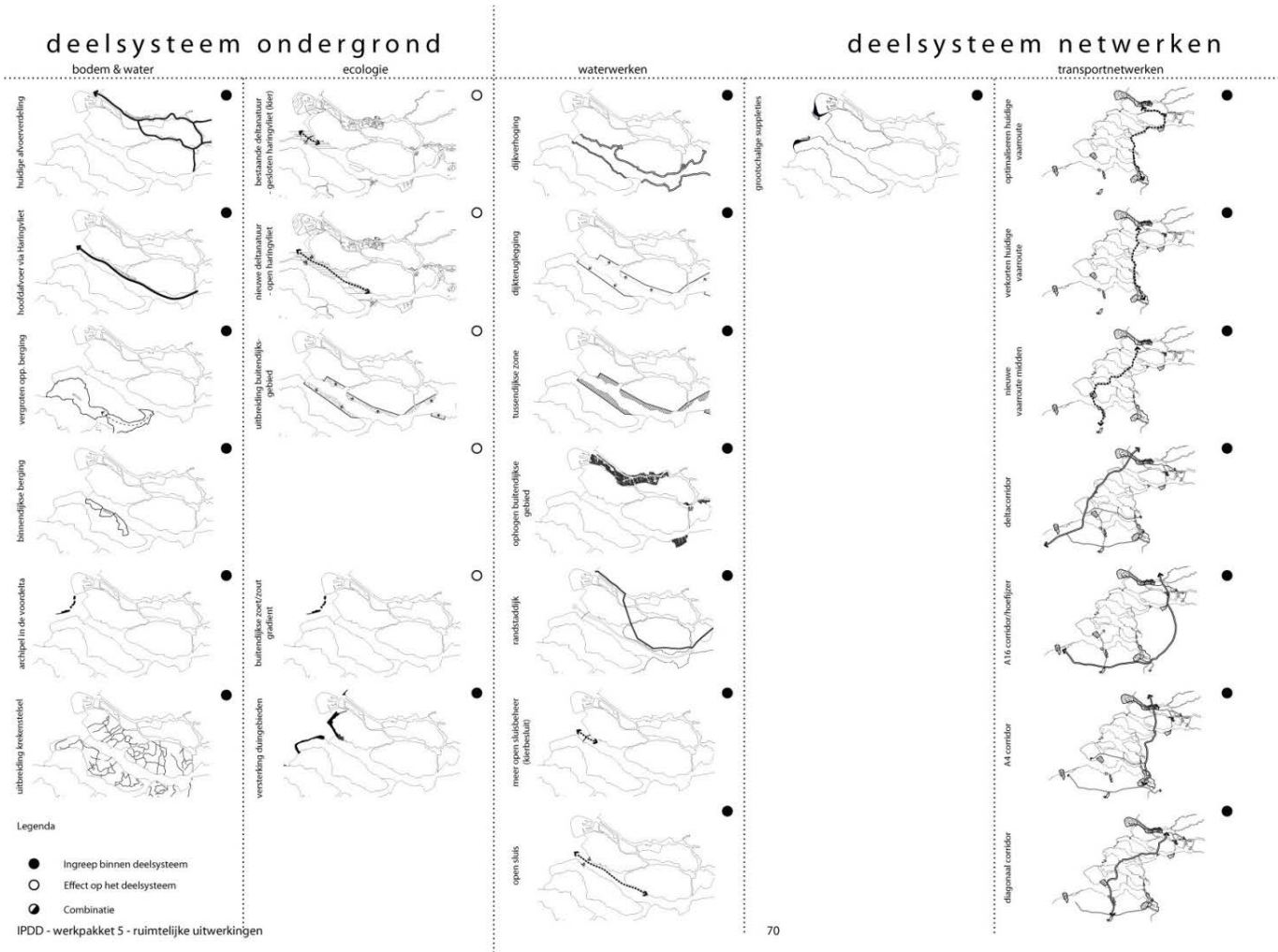
Design & Science: Understanding the complexity of the system

How to combine small scale, short term initiatives with large scale, long term processes

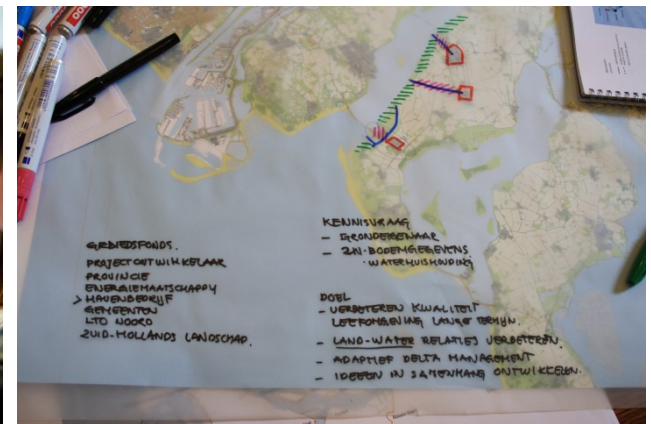
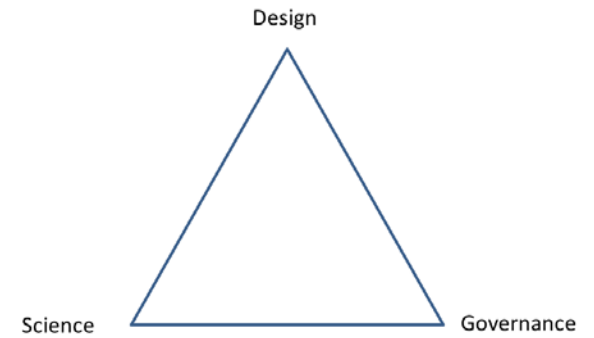


Delta Envisioning System (DENVIS)

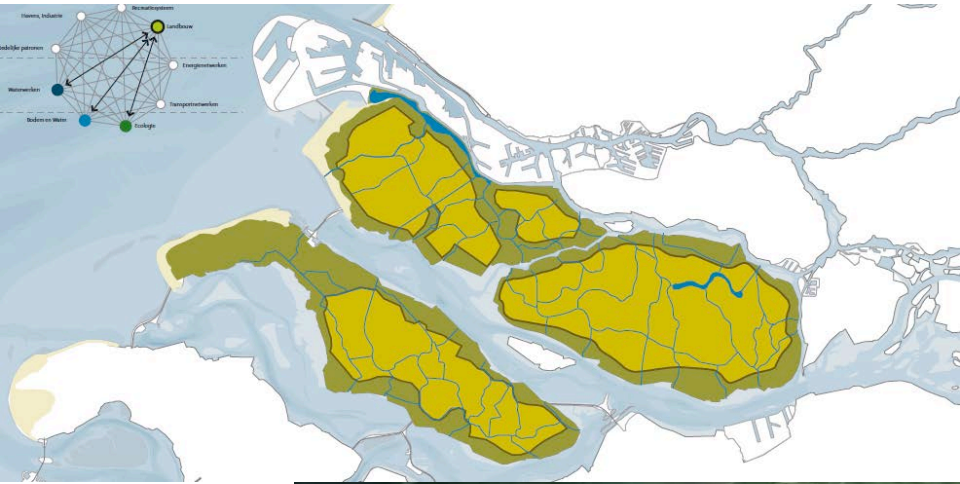
'I-MAPS'



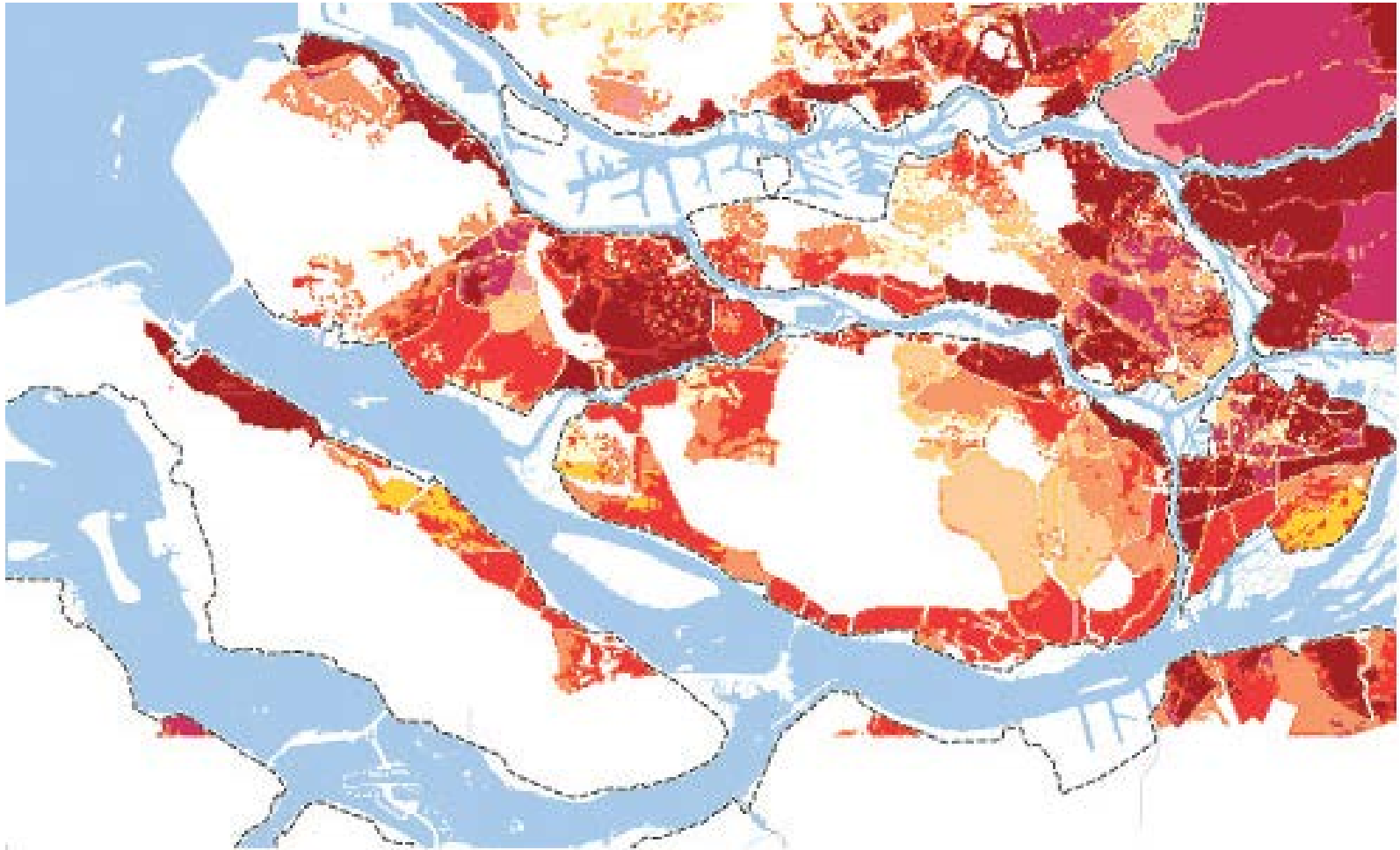
Delta Envisioning System (DEnviS)



'In-between dikes' zones

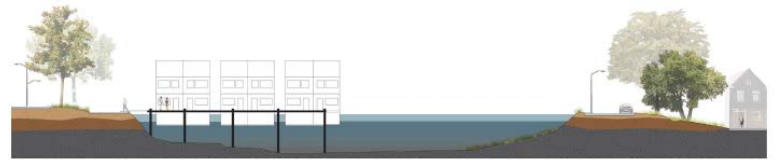


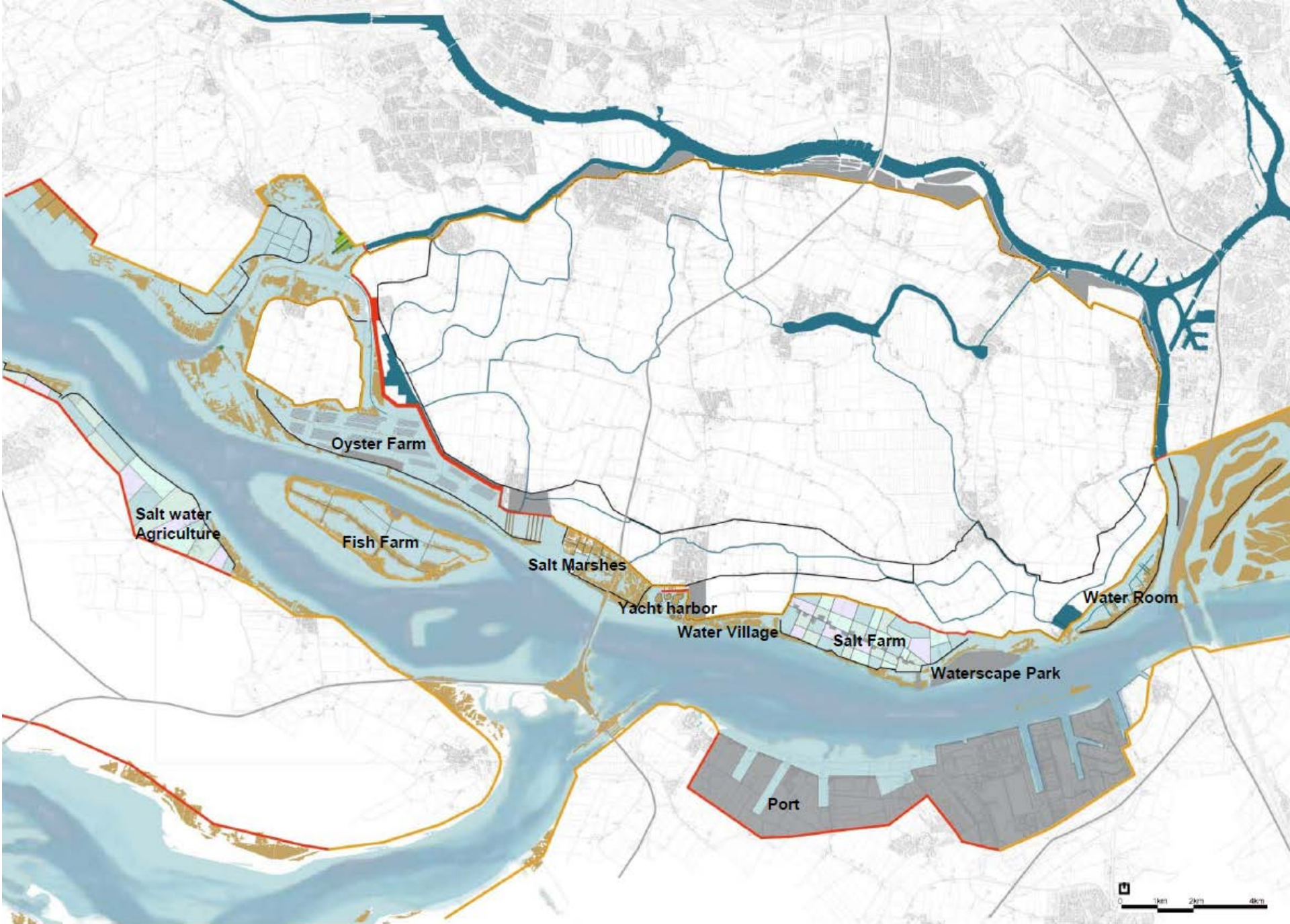
'In-between dikes' zones



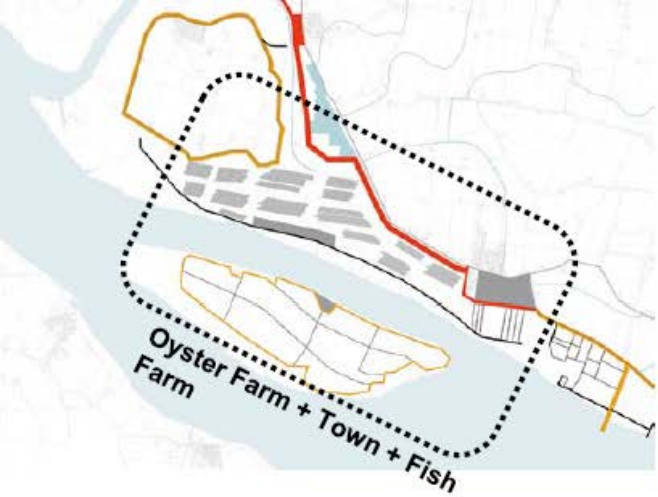
Delta program:
Speed and depth in case of flooding
(source DP Rijnmond-Drechtsteden)





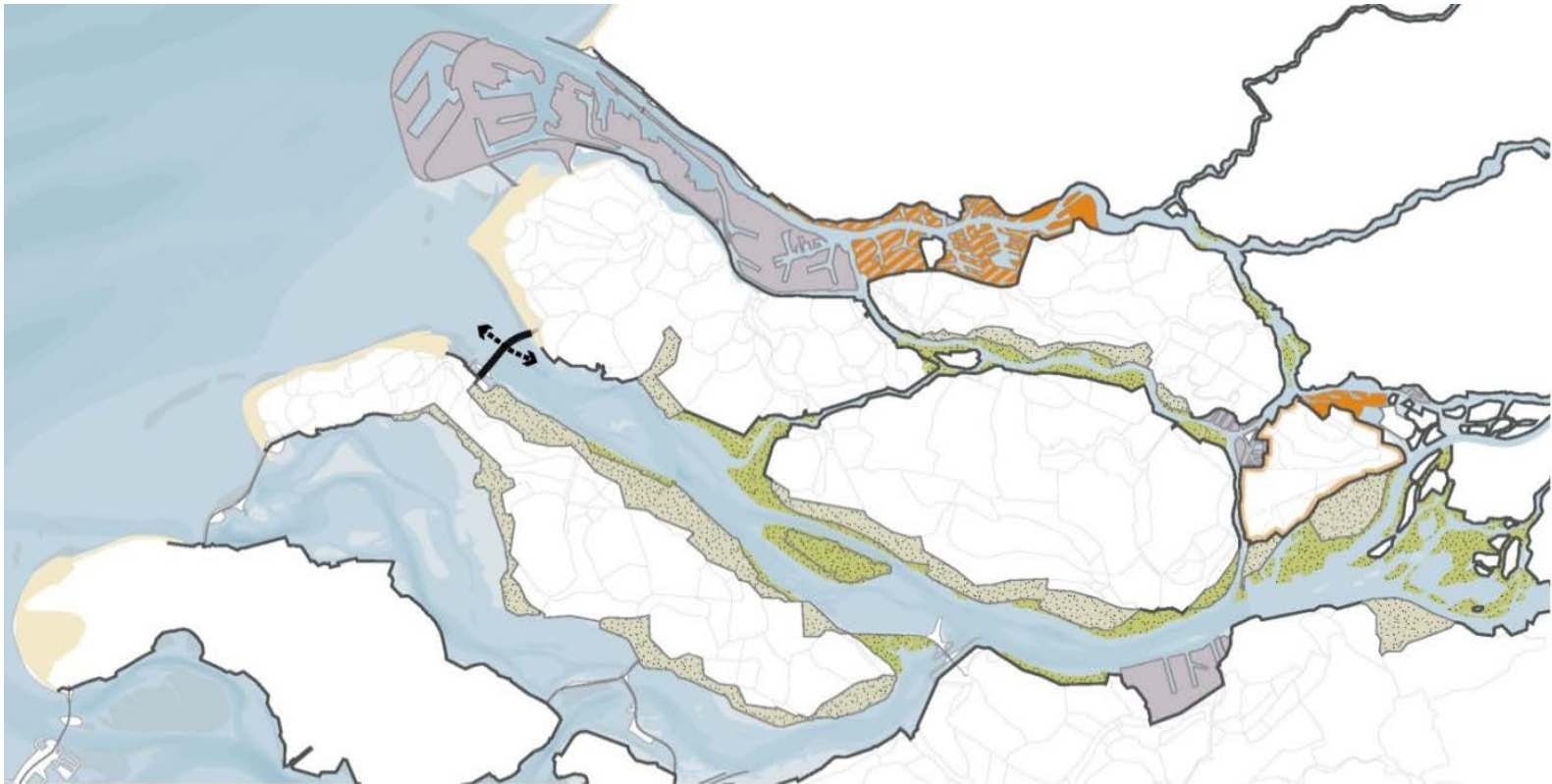


EMU project Joon Kim 2012



Preliminary result:

a 'Robust Adaptive Framework'



Towards a 'Community of Research & Practice'



Tweede Maasvlakte



Rivierfront Vlaardingen



Rotterdam Stadshavens



Stadswerven Dordrecht

Noordrand Goeree-Overflakkee



Meervoudige polders



Tiengemeten



Waterfront Numansdorp



Waterfront Moerdijk





Rhythms of the delta

Integration ...???

Comprehending ...???

It is about creating space for
combining different systems with
different rhythms

Integrated Planning and Design in the Delta (IPDD)



Planbureau voor de Leefomgeving



stedebouw
must



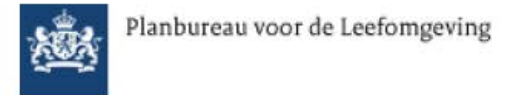
NWO

Nederlandse Organisatie voor Wetenschappelijk Onderzoek

Urban Regions in the Delta

NICOS
INSTITUTE

Integrated Planning and Design in the Delta (IPDD)



Deltaprogramma



Nederlandse Organisatie voor Wetenschappelijk Onderzoek

Urban Regions in the Delta

