Waterveiligheidslandschappen

Future Riverscapes: flood safety & robust ecosystems

enabling delta life

Foto: Waal bij Millingen

Gertjan Geerling

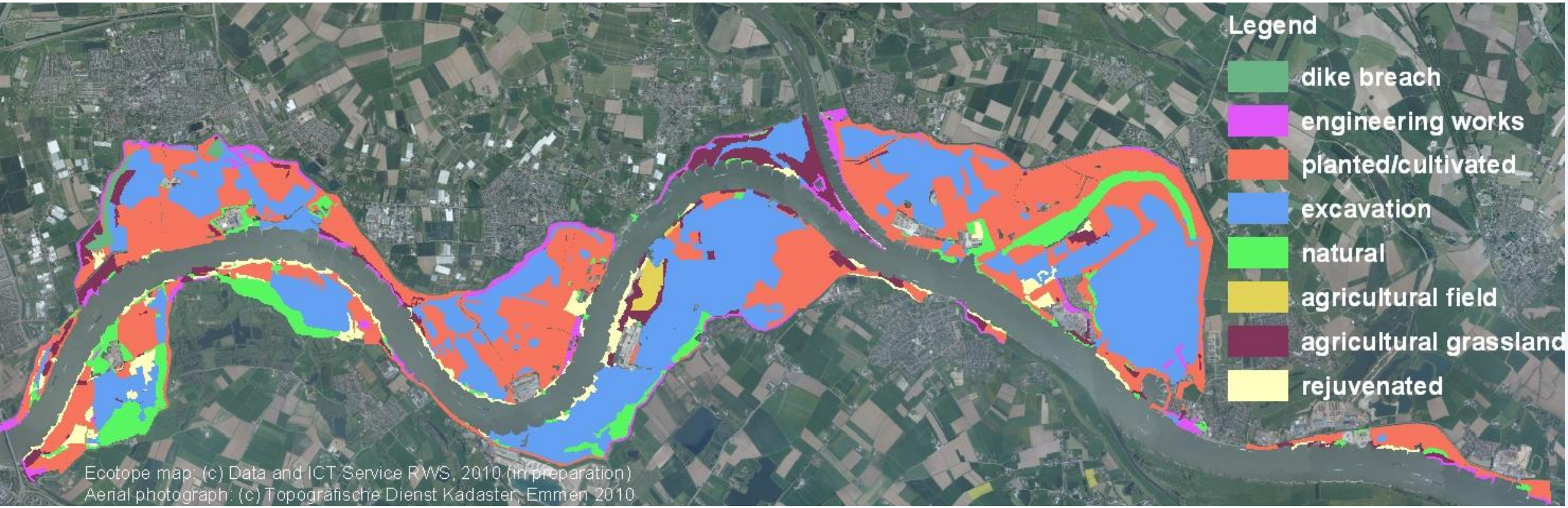
Unregulated “overstromingslandschap”

“Adapts” to changing flow and sediment regimes

Allier (France)

Regulated “overstromingslandschap”

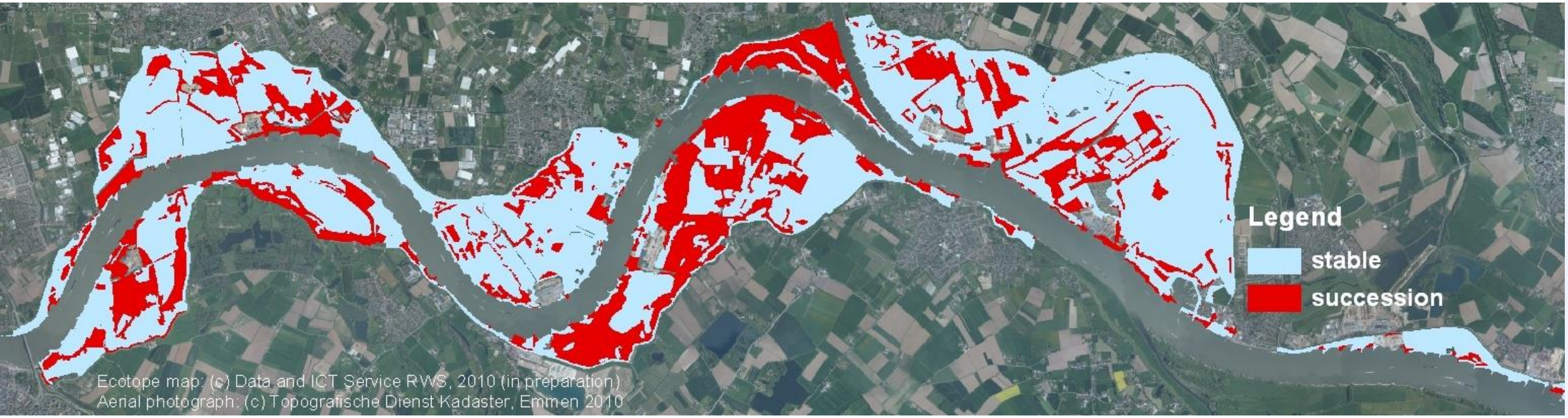
Man-made landscape | origin of ecotopes



Ecotope origin (anno 2010):

- Excavation (40%)
- Cultivations (38%)
- Natural (7%)
- Introduction of ‘natural’ grazing on arg. grasslands (6%)

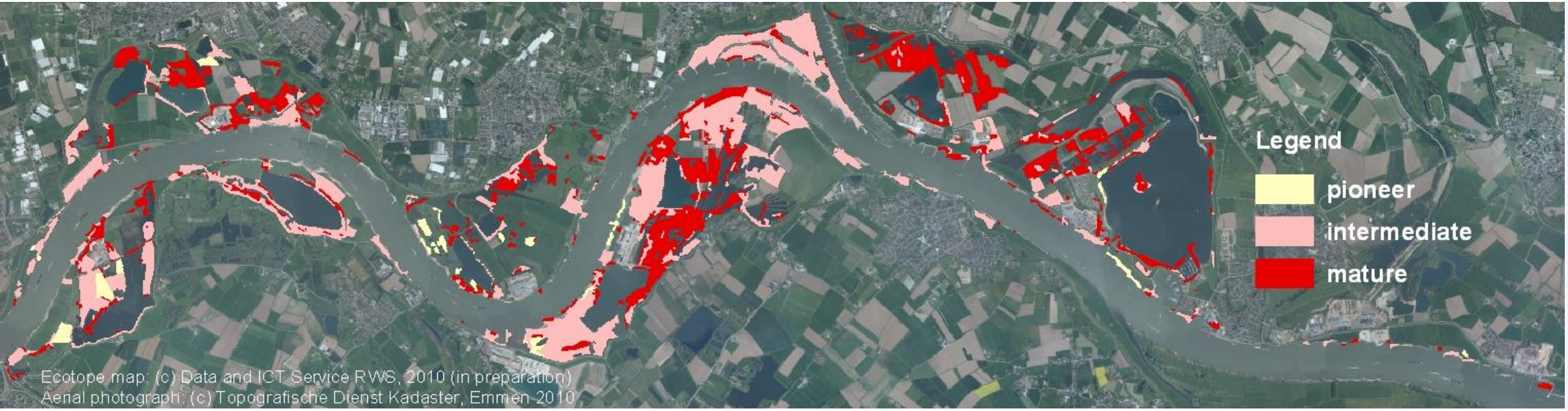
Dynamic landscape | ecological succession



2010: 30% in succession and 70% stable

2100: 70% in succession?

Succession stage | hydraulic roughnes dynamics



2010: Succession stage of ecotopes:

- 4% in pioneer stage (e.g. bare soil and pioneer vegetations)
- 54% intermediate (herbaceous, grass)
- 42% mature (shrubs and forest)

Pioneer landscape

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Intermediate stage

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Mature stage
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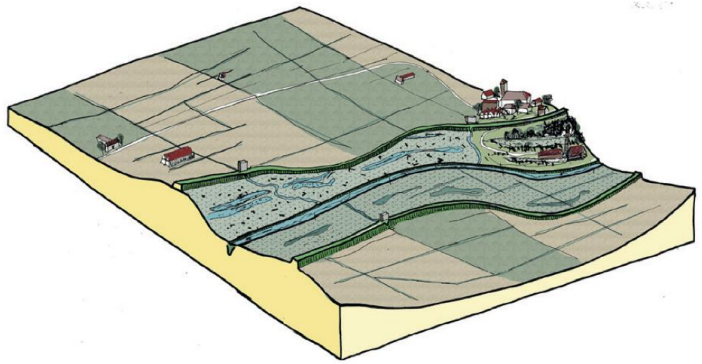
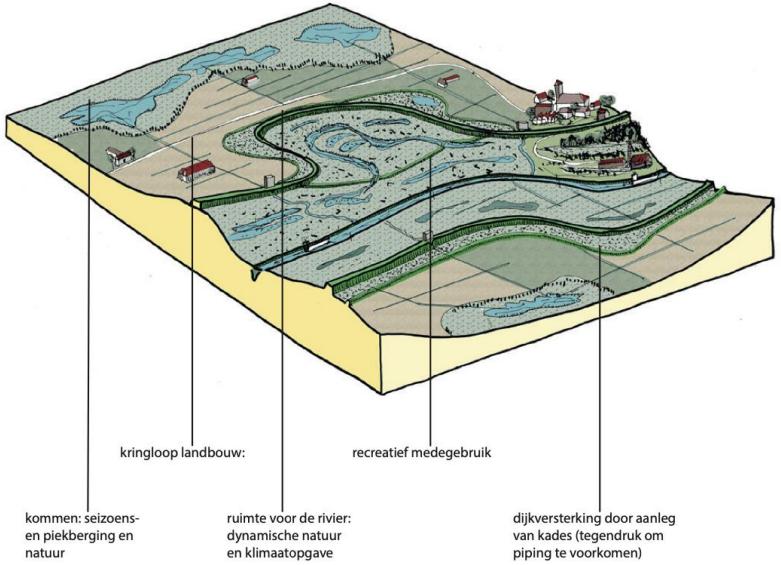
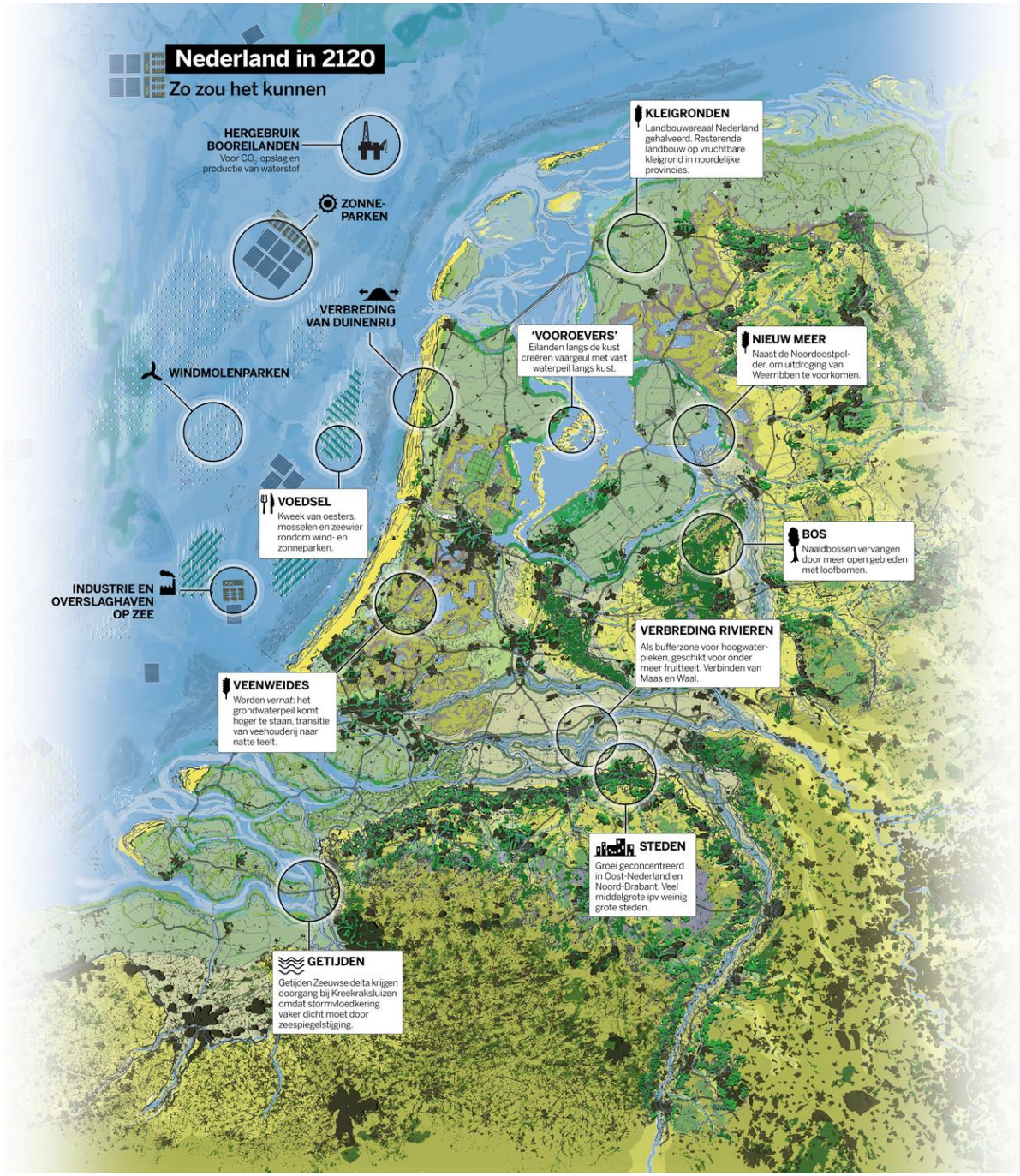
“WUR” scenario 2120



Rivierengebied: huidige situatie



Rivierengebied: toekomstige situatie



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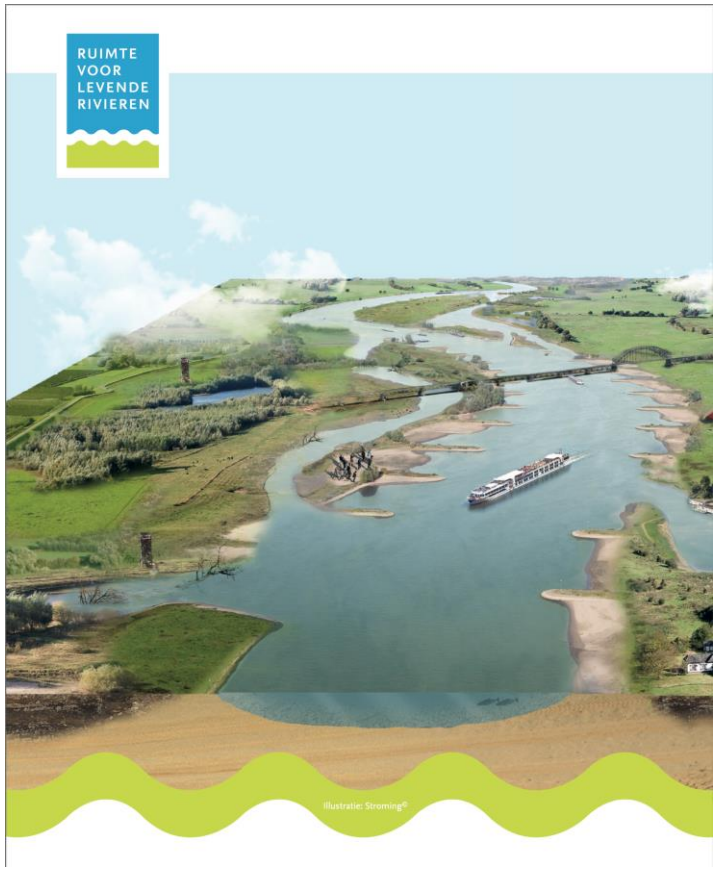
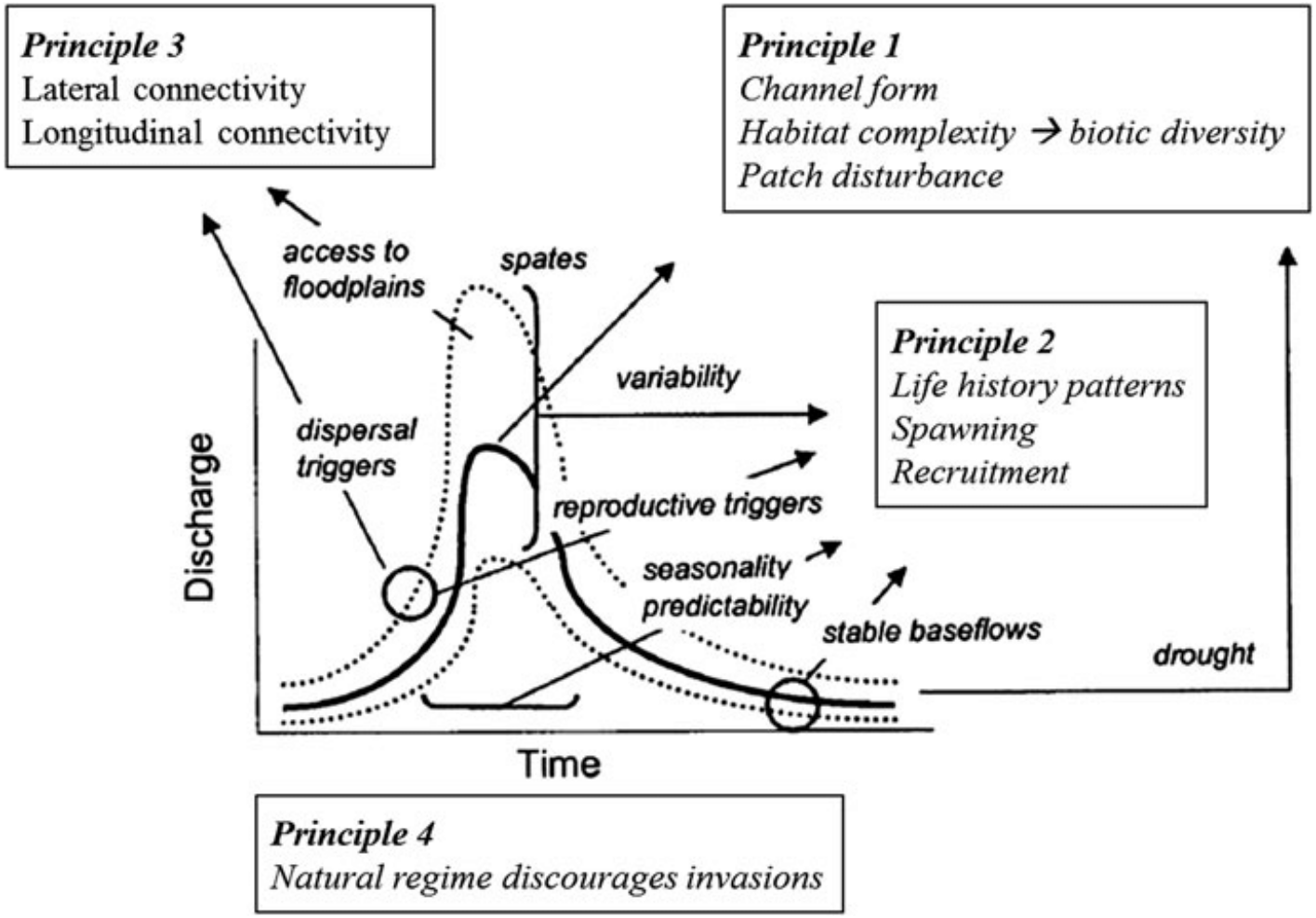
Martin Baptist, Tim van Hattum, Stein Reinhard, et al., 2019. Een natuurlijkere toekomst voor Nederland in 2120. WUR.

WWF | connectivity | aquatic biodiversity





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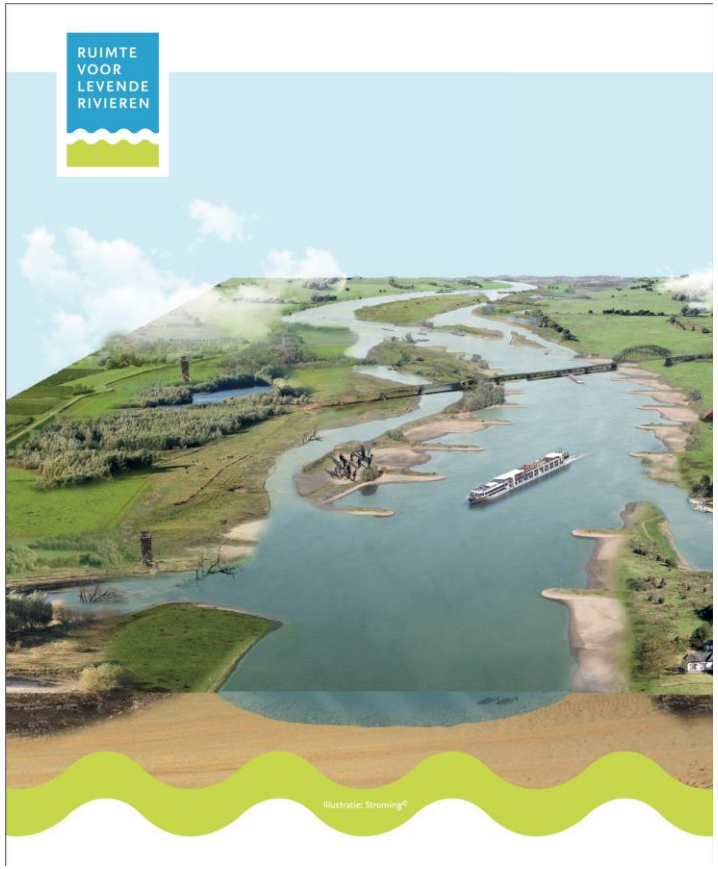
Bunn, S. E., & Arthington, A. H. (2002). Basic principles and ecological consequences of altered flow regimes for aquatic biodiversity. Environmental management, 30(4), 492-507.

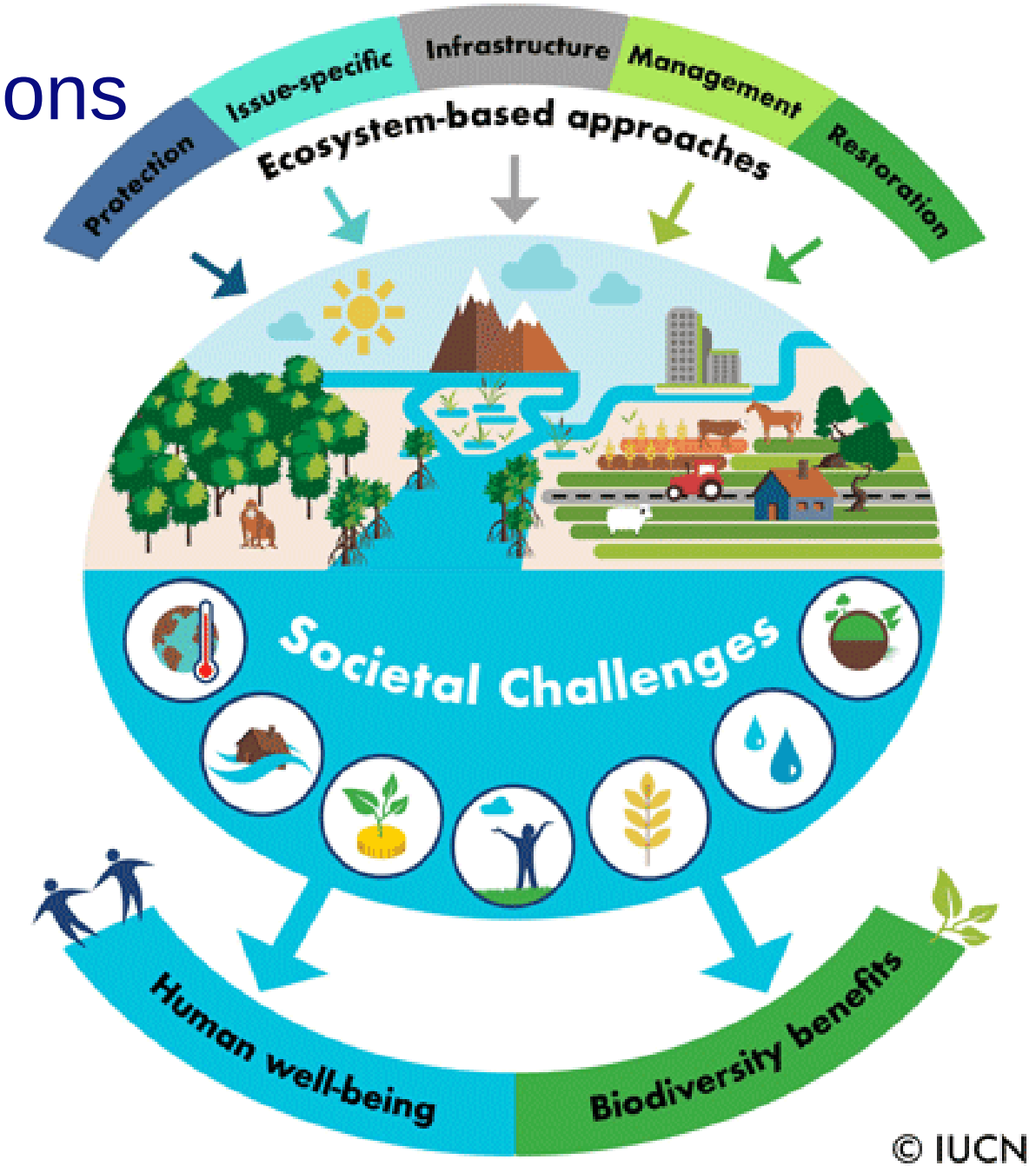
The visions

- More nature, less agriculture
- More dynamics
- More freedom & room to accommodate change ?
- More adaptability ?
- Shipping: more of the same ?

How to get there?



Nature based Solutions



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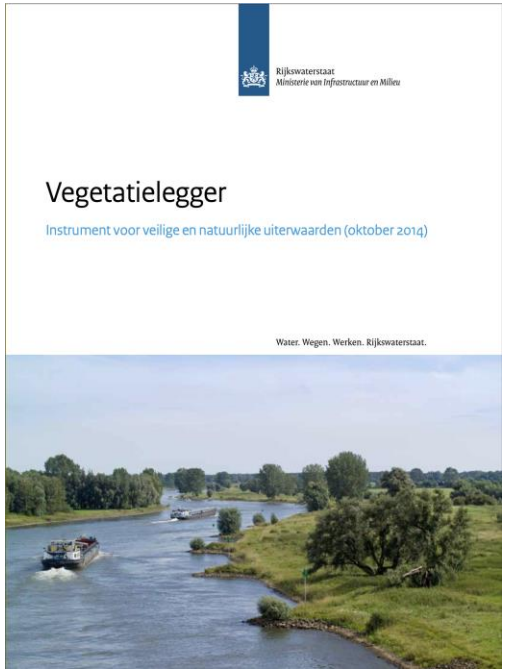
NBS: “Let the river do the work” | Ward (1994)

But also nature-based management and policies!

It's not only physical measures that "freeze" the landscape (and raise management frequency & costs)

- No "vergunningen" that freeze the landscape (vegetatielegger / bodemhoogte nevengeulen)
- No yearly management of floodplains, use natural processes for "beheer" a.m.a.p.
- Nature laws that focus on conservation rather than change and nature development



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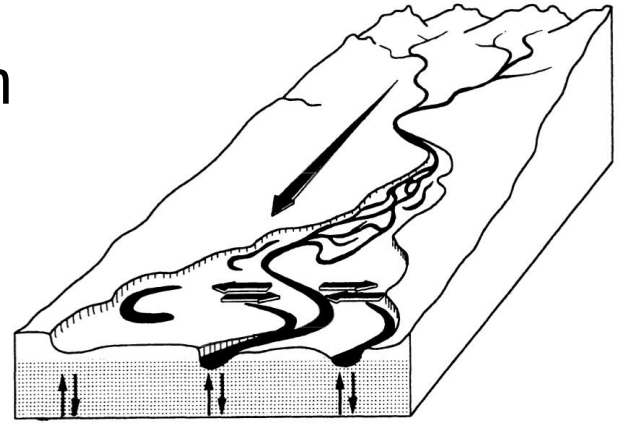
Based on nature .. 4 useful principles

A “nature based solution” in rivers does not hamper or improves:



… **transport** of water, sediment and biota from upstream downstream and vice versa (biota);

… **lateral connections** with a flood plain by variable water levels;

… room for **sedimentation and erosion**;

… and **space and time** for ecological rejuvenation and succession.

Je kan maatregelen kwalitatief beoordelen langs deze 4 ‘principes’.

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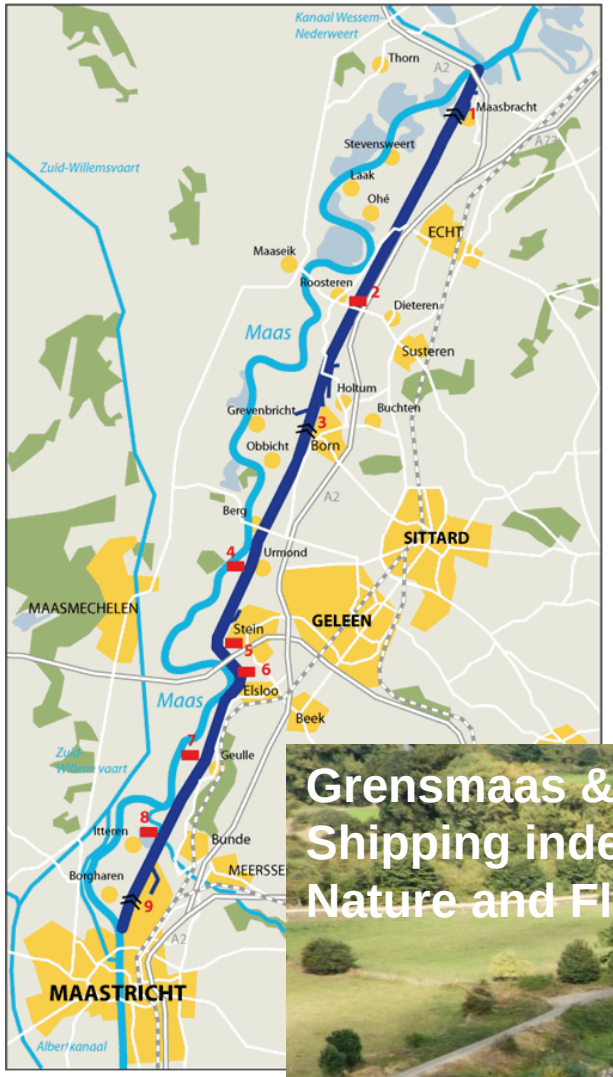
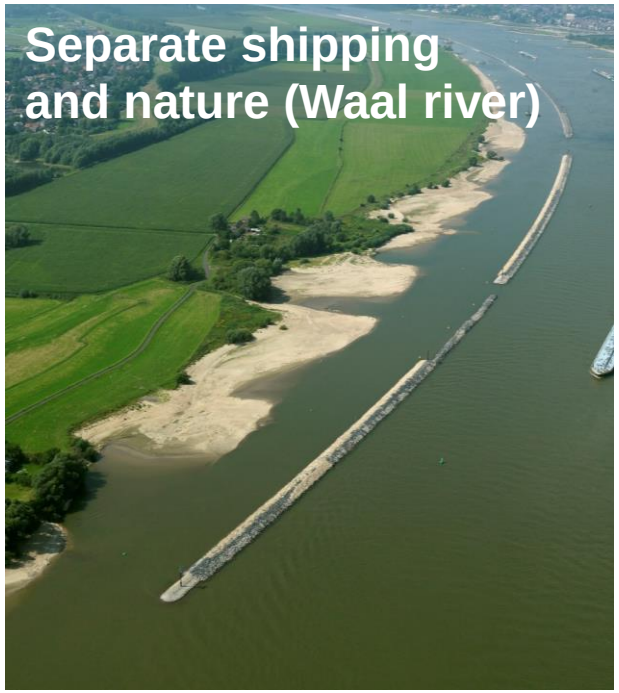
Source: Gertjan Geerling, unpublished.

Disentangle functions | avoid heavy compromises





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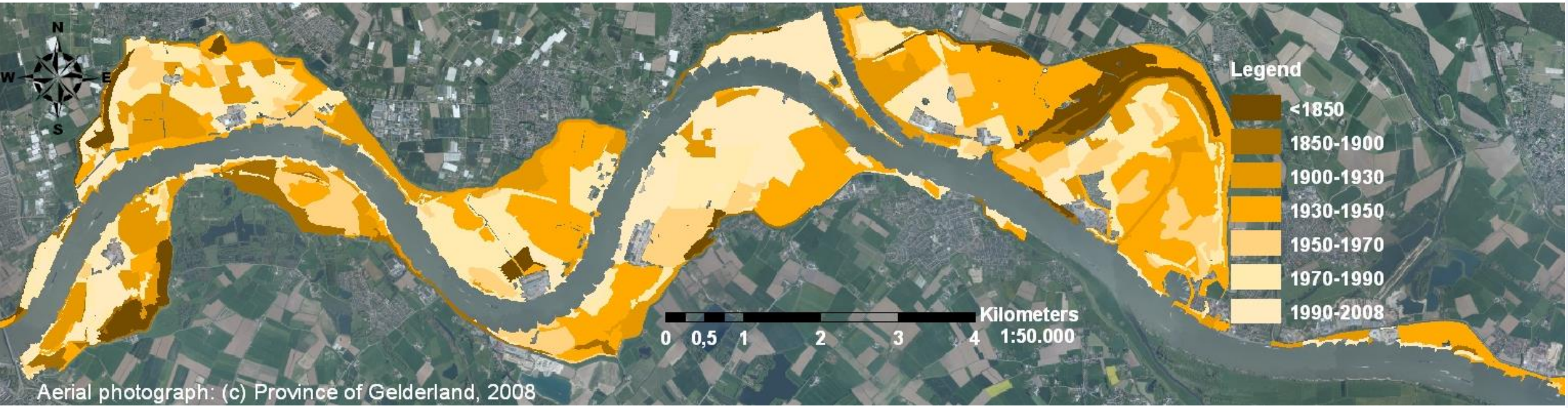
Age of ecotopes



- Average age: 54 years
- Oldest: 309 years (cut-off meander)
- Youngest: new pioneer sites (e.g. excavations and river dynamics)