

Graduation presentation

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22 June 2026

16.30-17.00

● Delft



● The Hague

● Delft



● The Hague

● Delft

● Vleuten



● Leiden

● Vleuten

● The Hague

● Delft



- Leiden
- Voorschoten
- The Hague
- Delft
- Vleuten



The Randstad

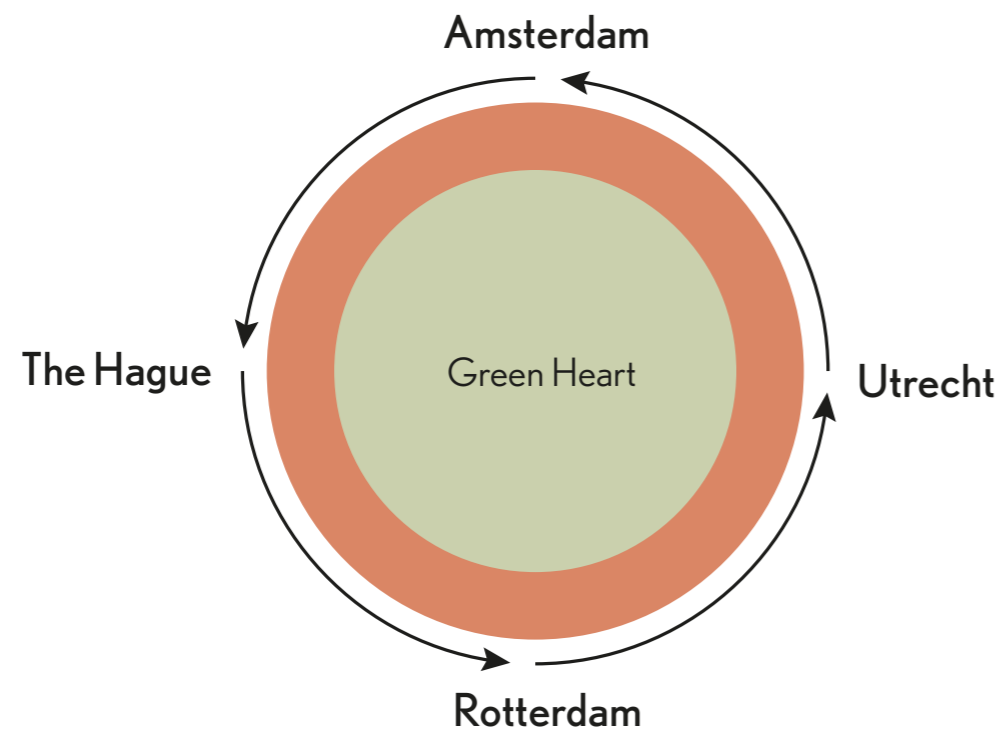
Randstad / Green Heart concept since 1930's

- Polycentric deltametropole with urban ring

- Amsterdam (*finance and culture*)
- Rotterdam (*leading port*)
- The Hague (*national government*)
- Utrecht (*national distribution*)

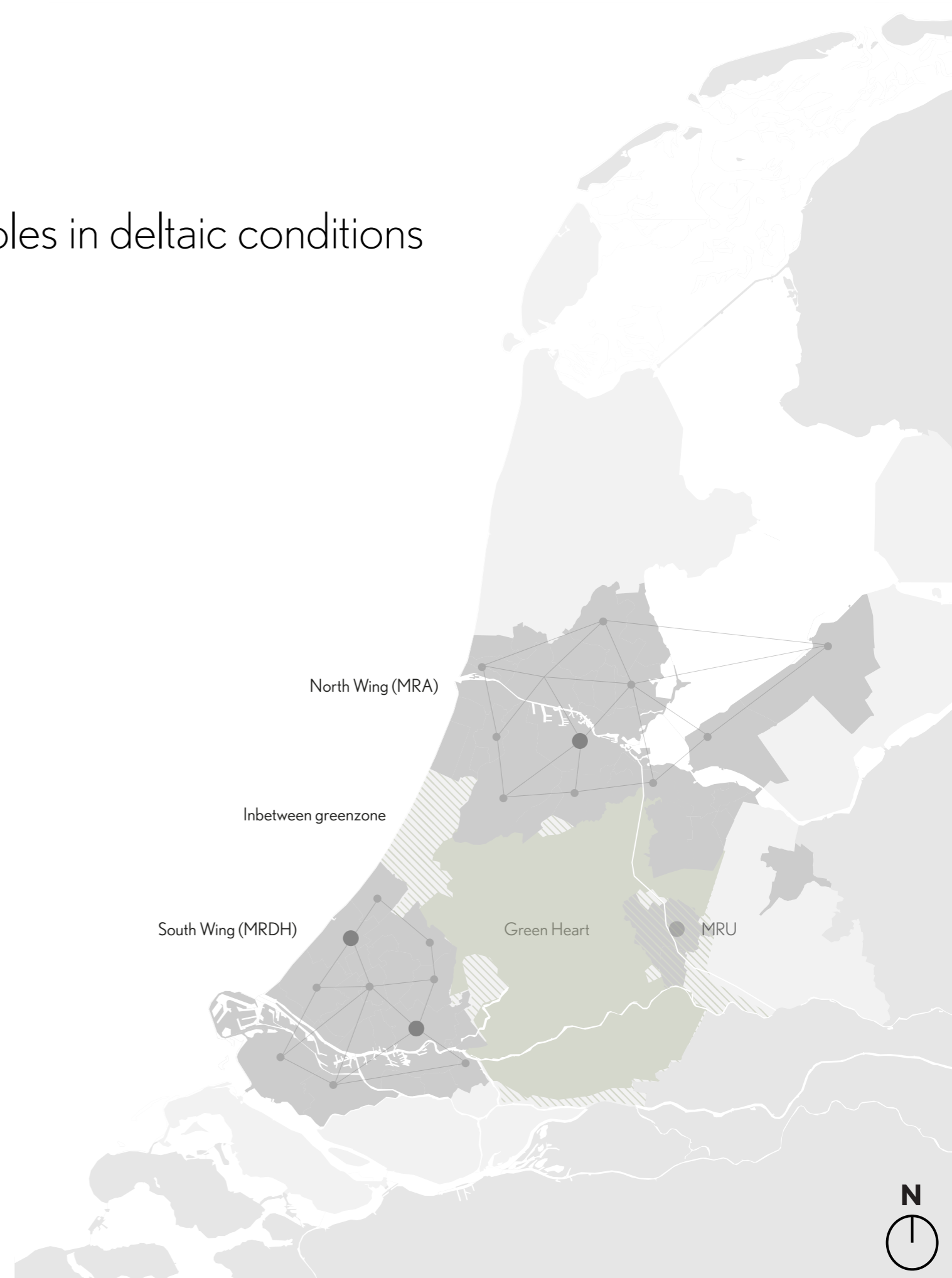
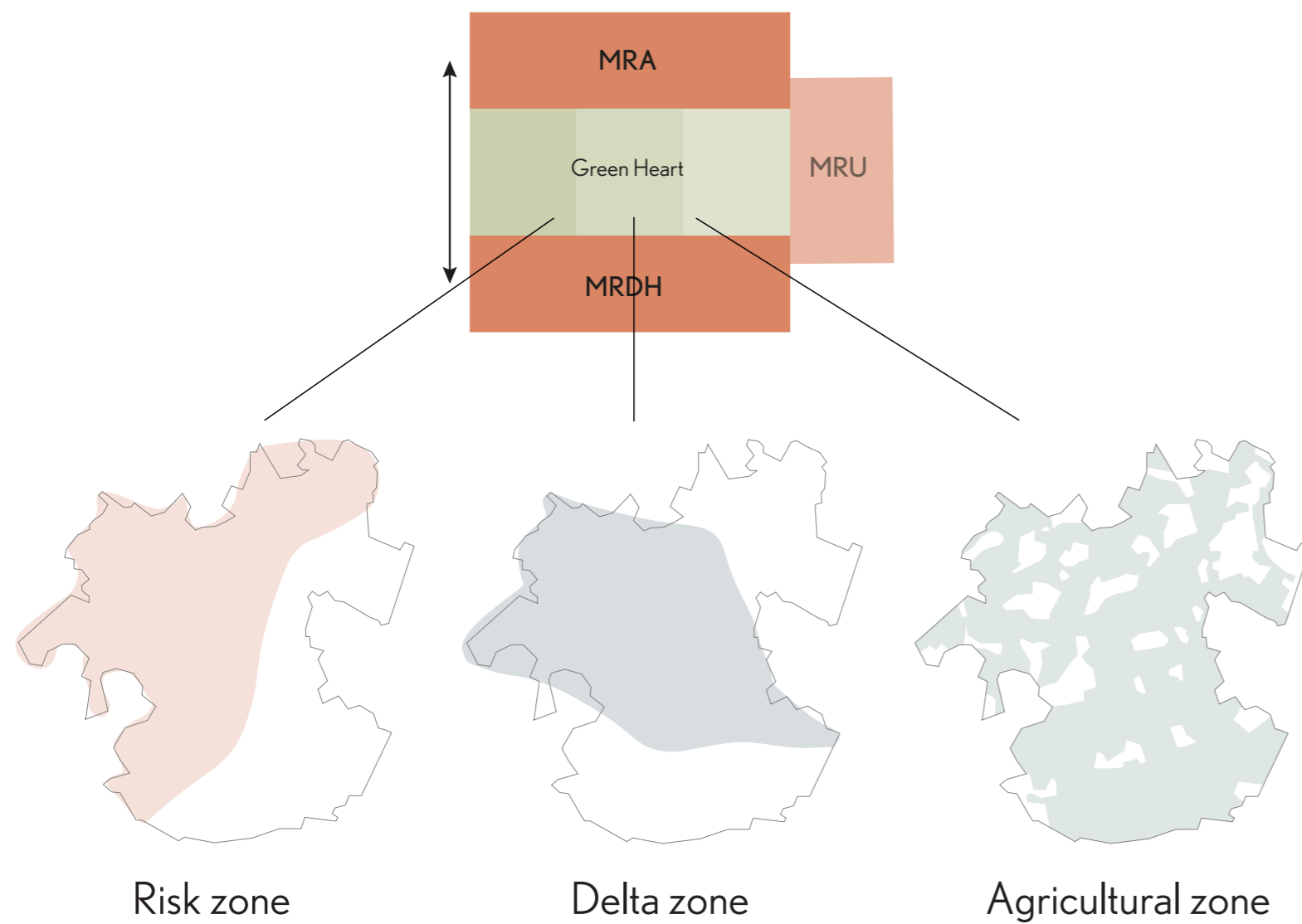
- Green Heart in between

- Open and green landscape.
- Functions: recreation, agriculture and preservation of nature



Actual Randstad / Green Heart model

- Actual model: layered Wing system with 2 metropolises in deltaic conditions
- (Car) infrastructure directs spatial configuration



PROBLEMISATION

METHODOLOGY

RE-ENVISIONING

VISION 2100

CONCLUSION

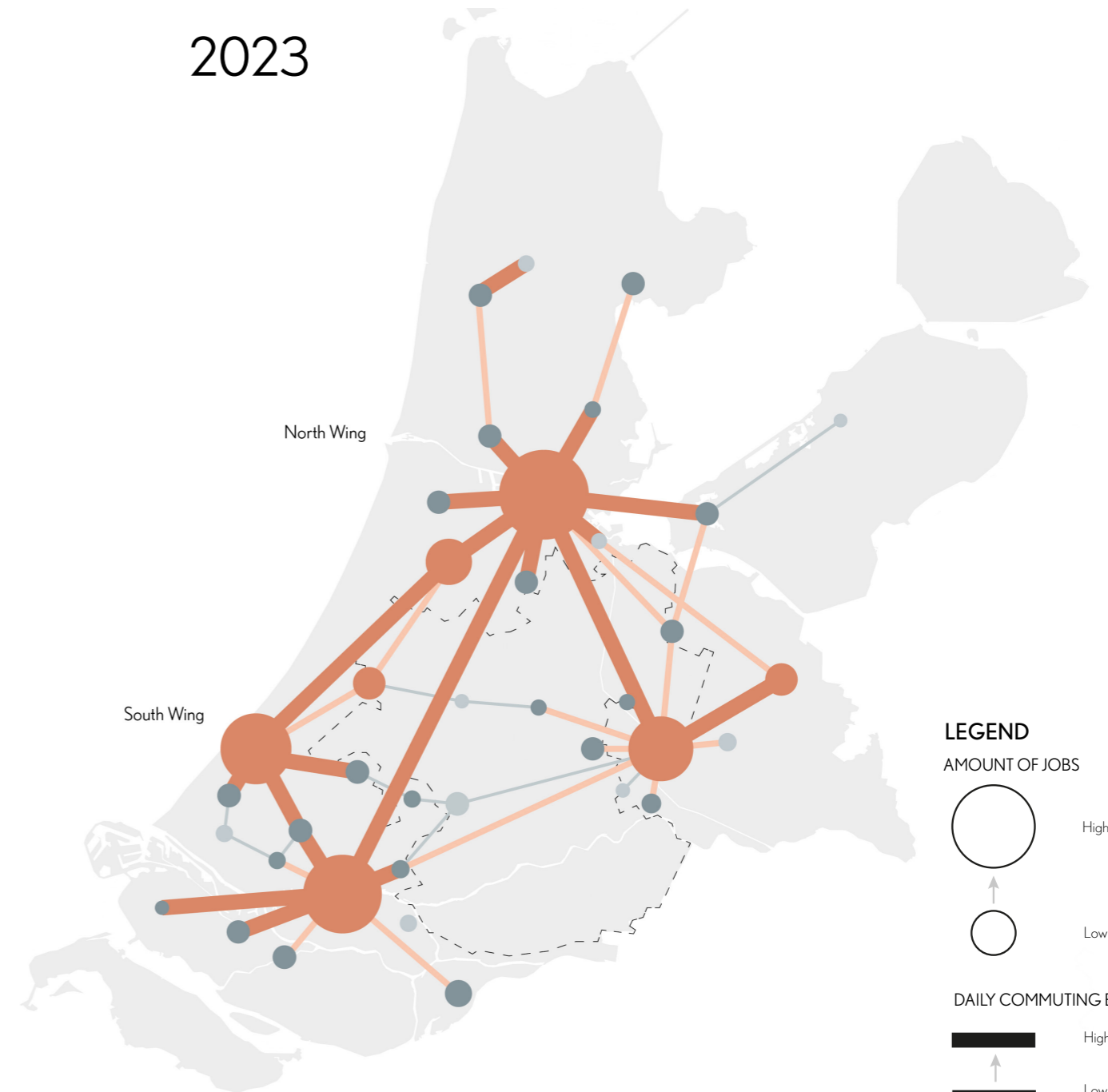
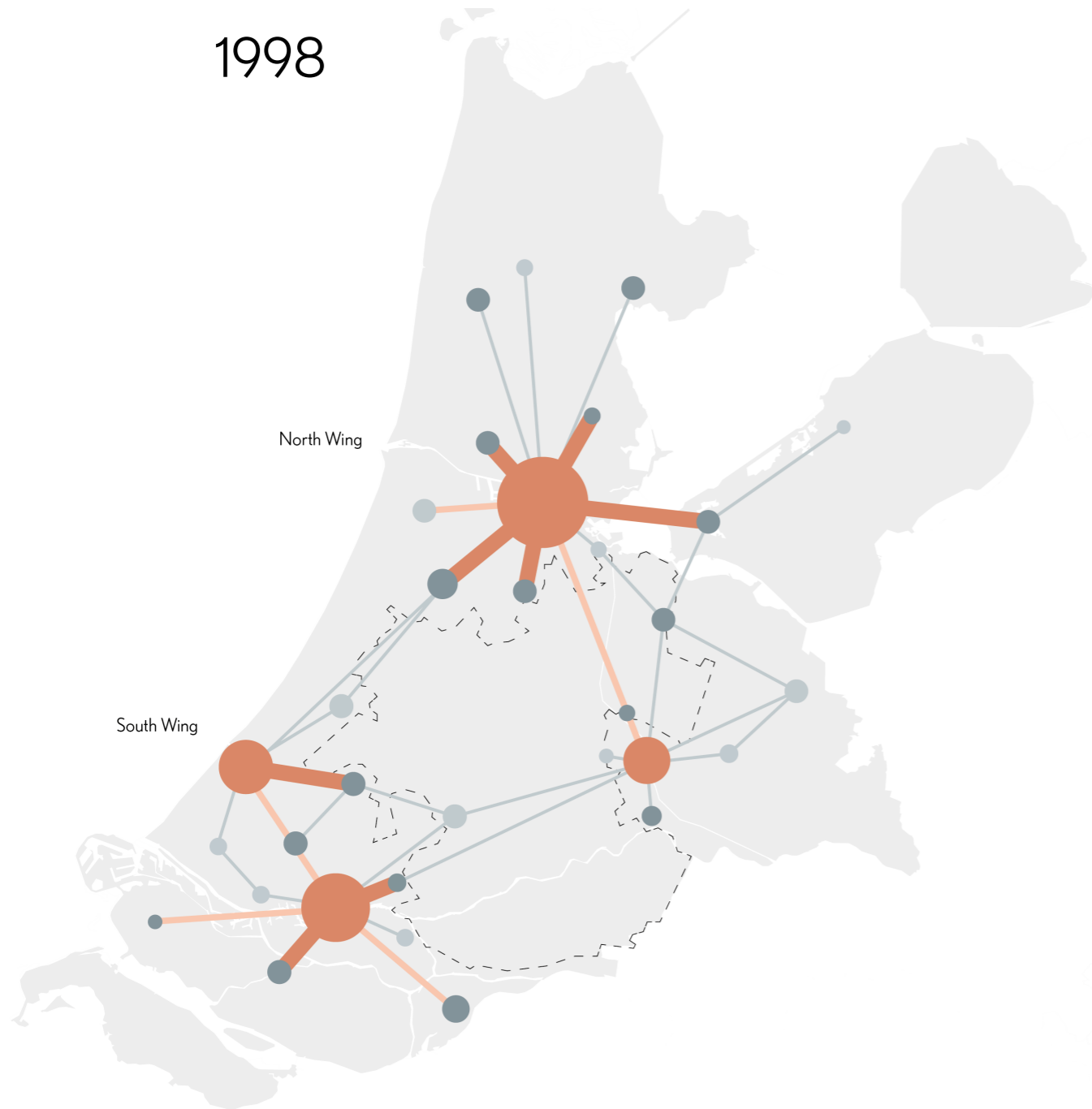
Commuting relations between cities

"Initial concept"

"actual model"

1998

2023



LEGEND

AMOUNT OF JOBS



DAILY COMMUTING BETWEEN NODES



● PROBLEMISATION

● METHODOLOGY

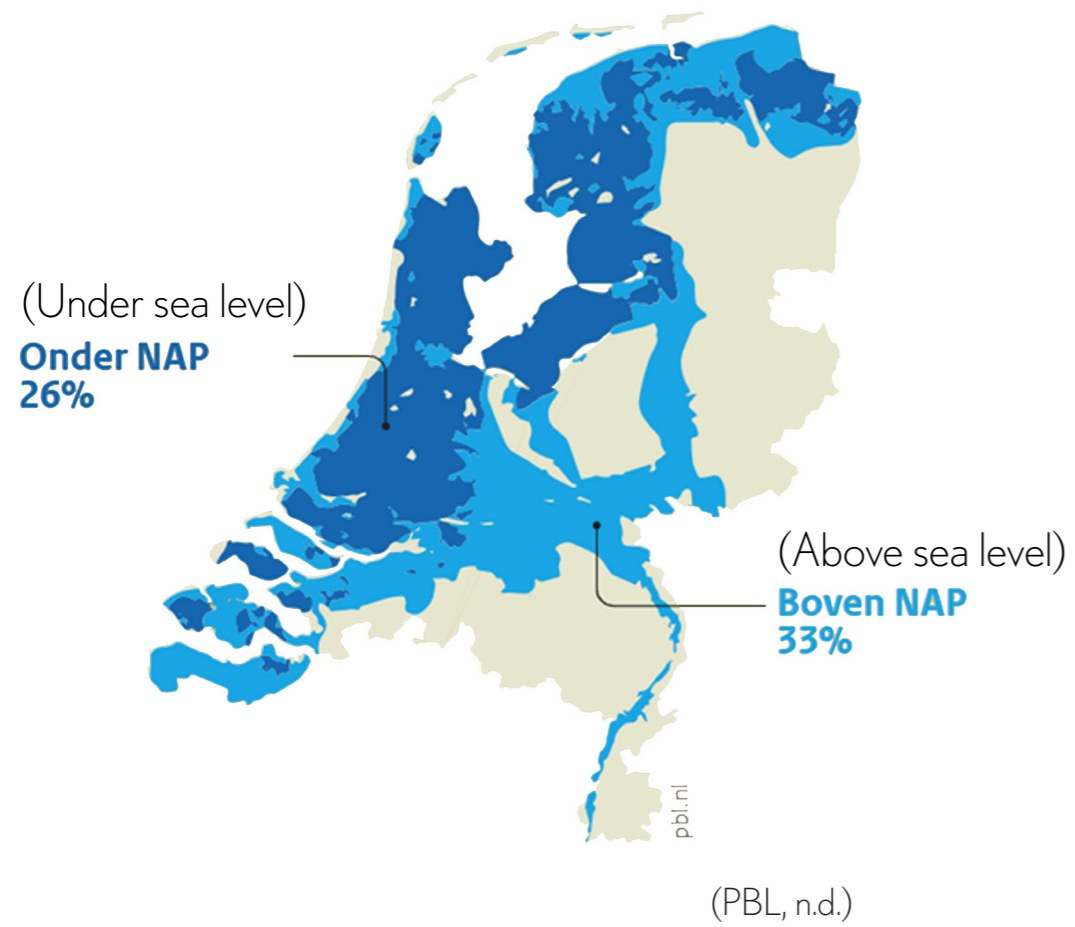
● RE-ENVISIONING

● VISION 2100

● CONCLUSION

Governance mismatch

Risk Management



●
PROBLEMISATION

●
METHODOLOGY

●
RE-ENVISIONING

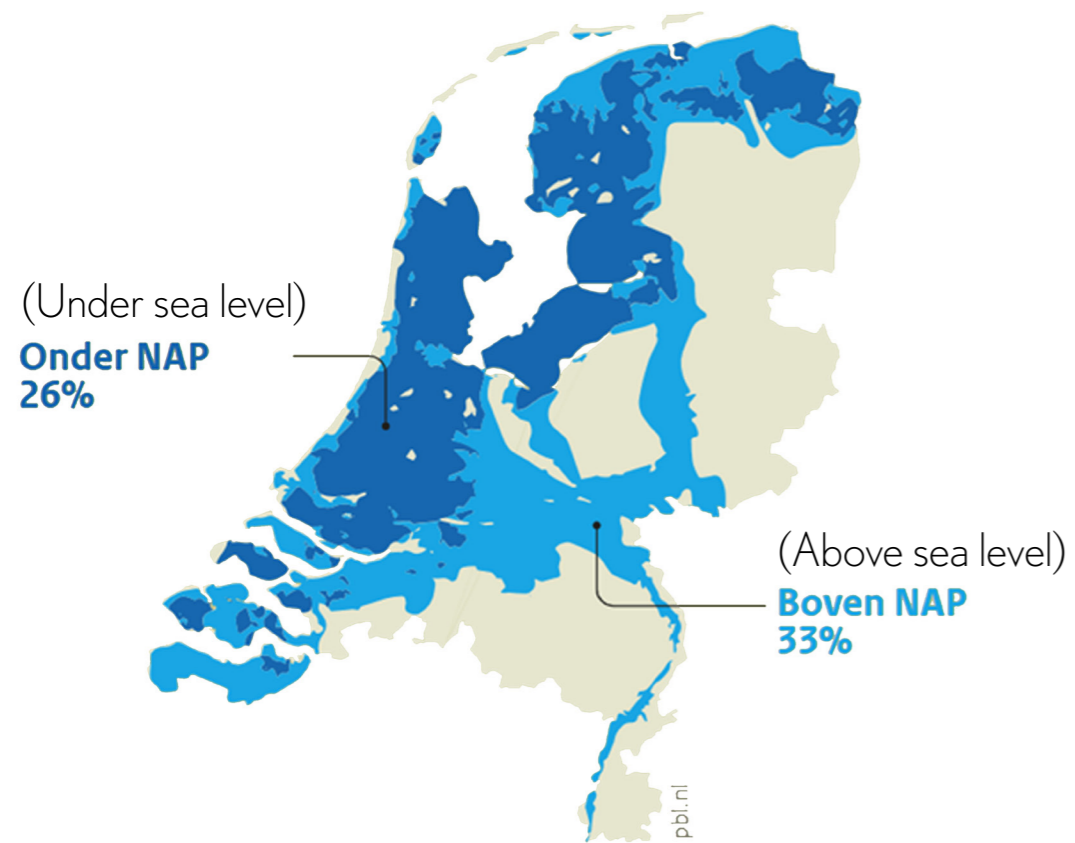
●
VISION 2100

●
CONCLUSION

Governance mismatch

Risk Management

+ Actual Randstad Model
is unrecognised in decision-making



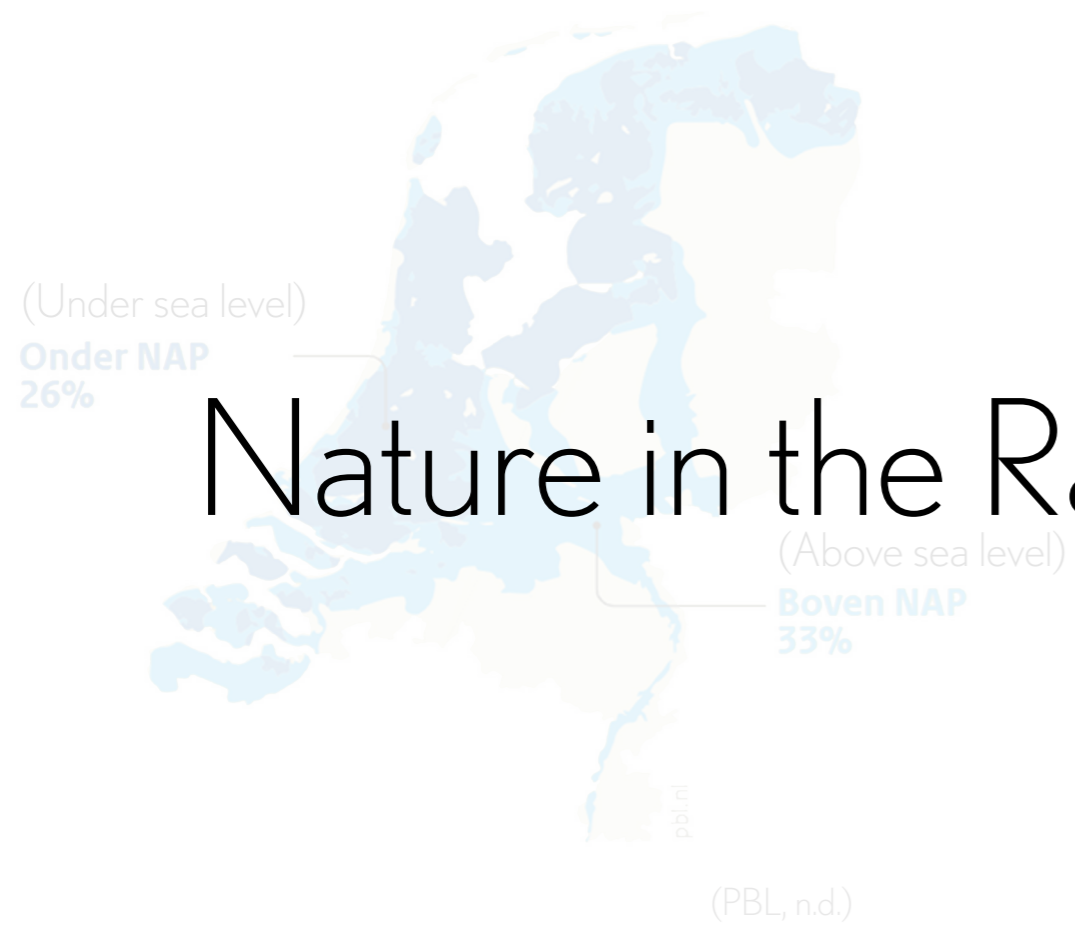
(PBL, n.d.)



Governance mismatch

Risk Management

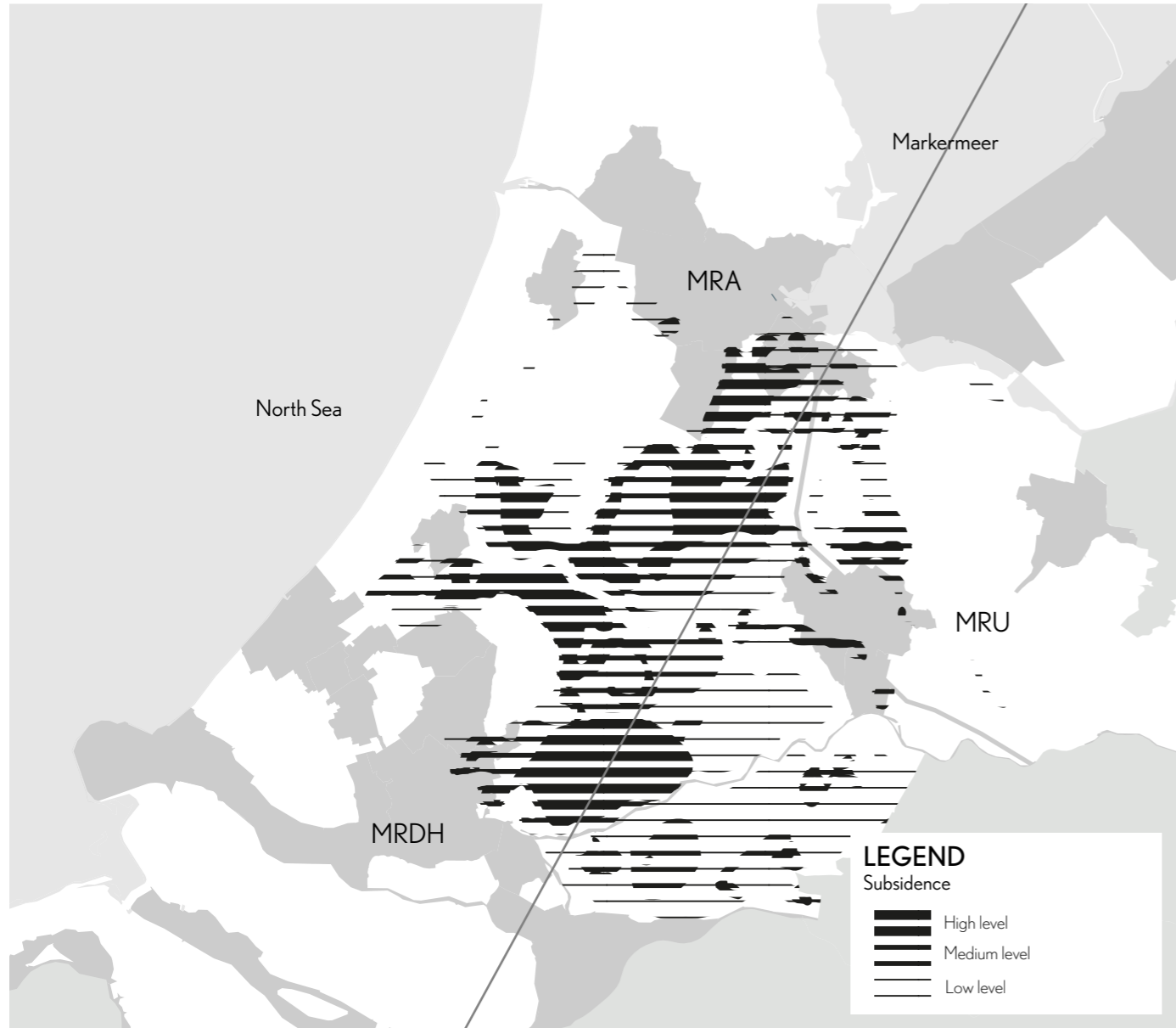
+ Actual Randstad Model
is unrecognised in decision-making




Nature in the Randstad has started to *decay*...

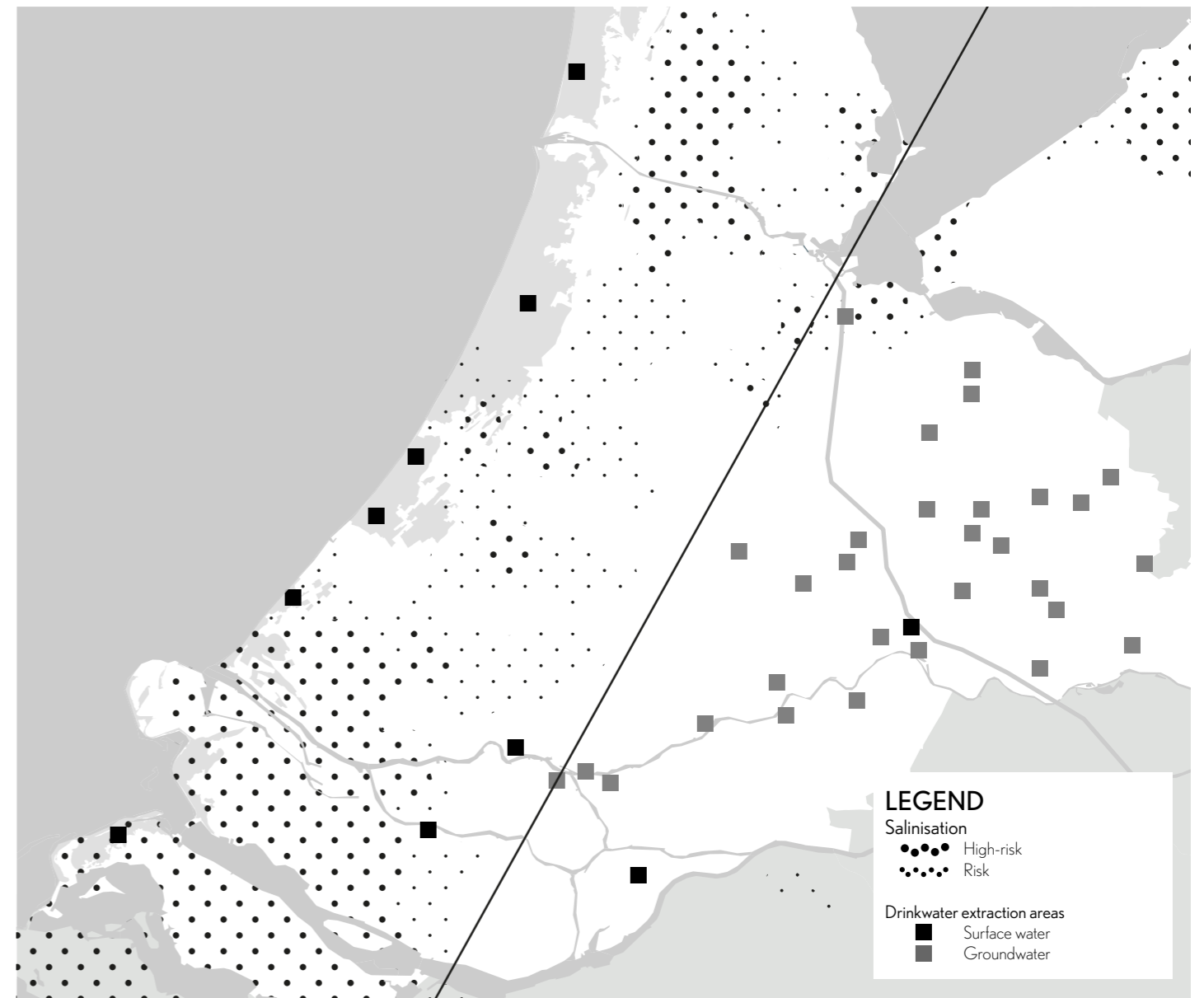
Hydrogeomorphological systems - decay of nature


Subsidence



Scale 1:600.000 | 0 6 18 KM 

Salinisation

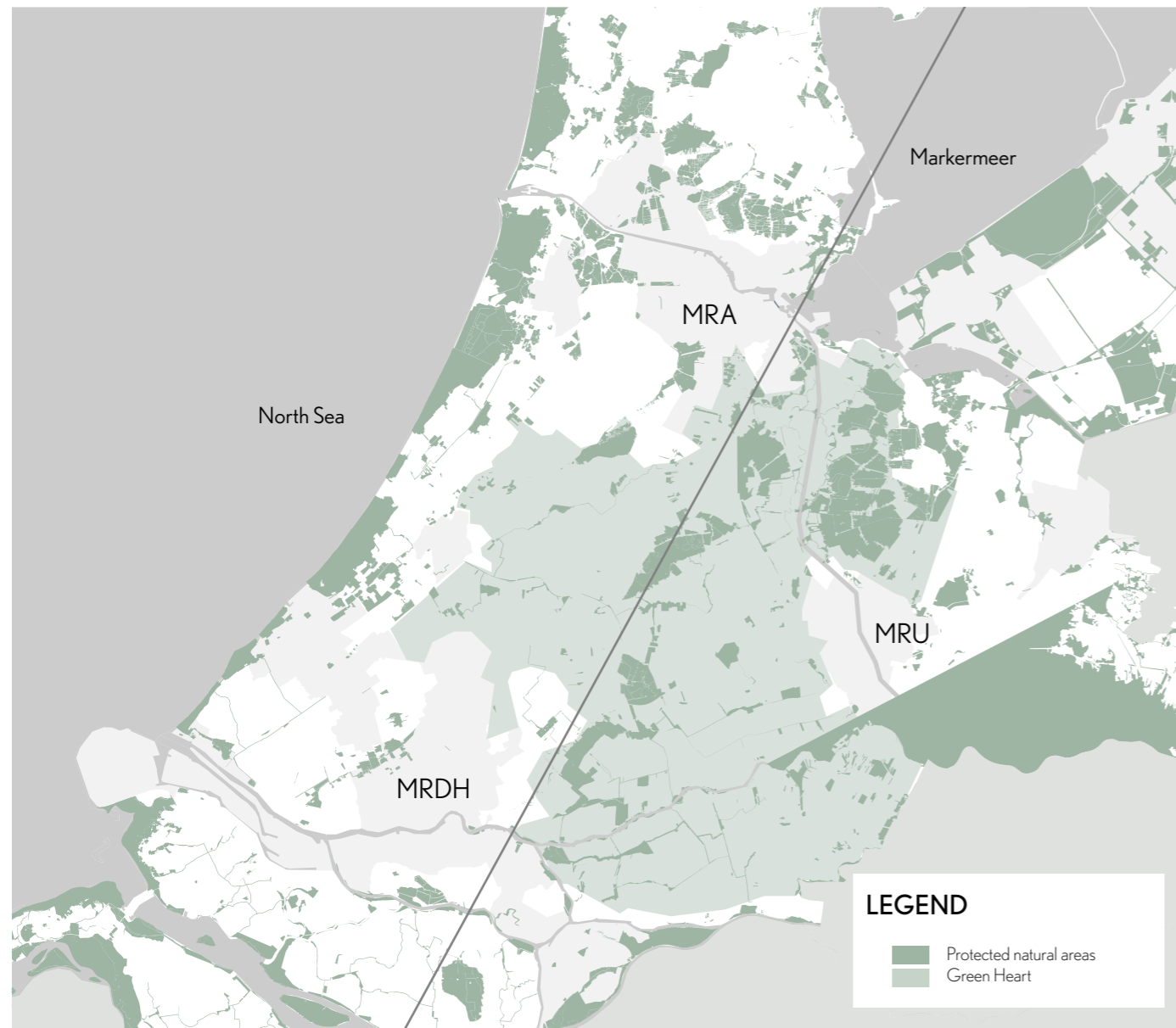


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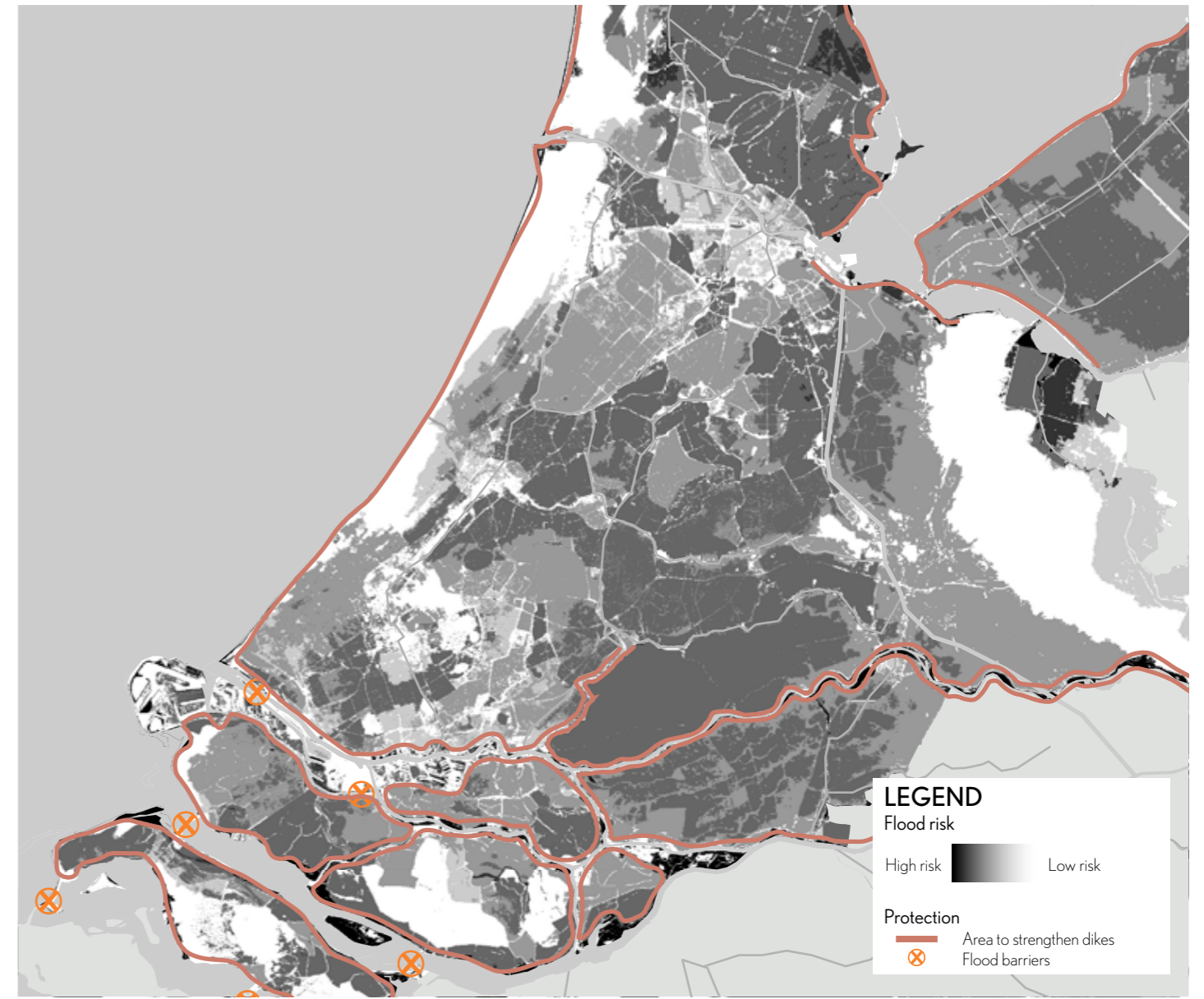


Hydrogeomorphological systems - decay of nature

Protected natural areas



Floodrisk and dike strenghtening zones

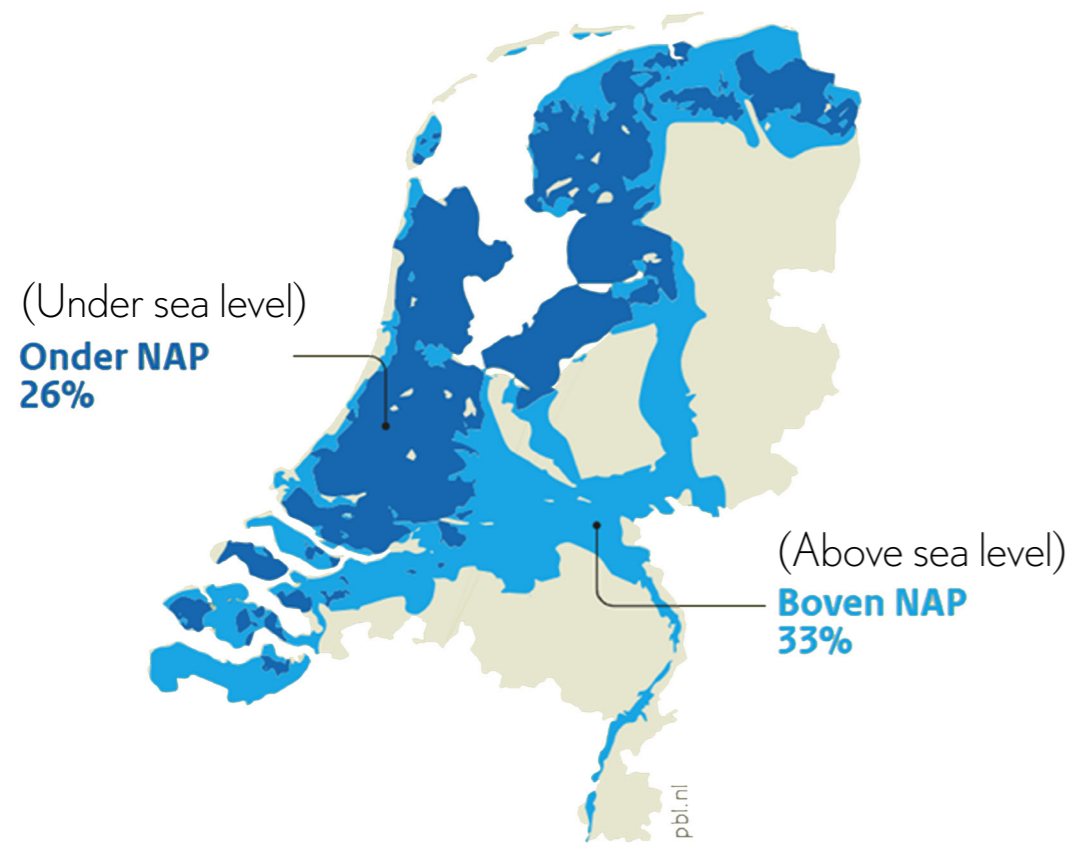


Governmental challenges

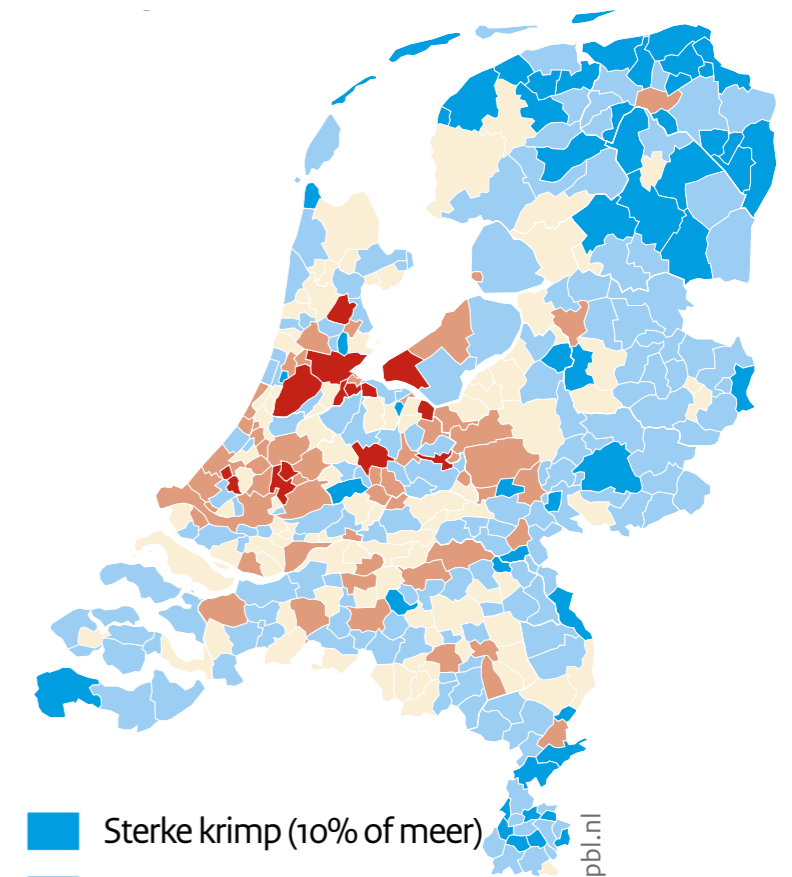
Risk Management

+ Actual Randstad Model
is unrecognised in decision-making

+ Urbanisation Demands



(PBL, n.d.)



- Sterke krimp (10% of meer)
 - Krimp (2,5% tot 10%)
 - Redelijk stabiel (-2,5% tot 2,5%)
 - Groei (2,5% tot 10%)
 - Sterke groei (10% of meer)
- (PBL, 2022)

Different sectoral objectives

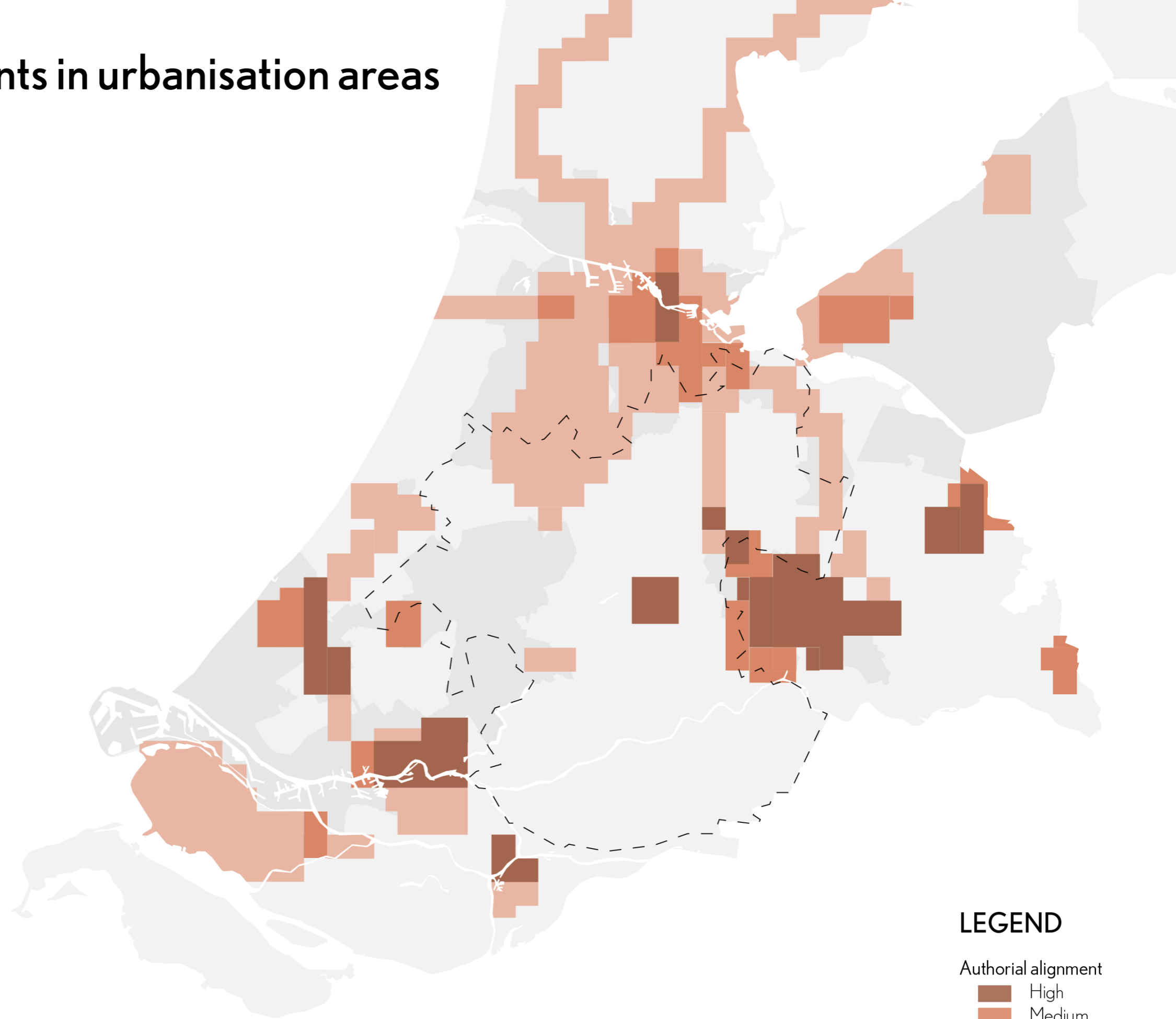
	URBANISATION	WATER	SOIL
Rijkswaterstaat (government)	-	Generate energy from water & water safety	Keep biodiversity
Room for the River program	-	Make the river area future-proof + concerns about space to safely drain water away	Stop erosion & raise the riverbed
Province Zuid-Holland	New homes in suitable locations in the Green Heart region	Keep the peat meadow open character of the Green Heart	Use peatlands as space to build on, depending on the pace of innovation
Province Noord-Holland	-	Create a climate-adaptive and healthy water system	Boost biodiversity & reduce soil subsidence
Province Utrecht	Give urbanisation space on outskirts of the Green Heart	Develop a water system that can handle extreme weather and droughts	Reduce soil subsidence & build further on characteristic parcel structure
MRDH	Densification in inner-city & more clean and accessible mobility	-	-
MRA	Densification is both inner- and outcity (multi-core)	Strengthen blue-green environment to improve biodiversity and water management system & maintain peat meadow character	Develop blue-green network that grows alongside more urbanisation
MRU	Accelerate the pace of housing construction	Look for water storage areas to prevent drought & create groundwater protection zones	Develop blue-green ambitions



Authorial (mis)alignments in urbanisation areas

Urbanisation plans from:

- Dutch government
- Provinces
- Metropole regions



LEGEND

- Authorial alignment
- High
 - Medium
 - Low

Scale 1:600.000
0 6 18 KM

PROBLEMISATION

METHODOLOGY

RE-ENVISIONING

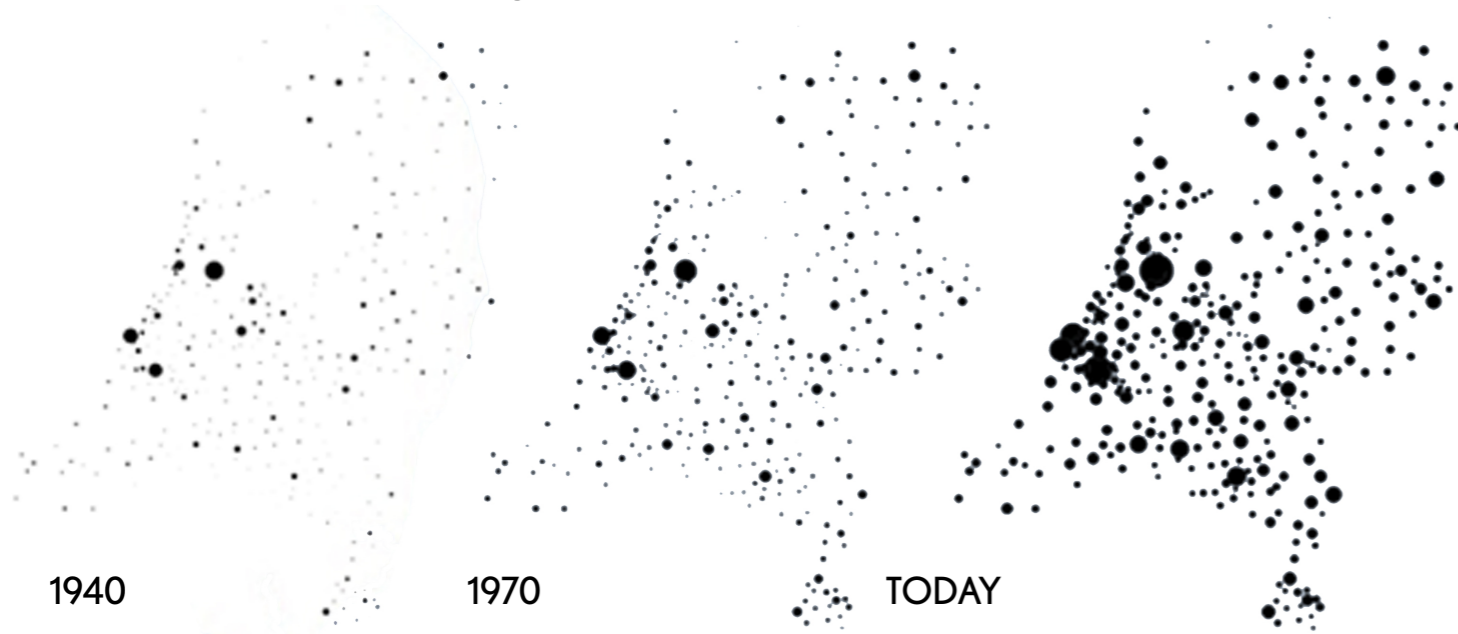
VISION 2100


CONCLUSION

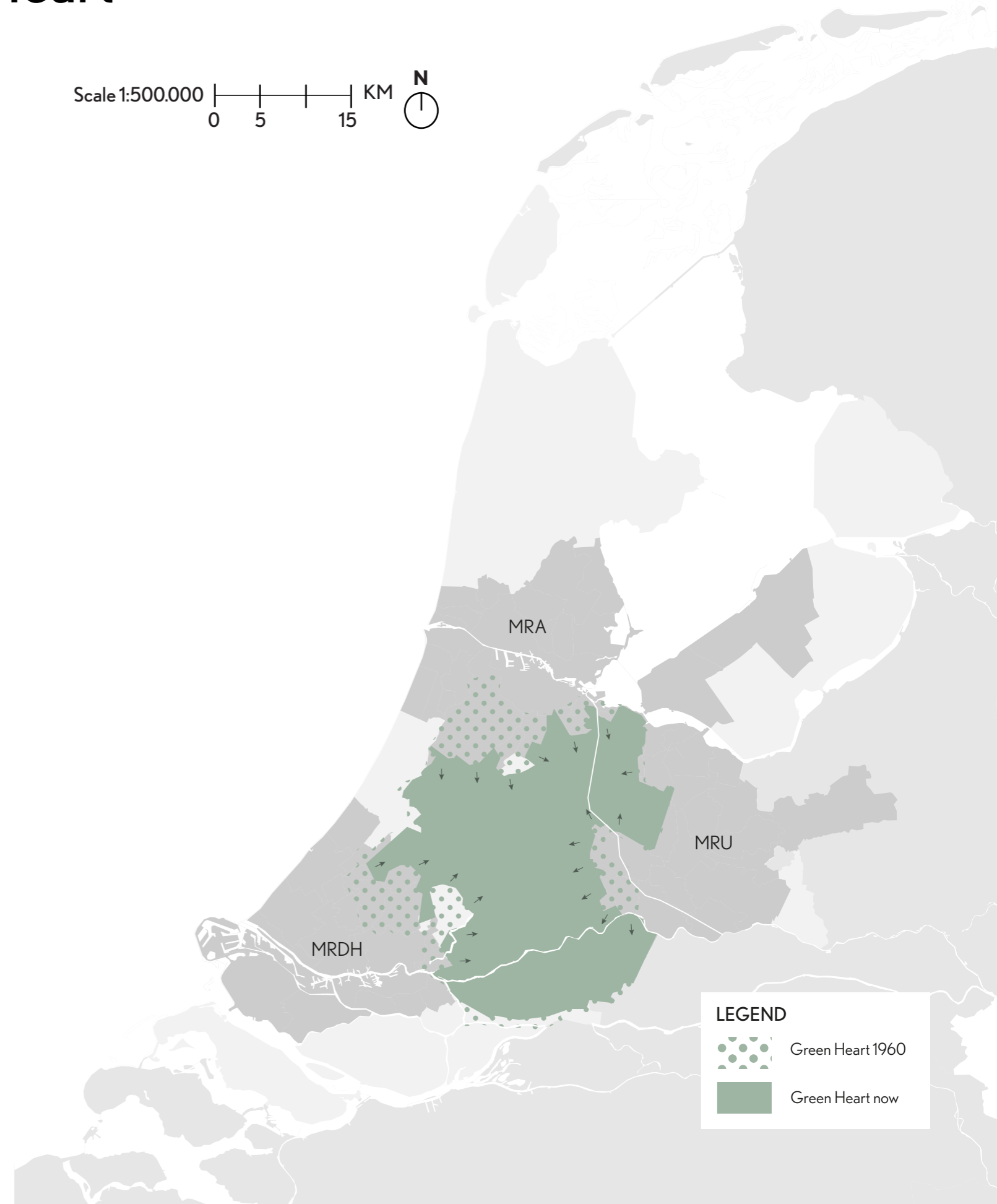
Uncontrollable urban sprawl into Green Heart

- Improved infrastructure made urbanisation inside the Green Heart possible
- Green Heart is urban in character, not rural

Urban growth in the Netherlands



Scale 1:500.000 0 5 15 KM 



PROBLEMISATION

METHODOLOGY

RE-ENVISIONING

VISION 2100

CONCLUSION

Current Randstad (governance) model is *unsustainable*

Between the Wings



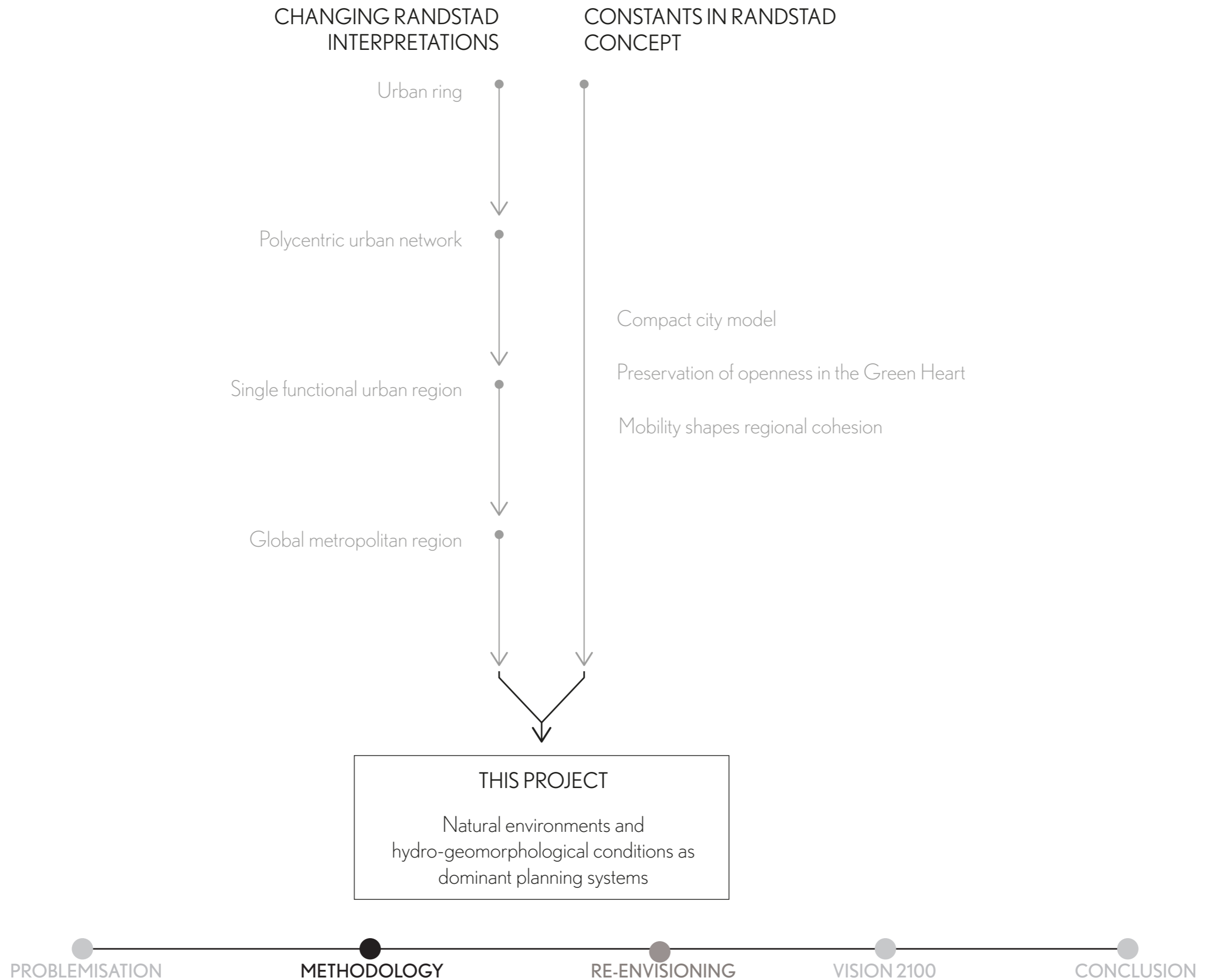
A bioregional landscape mosaic
within a changing Randstad

Aim of the project

1. Find a renewed *identity* for the Randstad / Green Heart that fosters *human-nature coexistence* and facilitates *risk management* and *integrated governance*
2. Explore what the Randstad / Green Heart 2100 could look like with *future climate and urban conditions* taken into account (as Nota Ruimte doesn't do this)



An new layer in understanding the Randstad

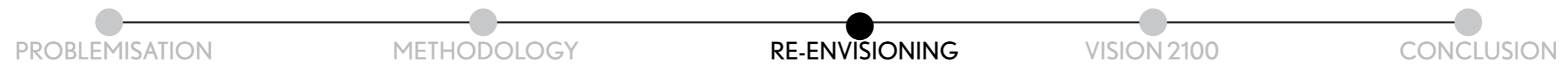


MAIN RESEARCH QUESTION

How can today's outdated model of the Randstad / Green Heart concept be re-envisioned to foster socio-environmental fellowship, considering its hydrogeomorphological alterations, its current type of metropolisation demands, and the future climate conditions towards 2100?

European system

Randstads position inside the Eurodelta-Metropolis



Urban

- Megaregion: "Gateway to Europe"
- A cross-national region between Randstad, Flemish Diamond and Ruhr region.

LEGEND

- Primary (core) cities
 - With port
 - With airport
- Secondary cities
- Vital infrastructure
- Other infrastructure
- Vital rail freight infrastructure

Scale 1:1.500.000

0 15 45 KM



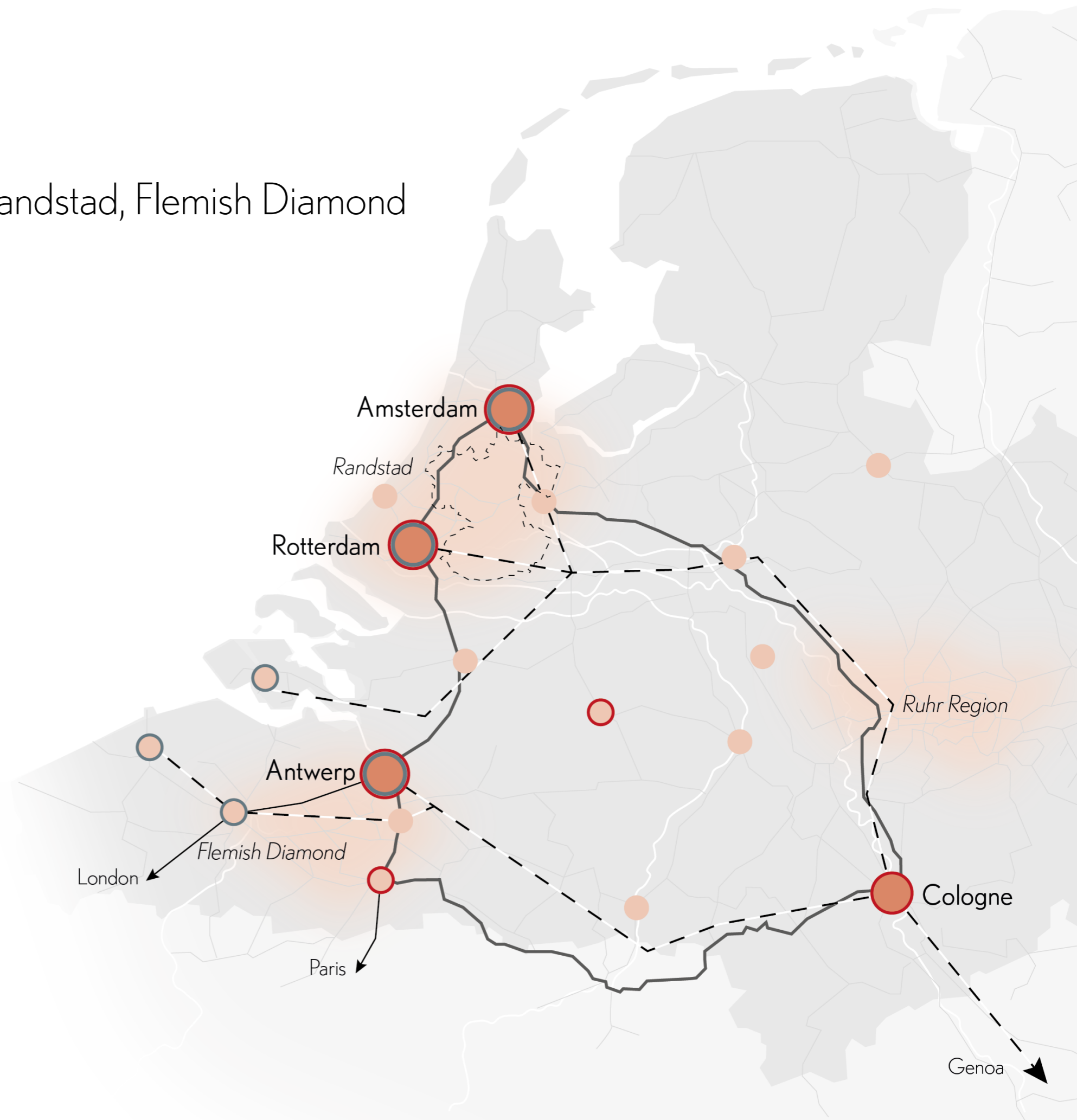
PROBLEMISATION

METHODOLOGY

RE-ENVISIONING

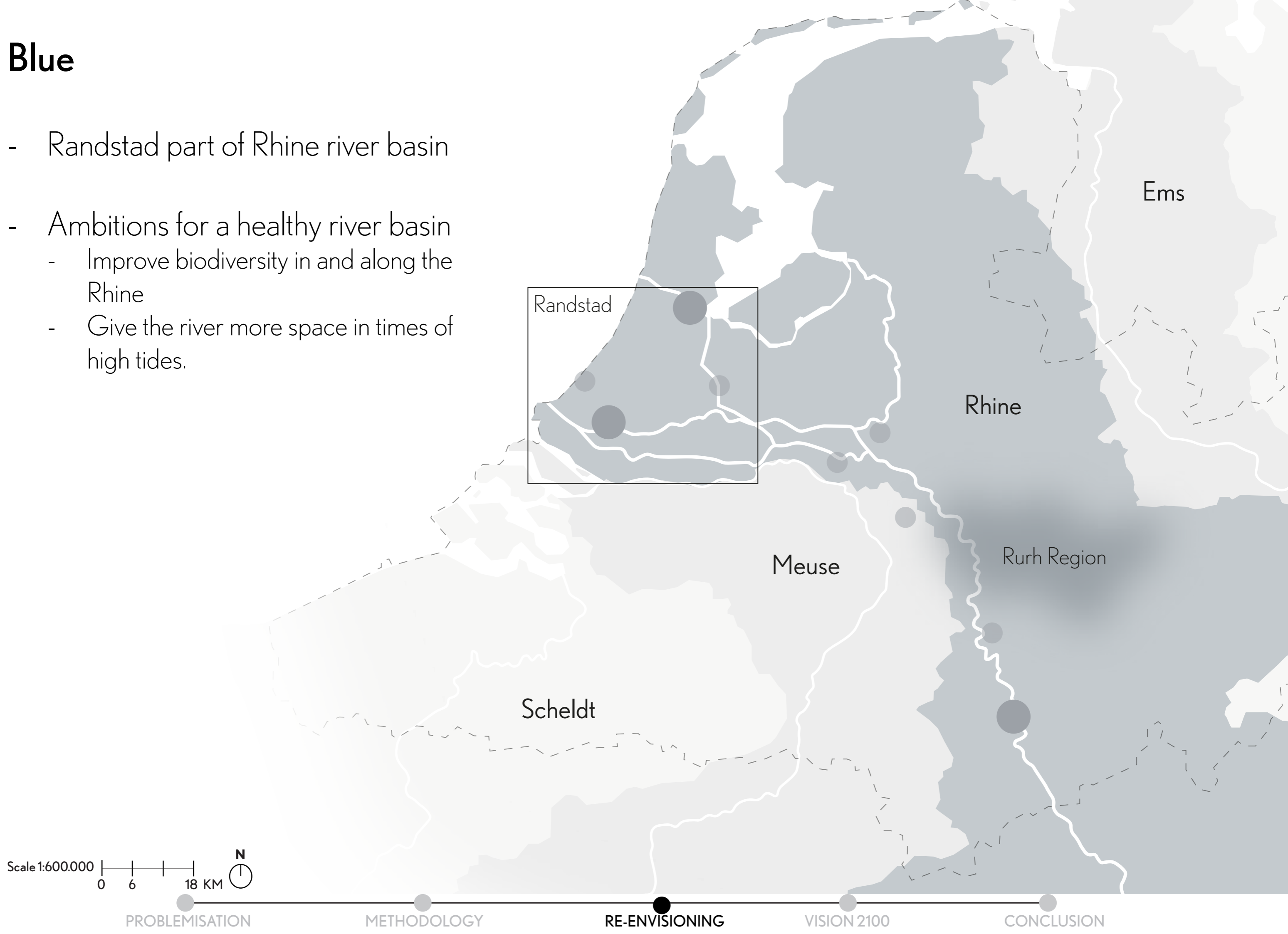
VISION 2100

CONCLUSION



Blue

- Randstad part of Rhine river basin
- Ambitions for a healthy river basin
 - Improve biodiversity in and along the Rhine
 - Give the river more space in times of high tides.



Scale 1:600.000
0 6 18 KM

PROBLEMISATION

METHODOLOGY

RE-ENVISIONING

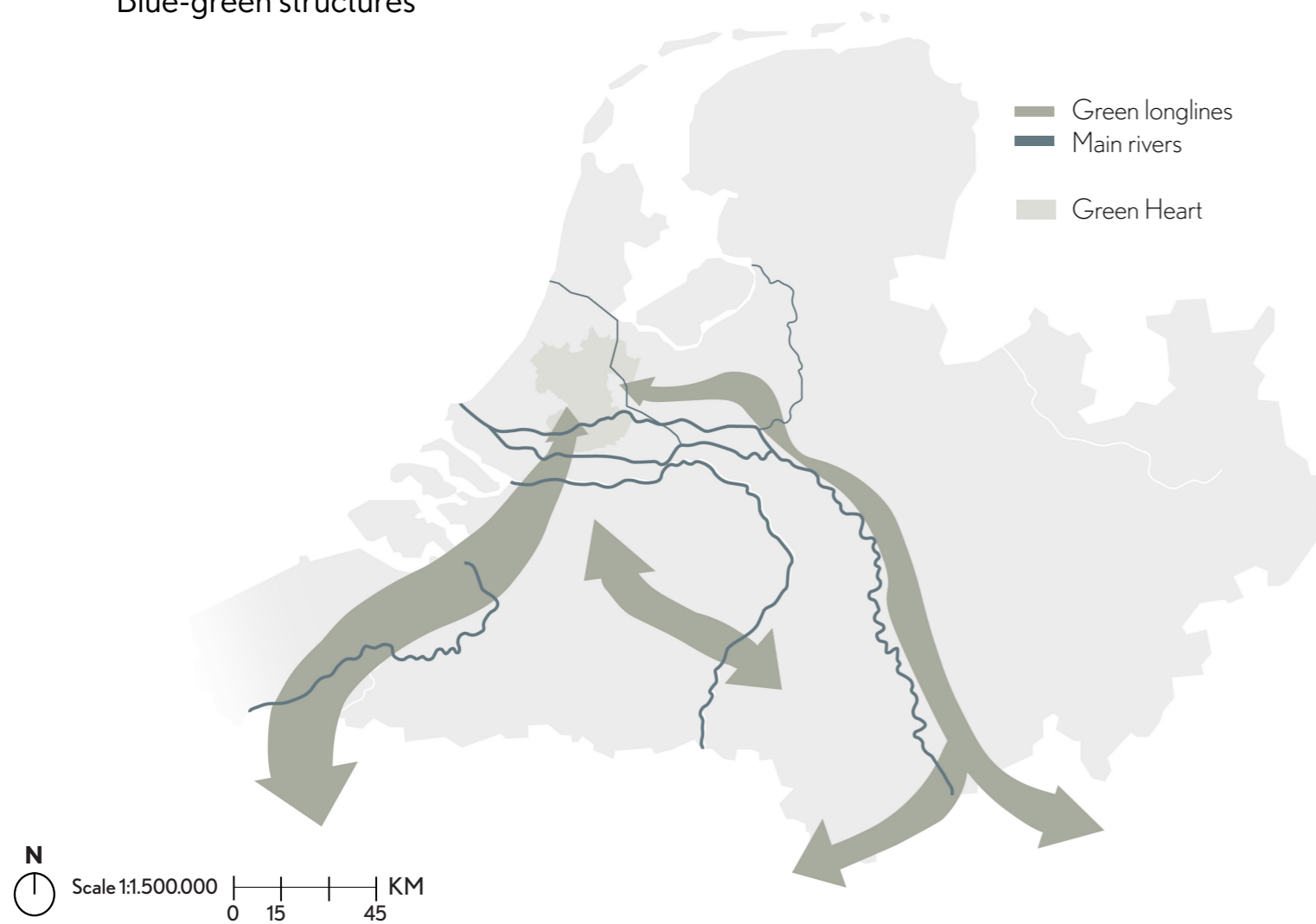
VISION 2100

CONCLUSION

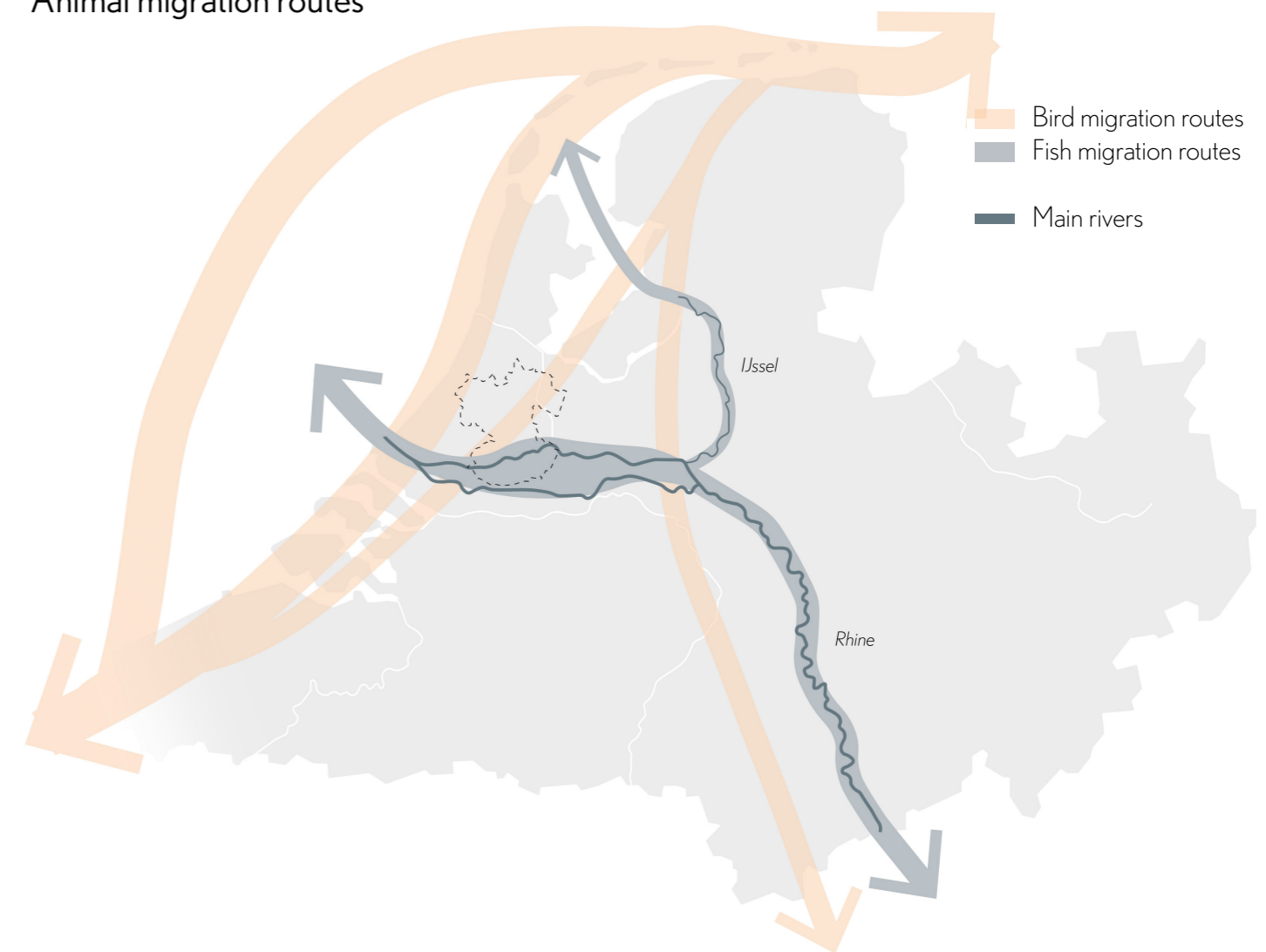
Green

- Randstad / Green Heart as meeting point and passing zone for natural and ecological systems

Blue-green structures



Animal migration routes



PROBLEMISATION

METHODOLOGY

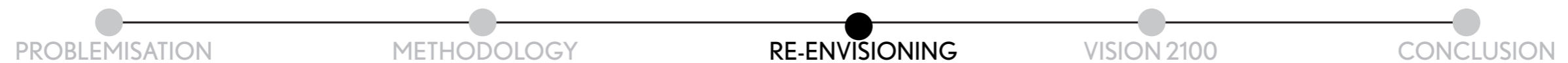
RE-ENVISIONING

VISION 2100

CONCLUSION

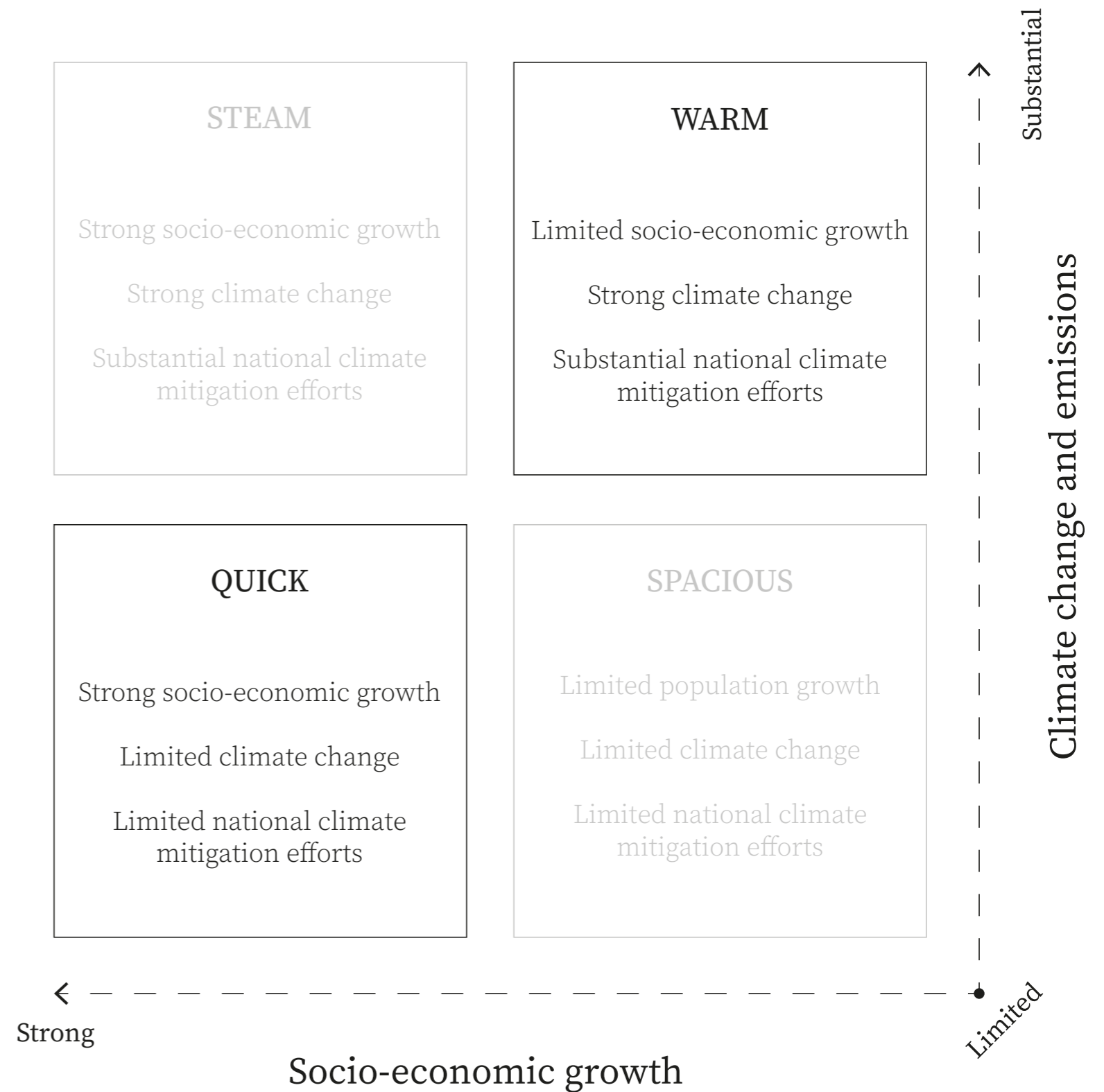
National system

A Randstad adapted to future climate and urban conditions



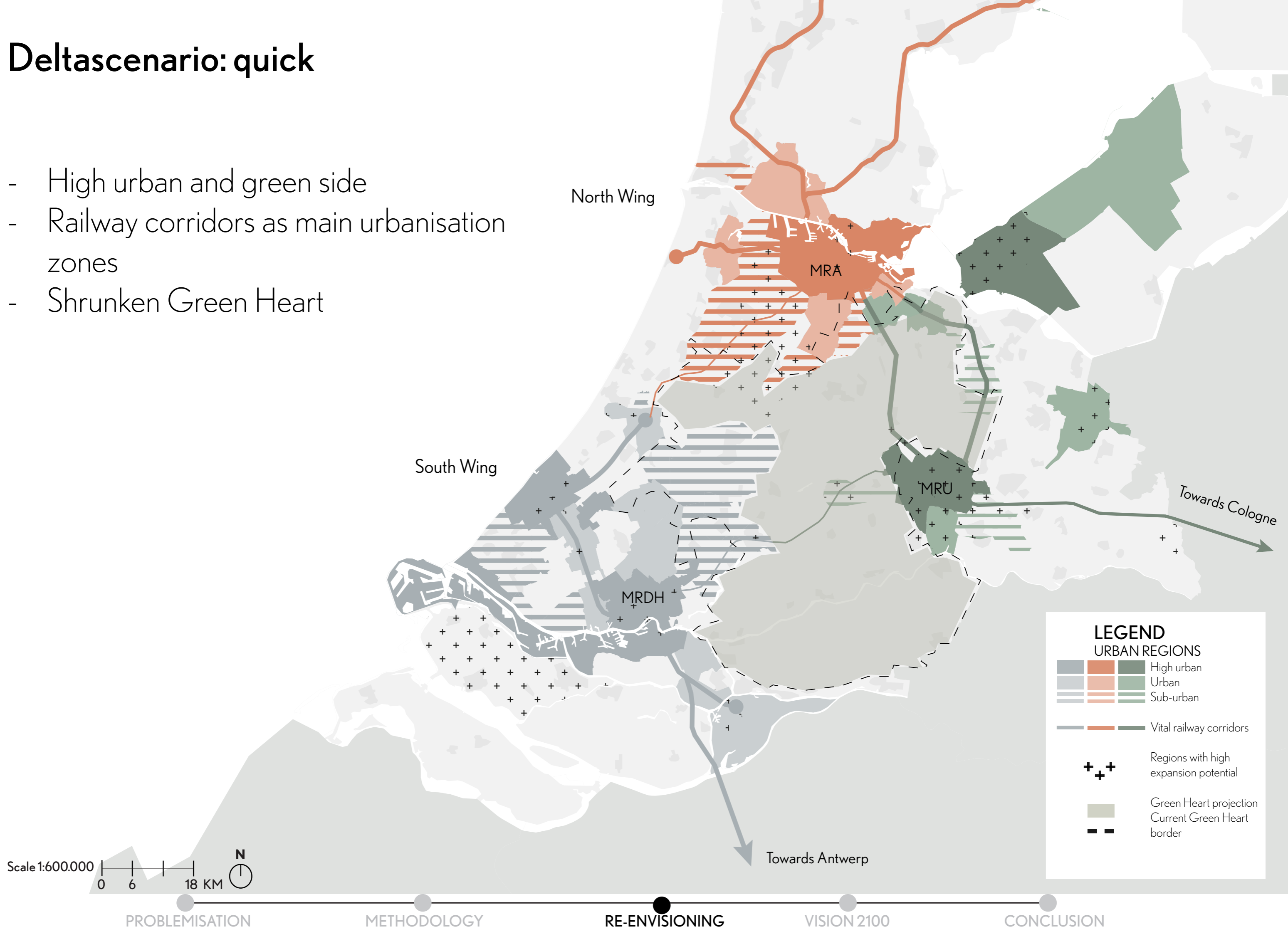
Deltaprogramma 2026

- Governmental program that looks at water and climate adaptability in the Netherlands



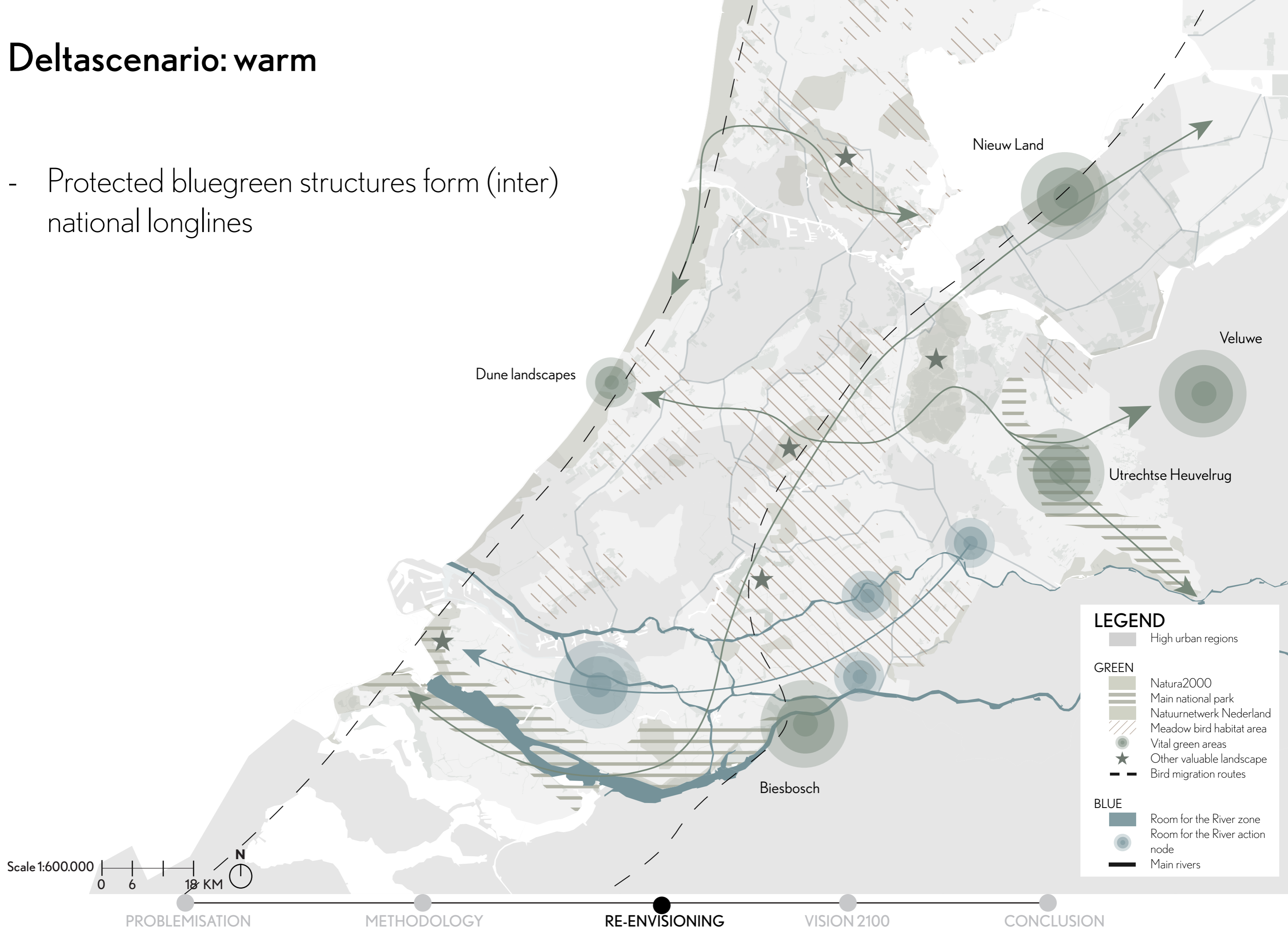
Deltascenario: quick

- High urban and green side
- Railway corridors as main urbanisation zones
- Shrunk Green Heart



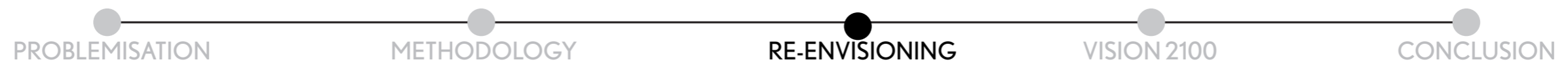
Deltascenario: warm

- Protected bluegreen structures form (inter) national longlines



Bioregional systems

Unique natural regions inside the Randstad

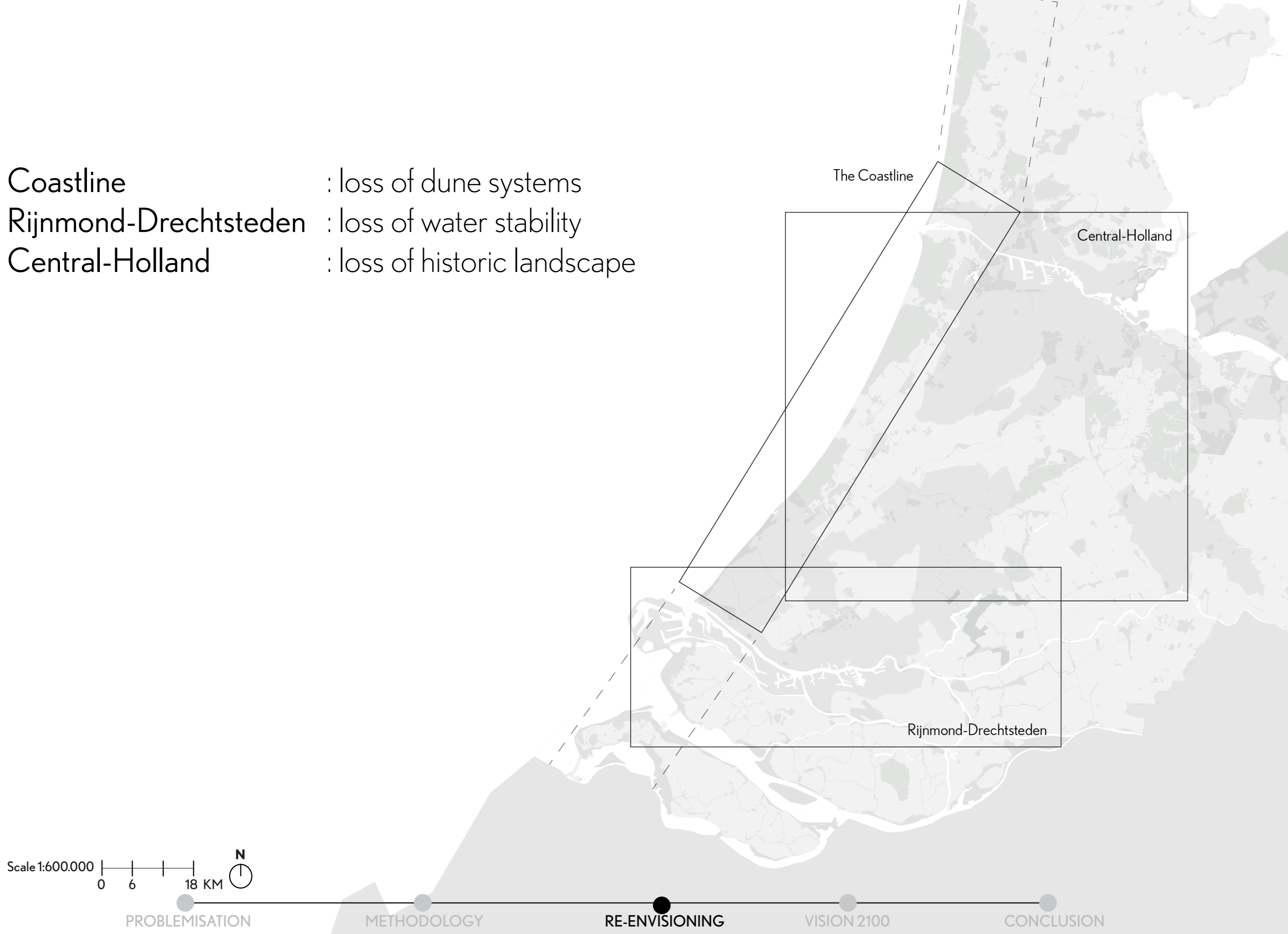


What is bioregionalism?

Bioregionalism is a planning approach that considers natural features of specific regions as the base for political and economic systems (Wearne et al., 2023).

*Natural (eco)systems **AND urban conditions** should dictate how humans inhabit territories in relationship within the capacities of the natural environment.*

Coastline : loss of dune systems
Rijnmond-Drechtsteden : loss of water stability
Central-Holland : loss of historic landscape



Scale 1:600.000
0 6 18 KM



PROBLEMISATION

METHODOLOGY

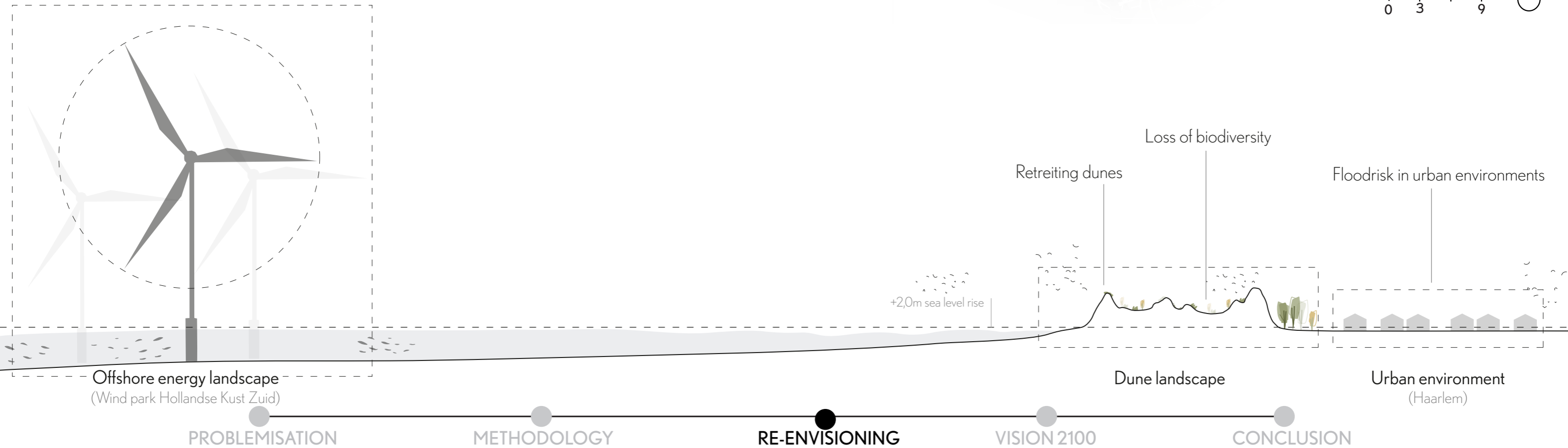
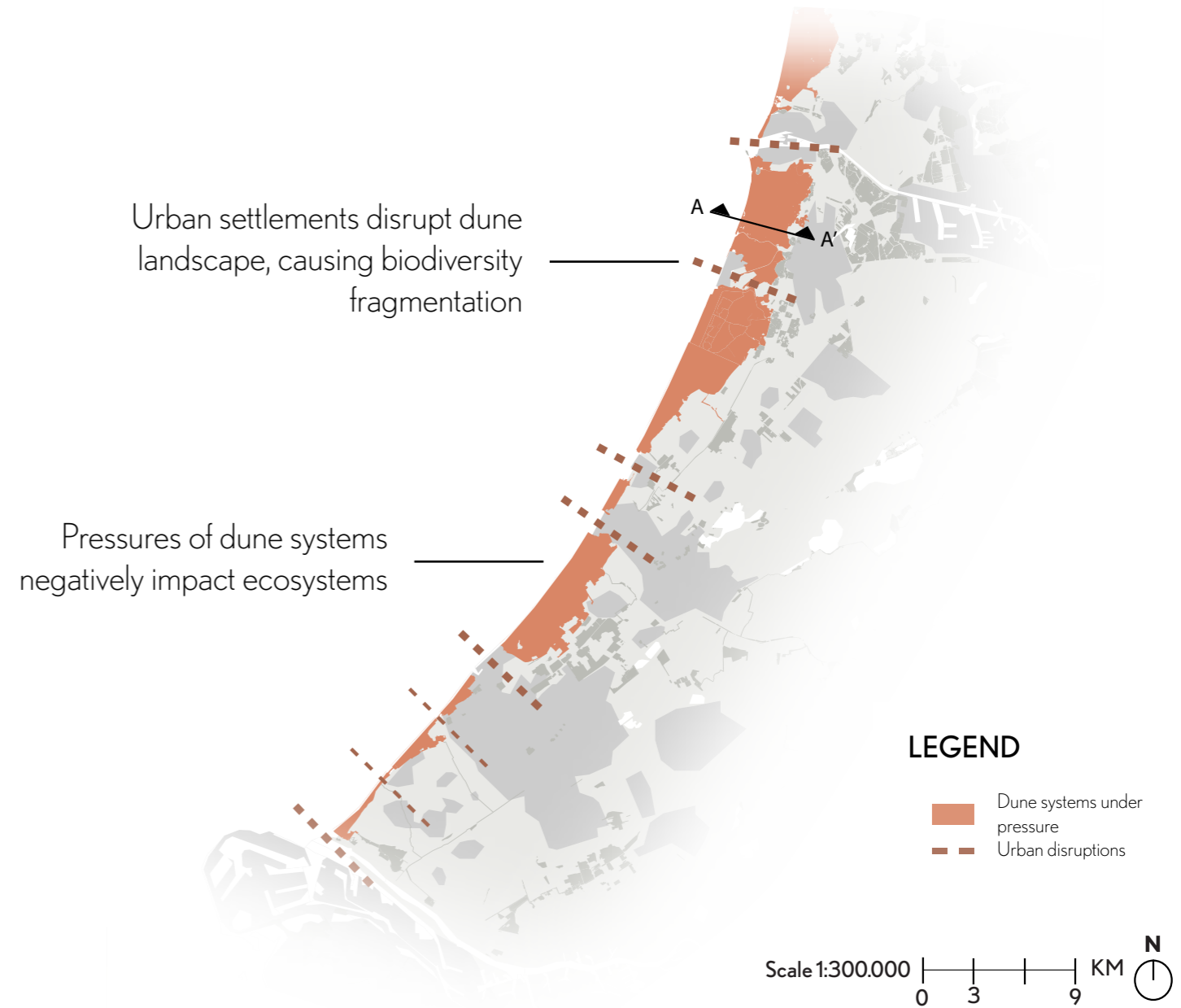
RE-ENVISIONING

VISION 2100

CONCLUSION

Coastline: decay

- Coastal erosion
- Pressures on dune system
- Biodiversity fragmentation



Coastline: guidelines

XL : (re)connect ecological / dune systems (inter)nationally

L : limited to none urbanisation in coastal region

M : encourage natural reinforcement of dune systems

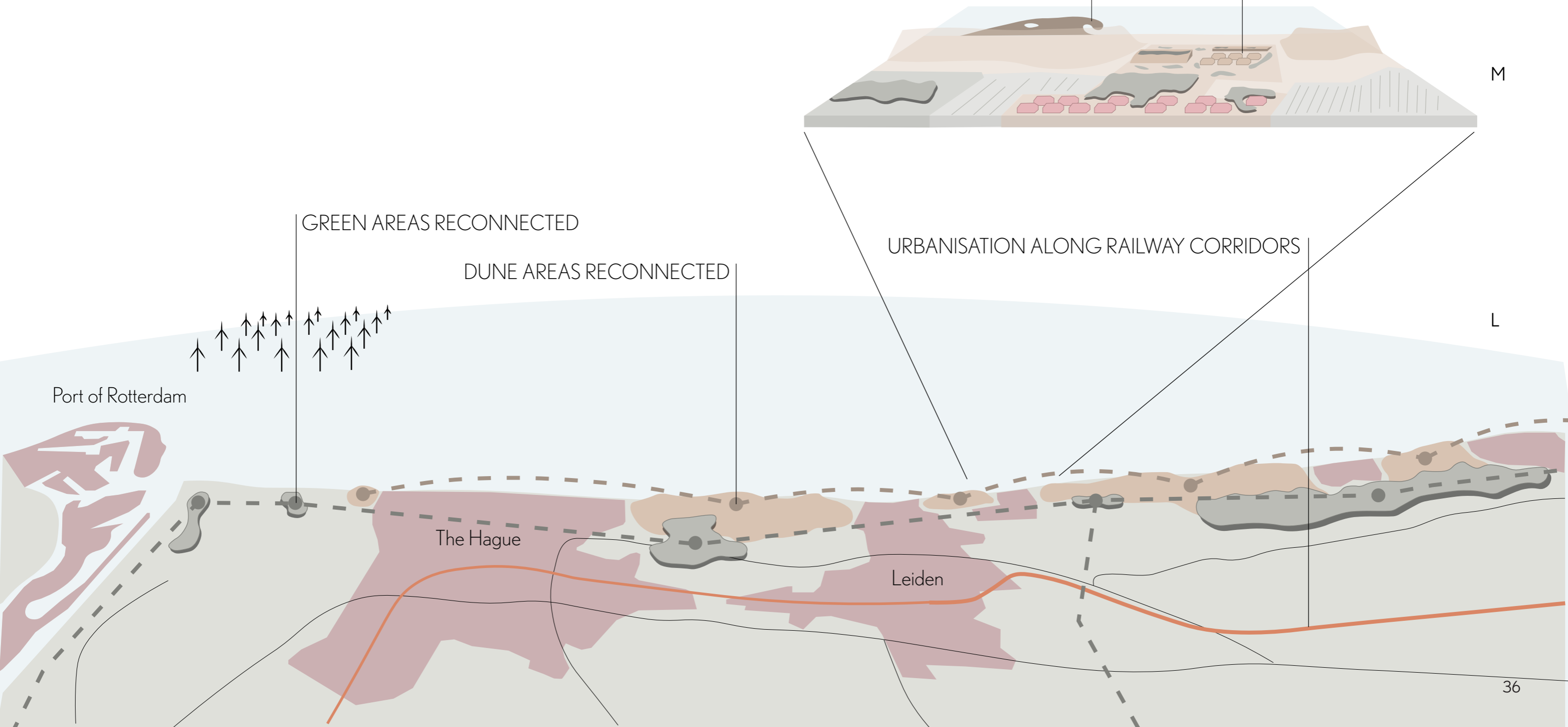
S : (re)planting lost native flora

PROJECTS TO RESTORE DUNES

- Take 'Zandmotor' as example
- Dunes should restore naturally

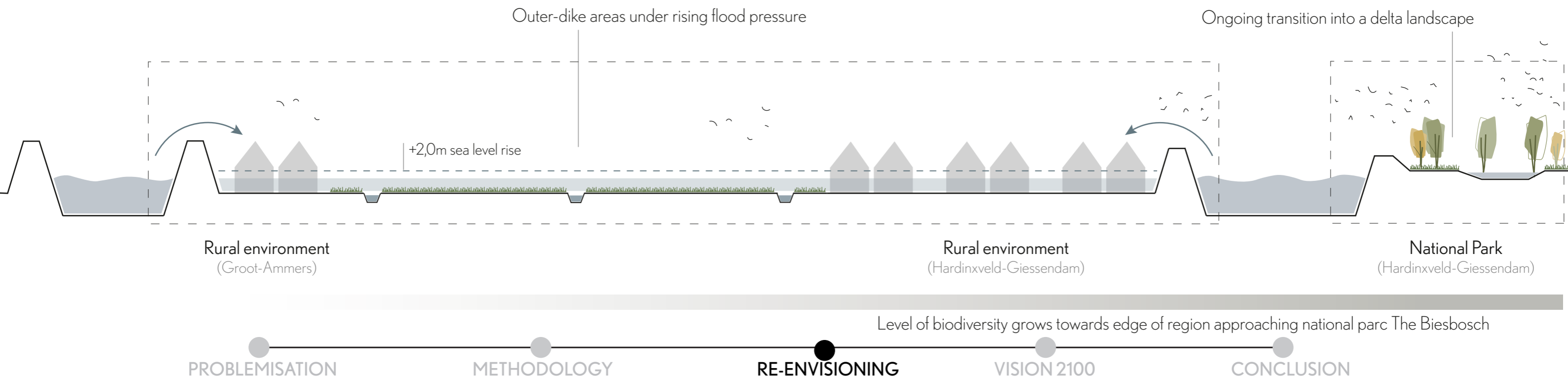
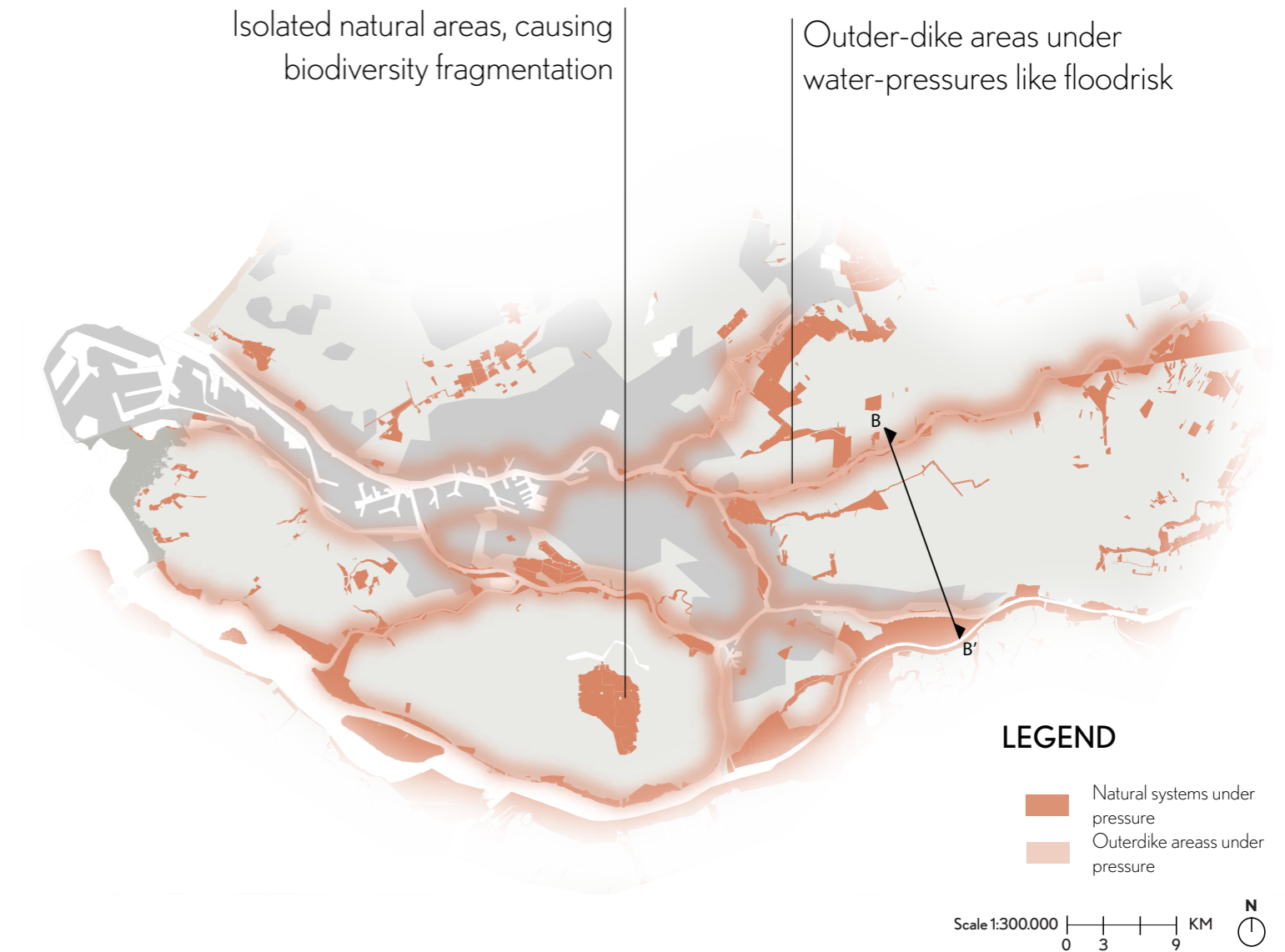
TRANSFORMATION OF COASTAL TOWNS

- Urban structures embedded in dune landscape
- Urban structures adapted to coast dynamics



Rijnmond-Drechtsteden: decay

- Pressures on outer-dike areas
- Ecological instability



Rijnmond-Drechtsteden: guidelines

XL : (re)connect ecological / dune systems (inter)nationally

L : strengthen dikes and urbanise flood-sensitive

M : use controlled flooding zones to maintain save water level

S : use nature-based reinforcements at dikes to bolster ecology

CONTROLLED FLOODING ZONES

- Manage high water levels in agricultural zones

FLOOD RESILIENT HOUSING

- Minimise flood impacts
- Ensure safety

M

ECOLOGICAL CORRIDORS ALONG RIVERS

- Connect blue-green corridors to bolster biodiversity

DIKE STRENGTHENING ZONES

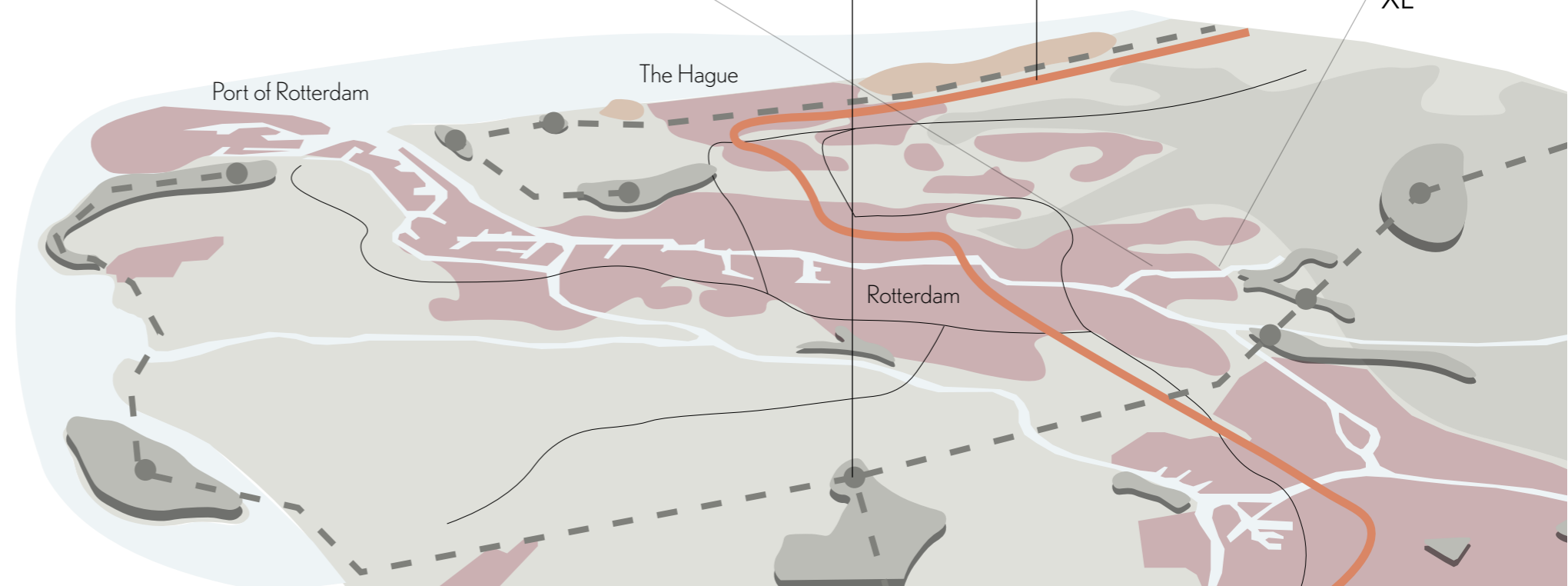
- Minimise flood impacts
- Room for River measures: dike widening + foreland excavations

L

ENHANCE (INTER)NATIONAL GREEN CORRIDORS

URBANISATION ALONG RAILWAY CORRIDORS

XL

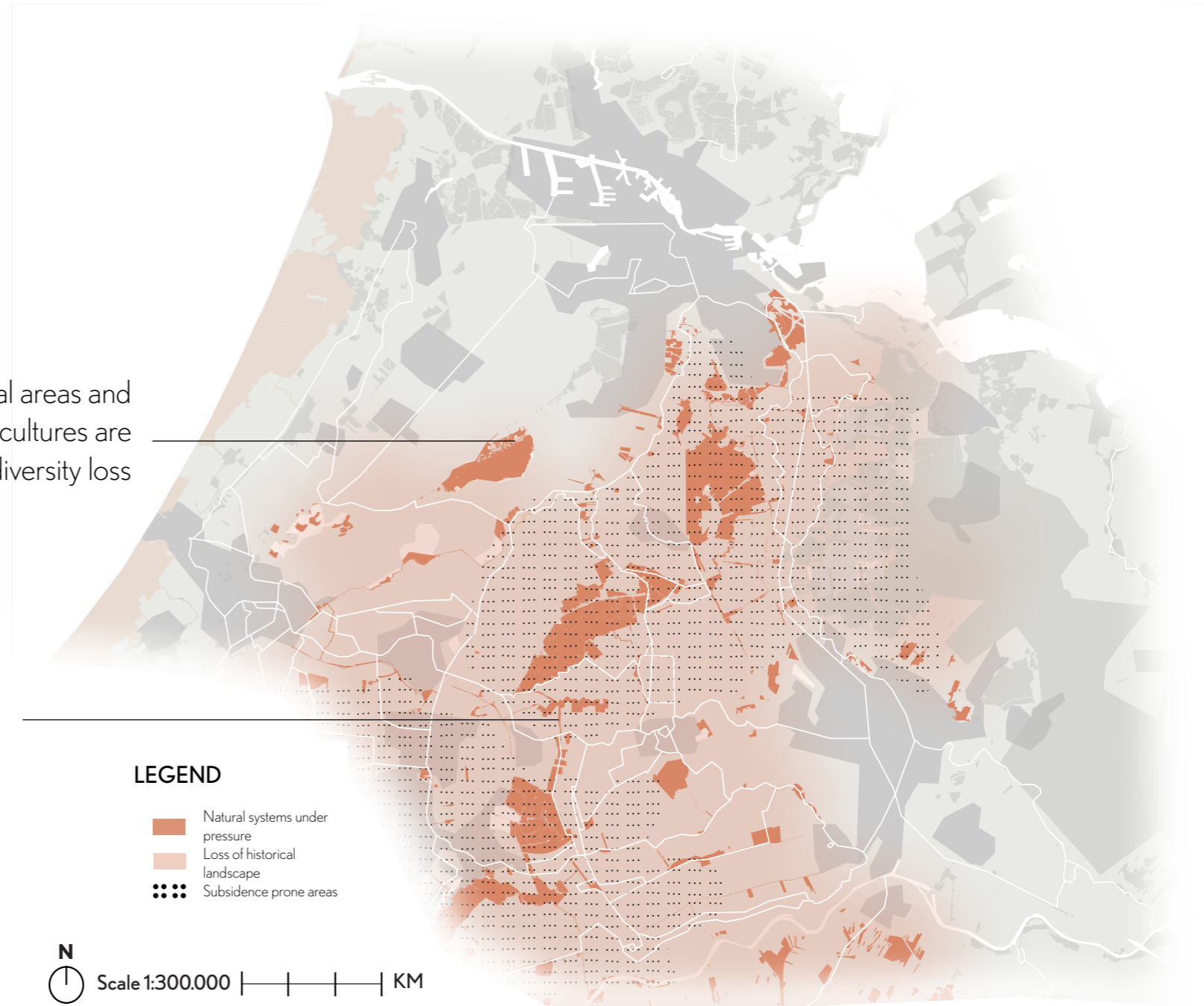


Central-Holland: decay

- Peat oxidation
- Pressures on biodiversity
- Historical landscape disappearance

Isolated natural areas and grass monocultures are causing biodiversity loss

Pressures on isolated natural systems negatively causes subsidence and landscape loss

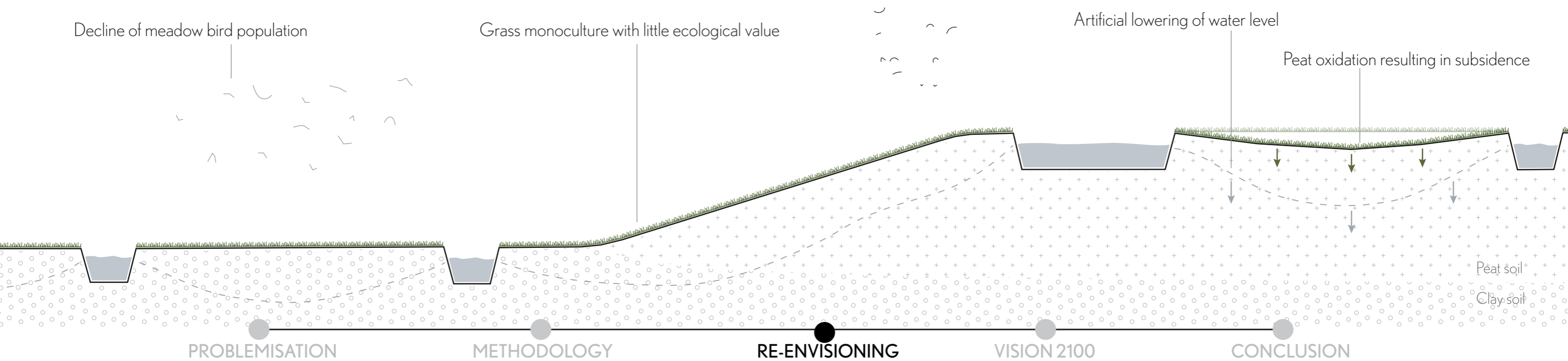


Decline of meadow bird population

Grass monoculture with little ecological value

Artificial lowering of water level

Peat oxidation resulting in subsidence



PROBLEMISATION

METHODOLOGY

RE-ENVISIONING

VISION 2100

CONCLUSION

Peat soil
Clay soil

Central-Holland: guidelines

XL : (re)connect ecological / dune systems (inter)nationally

L : use waterlogging to restore historical landscape & limit urbanisation in subsidence-prone areas

M : use controlled flooding zones and create swamp zones to maintain save water level

S : (re)planting lost native flora

SWAMP ZONE AS ECOLOGICAL CORRIDOR

- Improves biodiversity and species movements in and along blue-green corridors

STILT AND/OR AMPHIBIOUS HOUSING

- Enables eco-friendly living in swamp zones

KEEP SUBSIDENCE PRONE-AREAS AS BLUEGREEN AS POSSIBLE

- Minimise flood impacts
- Room for River measures: dike widening + foreland excavations

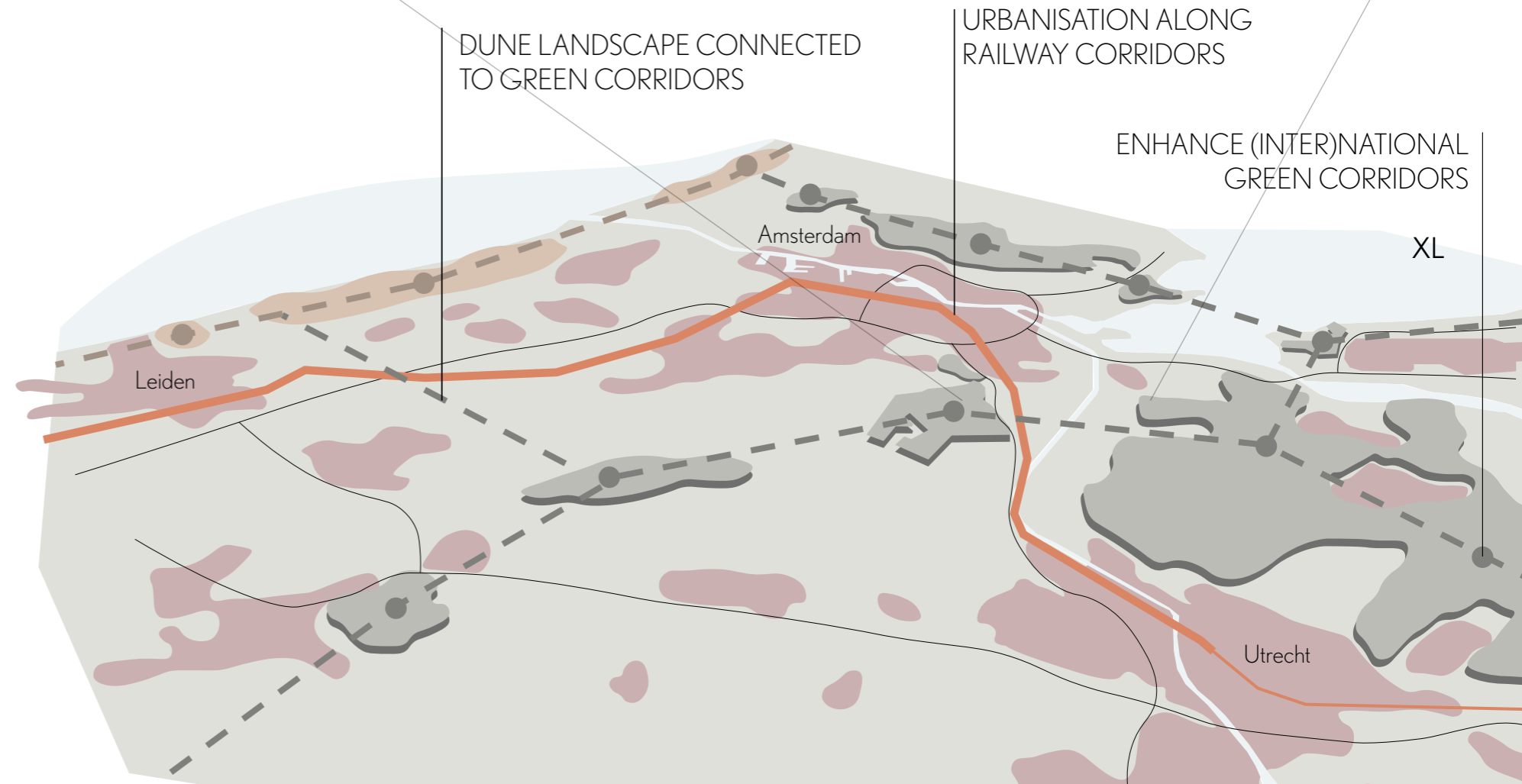
SWAMP ZONES

- Allows more waterlogging
- Connecting bluegreen corridors
- Helps restoring historic swamp landscape

DUNE LANDSCAPE CONNECTED TO GREEN CORRIDORS

URBANISATION ALONG RAILWAY CORRIDORS

ENHANCE (INTER)NATIONAL GREEN CORRIDORS



M

L

XL

Vision Randstad / Green Heart 2100






Vision: natural structures







- From Green Heart to Green Vessel system

NATURAL STRUCTURE

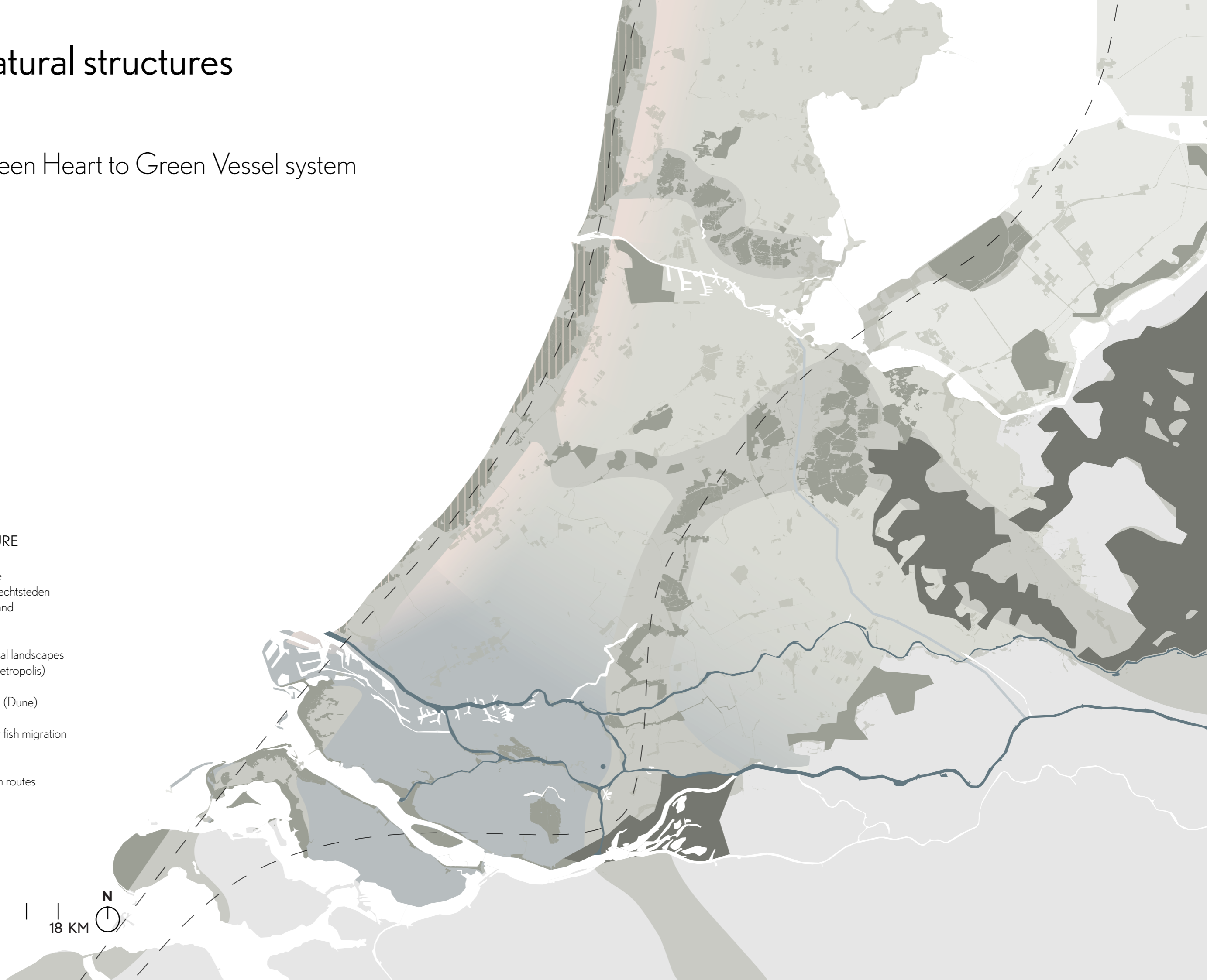
Bioregions

-  The Coastline
-  Rijnmond-Drechtsteden
-  Central-Holland

Natural structures

-  Vital ecological landscapes (Eurodelta-Metropolis)
-  Green Vessel
-  Green Vessel (Dune)
-  Vital rivers for fish migration
-  Main rivers
-  Bird migration routes

Scale 1:600.000
0 6 18 KM



Vision: urban structures

- Urban development in response to bioregional conditions

URBAN STRUCTURE

Urbanisation

- High urbanisation
- Medium urbanisation
- Low urbanisation

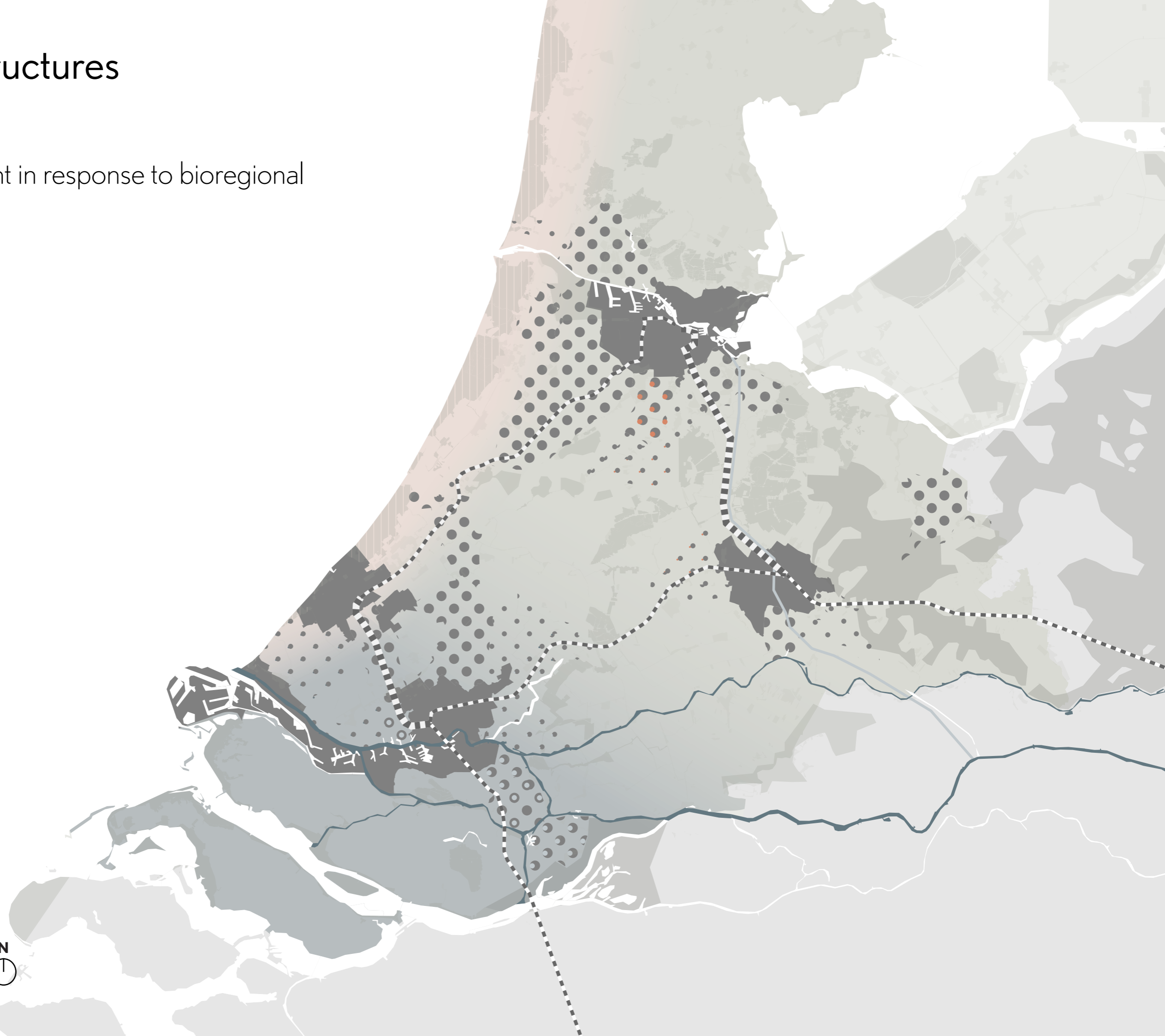
Housing typologies

- Flood-sensitive
- Amphibious

Infrastructure

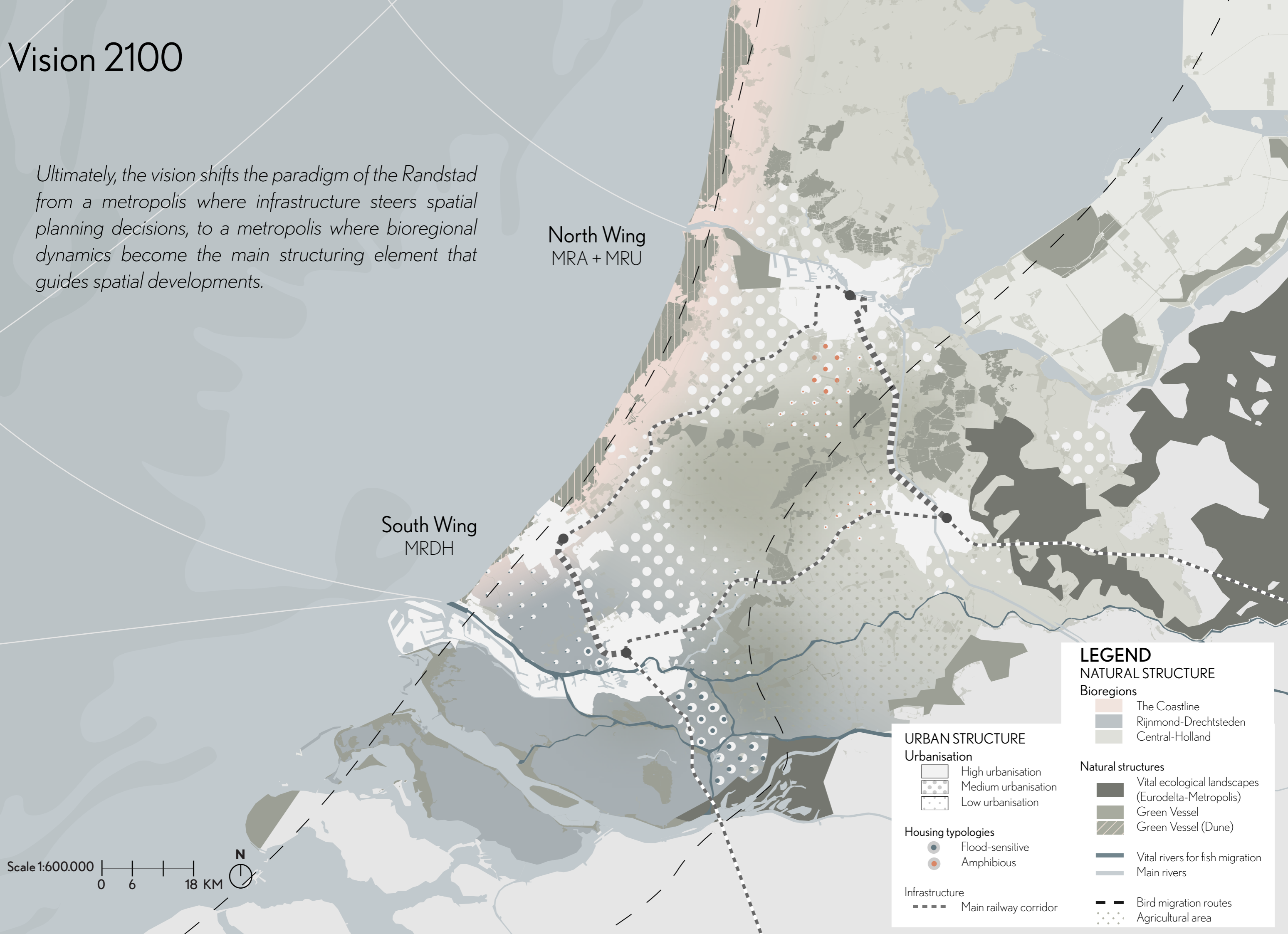
- Main railway corridor

Scale 1:600.000
0 6 18 KM



Vision 2100

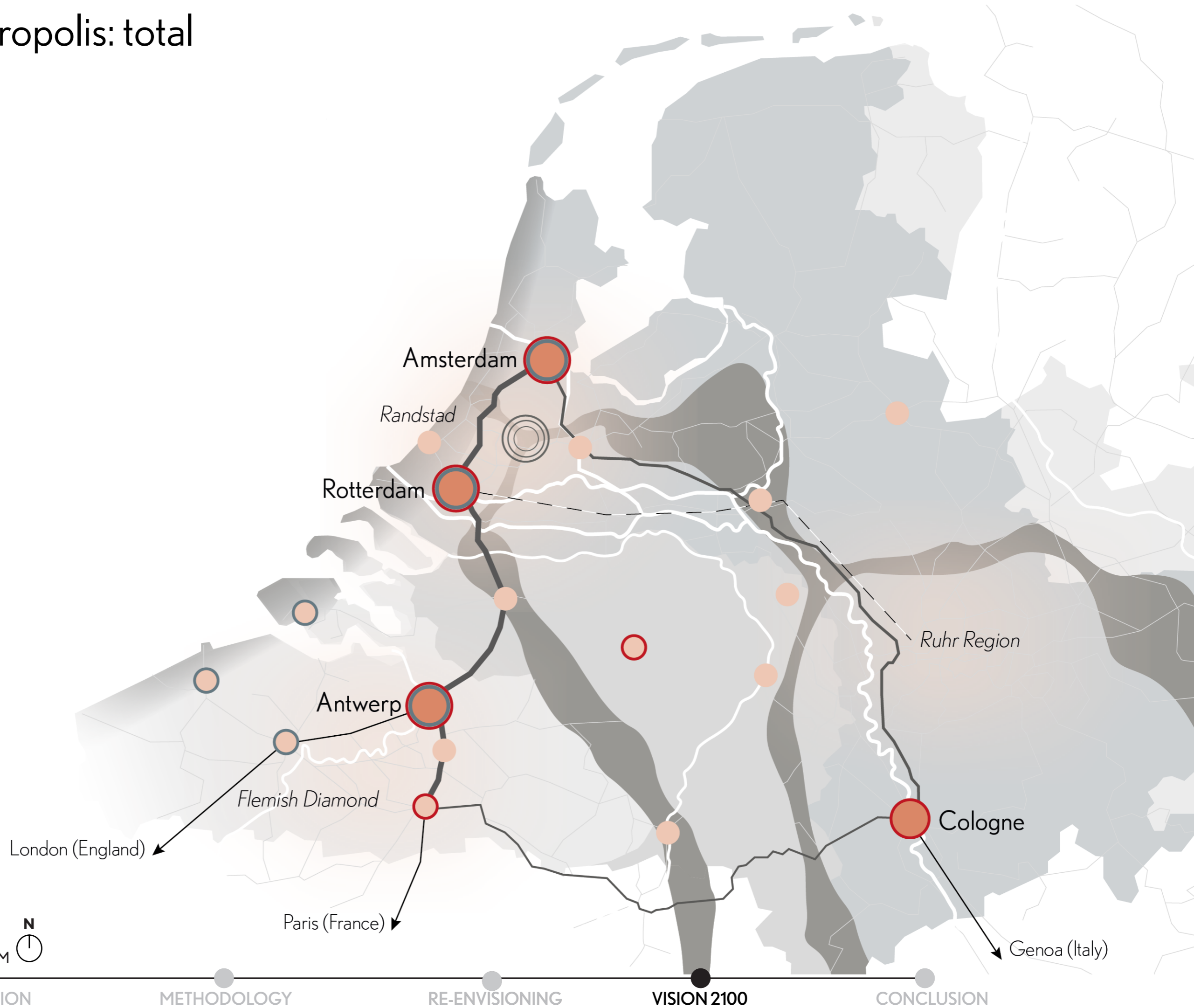
Ultimately, the vision shifts the paradigm of the Randstad from a metropolis where infrastructure steers spatial planning decisions, to a metropolis where bioregional dynamics become the main structuring element that guides spatial developments.



Eurodelta-Metropolis: total

LEGEND

- Green Vessel network
- Rhine river basin
- Meuse river basin
- Primary (core) cities
 - With port
 - With airport
- Secondary cities
- Vital infrastructure
- Other infrastructure
- Vital railway freight infrastructure



Scale 1:1.500.000
0 15 45 KM



PROBLEMISATION

METHODOLOGY

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VISION 2100

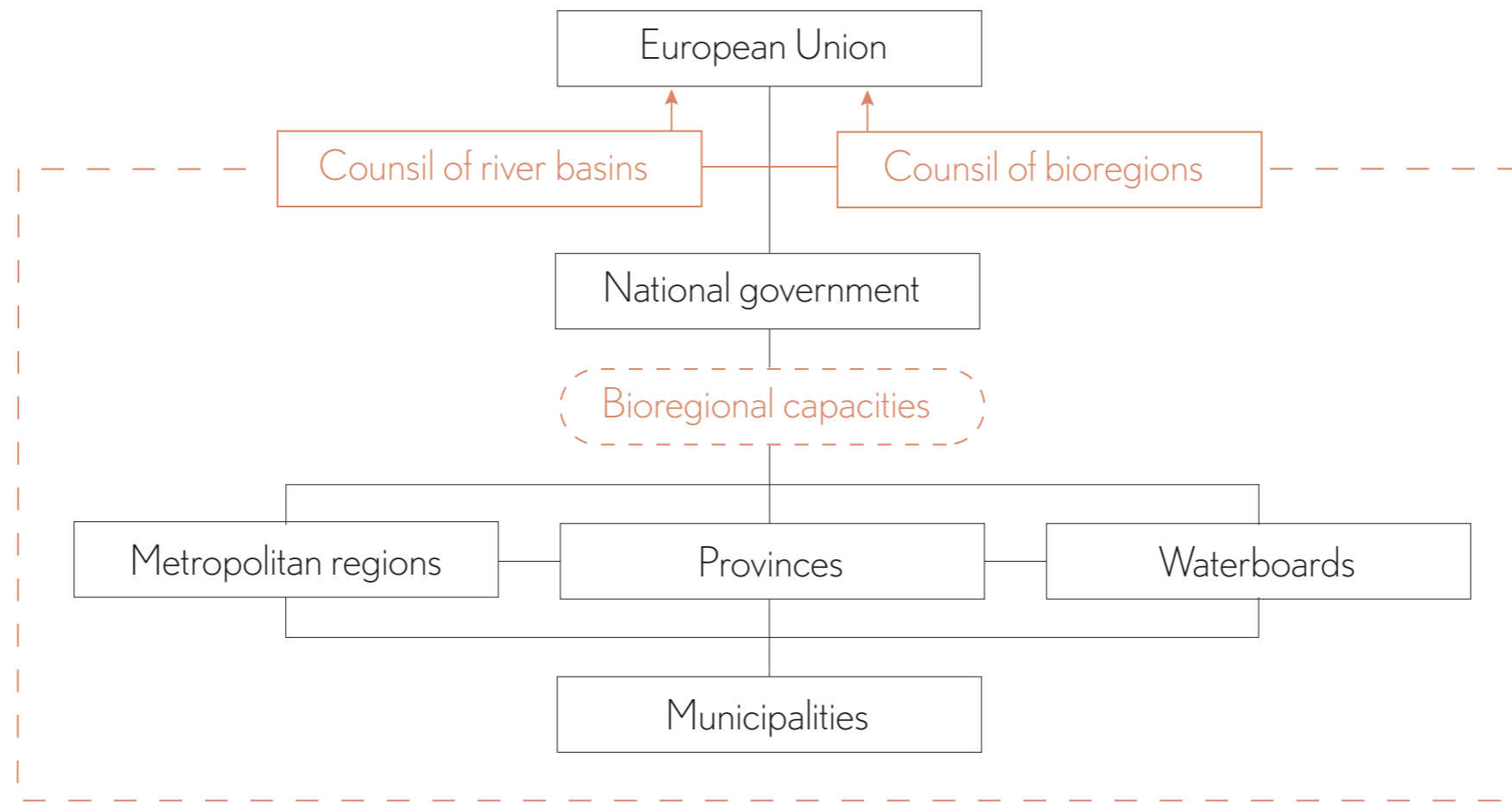
CONCLUSION

A fundamental shift in planning values



Re-ordering planning values

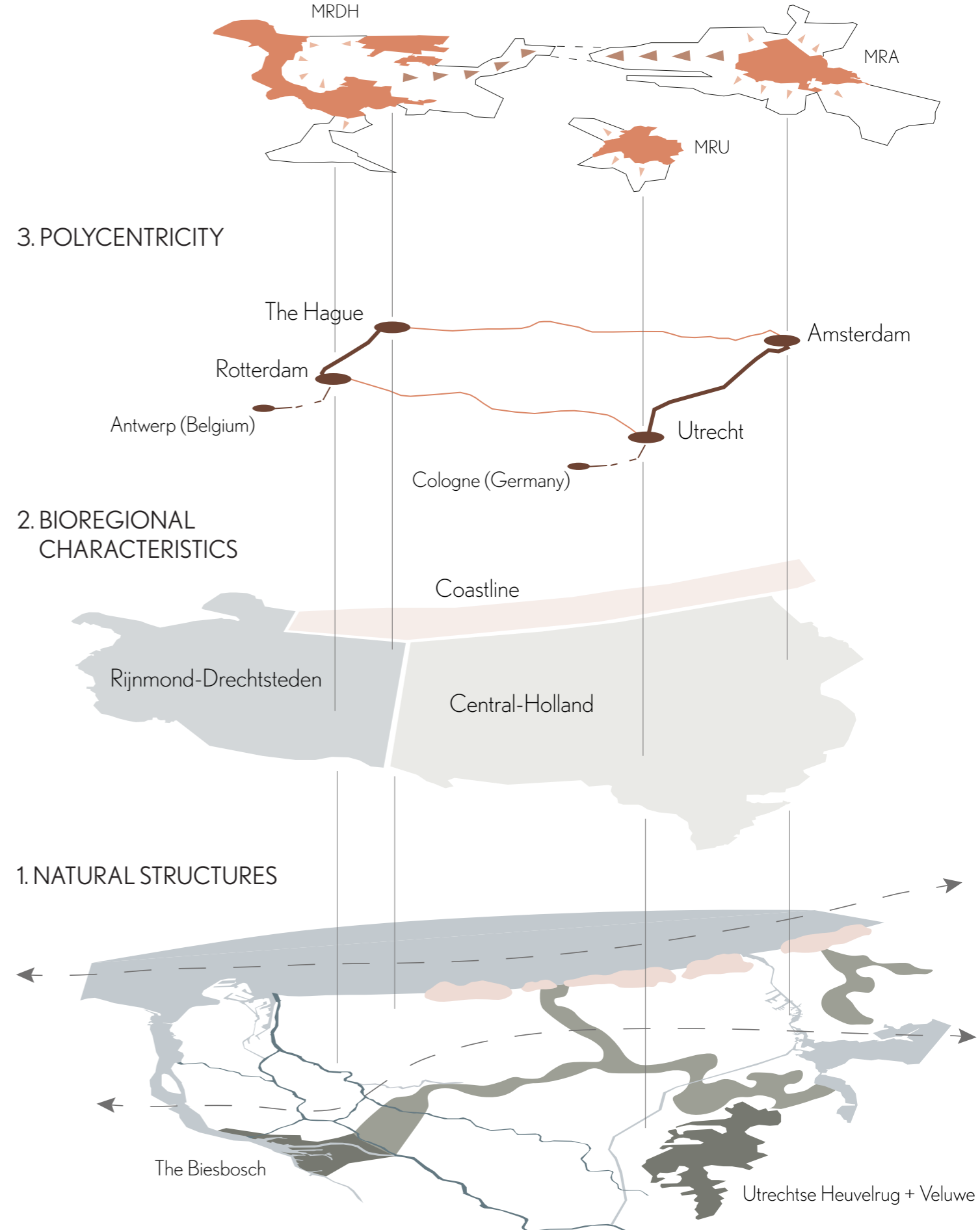
- Moving natural systems up the hierarchy



From controlling, to planning with nature

- Natural systems as structuring element
- Urban development responds to environmental and bioregional capacities

4. URBANISATION



Bioregional conditions should become dominant in the framework of spatial decision-making, requiring urbanisation to negotiate with landscape capacity. Hydro-geomorphological systems, environmental dynamics and ecological systems should therefore become the backbone for future regional developments, marking a transition from planning against nature towards planning with care for nature.

