Rijkswaterstaat
Ministry of Infrastructure and Water Management

Lessons in River Management from the European Union

– case river Rhine with a Dutch perspective

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Congres on charting a new course for the Mississippi
December 3rd, 2019

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- The Rhine: short introduction
- History and organisation of the ICPR (Int. Cie. for the Protection of the Rhine): 1950-1985-1998-2020-2040
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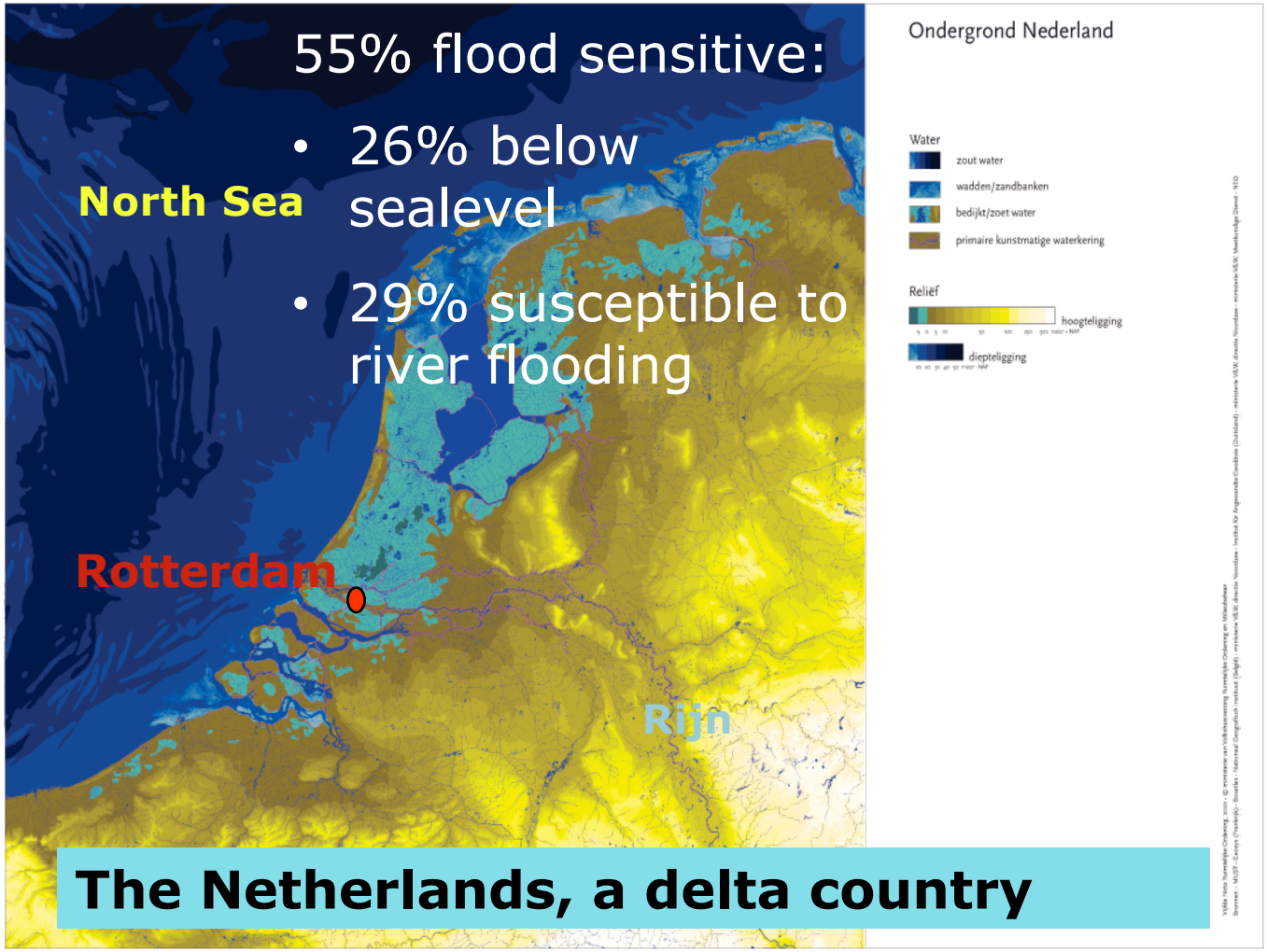
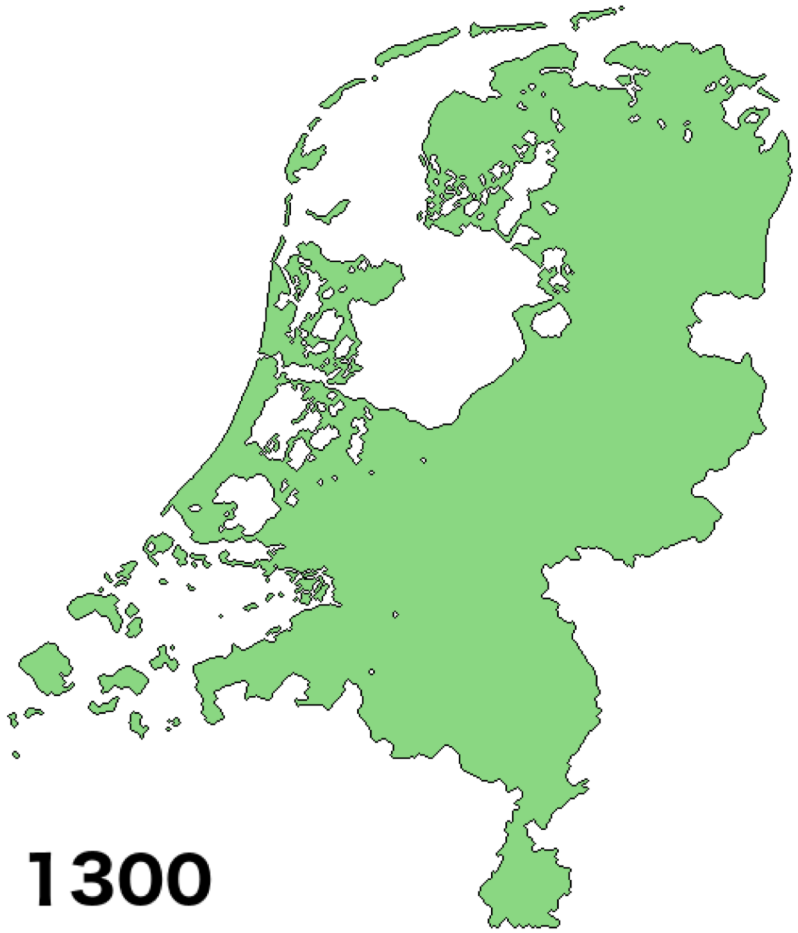
  - Ecology and fish migration
  - Water quantity
- Intermezzo: 2nd Dutch Delta Program & RvdR program
- Upcoming
- Summary and conclusions


Louisiana
Mississippi
new orleans
Louisiana
Maas
Rijn
Eems
0
50 km
100km
Netherlands



The Netherlands, a delta country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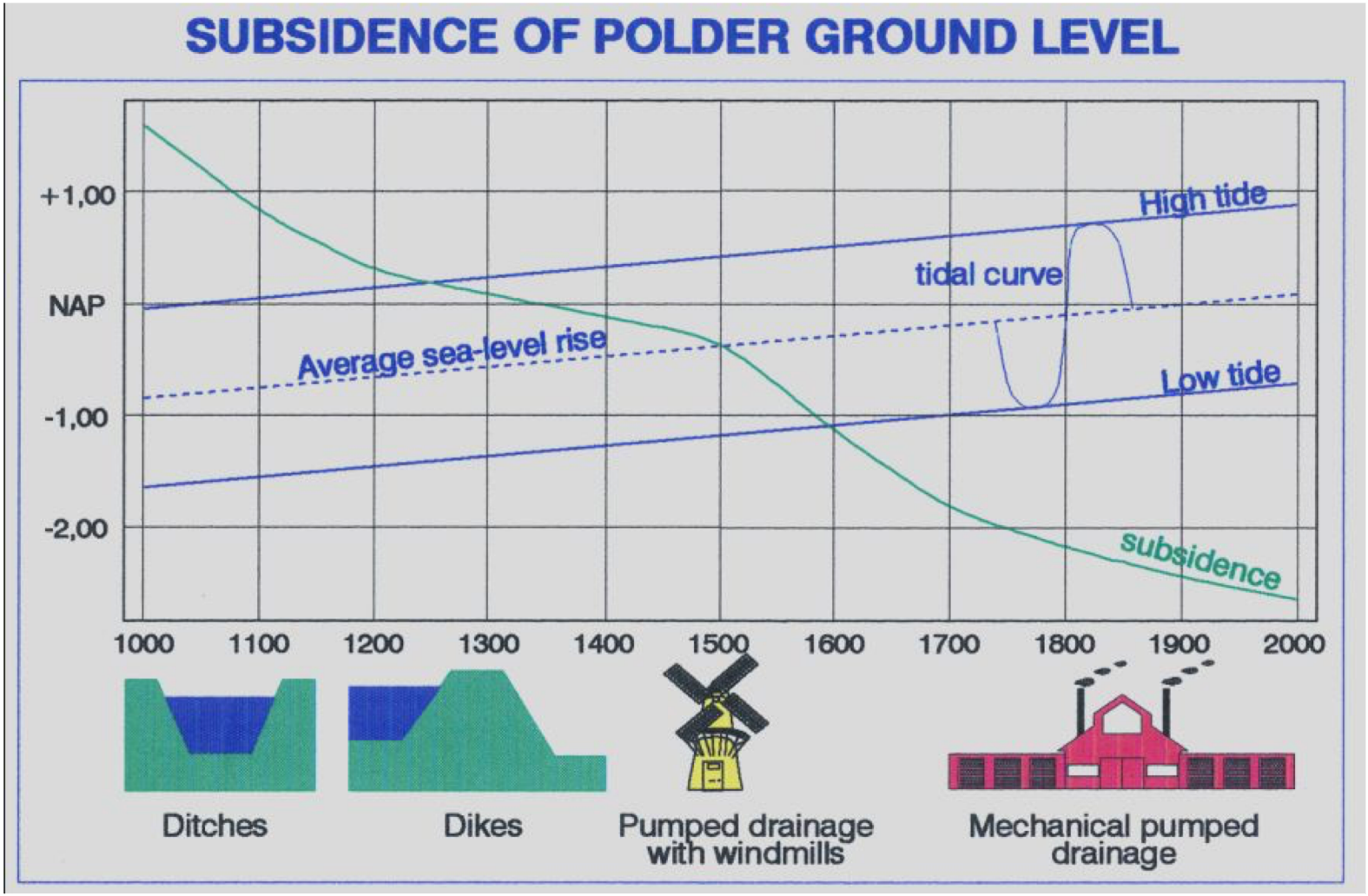
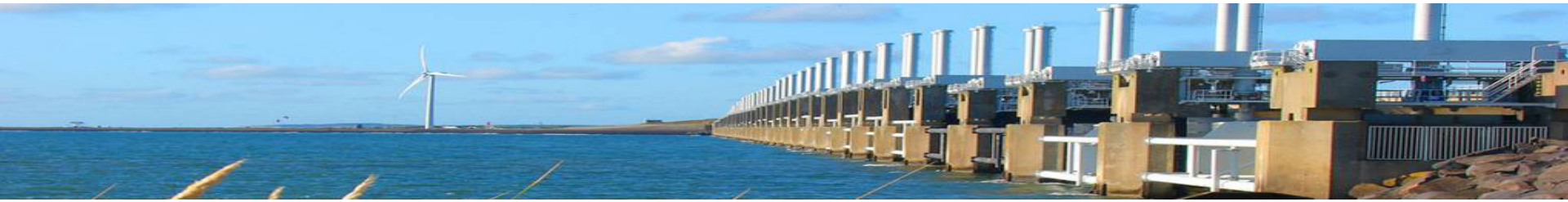
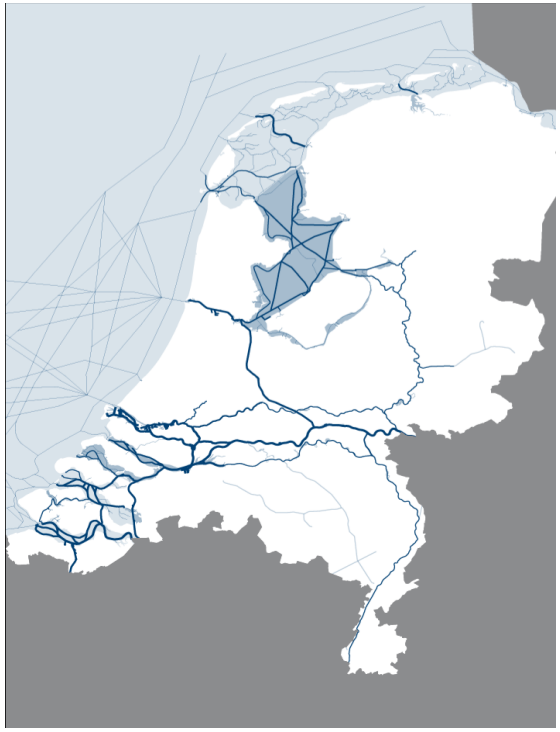

SUBSIDENCE OF POLDER GROUND LEVEL
+1,00
NAP
-1,00
-2,00
High tide
tidal curve
Average sea-level rise
Low tide
subsidence
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
Ditches
Dikes
Pumped drainage with windmills
Mechanical pumped drainage

Rijkswaterstaat

- Executive agency Ministry of Infrastructure and Water
- Founded in 1798 (one of the first national agencies)
- We build, manage and maintain Dutch national infrastructure and provide the associated information for Highways, Waterways and the Main Water system (including the North Sea)
- We contribute to a sustainable environment (SDGs)
- Annual budget € 5 bln – ca. 9000 employees



We build, manage and maintain much of the Dutch national infrastructure. Highways, Waterways and Main Water system (including the North Sea).



Some facts Main Water System

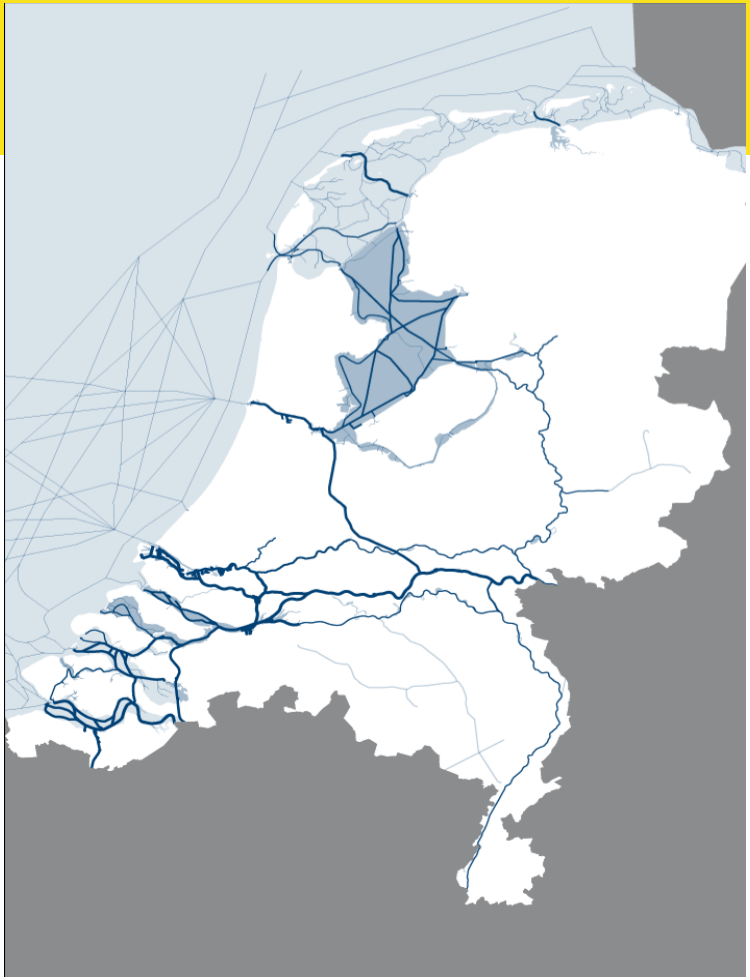
Rijkswaterstaat manages:

- 65,250 km² of surface water
- 44 kilometres of dunes
- 325 kilometres of levees and dams of ca. 17600 km total and 3700 primary defences
- 2,706 kilometres of banks
- 16 weirs
- Afsluitdijk and Houtribdijk dykes
- 5 storm surge barriers

Main Waterway Network

Rijkswaterstaat manages:

- 1,686 kilometres of canals and rivers, 1,462 kilometres of which main traffic axes
- 6,165 kilometres of waterway on open water
- 83 locks
- 422 bridges
- Emergency management infomation



We share a desire to innovate

Switzerland is the world's most-innovative country followed by Sweden, the United States of America (U.S.), the Netherlands and the United Kingdom (U.K.), according to the 2019 edition of the Global Innovation Index (GII).

Rhine catchment area

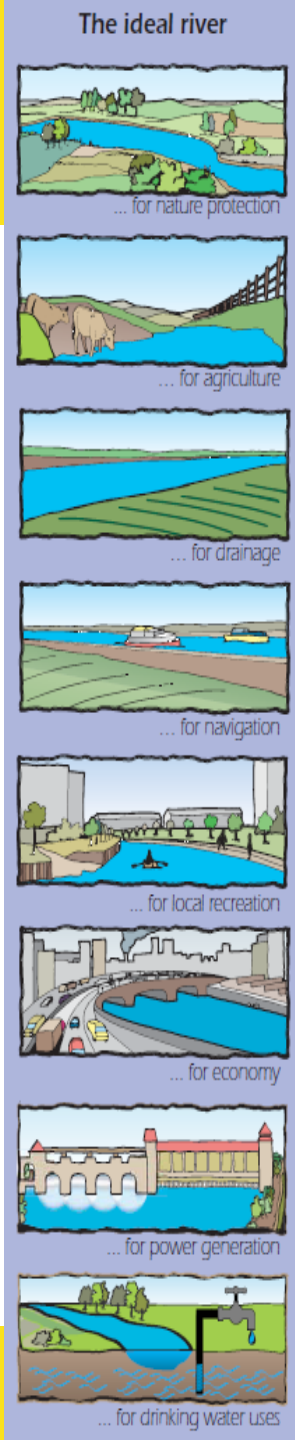
Rhine catchment area

	Rhine	Mississippi
length (km)	1.233	3.766
area (km^2)	185.000	3.220.000
Q (m^3/s)	2.300	5.500 @St. Louis
		16.800 @Vicksburg
Countries/states	9	32 + 2 Canada

complexity

Interests / Pressures

- natural habitat for plant and animal life
- production of drinking water
- used as international waterway connecting vast industrial complexes
- used for industrial and agricultural purposes
- energy generation
- disposal of (treated) urban waste water
- recreational activities
- reduction in sediment transport as a result of engineering modification, due to dams, meander cutoffs, river-training structures, bank revetments and soil erosion control programs



Central Commission for the Navigation of the Rhine

- The Central Commission for the Navigation of the Rhine (CCNR) dates back to the Vienna Congress (1815).
- Legal basis: Revised Convention for Rhine Navigation of 17 October 1868 ("Mannheim Act").
- Commission is an international institution (& secretariat) that deals with all inland navigation matters.
- In close cooperation with other international organizations involved in European transport policy, as well as with non-governmental inland shipping organizations.

- But the CCNR does not cover water quality issues……..so

International Commission for the Protection of the Rhine (ICPR)

- Pré 1950 – extreme pollution
- 1950 1st meeting Basel
- 1963 Convention of Bern
- 1999 2nd Convention of Bern

Members:

- CH, FR, DE, LU, NL & EU (= level playing field)
- Since 2001 (because of WFD):
- Cooperation with AT, FL, BE
- Since 1995: cooperation with NGOs (ca. 20)

Co-operation rules of the ICPR (1)

- De-centralised organization
- National delegations
  - political mandate
  - technical know how
  - annual budget 1.2 m€
- Political framework, no sanctions
- Legal framework
  - EU Directives (WFD and FMD) provide structure
  - different national legislation (NL: Helpdesk water)
  - aligned/coordinated national river basin management plans, national monitoring/reporting obligation to EC
  - national enforcement (NL: inspection for environment and transport)

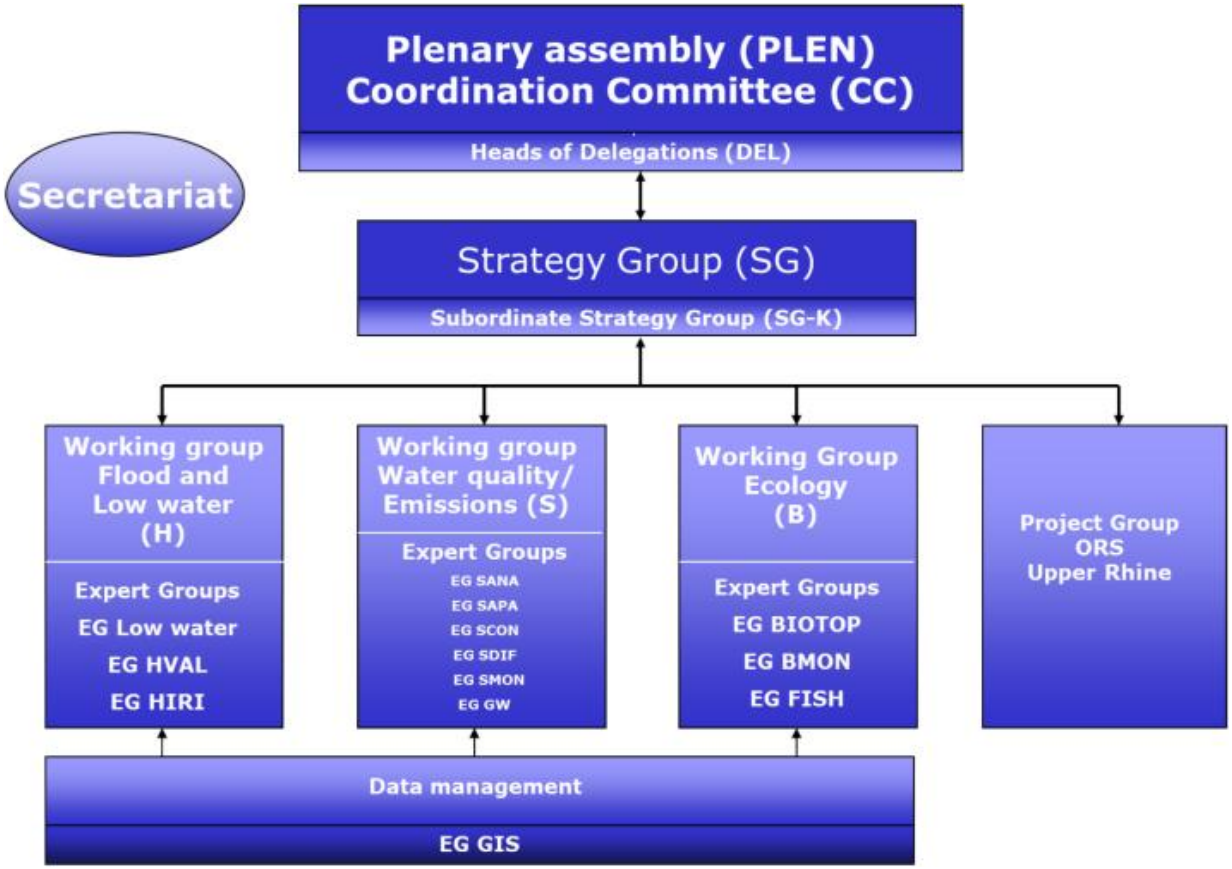
Co-operation rules of the ICPR (2)

- Unanimity / consensus
- Decisions are recommendations
- Obligation to report about implementing measures
- Simultaneous interpretation in all meetings and translation of all documents into French, German and Dutch

Secretariat / chairman

- ✓ secretariat: based in Koblenz (Germany),
  - executive secretary and 4 staff members
  - 4 interpreters
  - 2 secretaries
- ✓ chairman for a 3 years

Organisation of the ICPR



Working and project groups

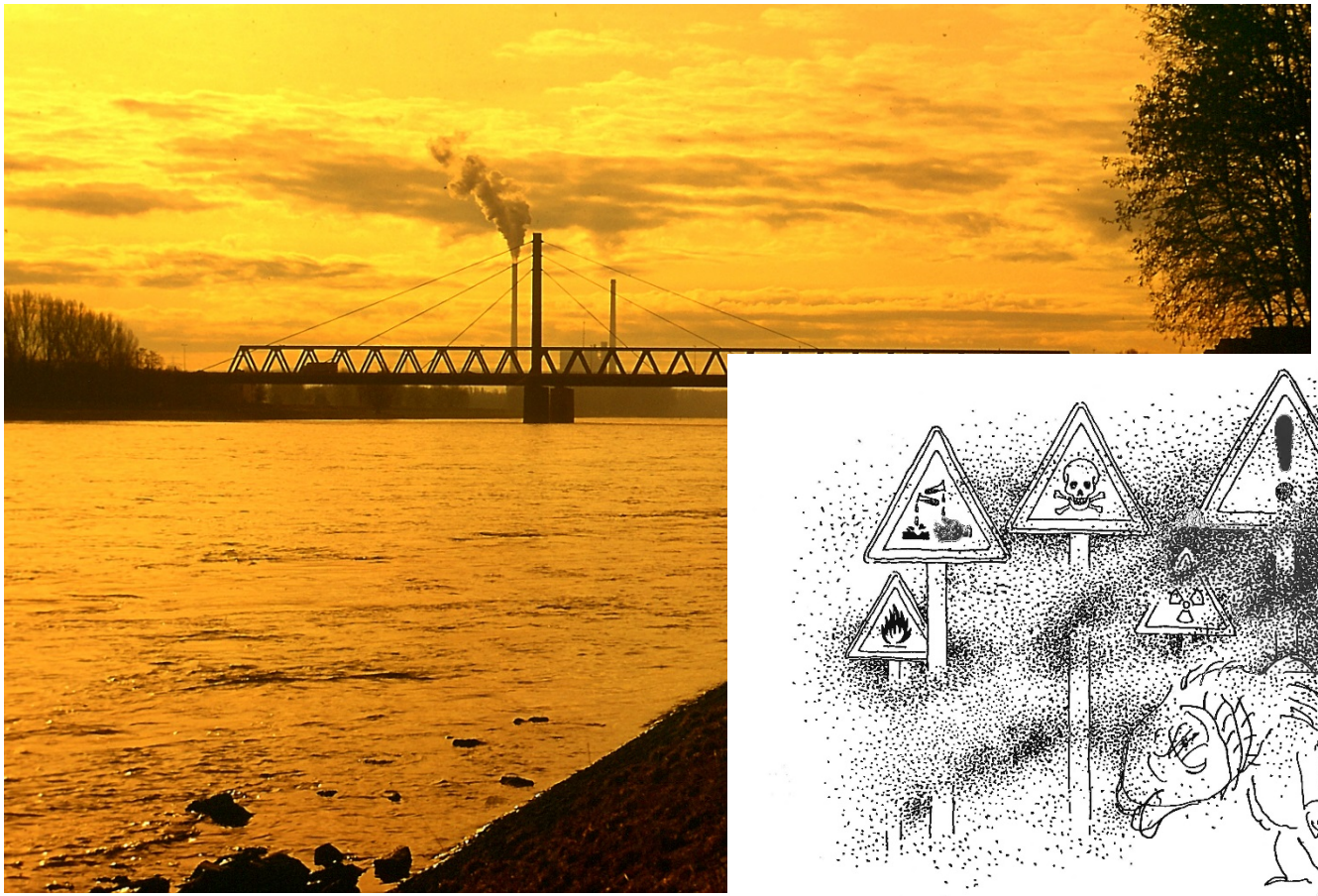
- ✓ Execute mandate formulated by the strategy group:
  - make reports implementation of the programme Rhine 2020
  - make inventories
  - propose research
  - install expert groups
- ✓ All members of the ICPR participate
- ✓ All members are responsible for their own contribution
- ✓ Consensus

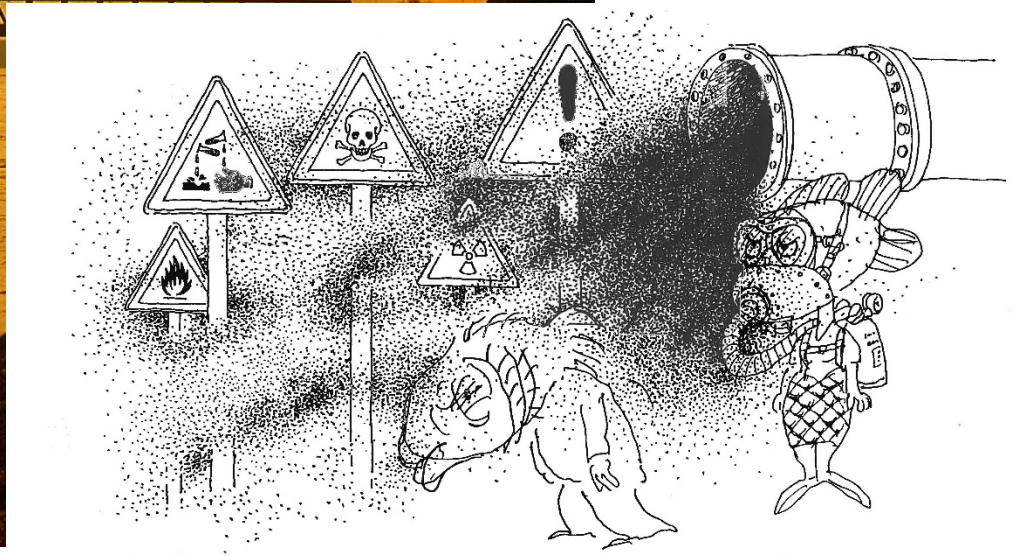
1. The beginning (1950-1985)

- ✓ 1950 Foundation in Basel
- ✓ 1953 Joint monitoring programmes
- ✓ 1963 Convention of Bern
- ✓ 1976 Agreement on chemical pollution:
  the ICPR fixes treshold values for the discharges of certain 'black listed' substances (Dangerous substances directive 76/464/EEC)
- ✓ 1976 Agreement on chloride
- ✓ Building trust and mutual understanding
- ✓ Starting point for urban wastewater treatment plants

>> public awareness/concern for water pollution

River Rhine: seen as the “sewer of Europe”





1986: Fire at Sandoz, Basel (CH)

- 10-30 tons of highly toxic pesticides flowed into the river
- caused death of all aquatic life for over 400 km downstream

Rhine Action Plan (1987-2000)

- ✓ Three general goals:
  - Prevention of accidents and security of industrial plants
  - Reduction of discharges by 50% up to 70% from 1985-1995
  - Salmon back in the Rhine by 2000

- ➢ From technical and legal discussion to long term ambitious political goal setting
- ➢ Integration of relevant policy fields

2. Management of accidents (1986-1998)

- Action Programmes with political commitment
- Formulation of concrete goals
- Precaution and prevention became basic principles
- From water quality management to integrated water management

Cologne 1993/95

Action plan on flood defence (1998-2020)

- ✓ Reduce demage risks: up to 10/25% by 2005/2020
- ✓ Reduce flood stages: up to 30/70 cm by 2005/2020
- ✓ Increase awareness of floodings by drafting risk maps for 100 % of the floodplains by 2005
- ✓ Improve the system of flood forecasting; prolong forecasting period by 100% by 2005

- ✓ N.b. this was all prè EU FMD

3. Integrated river basin management (1999-2020)

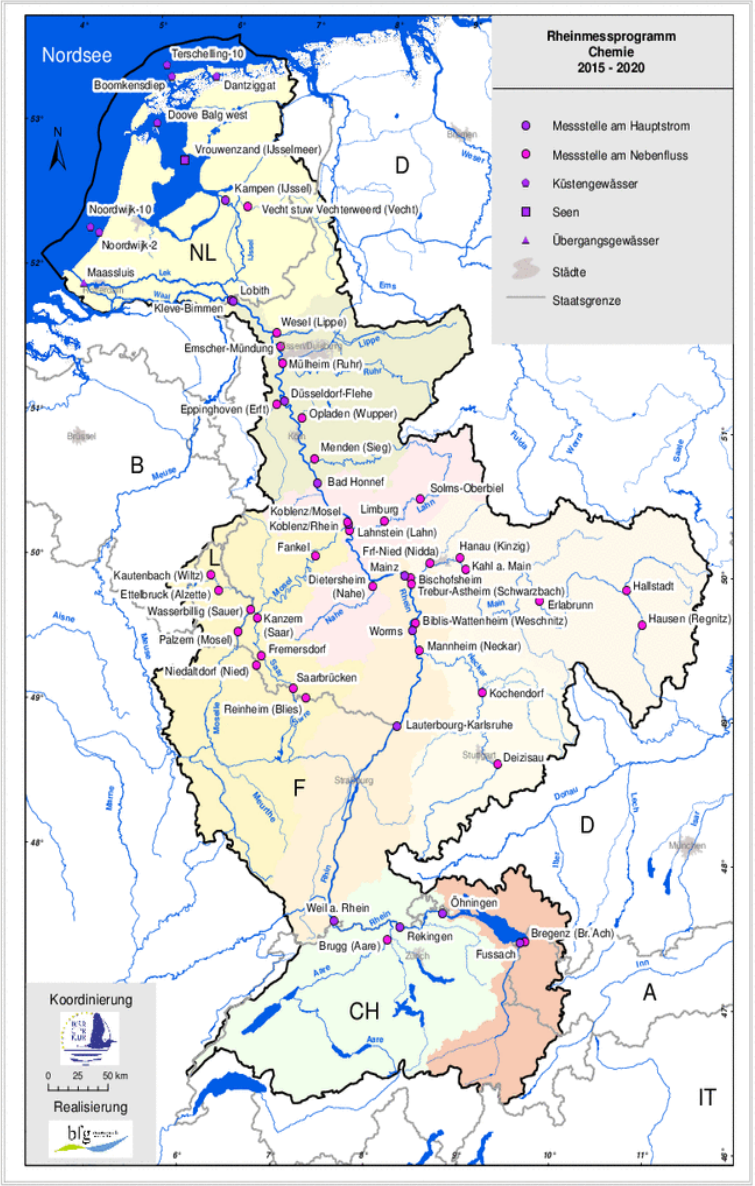
- ✓ 1999 New Rhine convention
  - legal basis for integrated approach
  - exchange of information
  - co-operation with NGOs
- ✓ 2001 Programme for a sustainable development of the Rhine (programme Rhine 2020)

4. Climate proof and sustainable river basin management (2020-2040)

- ✓ In 2020 publication of a programme for a climate proof and sustainable managed Rhine river basin
- ✓ "Rhine 2040" programme will cover important functions of the Rhine catchment area as an ecosystem and its numerous pressures, e.g. on water quality and extreme events.
- ✓ Climate change and sustainable management will be overarching issues.
- ✓ The new program is to be adopted by the 16th Conference of Rhine Ministers on 13 February 2020 in Amsterdam.

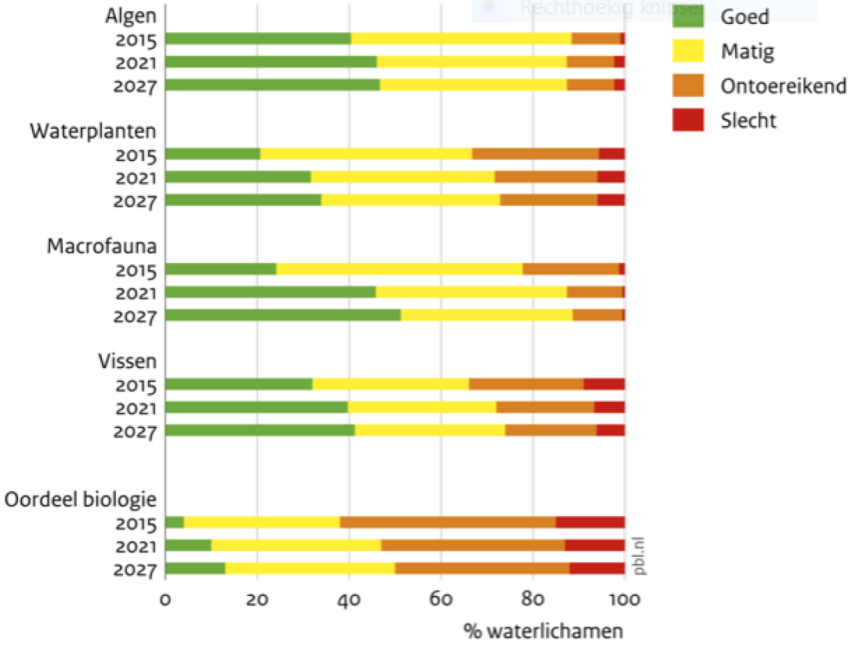
Themes: water quality

- Original focus of the ICPR on pollution & monitoring
- EU Water Framework Directive brought much needed level playing field
- International Warning and Alarm Plan
- Sediment management plans
- Micro-pollutants (incl.PFAS)
- Plastics



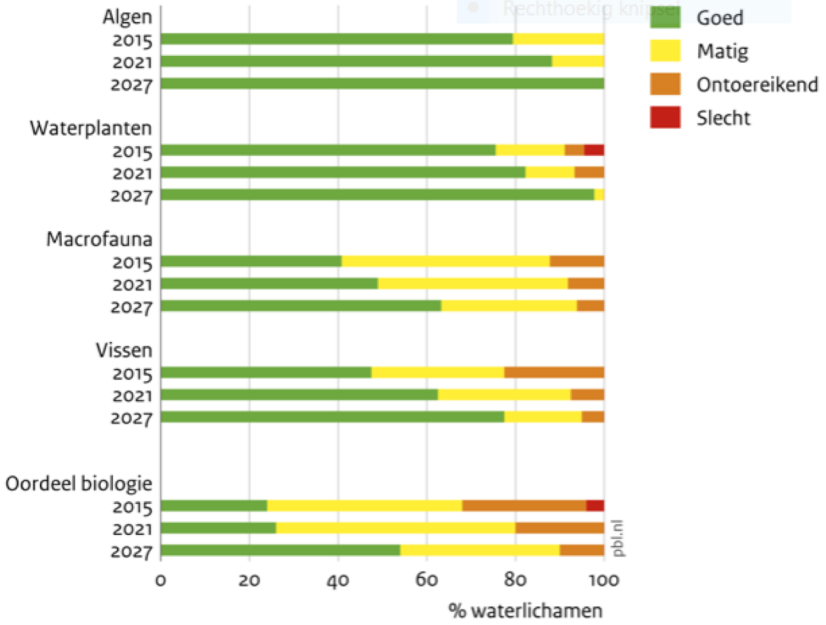
But: challenges remain @river watershed level

Beoordeling biologische kwaliteit in regionale wateren volgens Kaderrichtlijn Water



Bron: Deltares; bewerking PBL

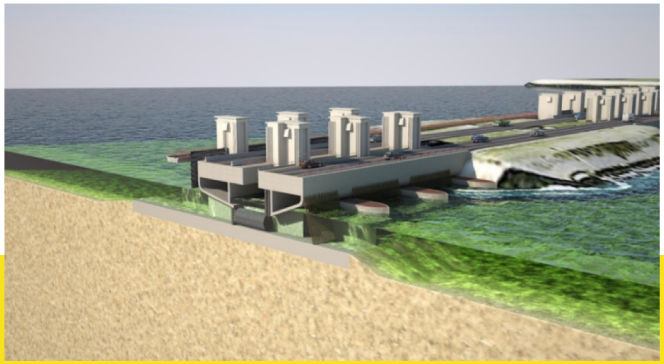
Beoordeling biologische kwaliteit in rijkswateren volgens Kaderrichtlijn Water



Bron: Deltares; bewerking PBL

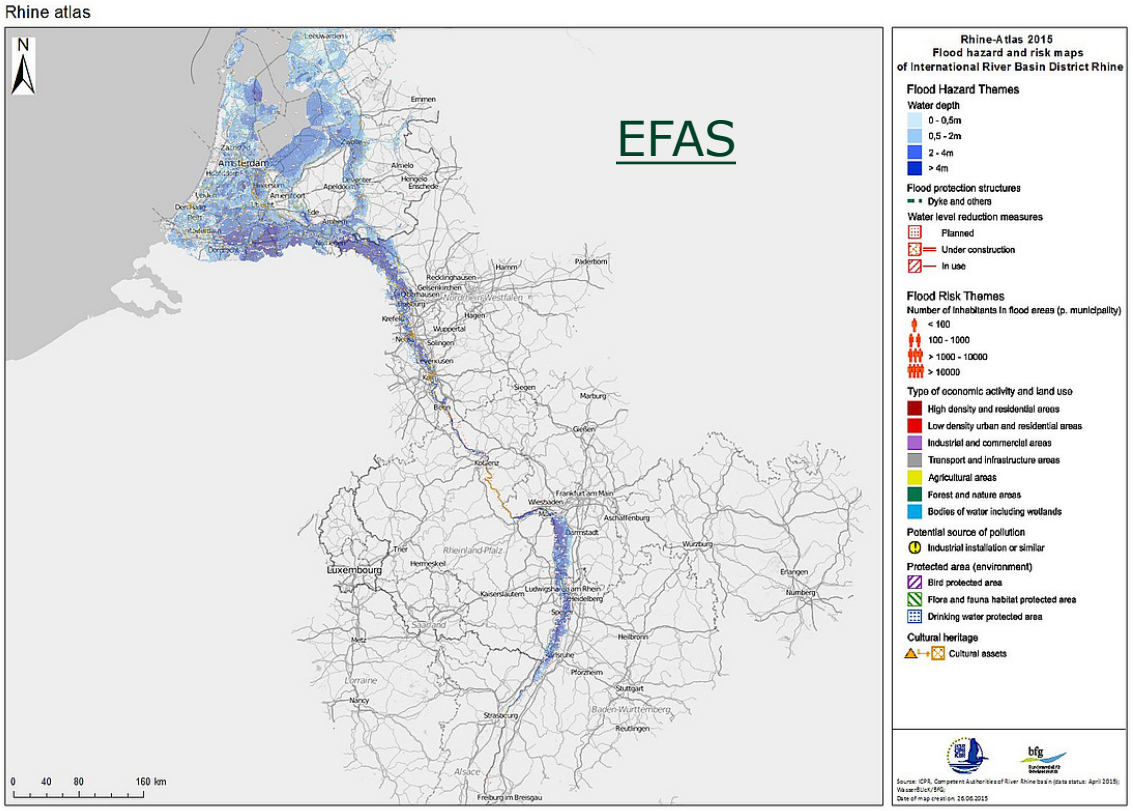
Themes: Ecology and Fish migration

- Habitat patch connectivity
- Fish migration
  - target species: the salmon as a symbol
  - dutch action: (re-)opening weirs Haringvliet, fish migration river
- Ecological continuity zones (N2000)
- Floodplain improvement

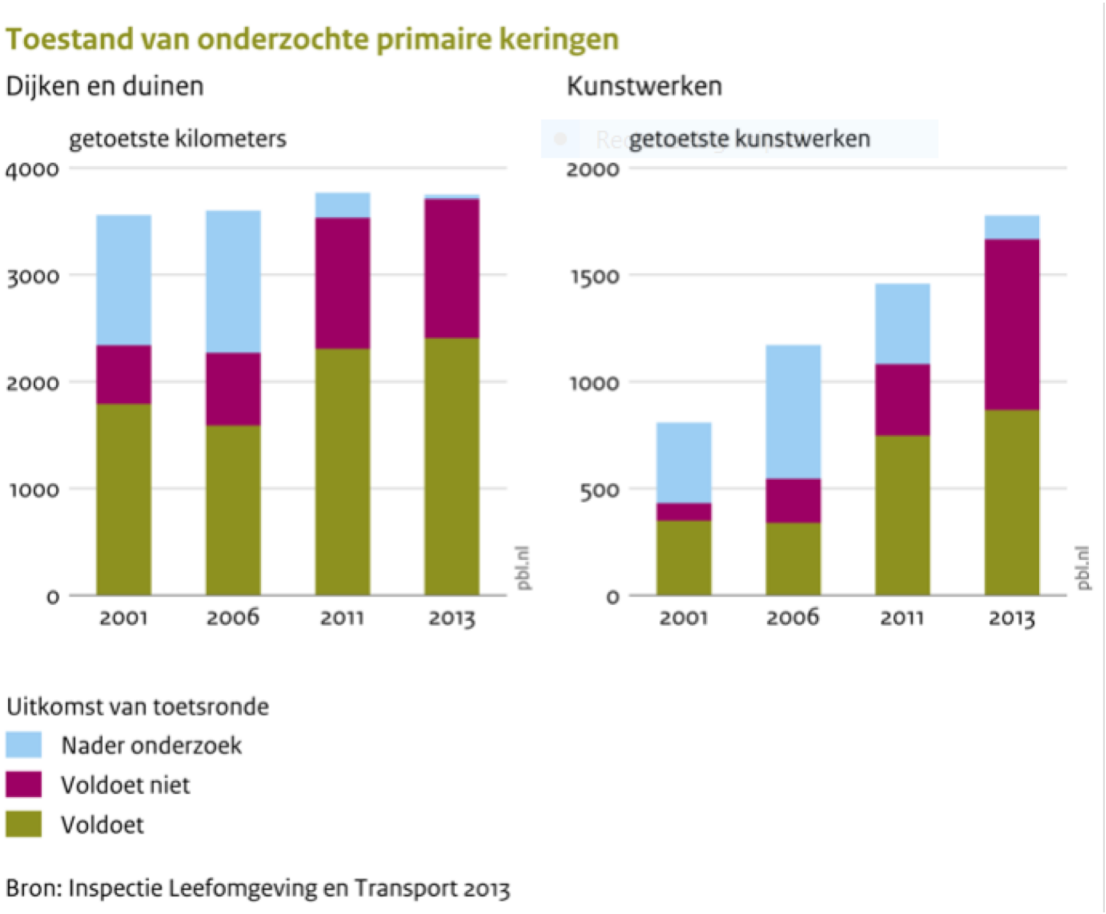


Themes: water quantity

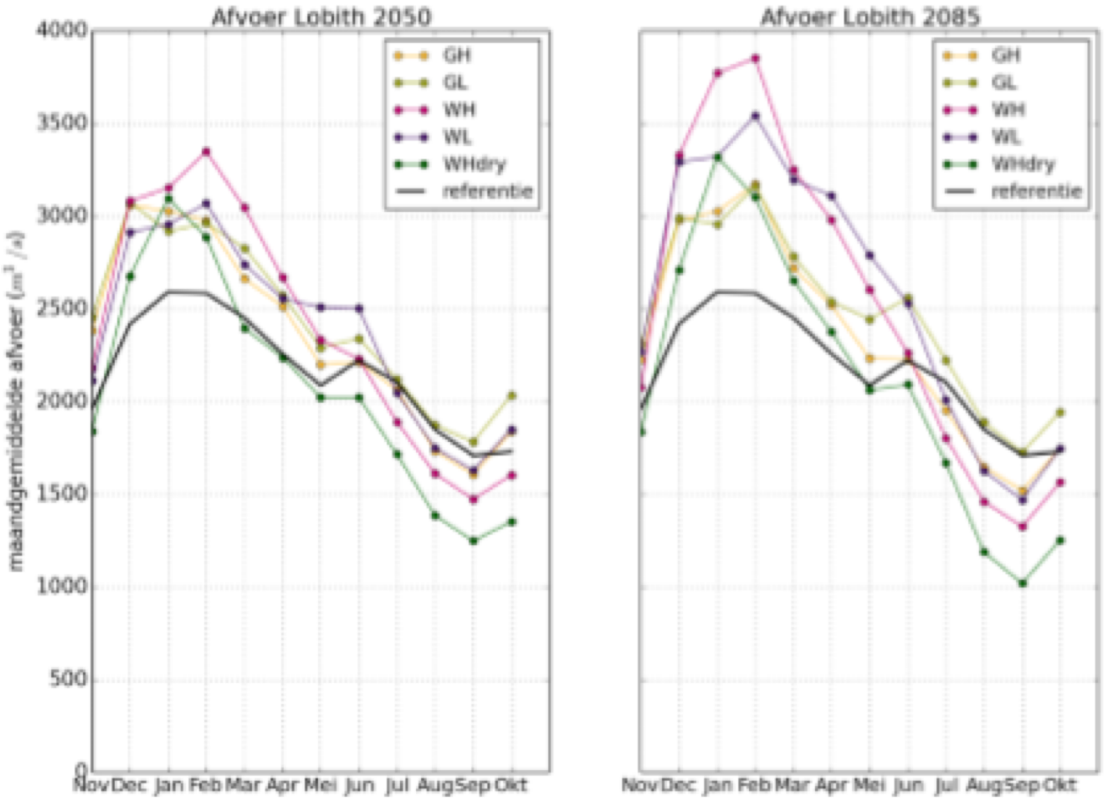
- Since 1995 focus also on floods
  - Protection and retention
  - Warning, forecasting
  - Awareness
- EU Floods Directive
- Rhine Atlas (2015)
- New: Low water



But: challenge remains, levee improvement program



Discharge predictions 2050-2085

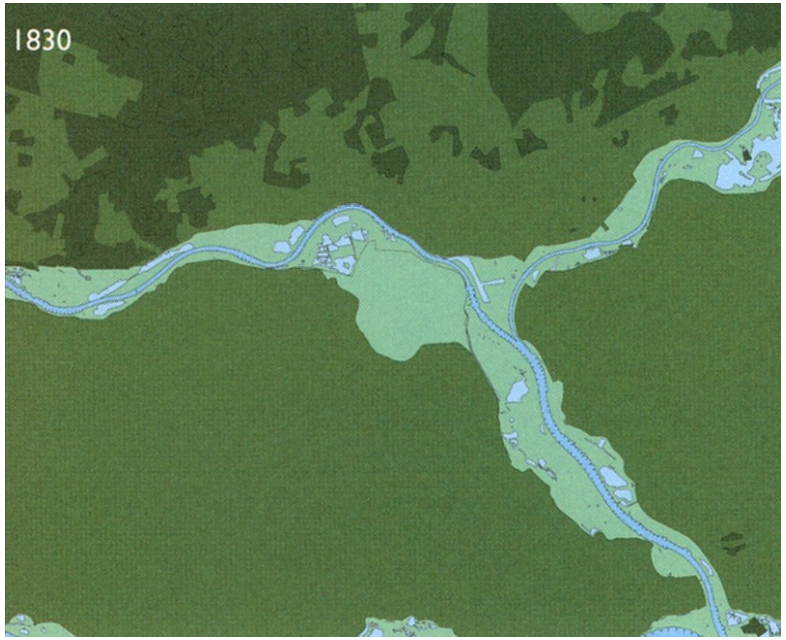


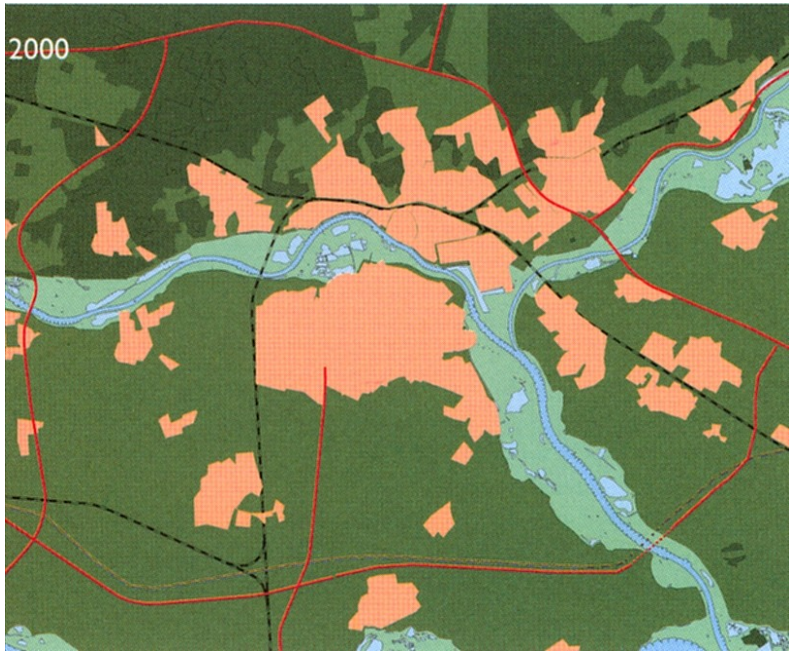
Figuur 2 Afvoerregime van de *Rijn* in de KNMI'14 scenario's in vergelijking met het huidige afvoerregime (in zwart).

Intermezzo: 2nd Delta Program

- 2007-2008: 2nd Delta Committee
- 2010: Delta Commissioner
- 2011: Delta Act & Delta Fund (2020:1 billion €/yr)
- 2014: Delta decisions
- Annually: Delta program

Urban expansion – increasingly less space for river & its floodplanes





2nd Delta program

3 national programmes:

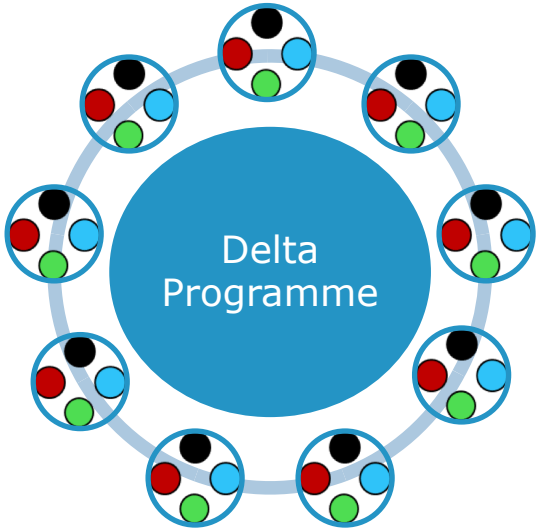
- Safety: risk based standards

  (cost benefit analysis)
- Fresh water strategy
- Spatial adaptation

6 regional programmes

Multilevel Governance & institutions

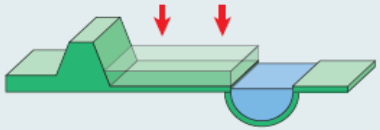
- **Ministry**
  - Policy guidelines,
  - Rijkswaterstaat - national watersystem
- **Provinces**
  - Spatial planning,
  - Supervision municipalities and waterboards
- **Municipalities**
  - Spatial planning, sewage & drainage system
- **Regional Water Authorities**
  - Regional watersystem, waterquality, waterquantity



Mutual Gains Approach as inspiration for Strategic Stakeholder Involvement

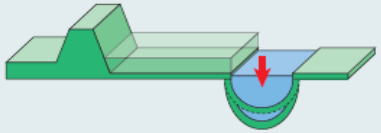
How to provide more room to a river

Lowering of floodplains



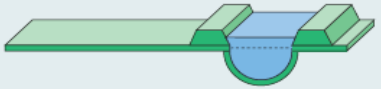
Lowering (excavating) an area of the floodplain to increase the room for the river at high water levels

Deepening summer bed



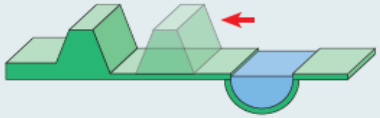
The river bed is deepened by excavavating the surface layer of the river bed. The deepened river bed provides more room for the river

Water storage



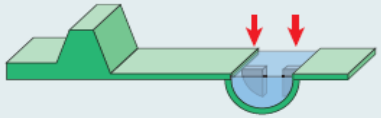
The Volkerak-Zoommeer lake provides for temporary water storage when exceptional conditions result in the combination of a closed storm surge barrier and high river discharges to the sea

Dyke relocation



Relocating a dyke inwards increases the width of the floodplains and provides more room for the river

Lowering groynes

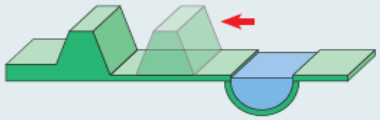


Groynes stabilise the location of the river and ensure that the river remains at the correct depth. However, at high water levels groynes can form an obstruction to the flow of water in the river. Lowering groynes increases the flow rate of the water in the river

High water channel

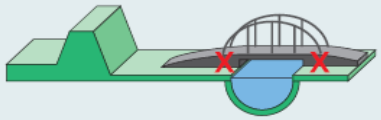
A high water channel is a dyked area that branches off from the main river to discharge some of the water via a separate route

Depoldering



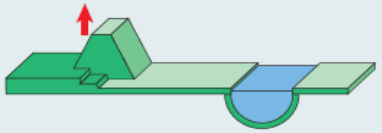
The dyke on the river side of a polder is relocated inwards. The polder is depoldered and water can flood the area at high water levels

Removing obstacles



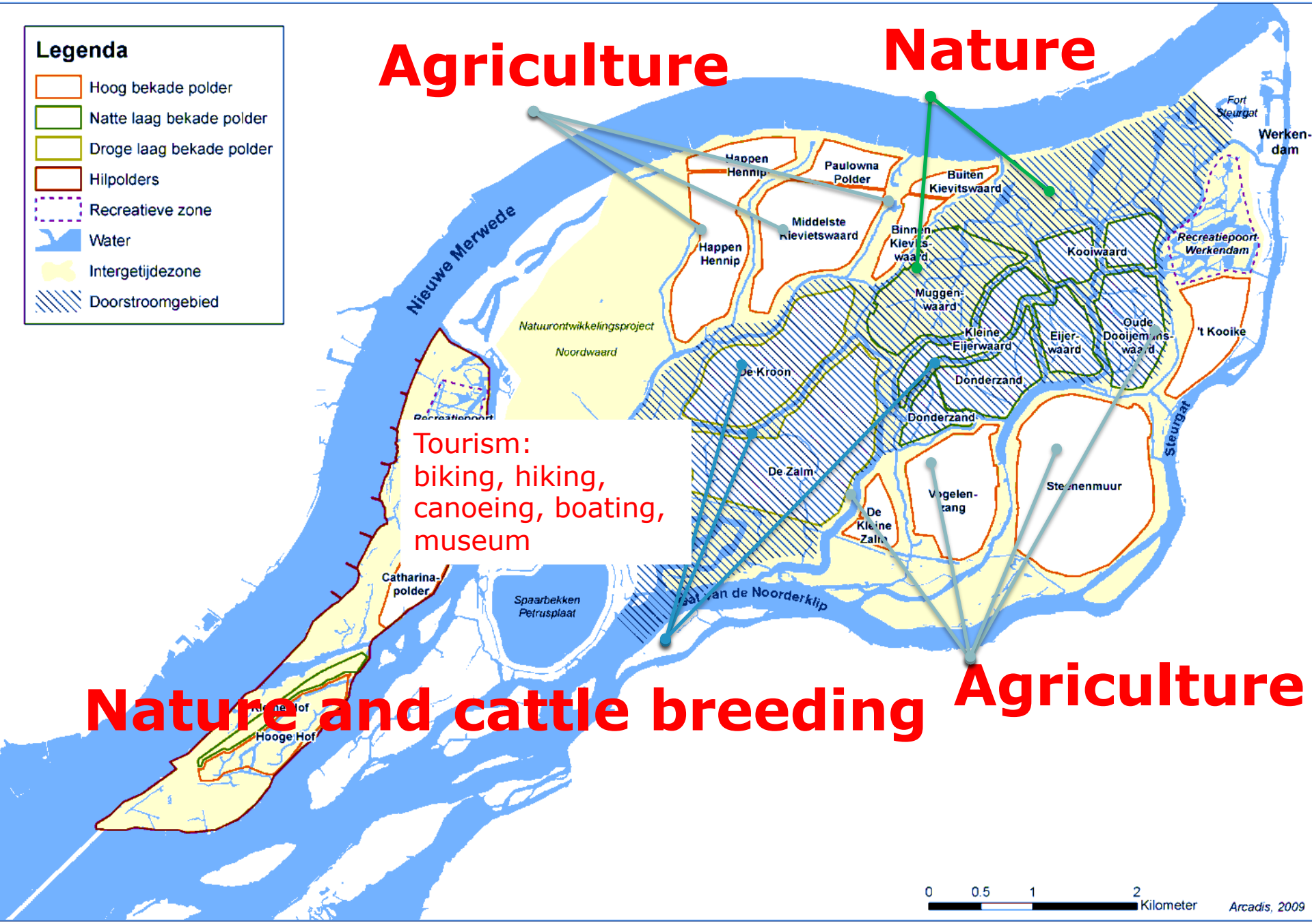
Removing or modifying obstacles in the river bed where possible, or modifying them, increases the flow rate of the water in the river

Strengthening dykes

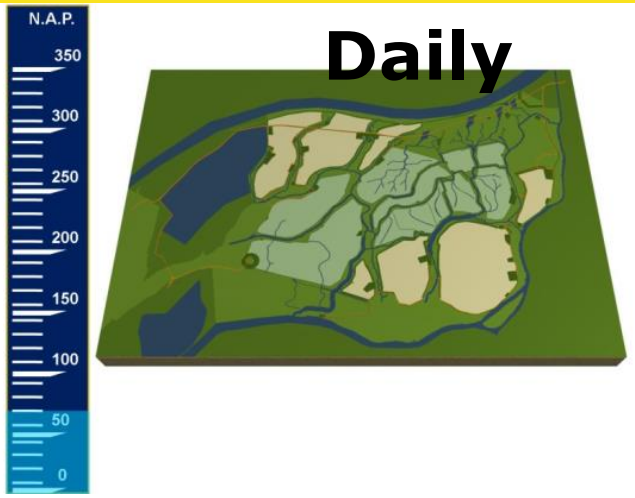


Dikes are strengthened in areas in which creating more room for the river is not an option

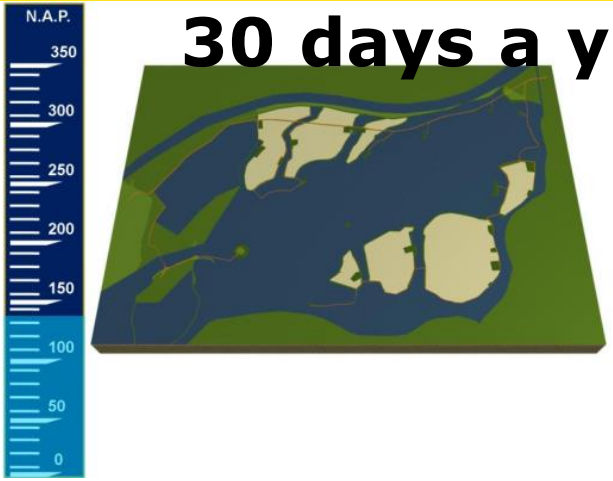
Room for the River program project area with the 34 projects: 2002-2018


Legenda
Hoog bekade polder
Natte laag bekade polder
Droge laag bekade polder
Hilpolders
Recreatieve zone
Water
Intergetijdezone
Doorstroomgebied
Agriculture
Nature
Tourism:
biking, hiking,
canoeing, boating,
museum
Nature and cattle breeding
Agriculture
Nieuwe Merwede
Natuurontwikkelingsproject
Noordwaard
Happen Hennip
Paulowna Polder
Middelste Kievietswaard
Buiten Kievitswaard
Kooiwaard
Recreatiepoort Werkendam
Fort Steurgat
Werken-dam
Muggen-waard
Kleine Eijerwaard
Eijer-waard
't Kooike
De Kroon
Donderzand
De Zalm
Steurgat
Catharina-polder
Spaarbekken Petrusplaat
Hooge Hof
0 0.5 1 2 Kilometer
Arcadis, 2009

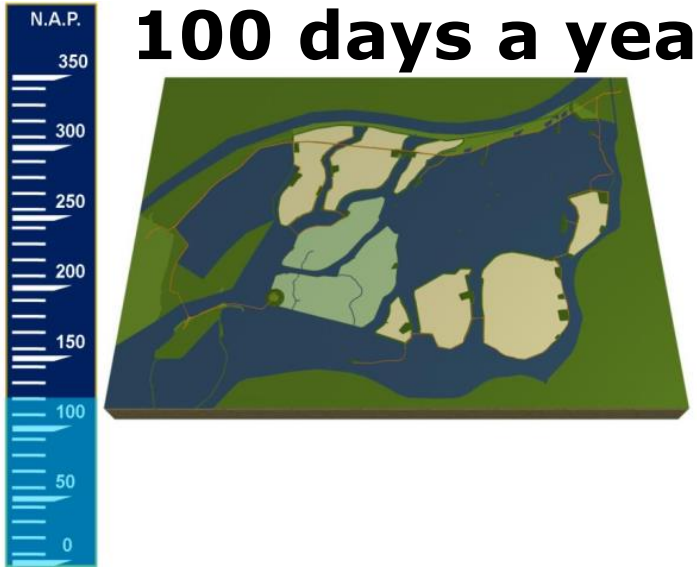
Daily



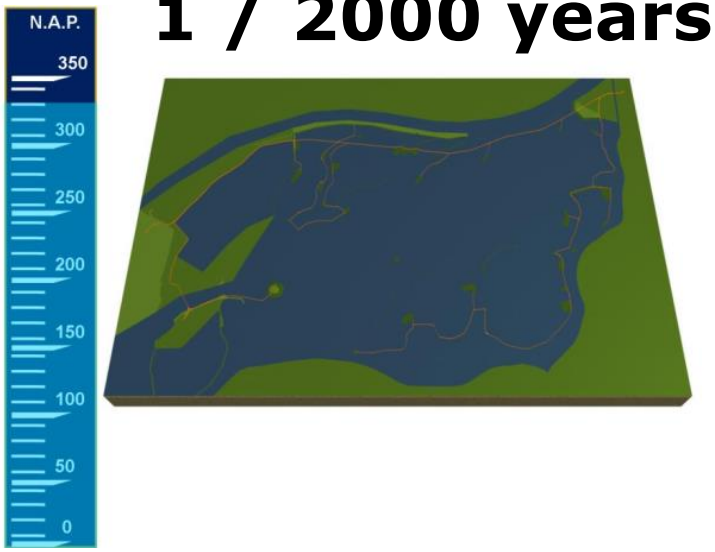
30 days a year



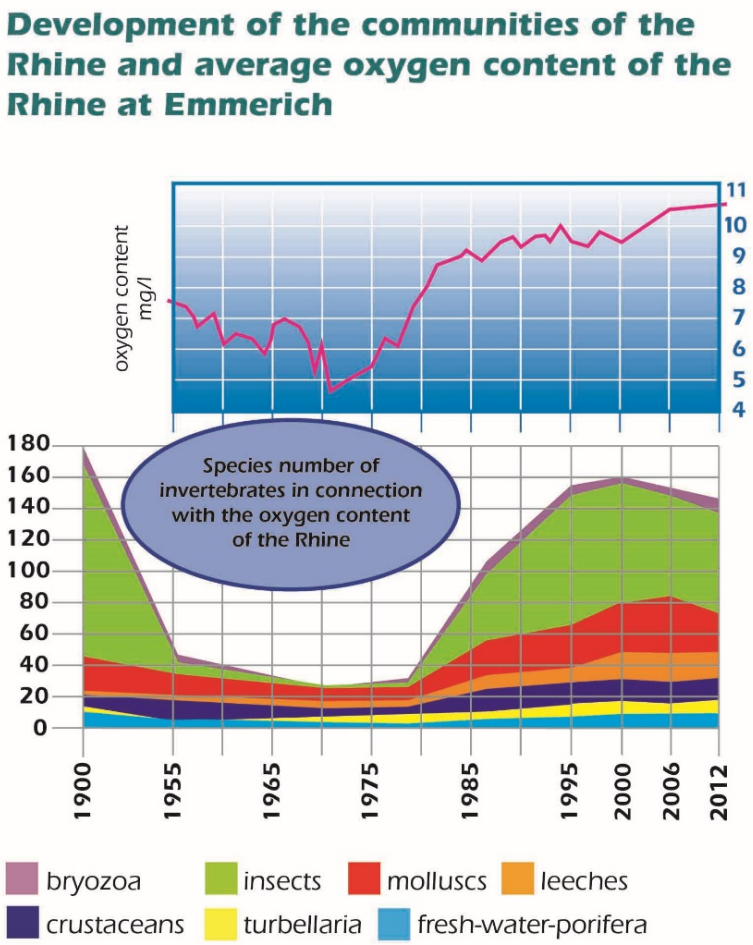
100 days a year



1 / 2000 years



Back to results ICPR



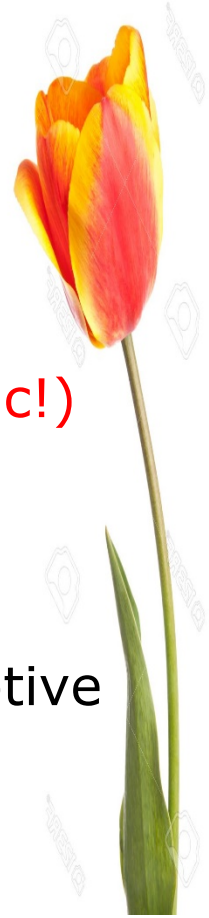
Upcoming

- Rhine Ministers Conference in Amsterdam, February 2020
  - Fish migration
  - Drought issues

- Rhine 2040 programme, with clear targets for:
  - Ecology
  - Water Quality
  - High and low water
  - Increasing International collaboration

Summary and conclusions

- ICPR moved from joint monitoring programmes towards integrated water resource management,
- guided by ‘learning by doing‘ and influenced by some catastrophes
- the formula of Action Programmes proved to be successful
- precaution and prevention became basic principles
- ICPR seeks unanimity & political commitment (be pragmatic!)
- ICPR started cooperation with NGOs
- EU WFD brought level playing field, essential for industry cooperation
- FMD and impact & risk assessments: instrumental for adaptive approaches (mix of hard & soft), but adequate funding @ national accounts much needed
- But it can be done…..☺ look@NL



Thank you for your attention

Further reading

- Two Centuries of Experience in Water Resources Management
- Delta program (English)
- Room for the River (English)
- Cost benefit analysis flood management NL
- Flood risk and watermanagement in the Netherlands
- River basis management plans 2016-2021
- ICPR and Convention on the protection of the Rhine