

Deltascapes - Towards a typology of urbanizing deltas

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Han Meyer & Steffen Nijhuis
30 September 2010

TU Delft
Delft University of Technology

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LAB**



Deltascapes - Towards a typology of urbanizing deltas

Aim: developing a **method of analysis** of urbanized deltas for fruitful planning- and design interventions

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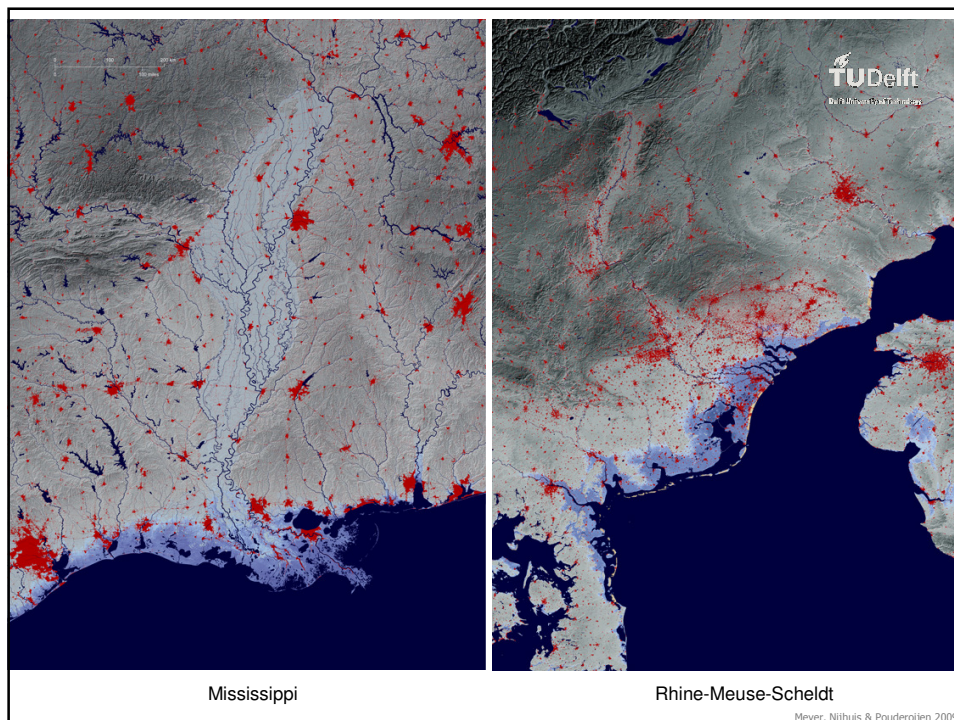
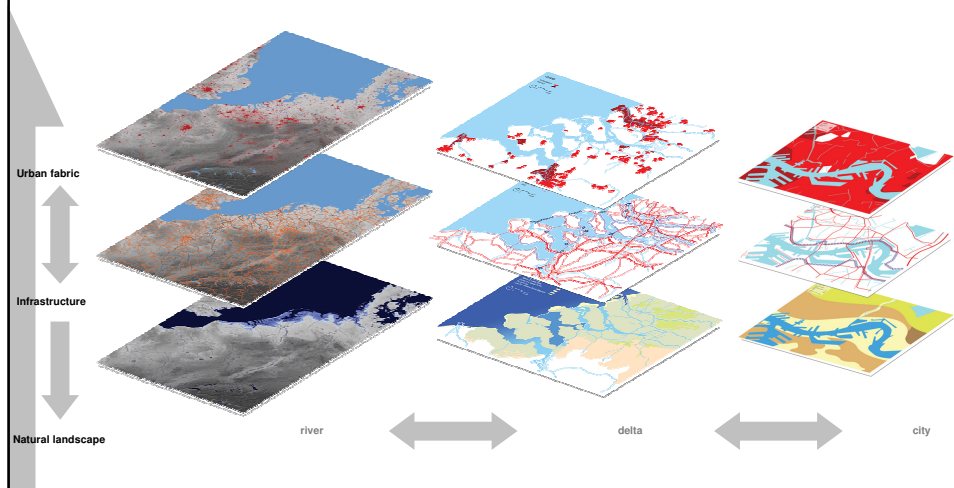
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3 layers x 3 scales x time

how are interventions in one layer and one scale related to changes in other layers and other scales in different periods

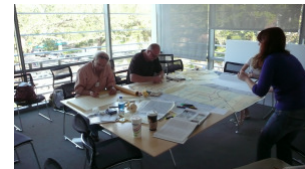


Netherlands ↔ New Orleans

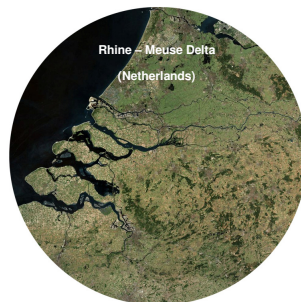
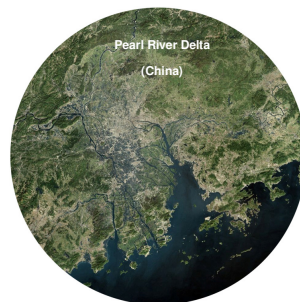
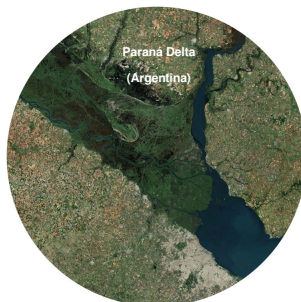
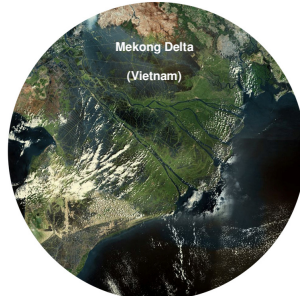
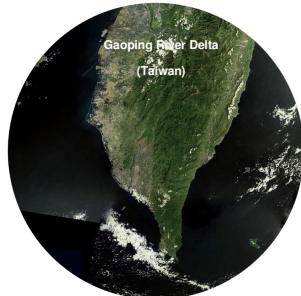


- What can New Orleans learn from the Netherlands
- and vice versa
- In what sense are both urbanized deltas comparable
- What are the differences and similarities
- How can we understand the specific complexity of a specific delta...
- ...in order to be able to develop fruitful design and planning interventions

Netherlands ↔ New Orleans



Urbanizing Delta's: research projects



Dredge Drain Reclaim

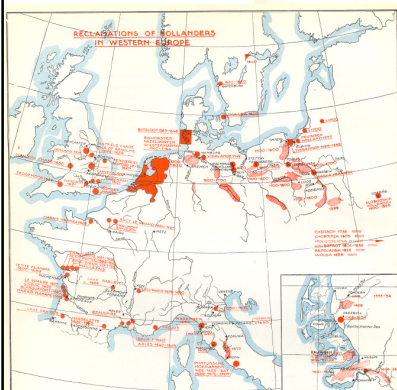
THE ART OF A NATION

BY

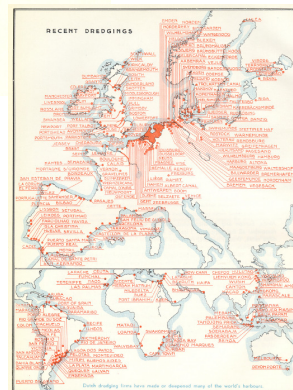
D^r JOH. VAN VEEN
CHIEF ENGINEER RIJKSWATERSTAAT



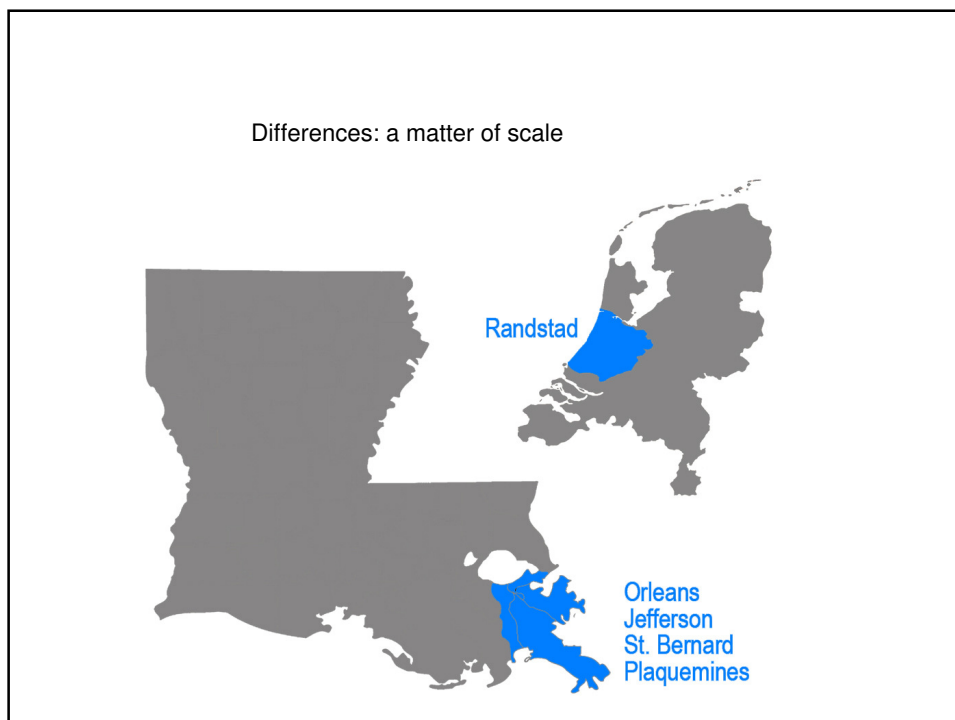
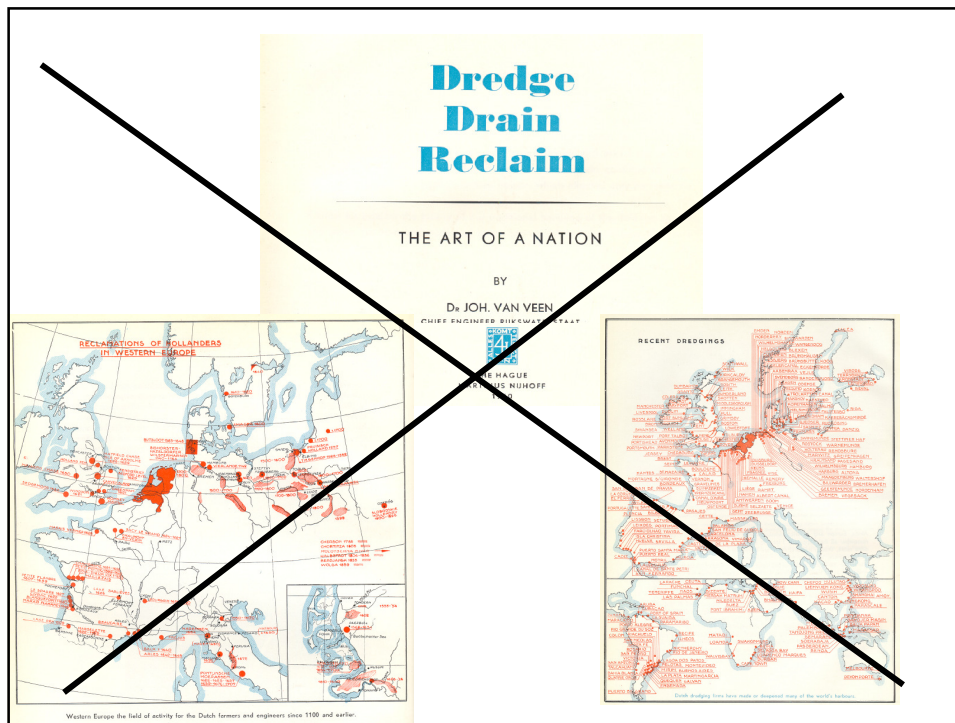
THE HAGUE
MARTINUS NIJHOFF
1950

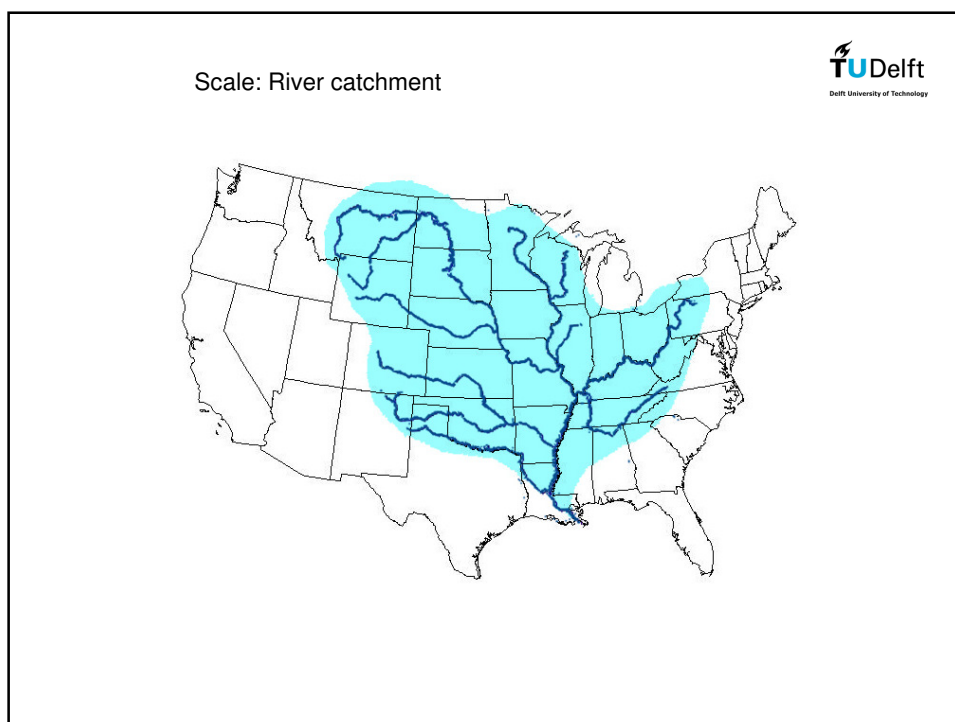
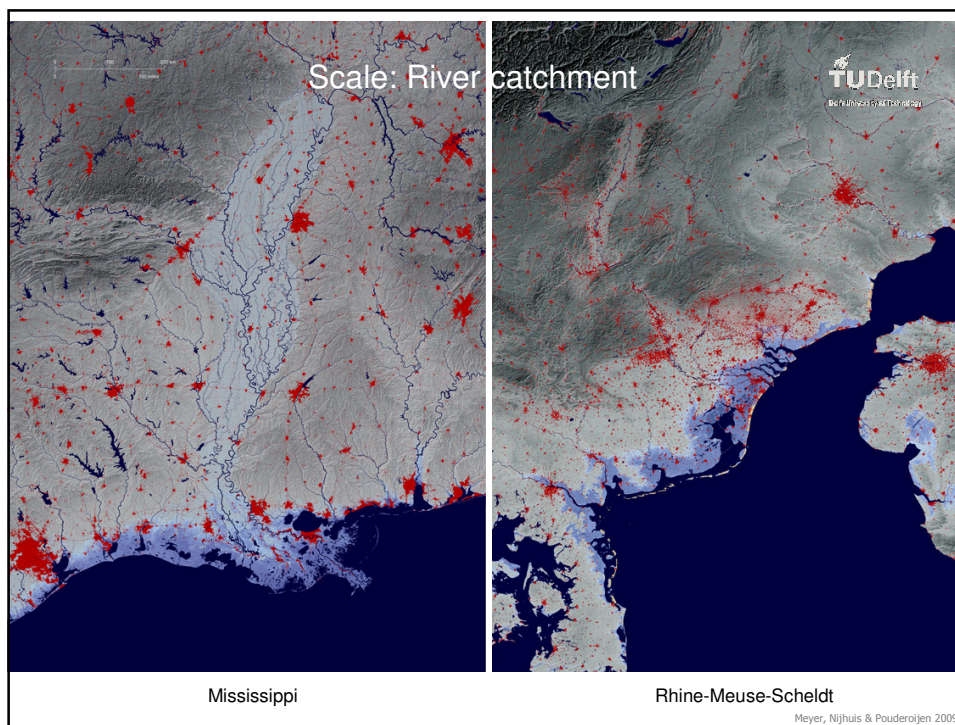


Western Europe the field of activity for the Dutch farmers and engineers since 1100 and earlier.



These dredgings have been made on European maps of the world's harbours.

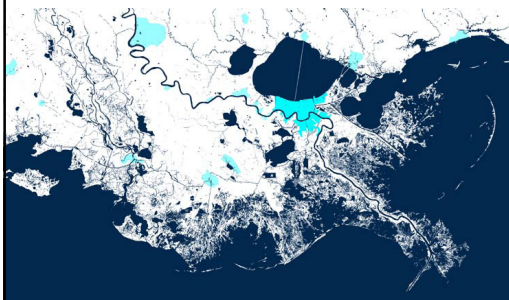




Case studies: Mississippi & Rhine-Meuse

	Mississippi	Rhine-Meuse
<i>Length</i>	6,275 km	1,320 km
<i>Depth - average</i>	New Orleans: 60 m	Arnhem: 8 m
<i>Discharge - average</i>	16,000 m ³ /sec	2000 (summer) m ³ /sec
<i>Discharge – extreme</i>	48,000 m ³ /sec	12,000 m ³ /sec
<i>Sediment transport</i>	170 million ton/yr	0.4 million ton/yr

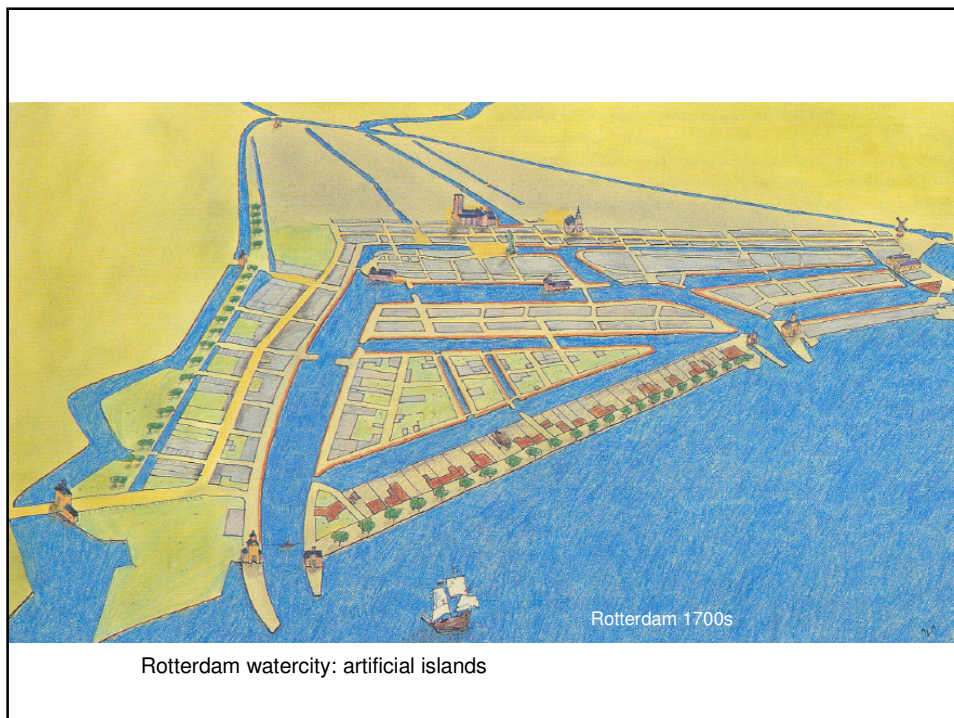
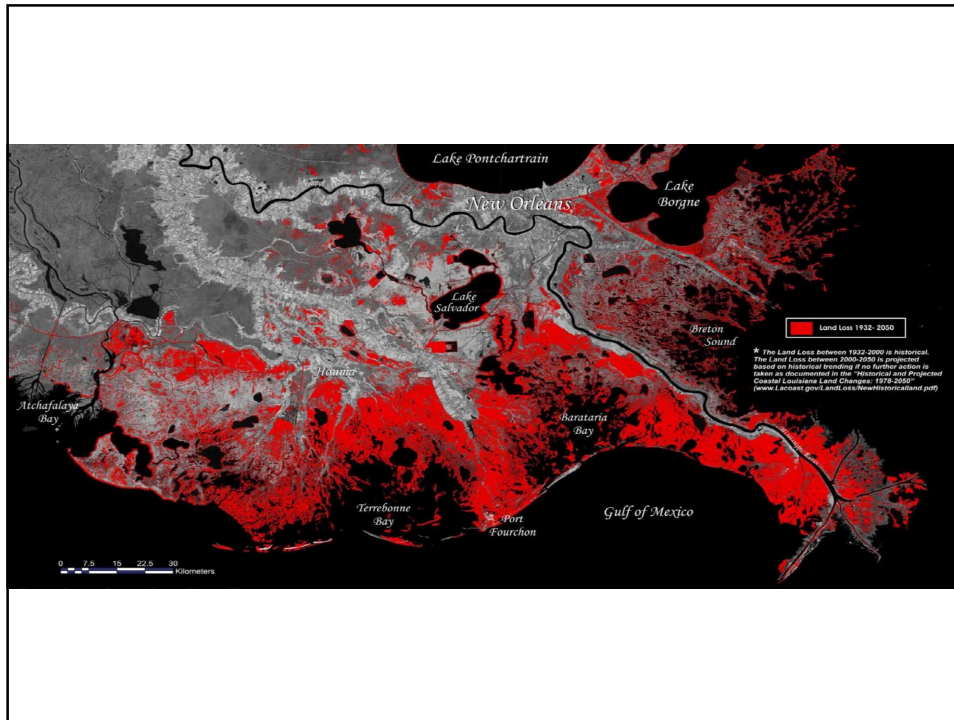
Delta scale

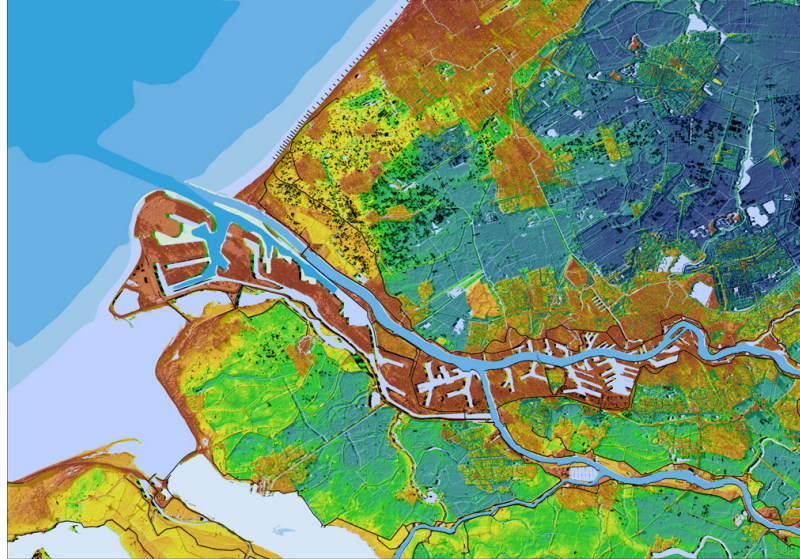


Mississippi delta

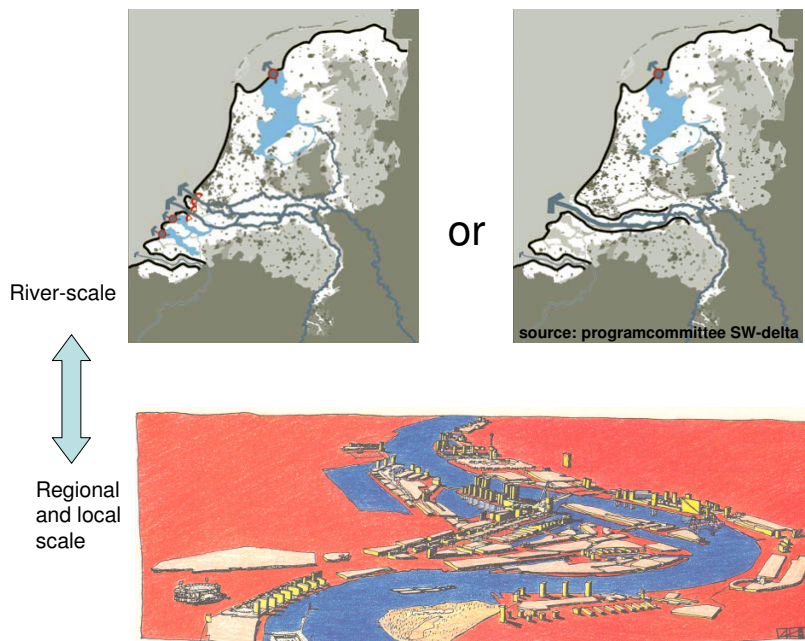


Rhine-Meuse-Scheldt delta

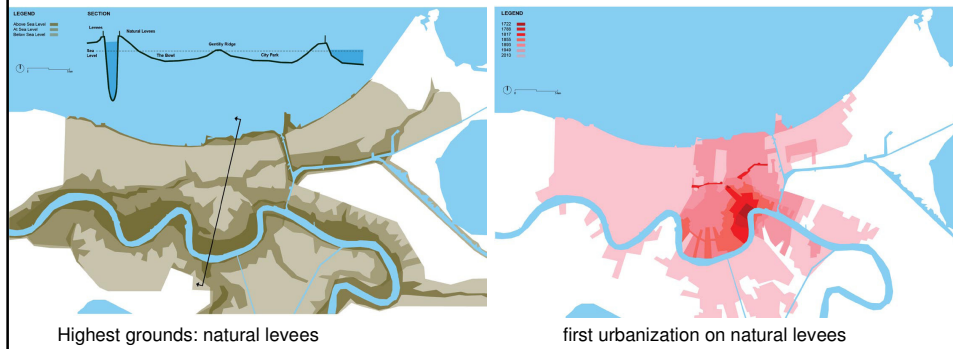




Artificial and natural high grounds in Rotterdam region

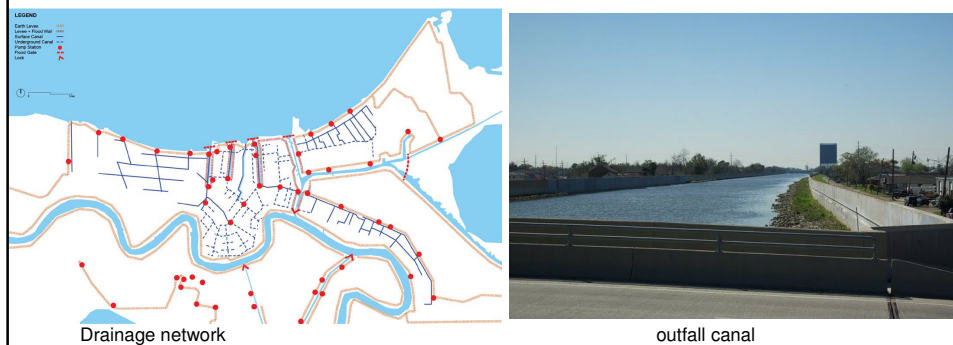


New Orleans city scale

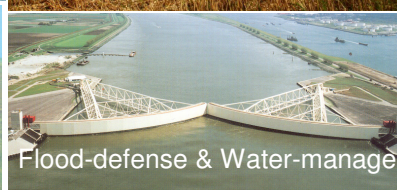


D. Raymond, 2010

New Orleans city scale



Complexity of urban delta's



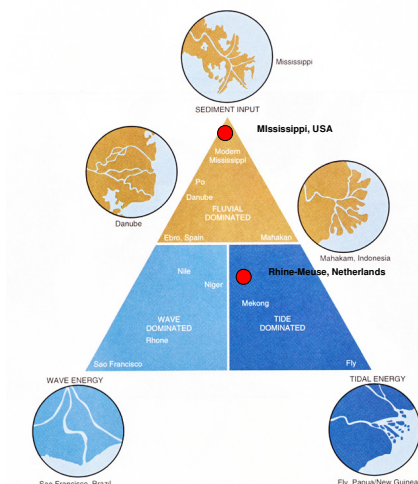
Complexity of urban delta's

Urban deltas are extremely **complex systems**

A complex is according to Batty (2005):

- 1) a system based on many interacting parts;
- 2) individual parts are changing because of internal and external influences;
- 3) changes in one part will influence and change other parts and the system as a whole;
- 4) it is difficult/impossible to predict the future of the system.

- *understanding* the mechanisms of the complexity of urban deltas is necessary for fruitful design- and planning interventions
- Understanding = what are the individual parts and how are they influencing each other.
- The complexity of one urban delta is not similar to the complexity of other urban deltas.
- For efficient design- and planning interventions we should be able to recognize the differences and similarities of the systems of different urban deltas.
- This is why a **typology of urban deltas** (= a science which is able to indicate the specific complexity of an urban delta) is necessary in order to be able to define *planning and design strategies* for urban deltas.

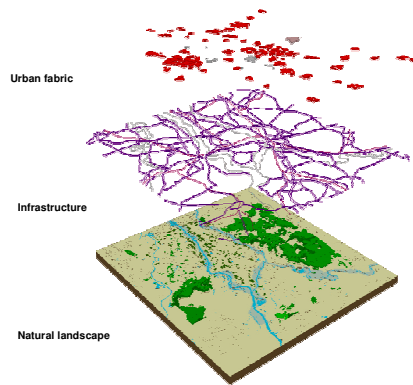


- First attempt for a typology of deltas: Bradschaw & Weaver (1995) focusing on the natural system of the delta

- Our intention is to develop a typology of urban deltas, including also infrastructural systems (hydraulic systems, road networks) and urban patterns

- Central question:
How do urban patterns and infrastructural systems influence the natural system of the delta, and vice versa ?

Layer-approach



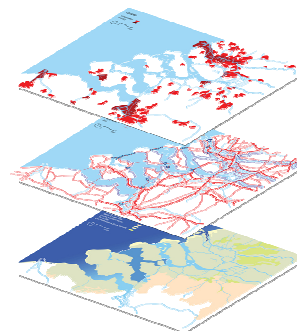
The *layer*-approach delivers possibilities for a development of this typology related with planning- and design strategies.

First applied by McHarg (1976), adopted and developed in the 1980s in NL, often mentioned in planning and design documents, but never elaborated in a systematic way.

Nijhuis 2006

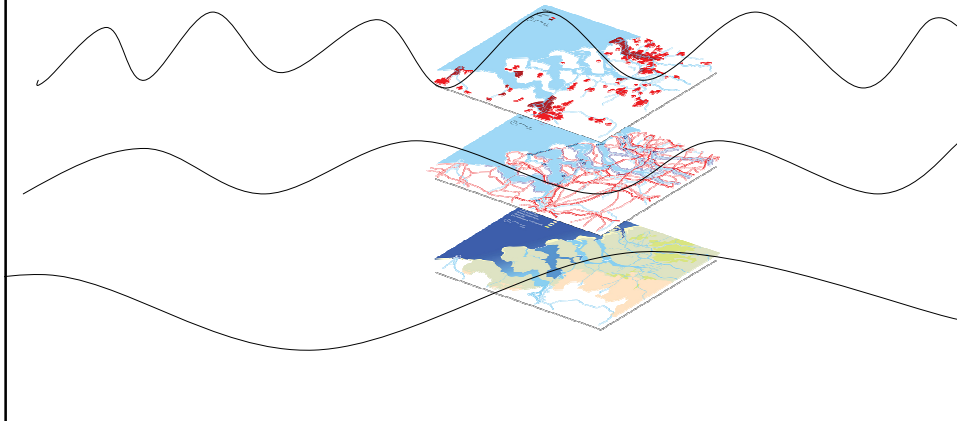
3 layers

We can study how, for instance, an intervention in the layer of infrastructure influences urban patterns and the natural system



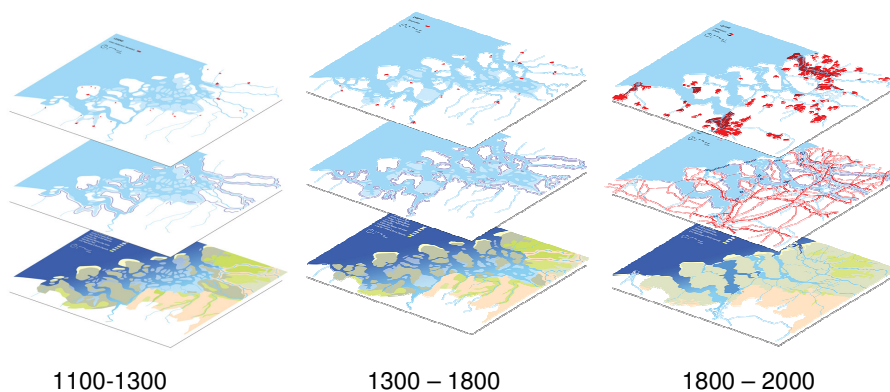
Time

Each layer has a specific transformation-frequency



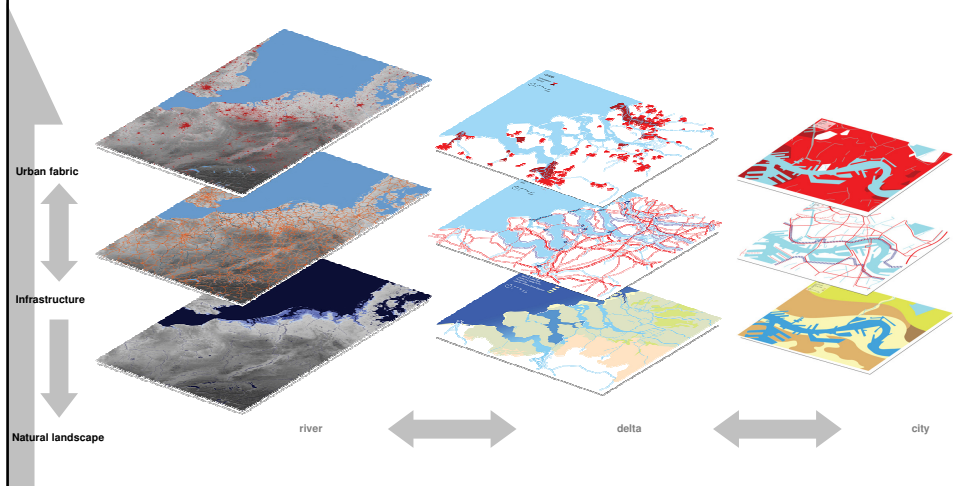
3 layers x time

We can study how, for instance, an intervention in the layer of infrastructure influences urban patterns and the natural system



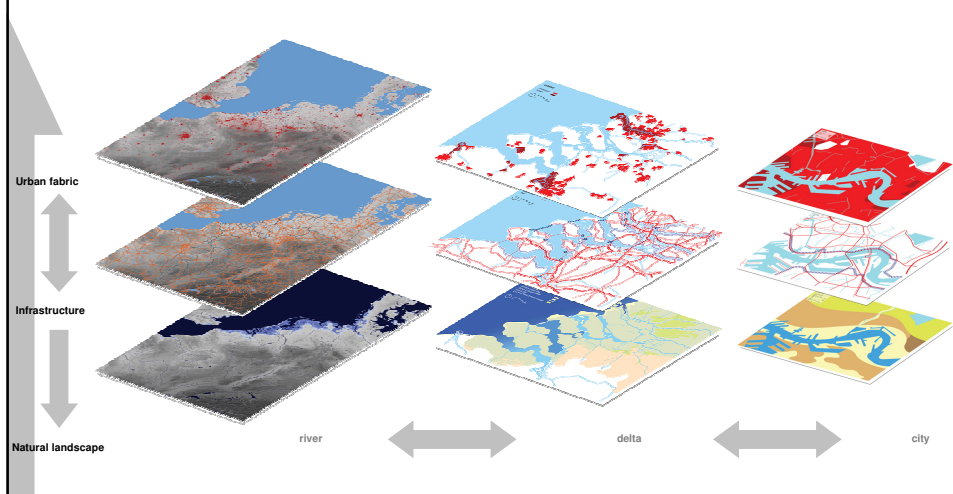
3 layers x 3 scales

We can study how, for instance, an intervention in the layer of infrastructure at the the delta-scale influences urban patterns and the natural system at different scales



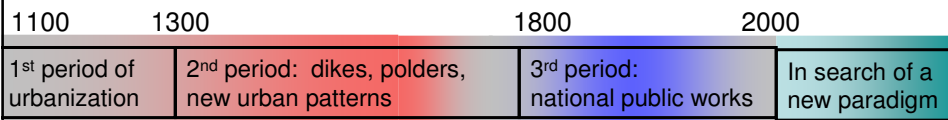
3 layers x 3 scales x time

how are interventions in one layer and one scale related to changes in other layers and other scales **in different periods**

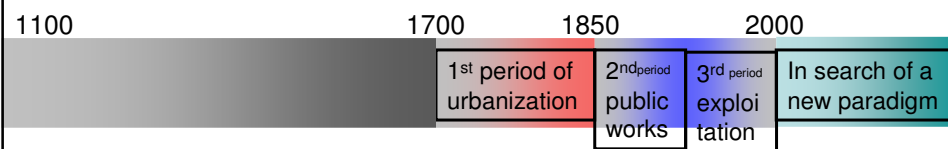


Different periods

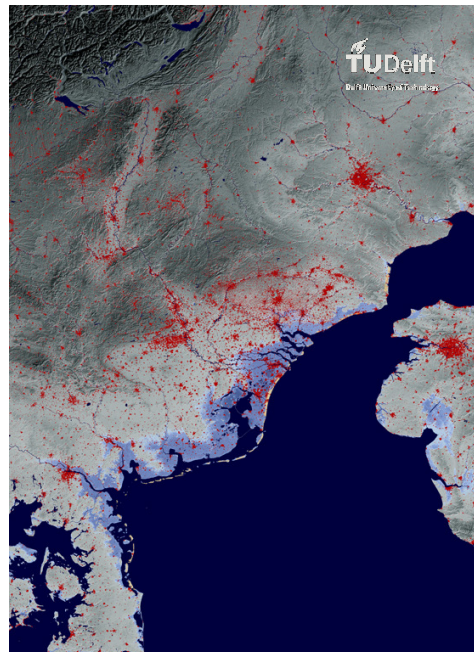
DUTCH DELTA



MISSISSIPPI DELTA

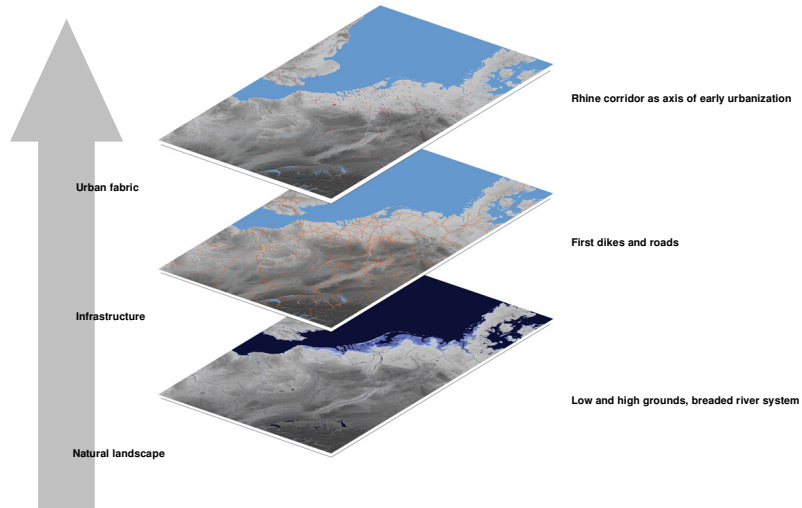


Rhine-Meuse-Scheldt Delta



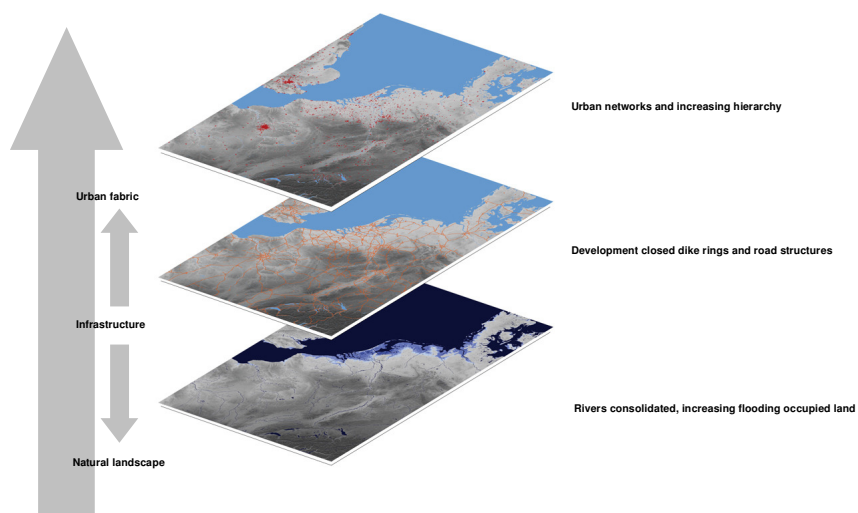
1.1 - Rhine-Meuse (1100 – 1300)

River scale



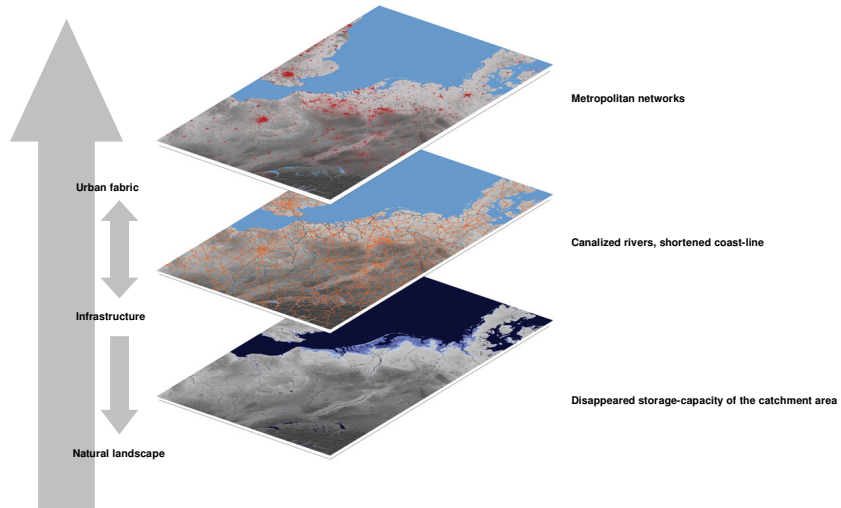
2.1 - Rhine-Meuse (1300 – 1800)

River scale



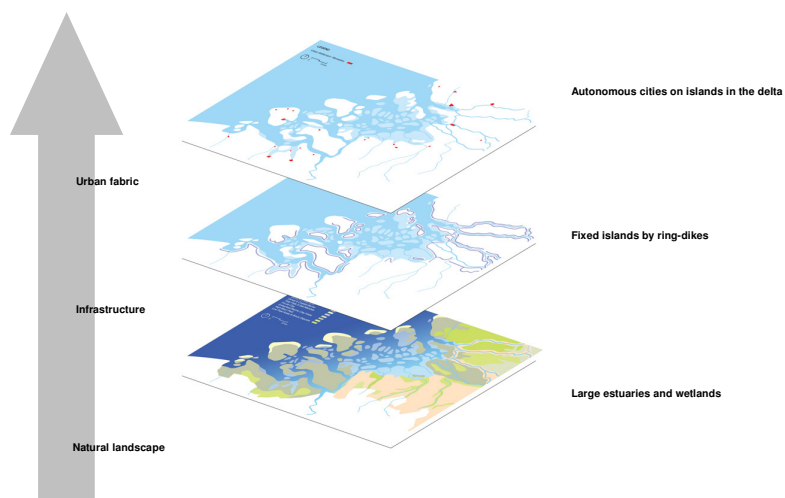
3.1 - Rhine-Meuse (1800 – 2010)

River scale



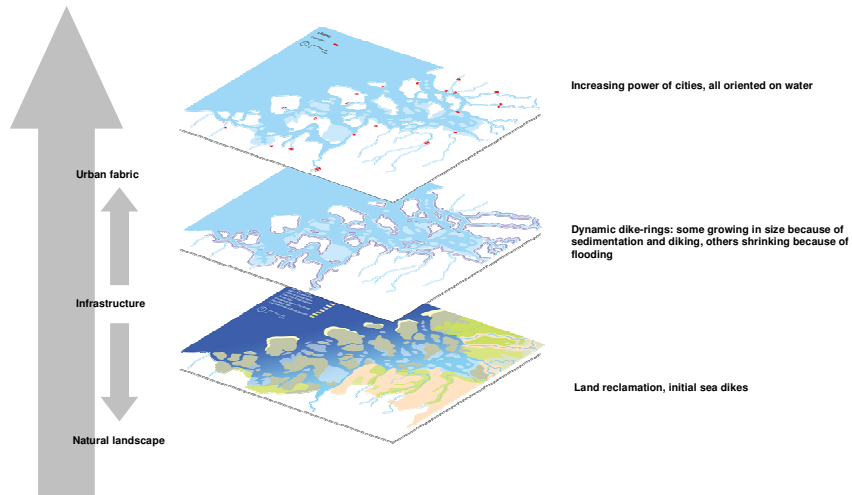
1.2 - Rhine-Meuse (1100 – 1300)

Delta scale



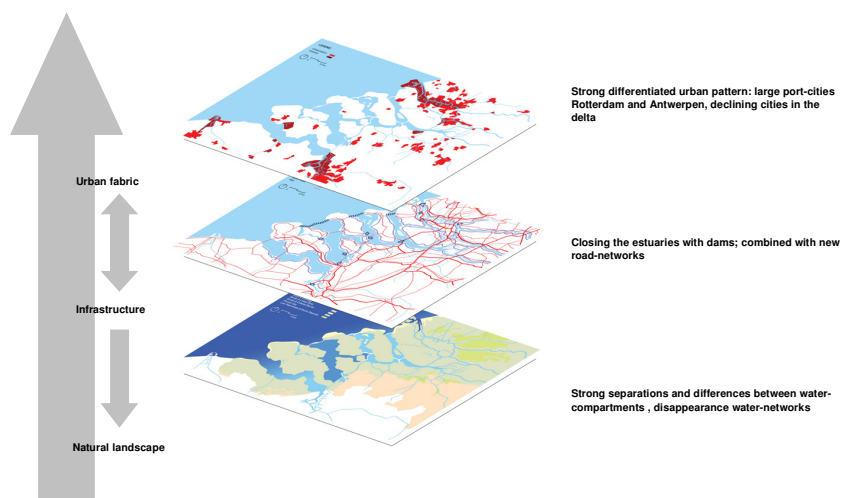
2.2 - Rhine-Meuse (1300 – 1800)

Delta scale



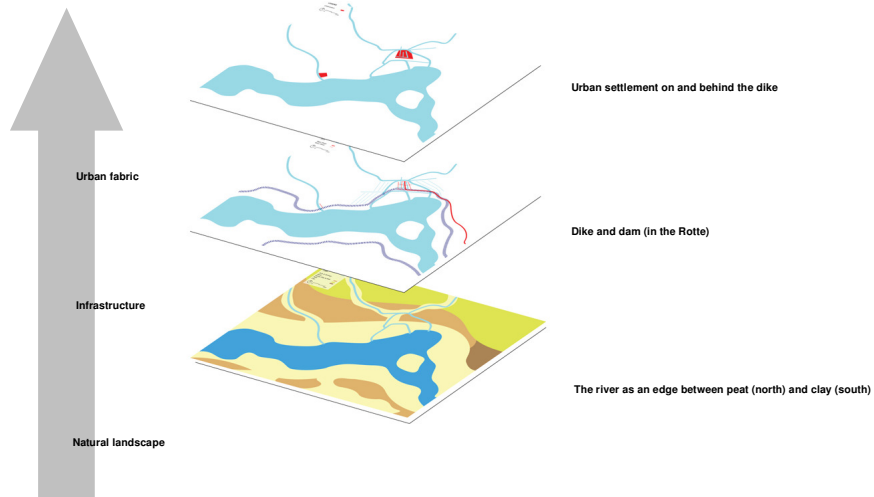
3.2 - Rhine-Meuse (1800 – 2010)

Delta scale



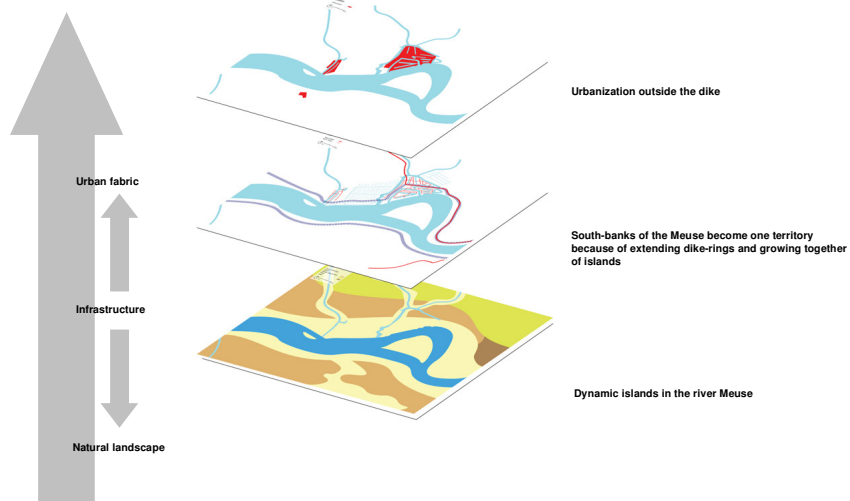
1.3 - Rhine-Meuse (1100 – 1300)

City scale



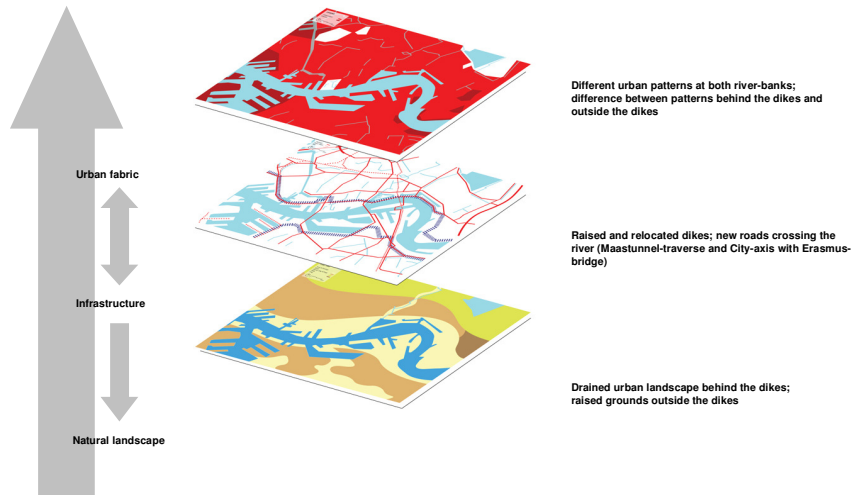
2.3 - Rhine-Meuse (1300 – 1800)

City scale



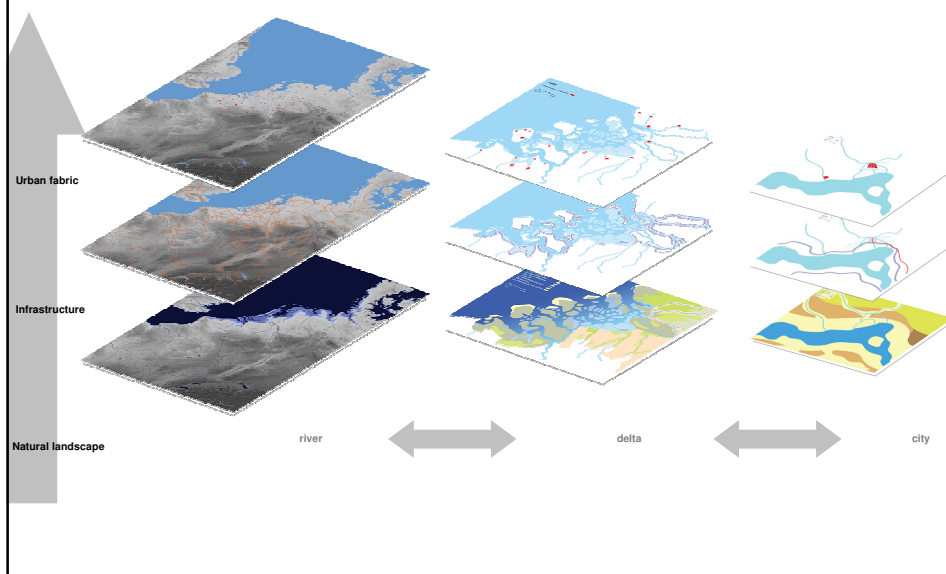
3.3 - Rhine-Meuse (1800 – 2010)

City scale



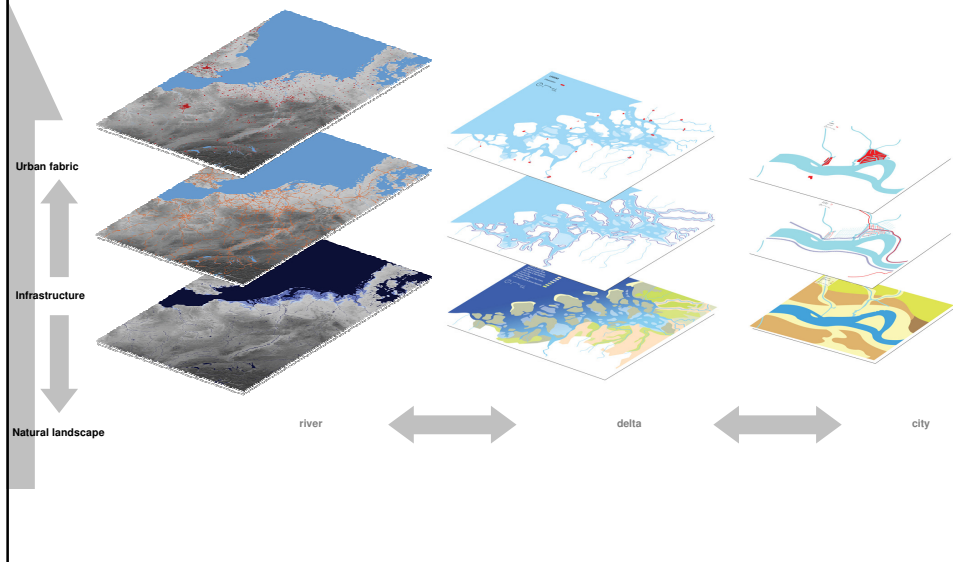
1.4 - Rhine-Meuse (1100 – 1300)

Overview



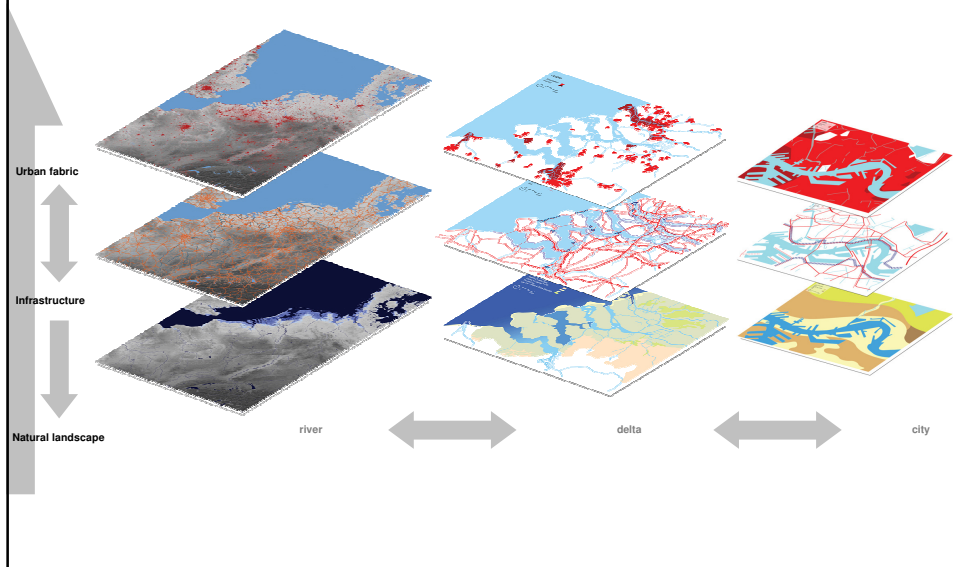
2.4 - Rhine-Meuse (1300 – 1800)

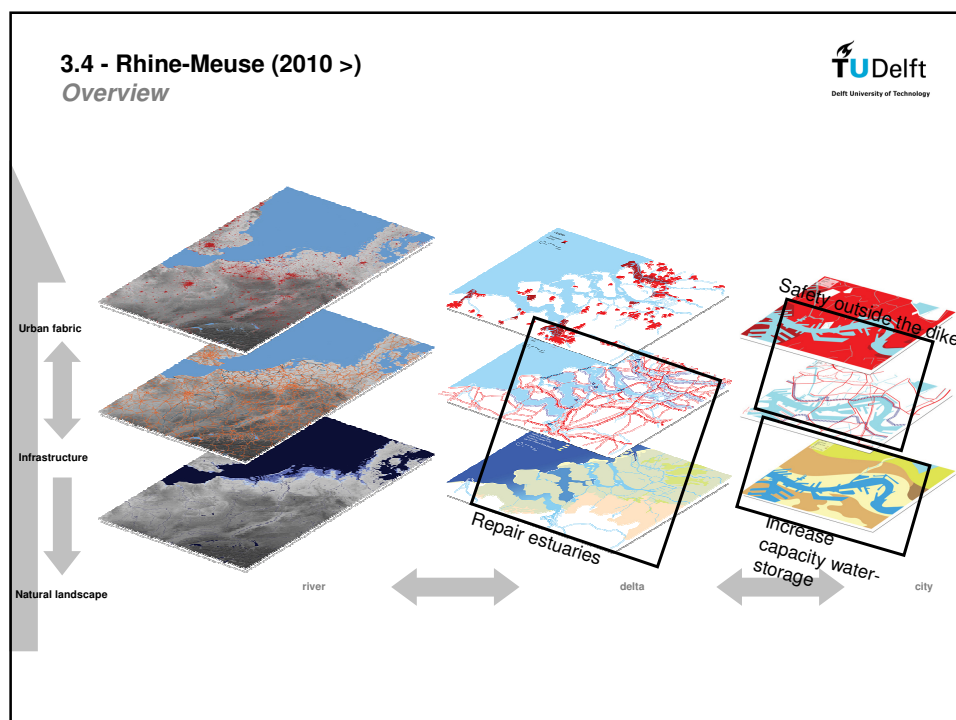
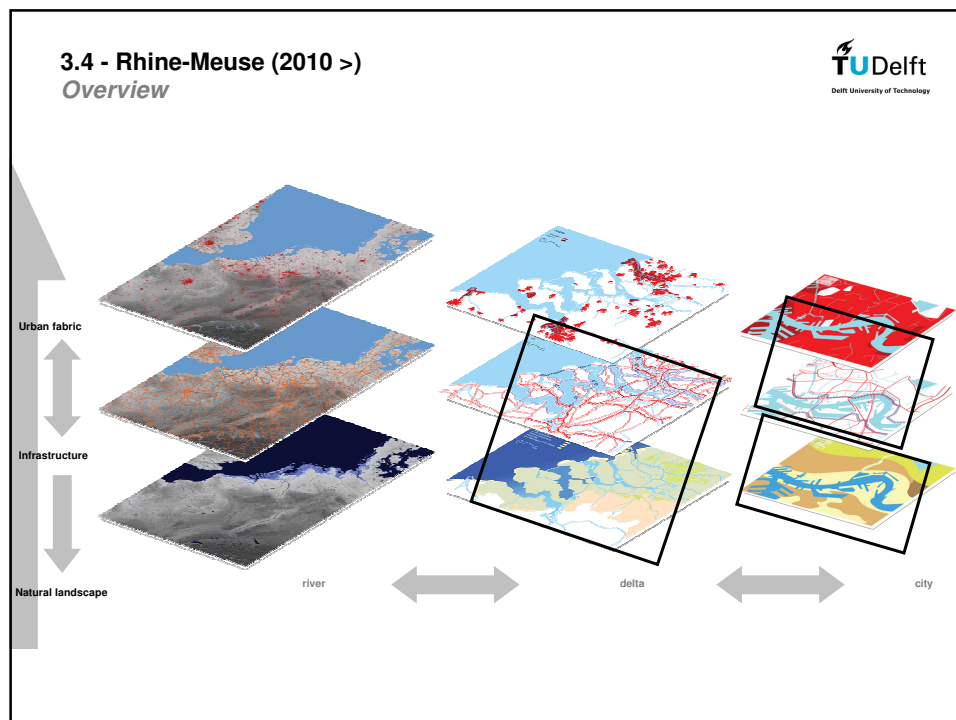
Overview



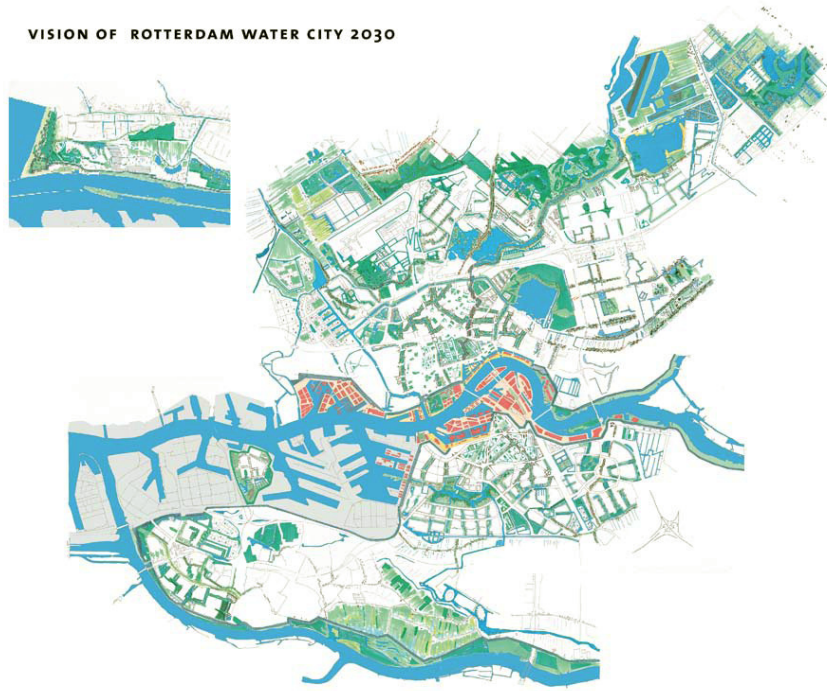
3.4 - Rhine-Meuse (1800 – 2010)

Overview



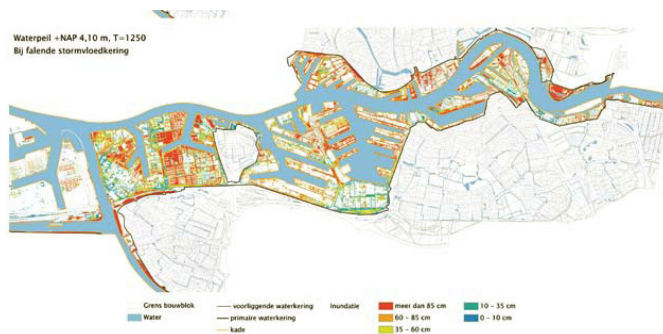


VISION OF ROTTERDAM WATER CITY 2030

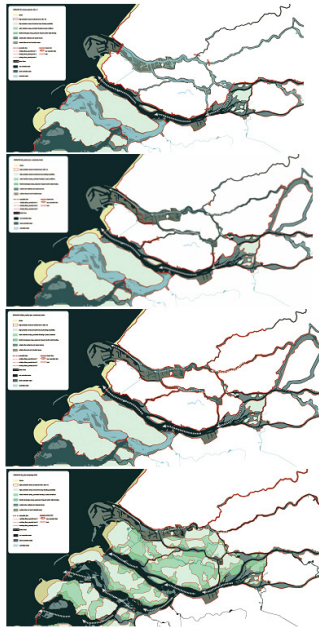


Flood-risks waterfront-sites 'outside the dikes'

Waterpeil +NAP 4.10 m, T=1250
Bij falende stormvloedkering



Regional system



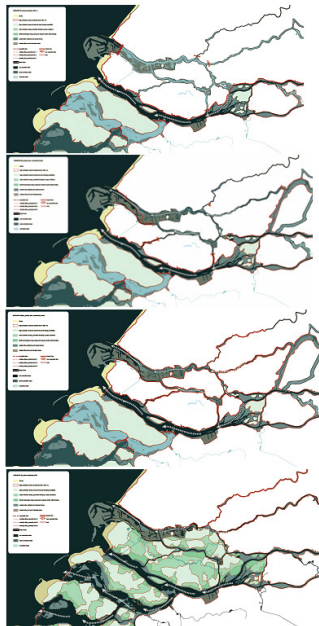
Closed

Open/closed

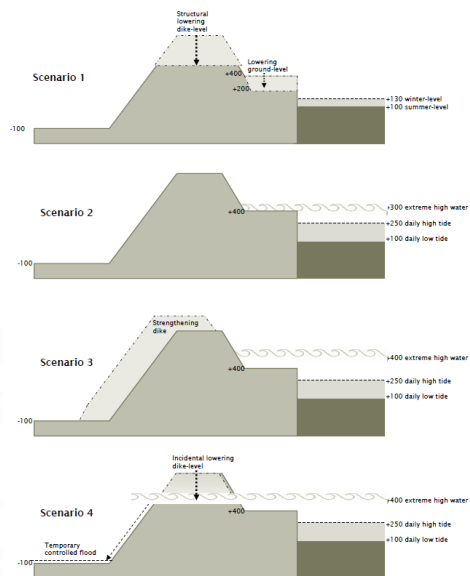
Open

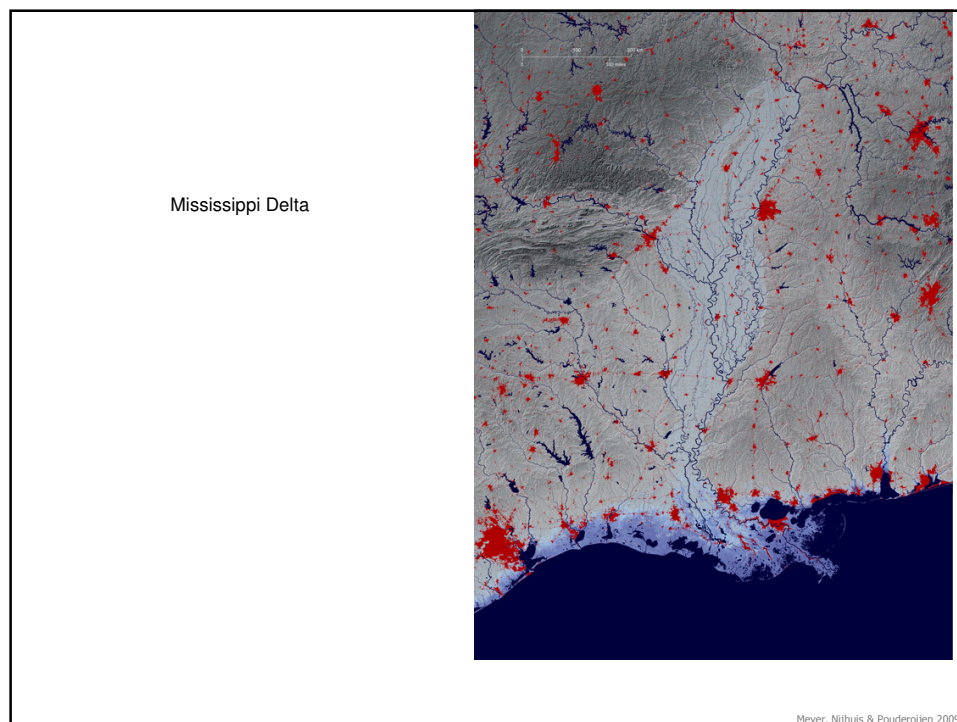
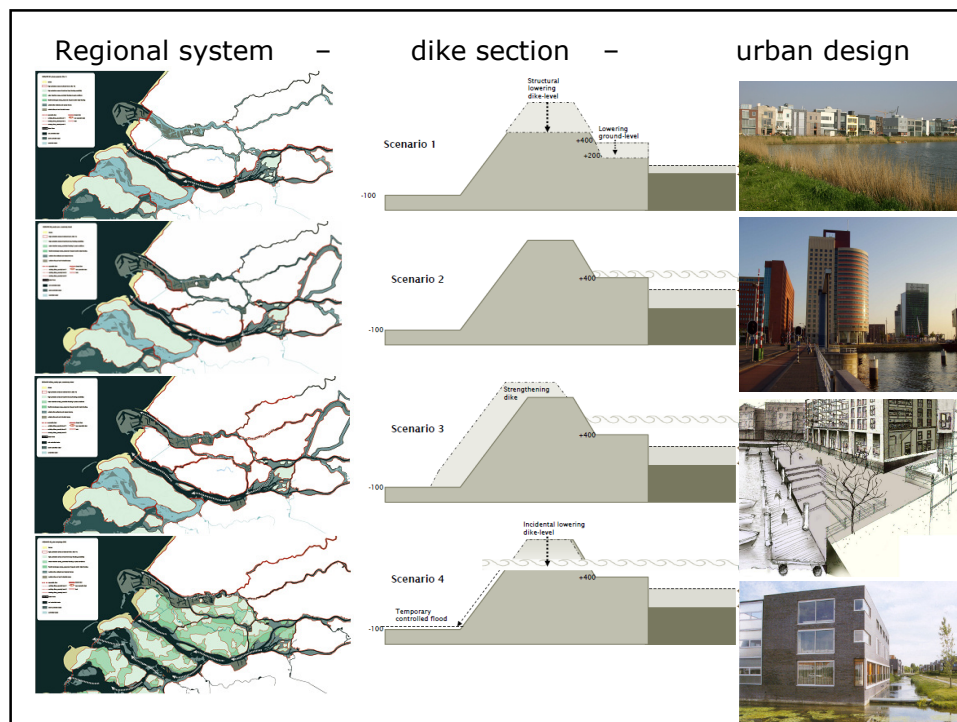
Open with
overflow-areas

Regional system



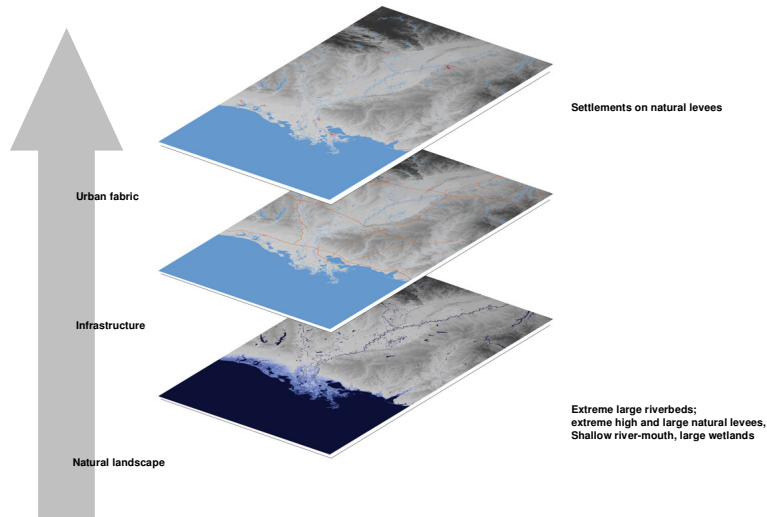
dike section





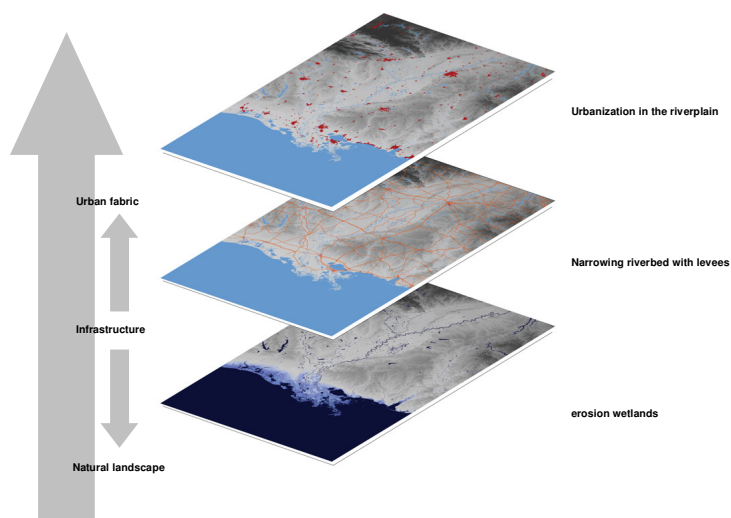
1.1 - Mississippi (1700 – 1850)

River scale



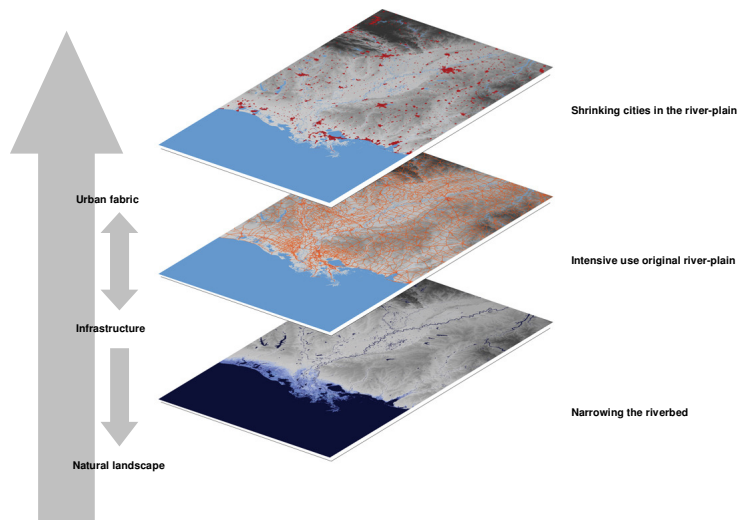
2.1 - Mississippi (1850 – 1950)

River scale



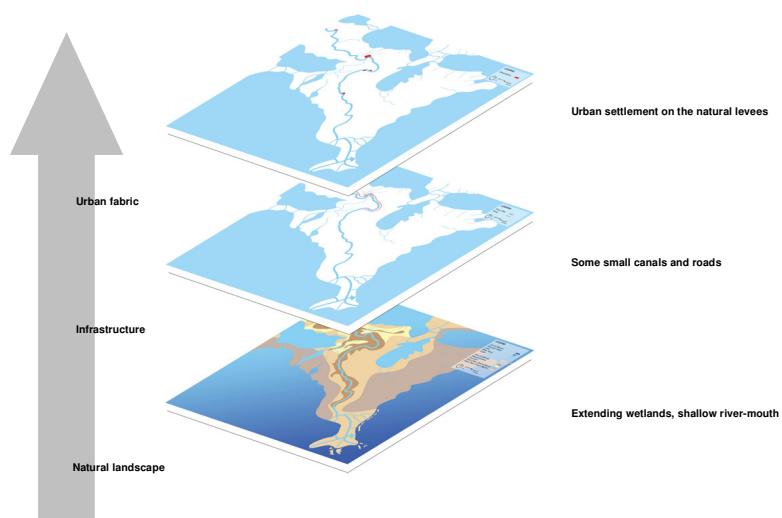
3.1 - Mississippi (1950 - 2010)

River scale



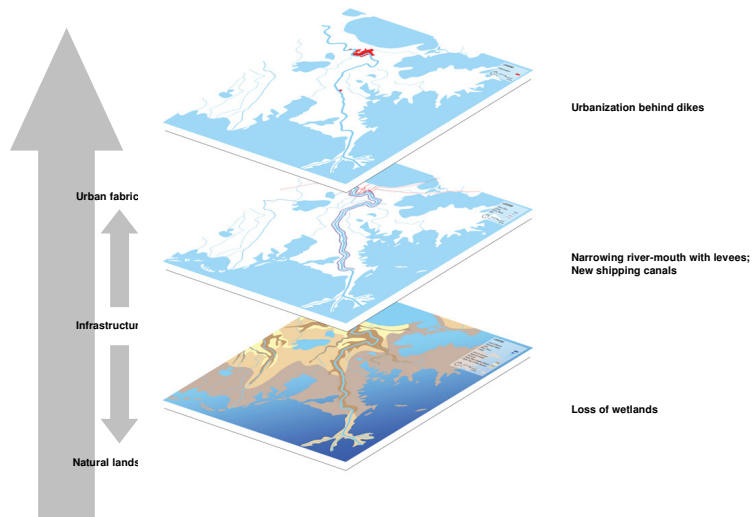
1.2 - Mississippi (1700 – 1850)

Delta scale



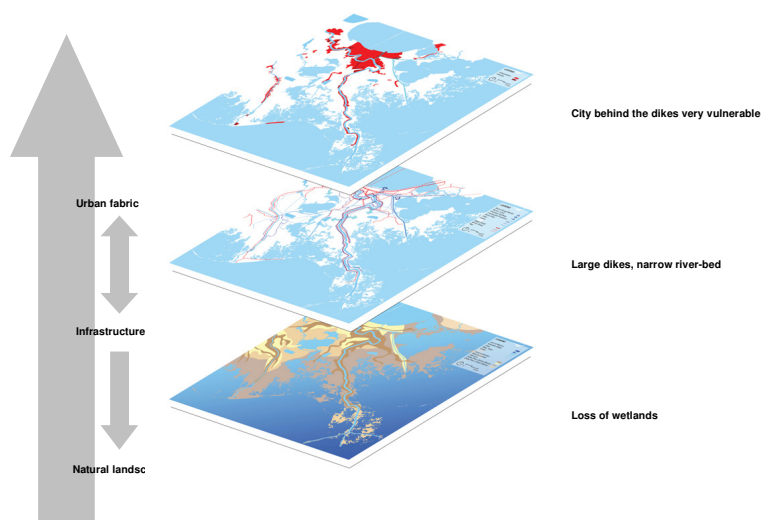
2.2 - Mississippi (1850 – 1950)

Delta scale



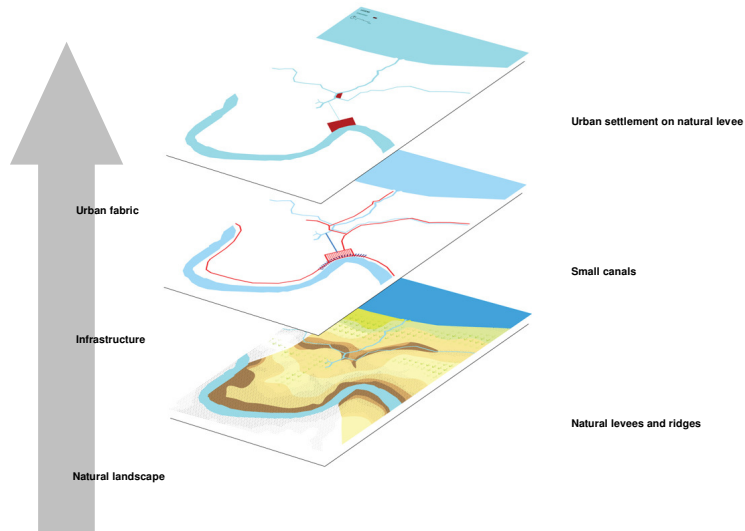
3.2 - Mississippi (1950 - 2010)

Delta scale



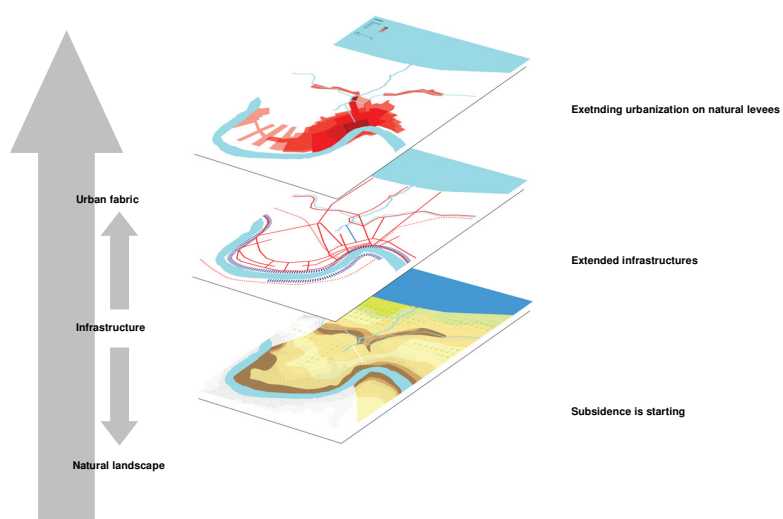
1.3 - Mississippi (1700 – 1850)

City scale



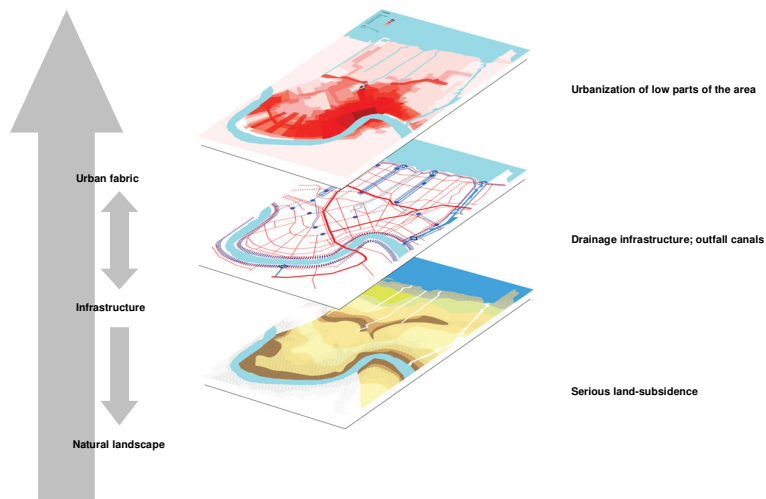
2.3 - Mississippi (1850 – 1950)

City scale



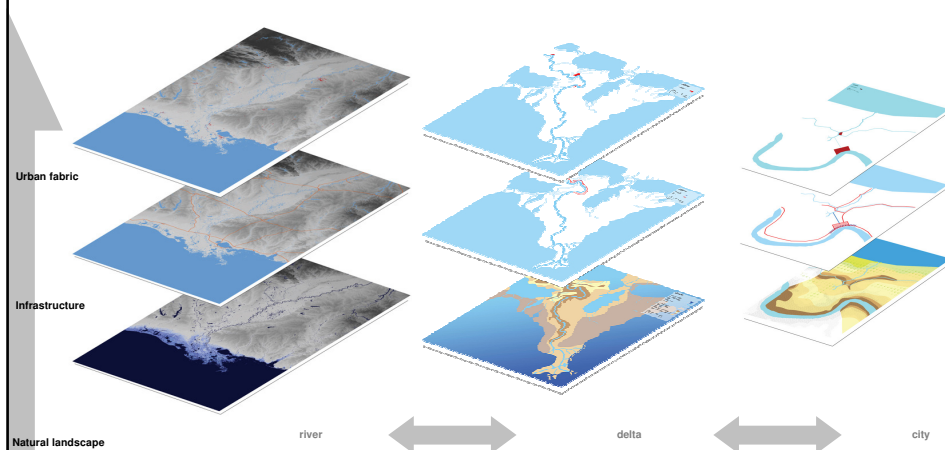
3.3 - Mississippi (1950 - 2010)

City scale



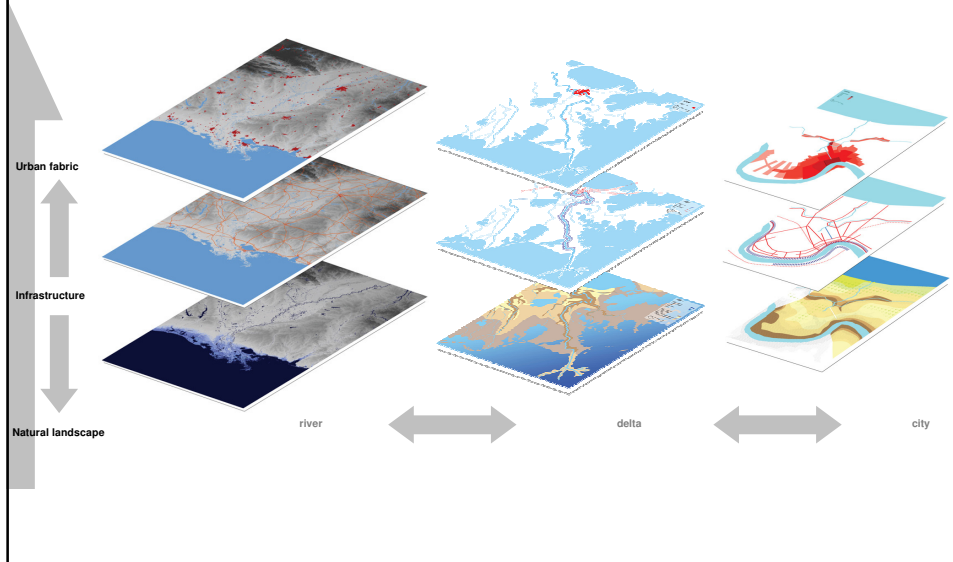
1.4 - Mississippi (1700 – 1850)

Overview



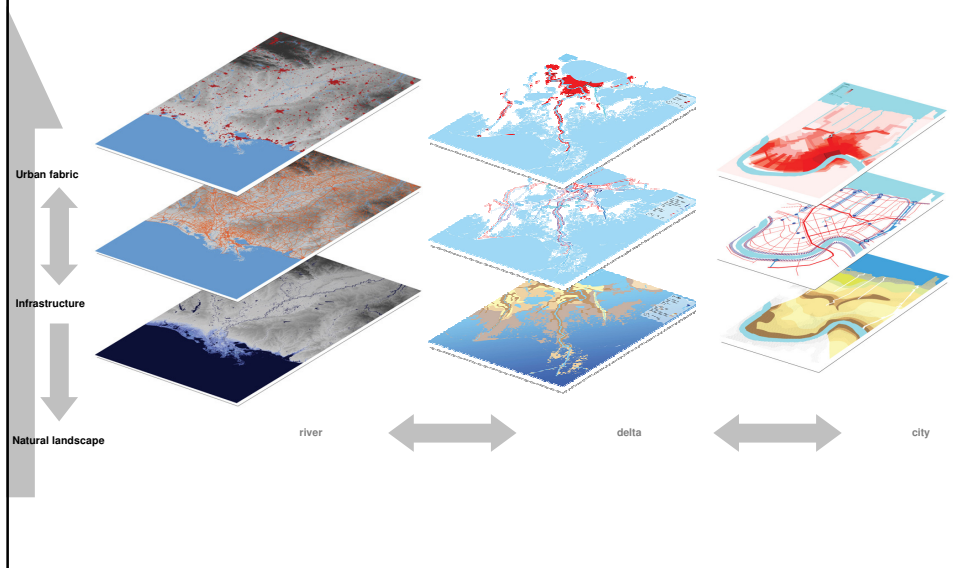
2.4 - Mississippi (1850 – 1950)

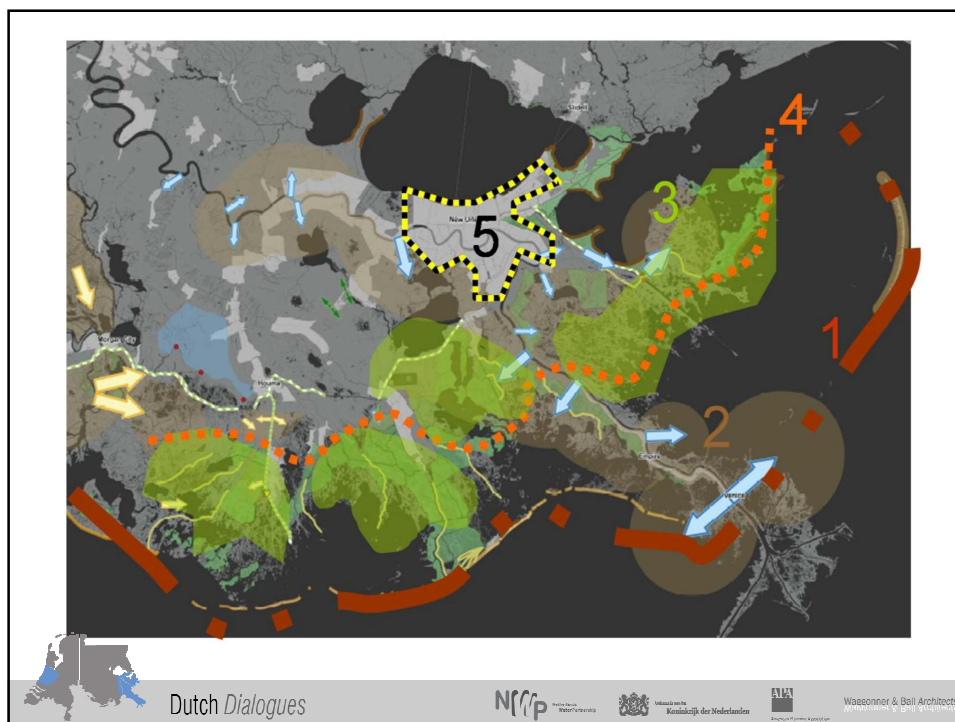
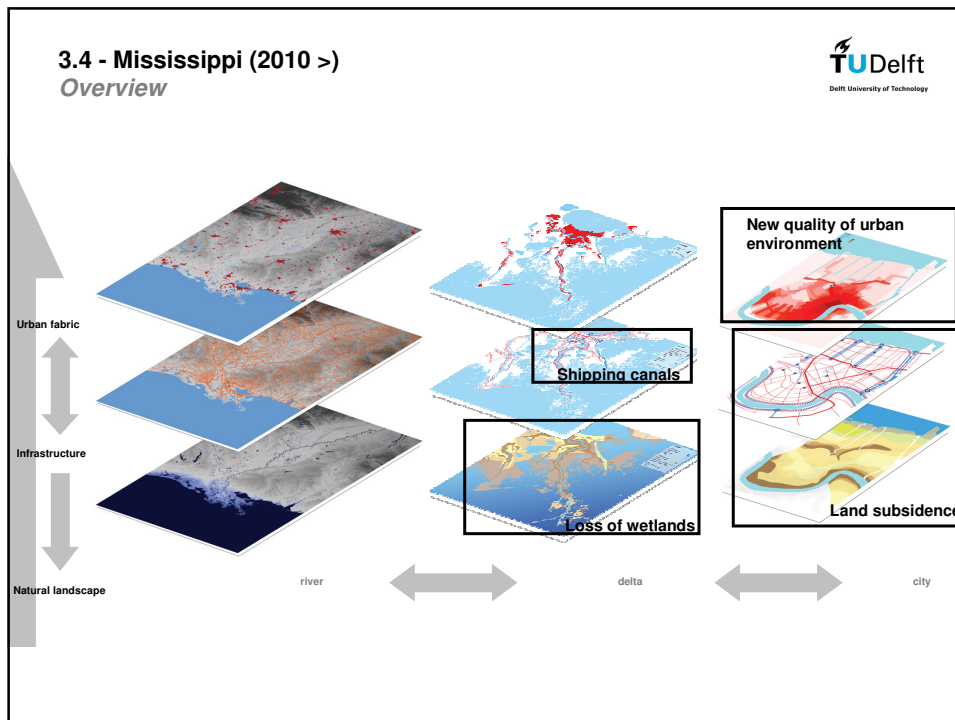
Overview



3.4 - Mississippi (1950 - 2010)

Overview





A 'vascular' water-system



Dutch Dialogues



Netherlands Research Programme



Ministerie van Infrastructuur en Watermanagement
Koninkrijk der Nederlanden



Water Valley Architects

Waeconner & Ball Architects
Waeconner & Ball Architects

Transformation outfall canals: introduction new urban quality



Dutch Dialogues



Netherlands Research Programme

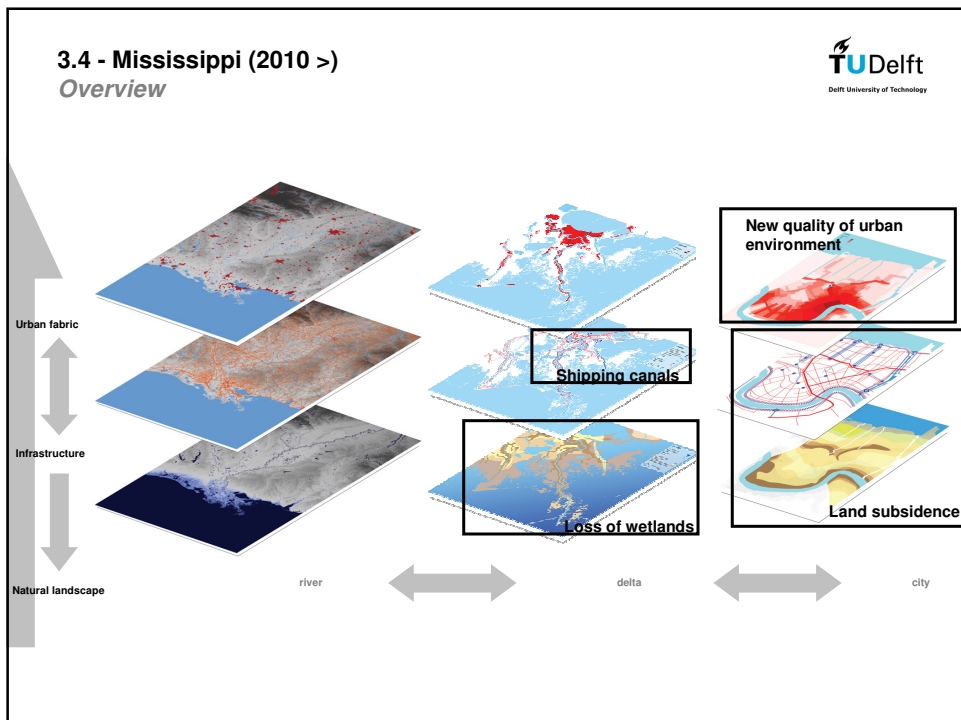
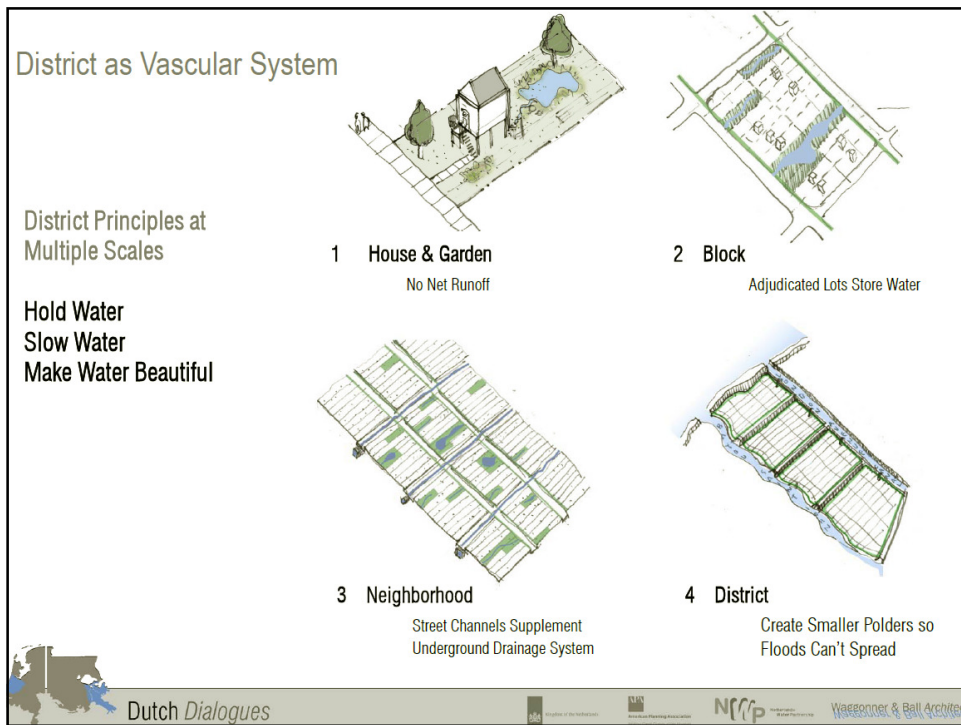


Ministerie van Infrastructuur en Watermanagement
Koninkrijk der Nederlanden



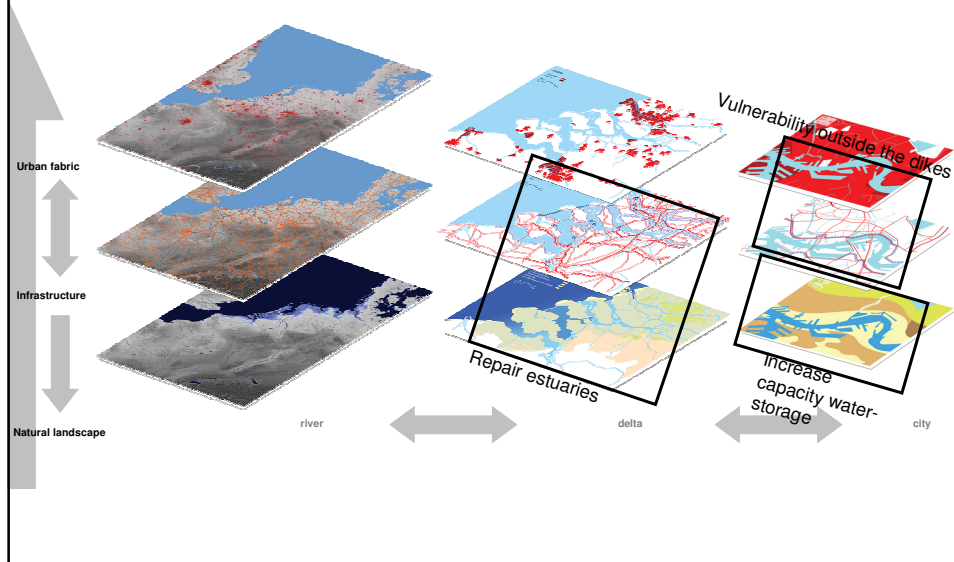
Water Valley Architects

Waeconner & Ball Architects
Waeconner & Ball Architects



3.4 - Rhine-Meuse (2010 >)

Overview



Conclusions & outlook

Defining strategic questions for urban planning and design:

- 1) indication of differences and similarities concerning planning and design in New Orleans and Netherlands;
- 2) necessity of awareness of relations between large scale and small scale interventions;
- 3) necessity of combination of multi-disciplinary design-interventions, involving landscape design, environmental design, hydraulic engineering, urban design and urban planning;
- 4) necessity of combination of policies of national, regional and local authorities.

Towards an *Atlas* of urban deltas

