System analysis at the basis of River restoration in The Netherlands

Bas van der Wal

STOWA,
Dutch Foundation for Applied Water Research

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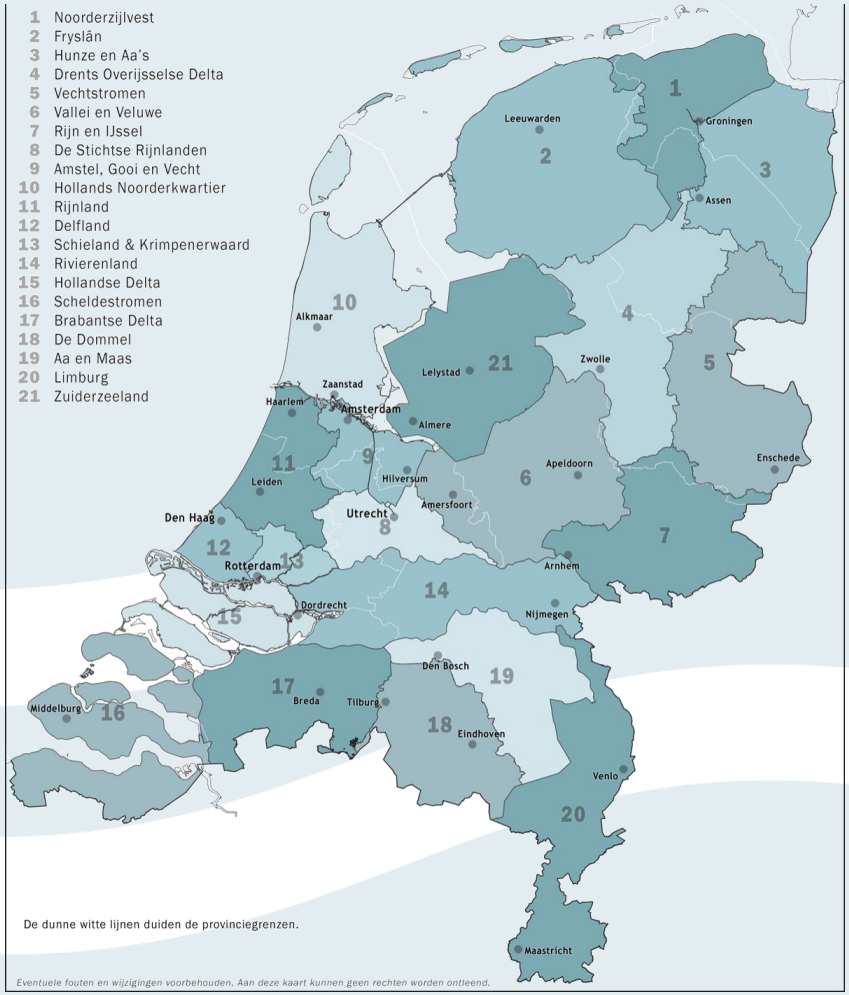
- Research Centre Dutch (22) water management organizations (water boards)
- Link between science, policy and practise
- Link between the individual watermanagement organizations.



- www.stowa.nl

Dutch Foundation for Applied Water Research

Success factors:

- Very close to water management (practise)
- Well informed on scientific progress (science)
- Connecting fields of interest (urban water, sewage water purification, hydrology, safety, ecology, heritage, recreation, health, etc.)
- Stable funding by regional water boards
    - Fixed Budget over many years
    - Allocation per project (not year by year)

STOWA facilitates groups like the CoP Brooks and rivers.
STOWA represents this group of watermanagers in the ECRR

Leading priciples

Ideology

public perception

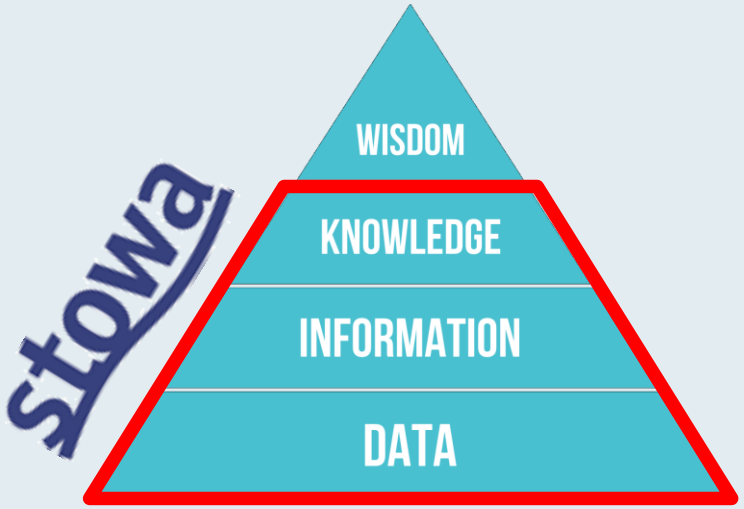
Evidence

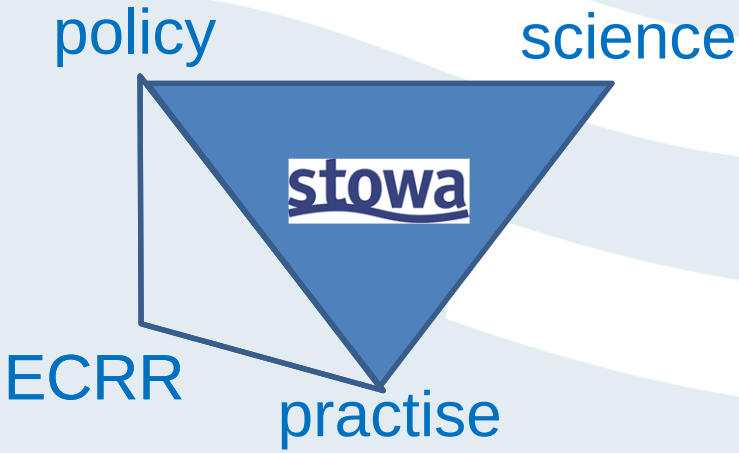
politics

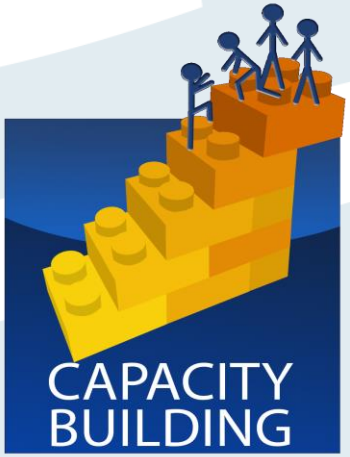
policy

Leading for STOWA

Bridging gaps







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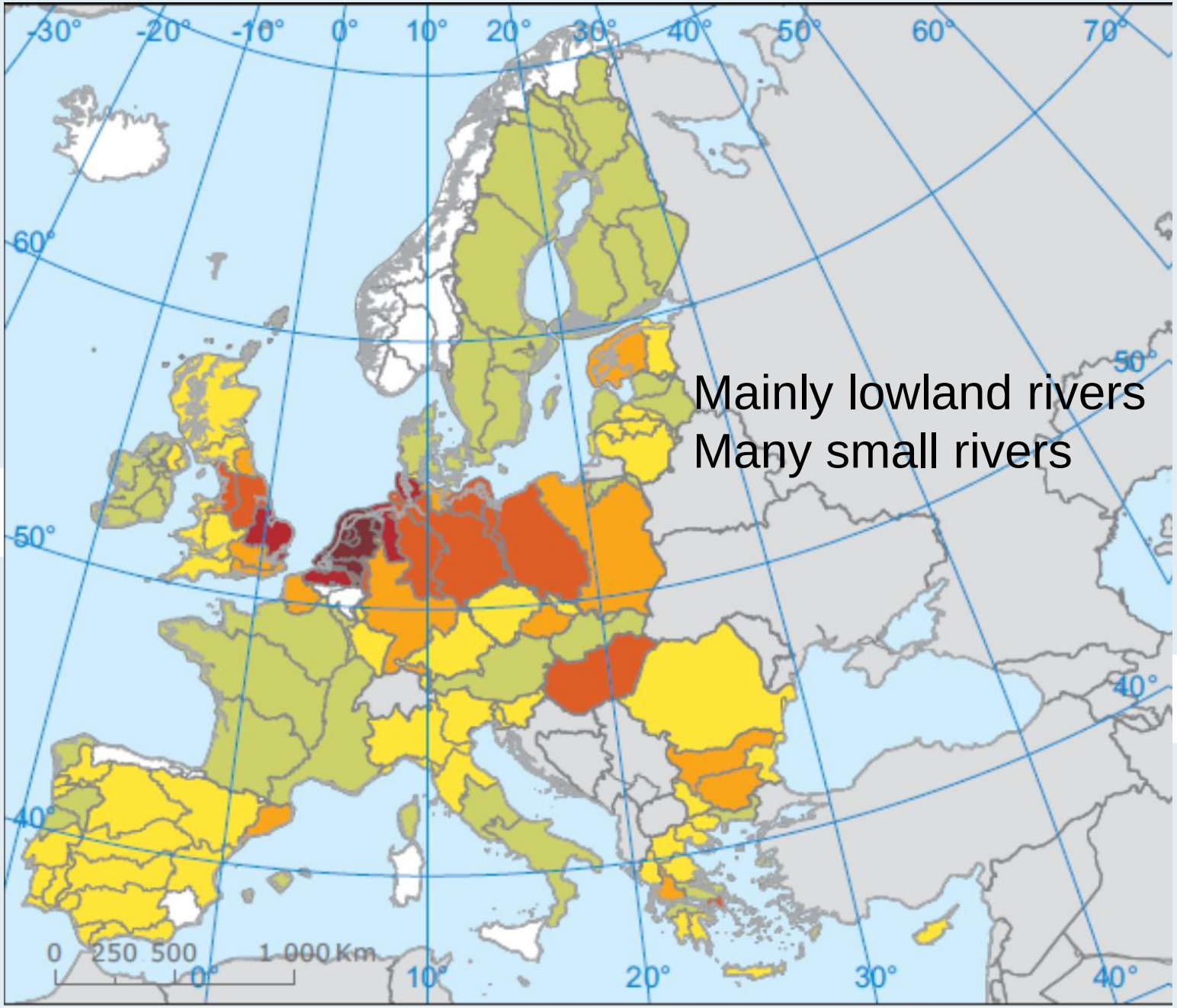
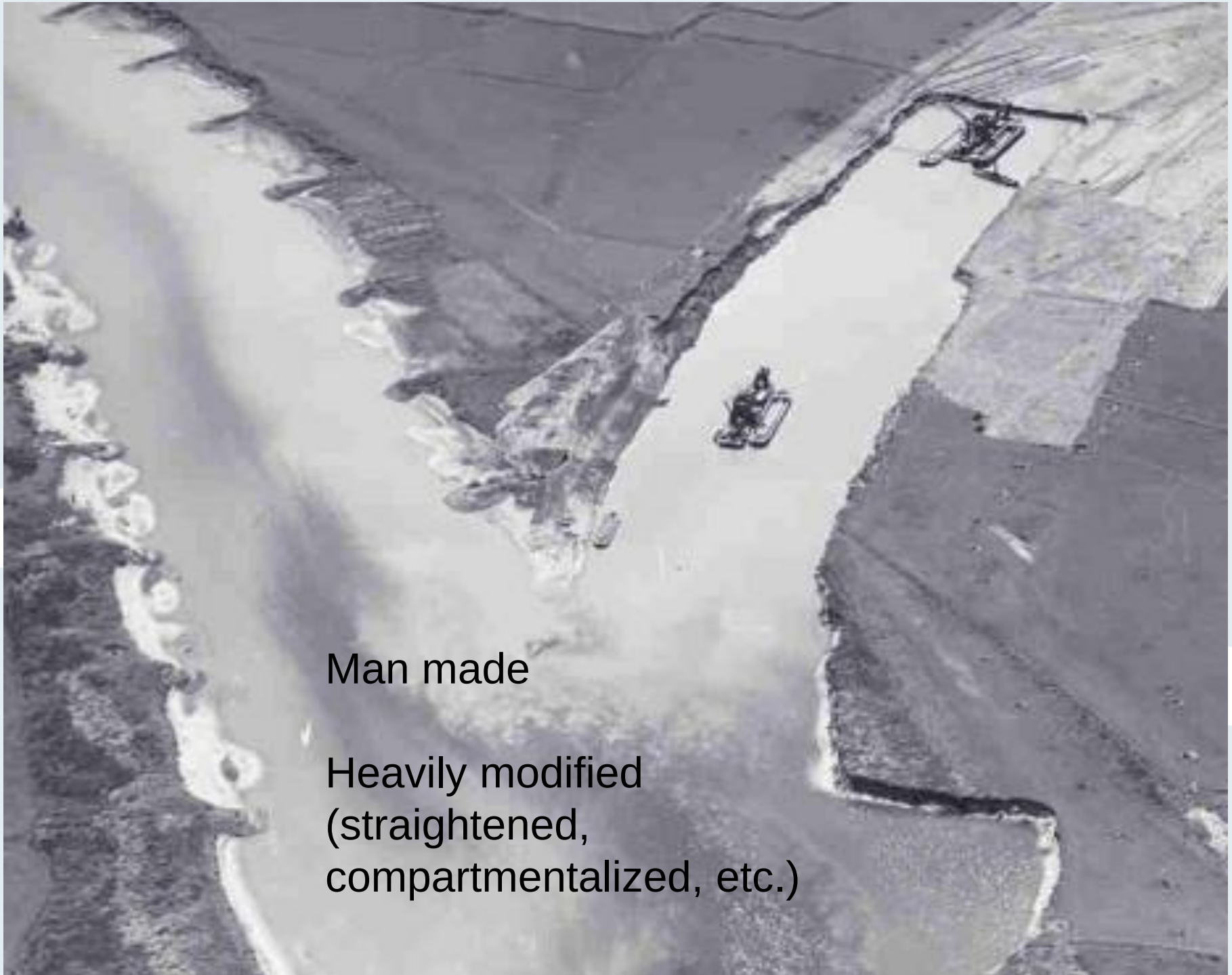
NL: a particular case.....

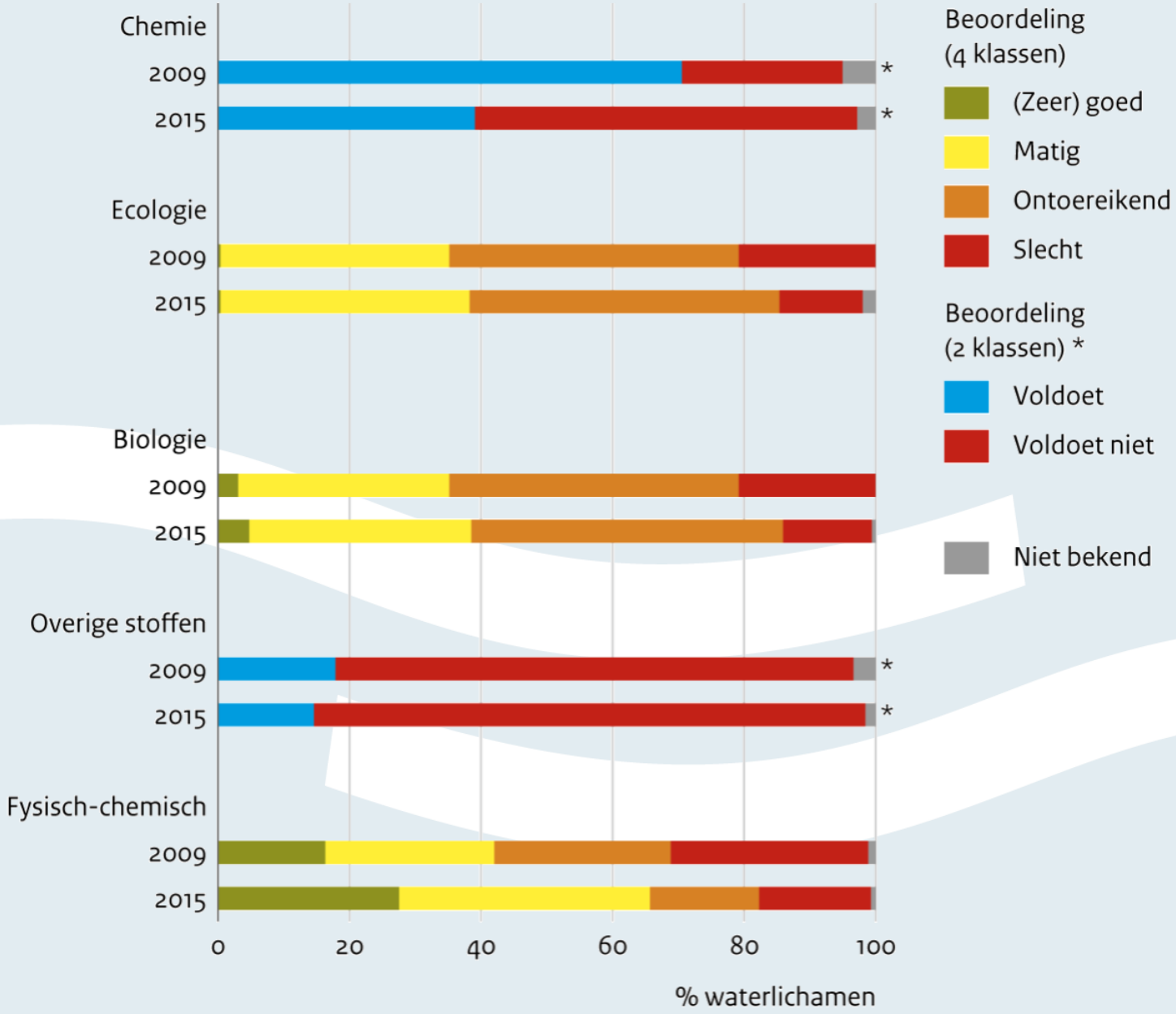


Mainly lowland rivers
Many small rivers


Man made
Heavily modified
(straightened,
compartmentalized, etc.)

Restoring rivers (?)

Water quality is improving slowly (or not?)



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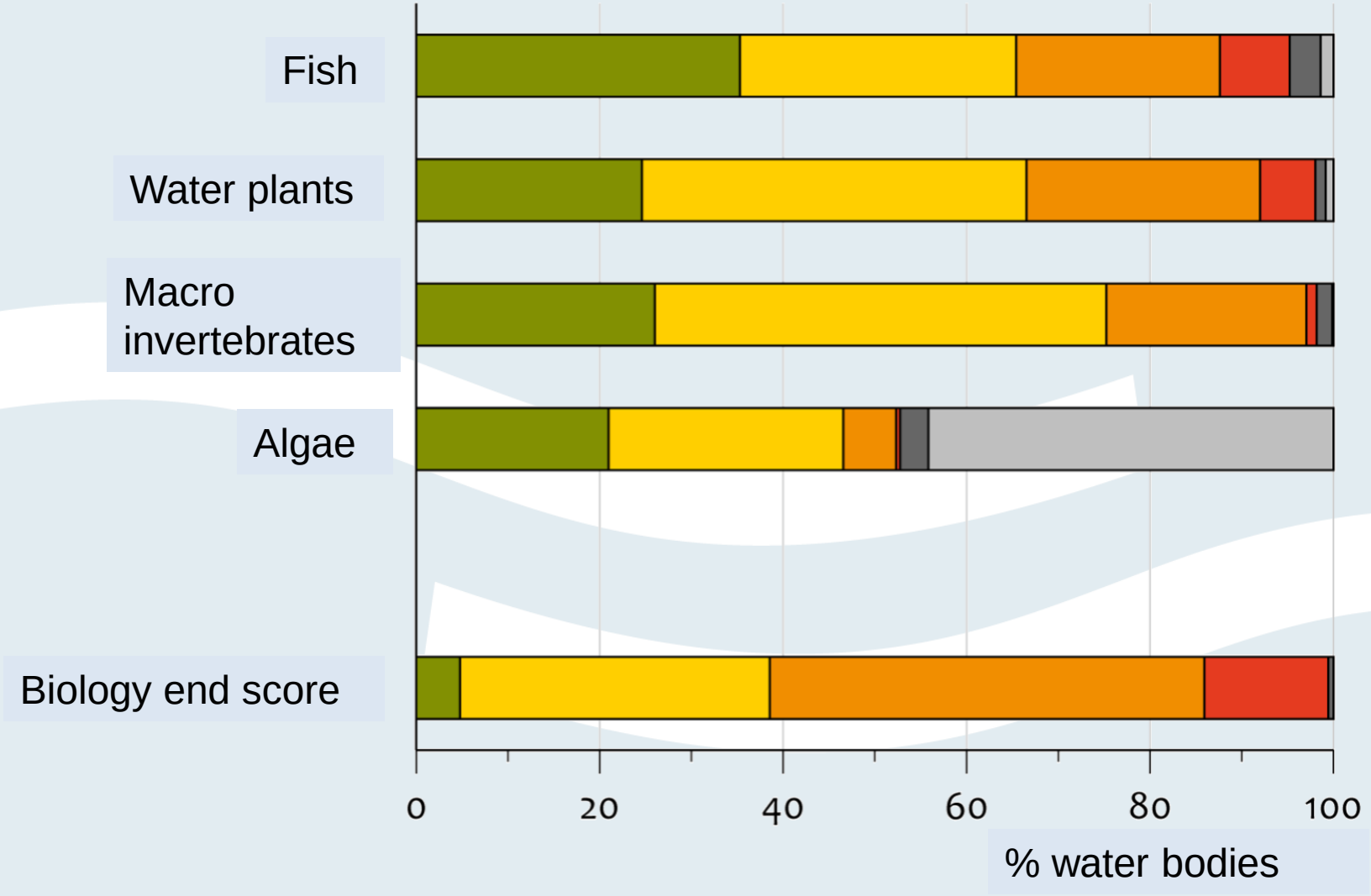
Biological status (2015)



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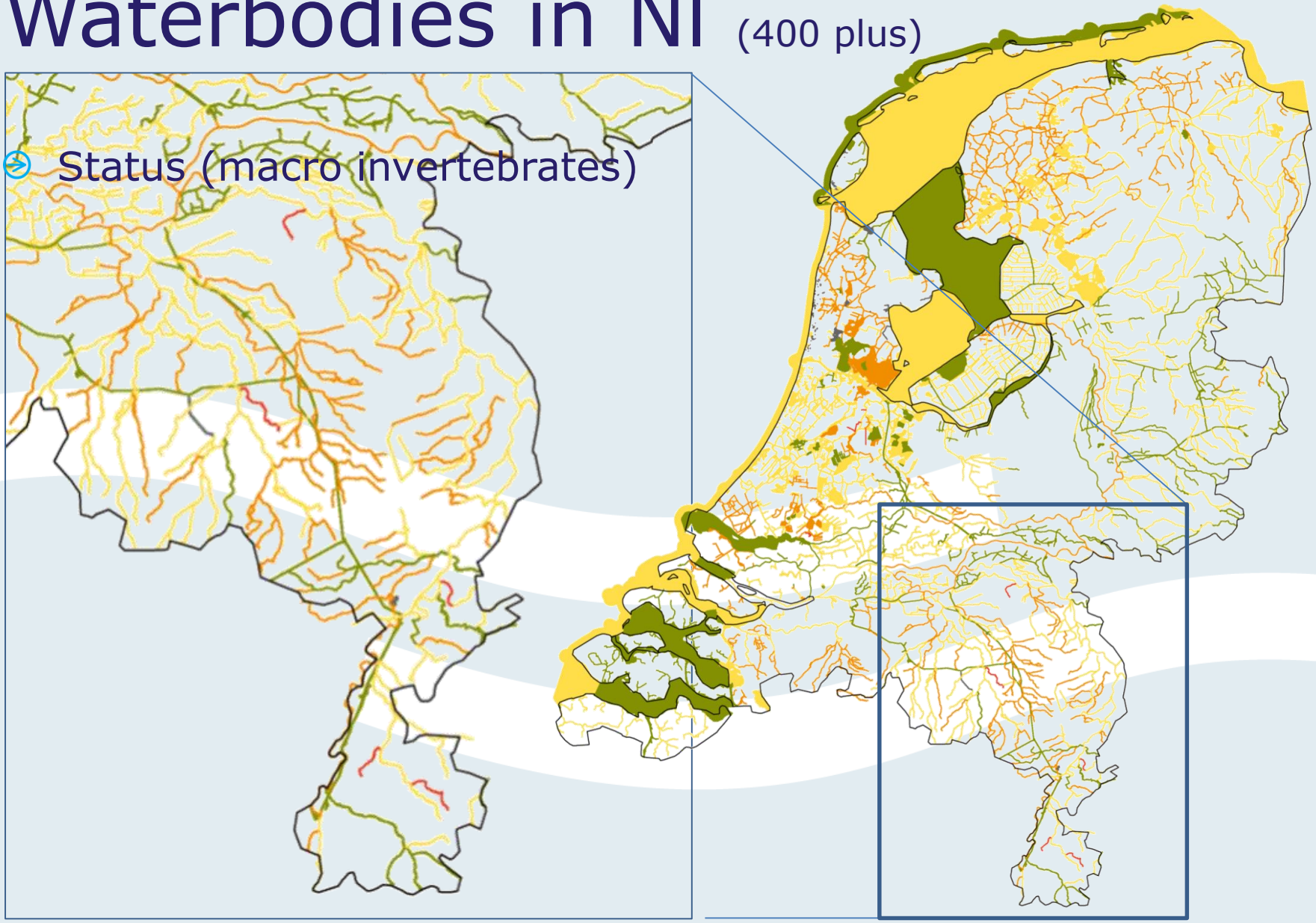
Waterbodies in Nl (400 plus)

- Status (macro invertebrates)



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Mismatch

- Goals sometimes inadequate

- Measures often inadequate

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What to do?

Understanding system functioning.
Obviously the basis for:

- Relevant goals
  - Ecologically ambitious goals
  - Realistic management goals

- Effective and cost efficient measures

Each system is unique!

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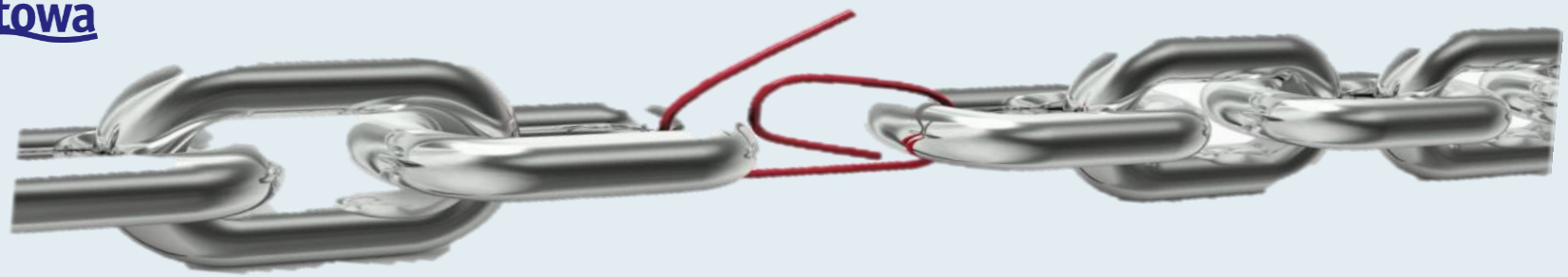

Very often the hampered water quality improvement is not caused by lack of scientific basis. It is caused by obscurity of that basis and by political ignorance.

Scientists: have to make knowledge digestible.

European Centre for River Restoration

ECRR

Management: must be prepared to learn and to innovate

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STOWA designed a tool kit

Ecological Key Factors

- EKF facilitate understanding aquatic ecosystem functioning
- Relevant for stating (WFD) goals and planning measures
- Entry to scientific knowledge (for water managers) / gaps in knowledge (for scientists)
- Communication
  - From ecologist to manager
  - From inside (water board) to outside ‘world’

Ecological Key Factors are related to issues of current policy and management options

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10
Context
1
Afvoerdynamiek
7
Bufferzone
3
Connectiviteit
4
Belasting
9
Stagnatie
5
Toxiciteit
8
Waterplanten
6
Natte doorsnede
2
Grondwater
Illustratie Dirk Oomen

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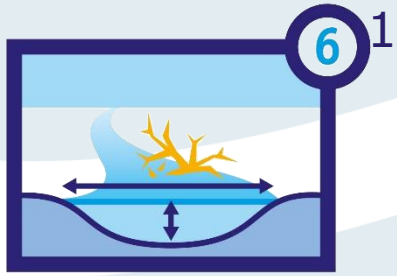
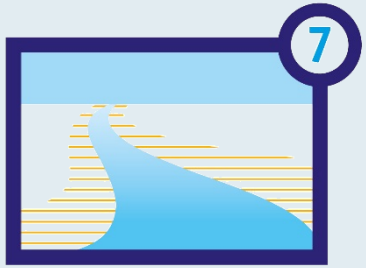
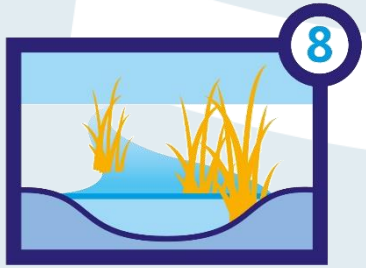
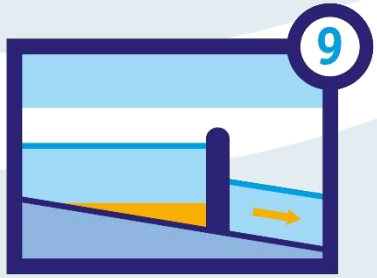
EKF running waters

(conditions)









1. Discharge dynamics
2. Ground water
3. Connectivity
4. Load
5. Toxicity
6. Wet cross section
7. Buffer zone
8. Aquatic vegetation
9. Stagnation
10. context

River Basin Management Plans
(2021)

- On a large scale system analyses are carried out
- Measures are being reconsidered
- In some cases goals are being reformulated

- Other activities:
  - Weighing ecosystem services
  - Cross-cutting cooperation between ma organisations (landowners, farmers, councils, nature conservancy, etc.)

(Government directive)

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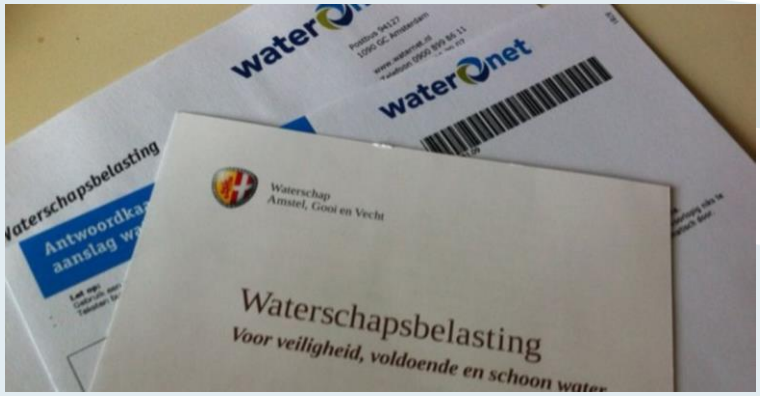
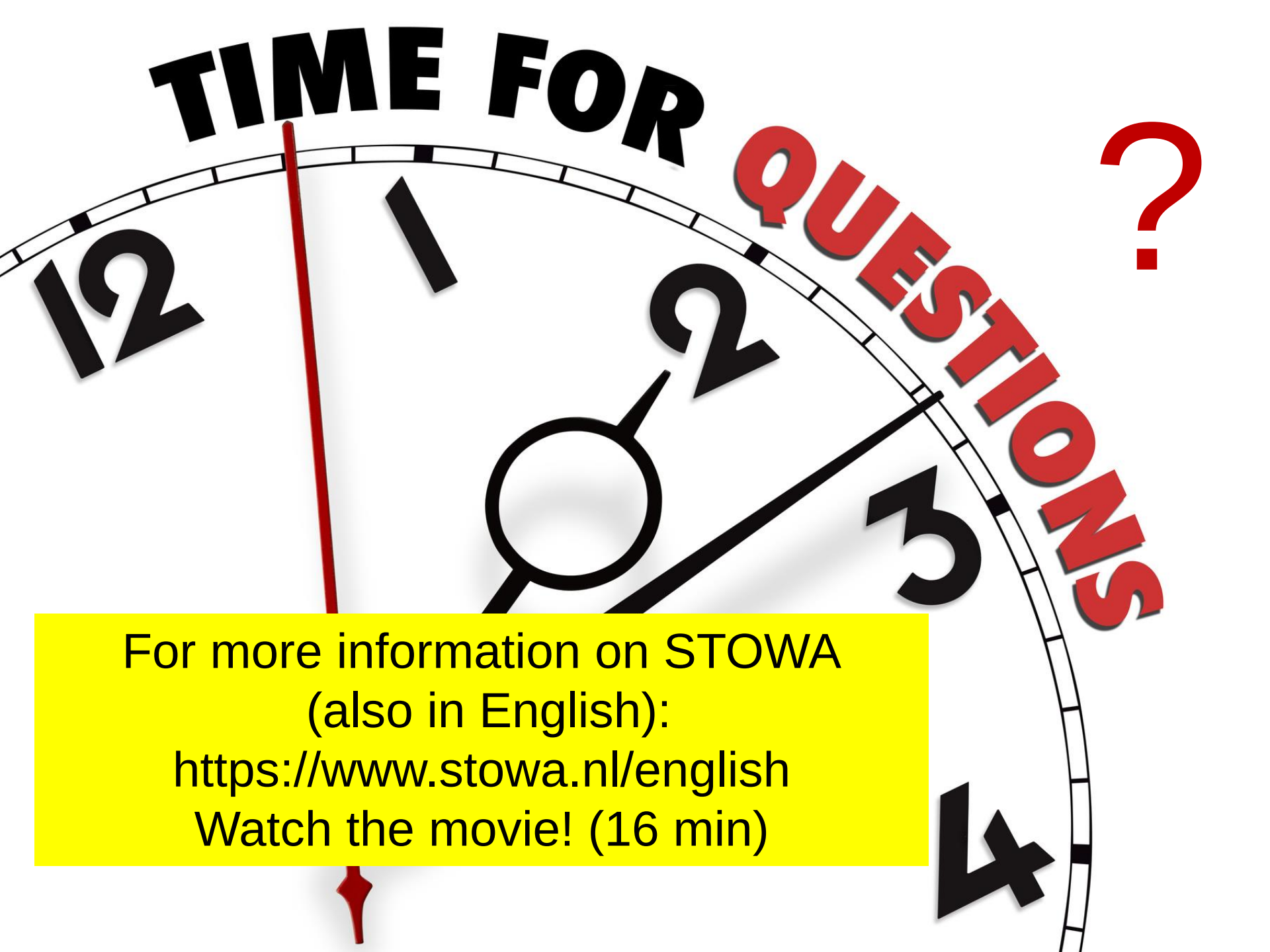
Funding:

- Water boards levy their own taxes.
  (specific taxes for safety, water control and water quality)
- River restoration in The Netherlands is mainly initiated and funded by the water boards
- Subsidies from Government, Provinces, city councils, etc





For more information on STOWA
(also in English):
https://www.stowa.nl/english
Watch the movie! (16 min)

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Discharge dynamics

Ground water

Connectivity

Load

Toxicity

Wet cross section

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Aquatic vegetation

Stagnation