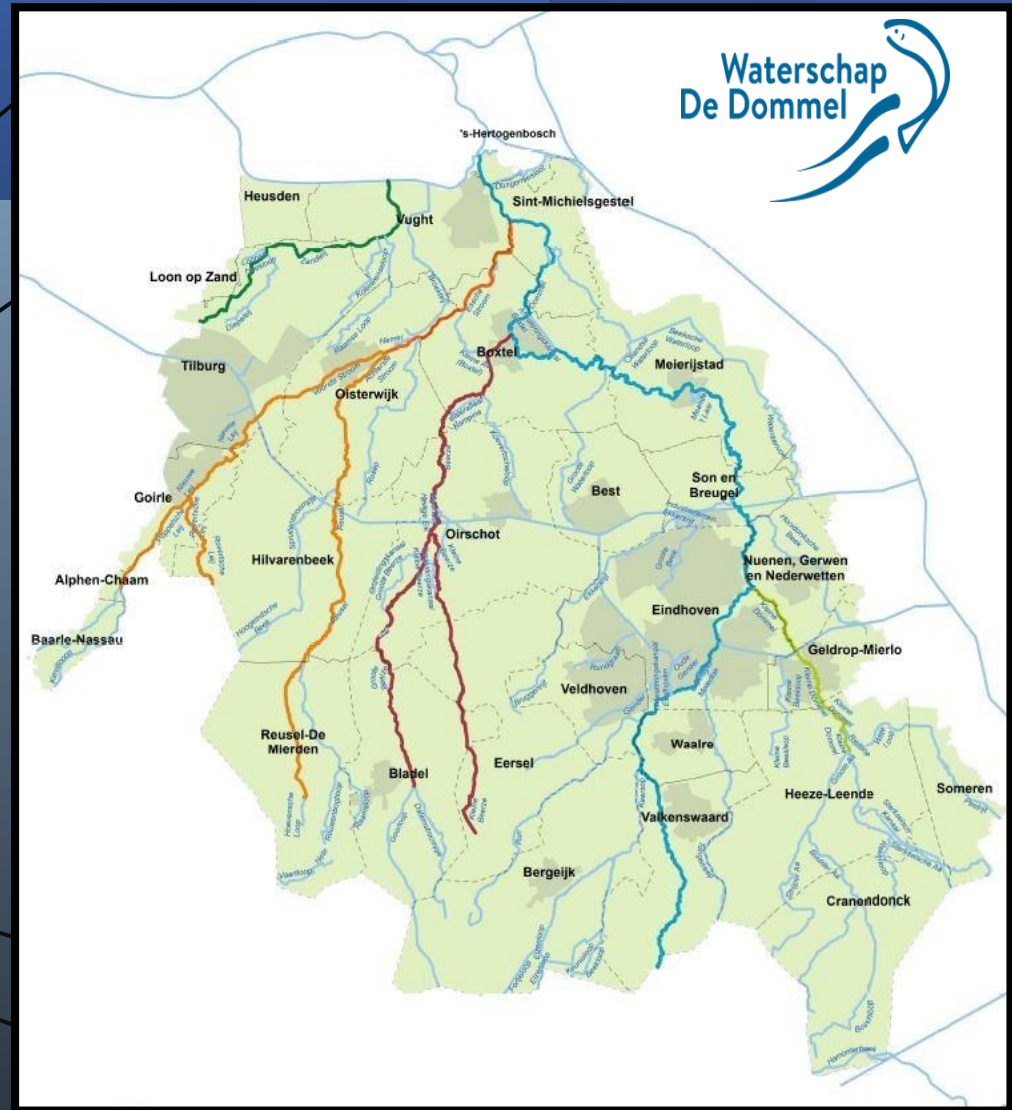


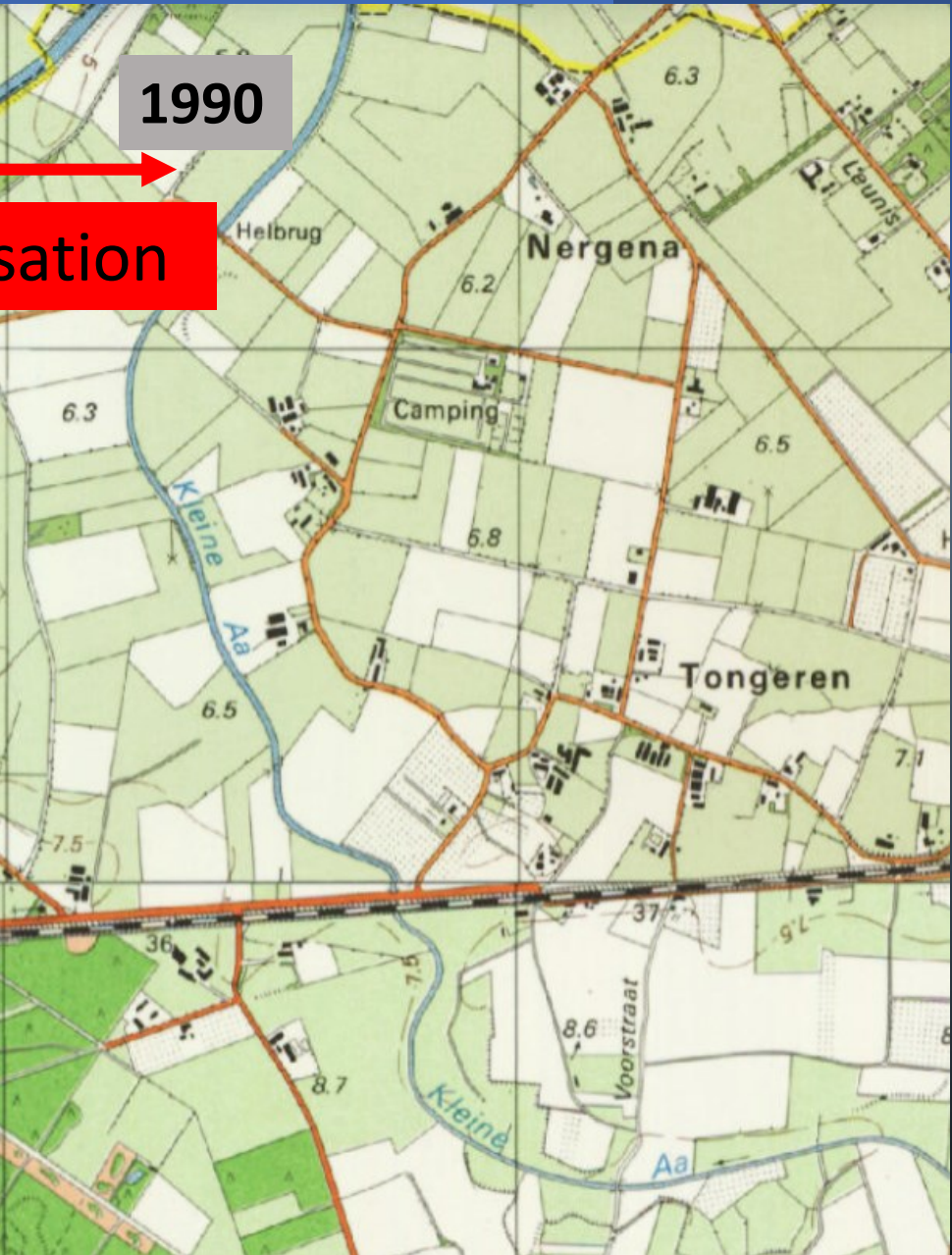
Restoring a lowland river basin

Effects of fishways, removing barriers and re-meandering on fish and macroinvertebrate communities

Panos Panagiotopoulos, Wilco de Bruijne, Tom Buijse, Edwin Peeters, Erwin Winter, Mark Scheepens, Max van de Ven, Leo Nagelkerke

Catchment: ~1800 km²



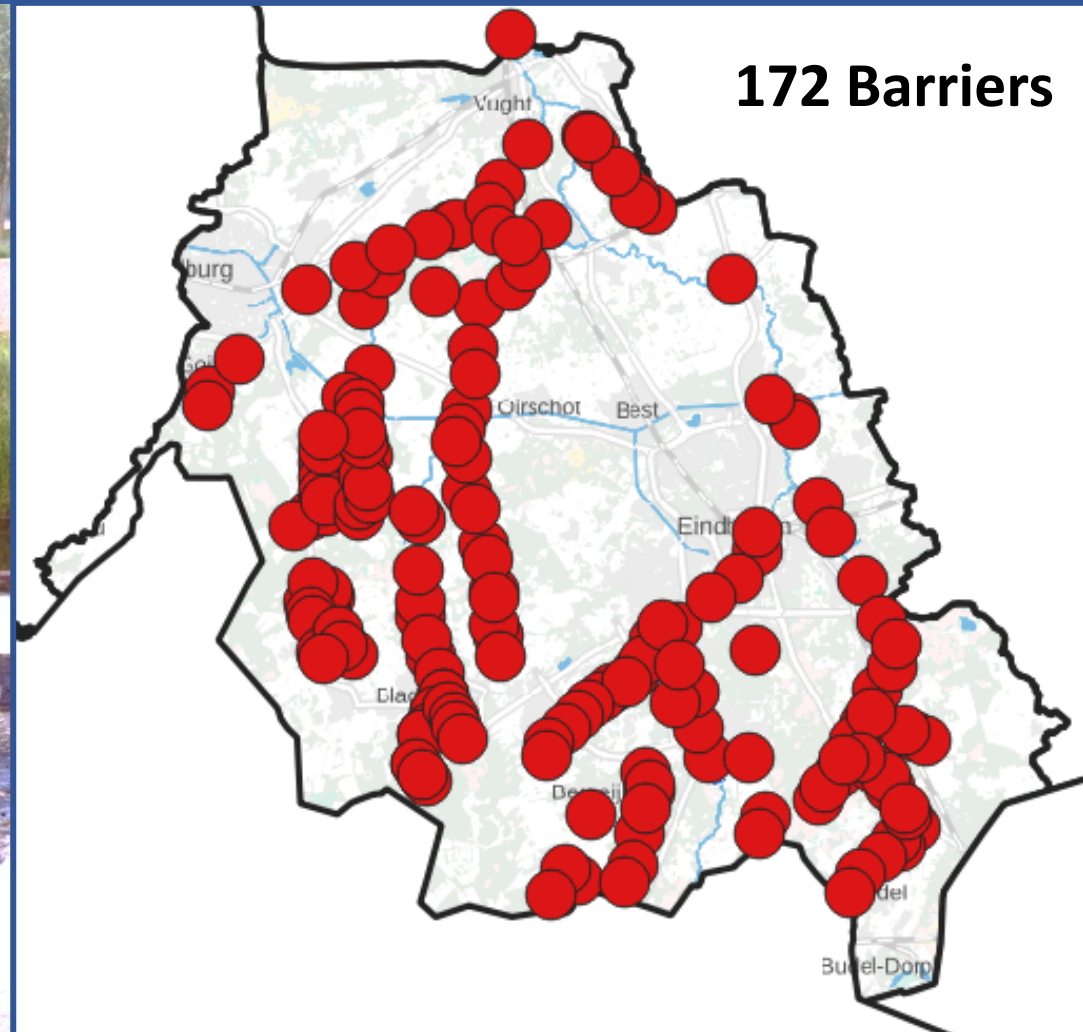


Canalisation

Poor water quality



Fragmentation

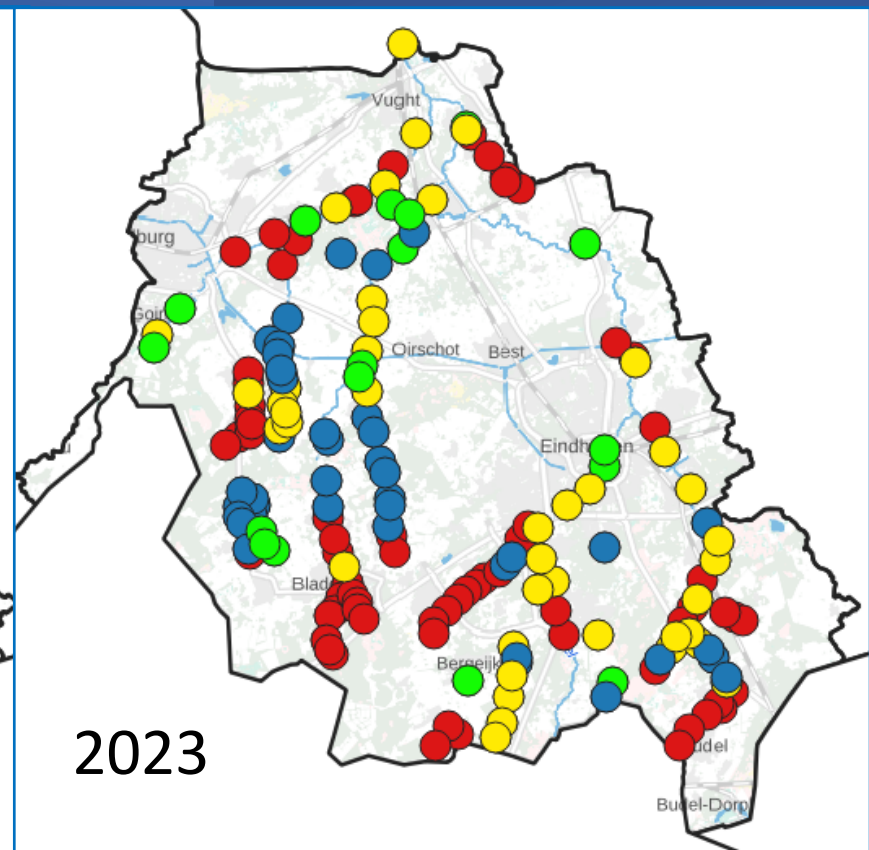
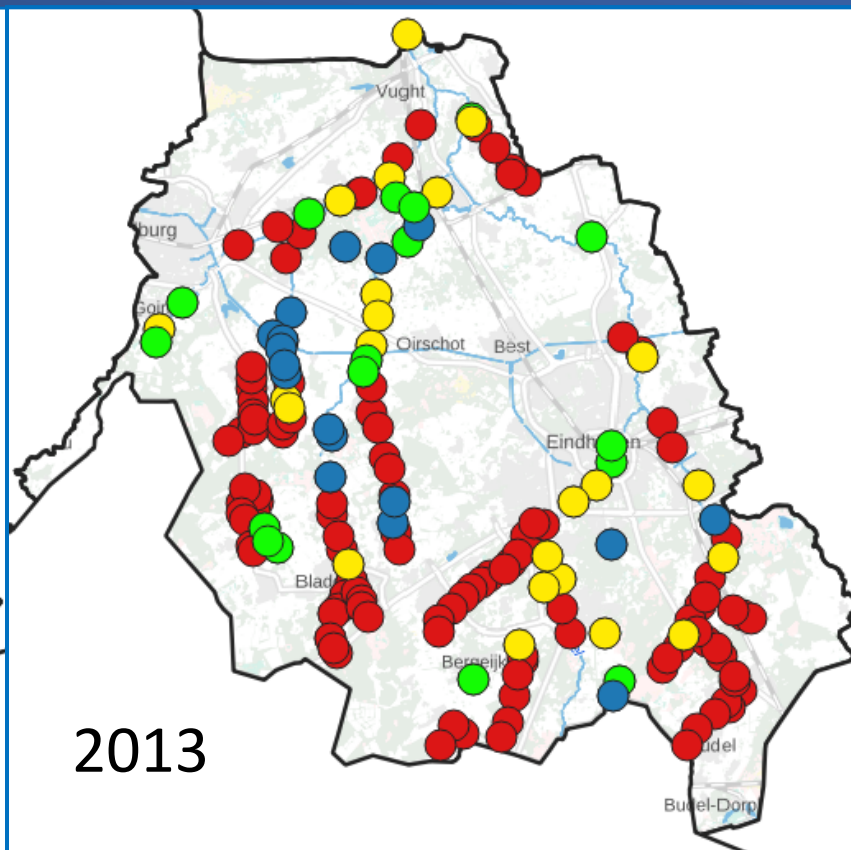
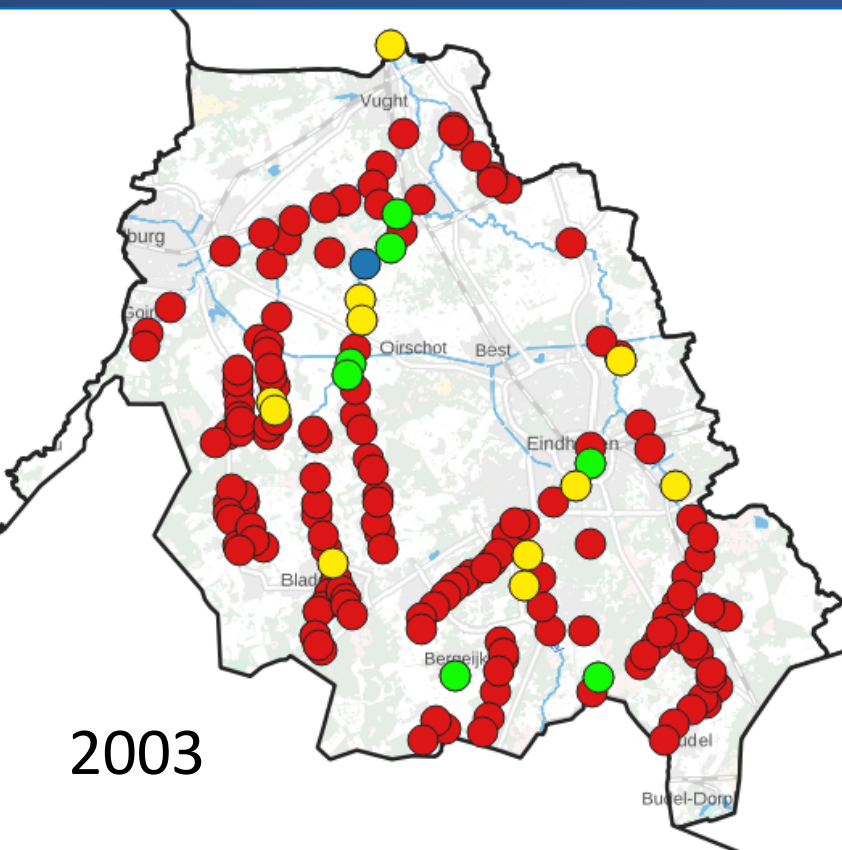


- “What measures have been implemented for restoration?”

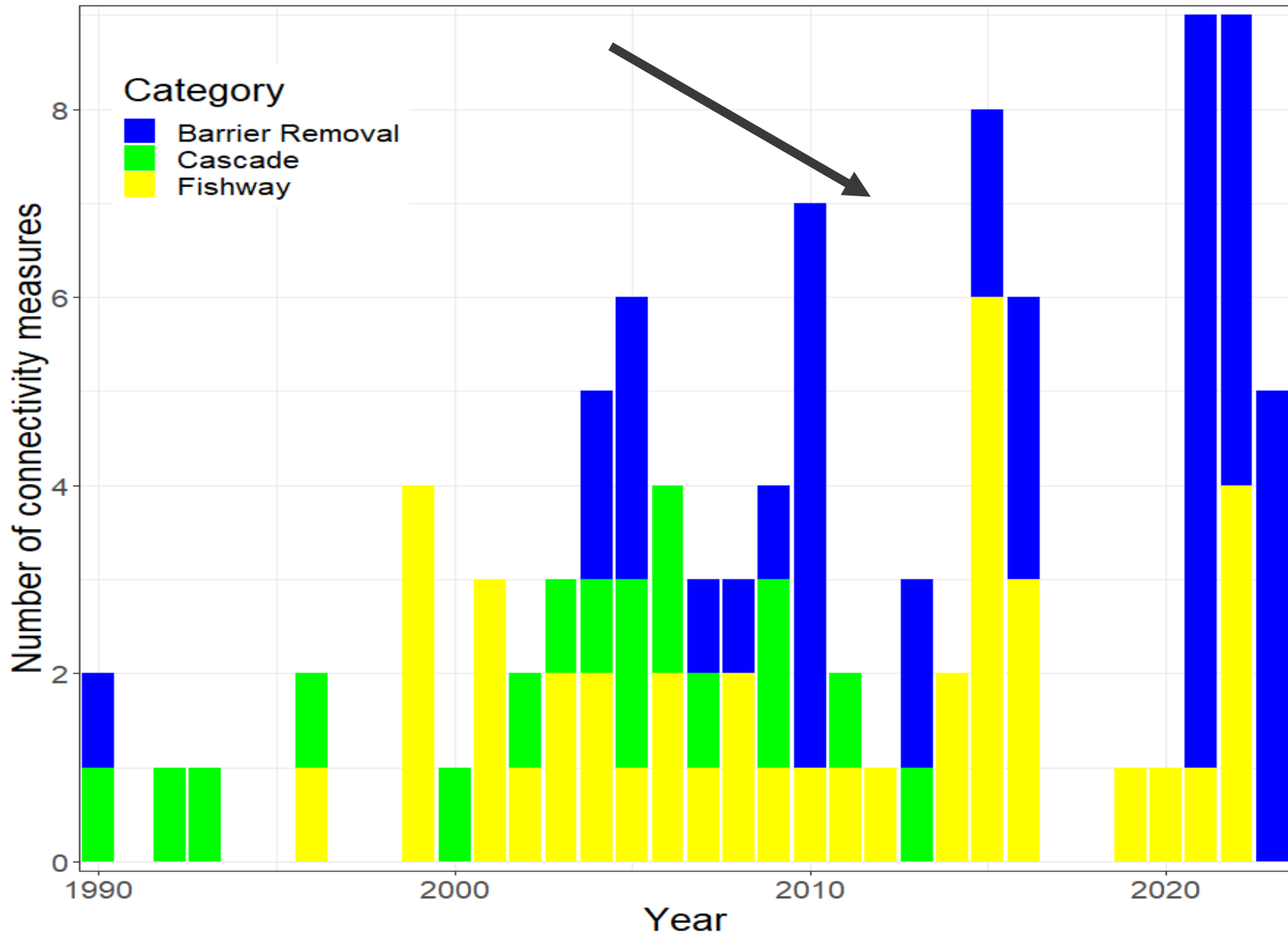
- “How did macroinvertebrate and fish communities respond to these measures?”

In collaboration with the water authority

WFD fish and macroinvertebrate monitoring data (2002-2022)



- Barrier removal
- Cascade fishway
- Fishway
- No measure



41 Fishways



17 cascade fishways

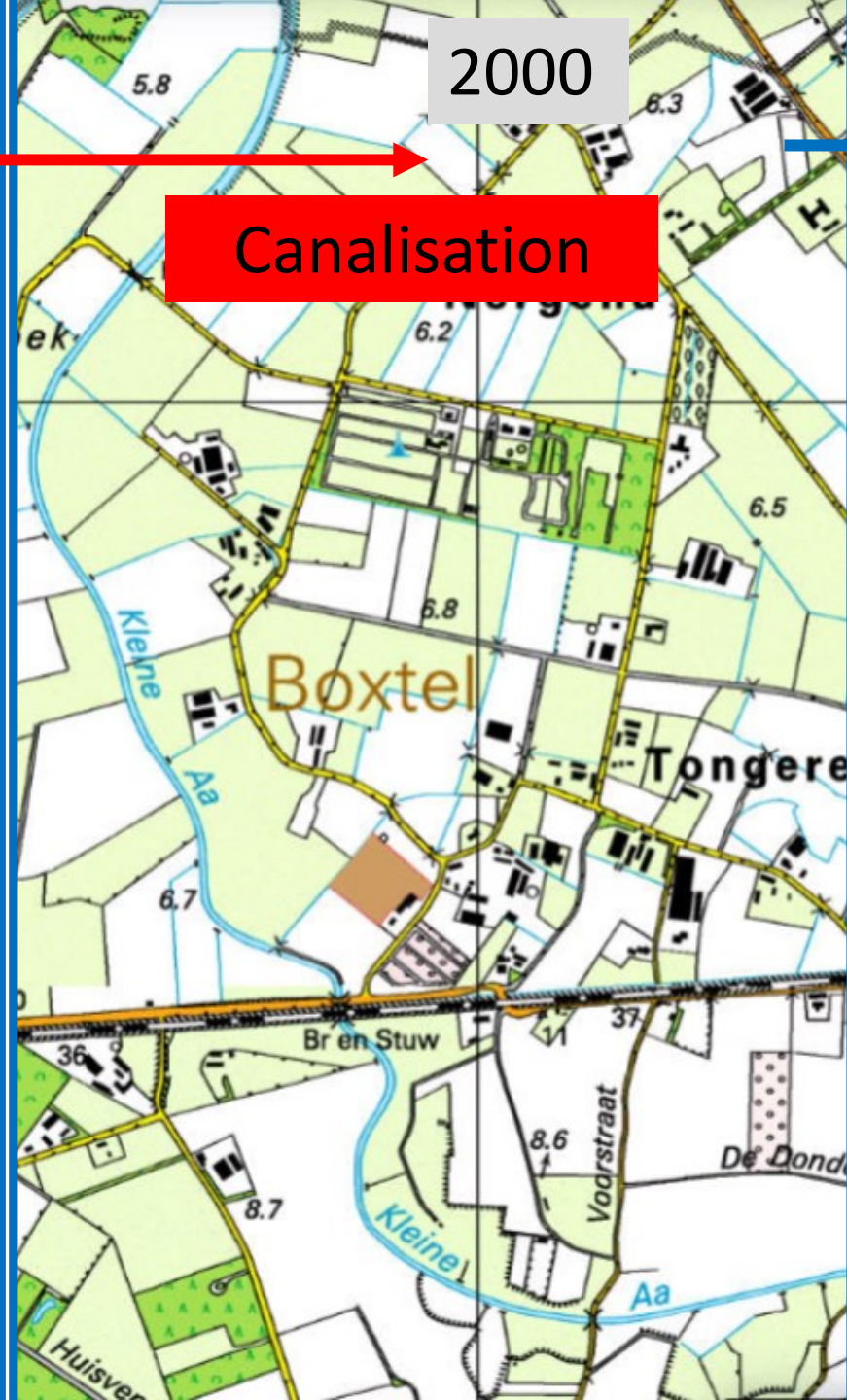


40 Barrier removals!



Barrier removal 2.0

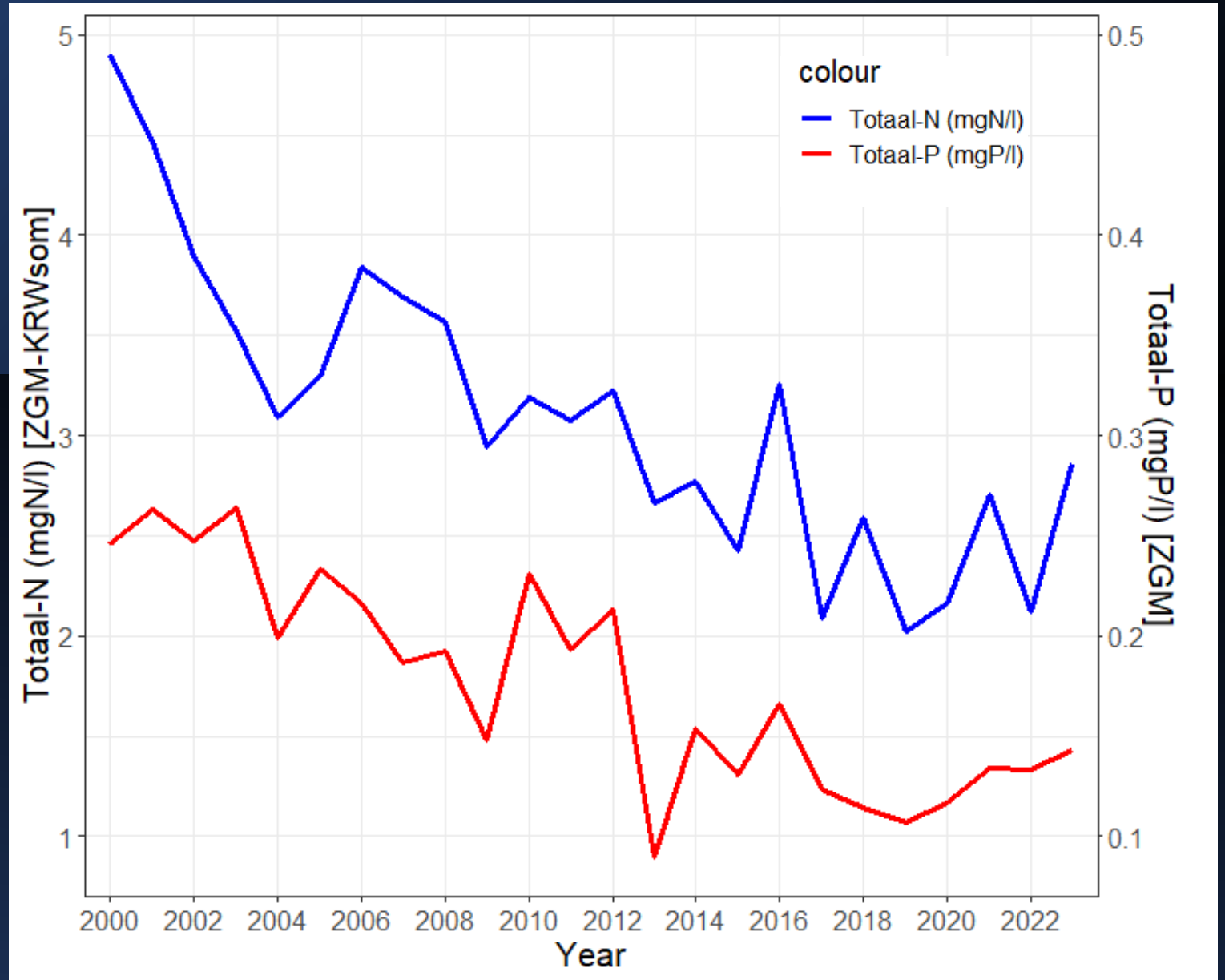
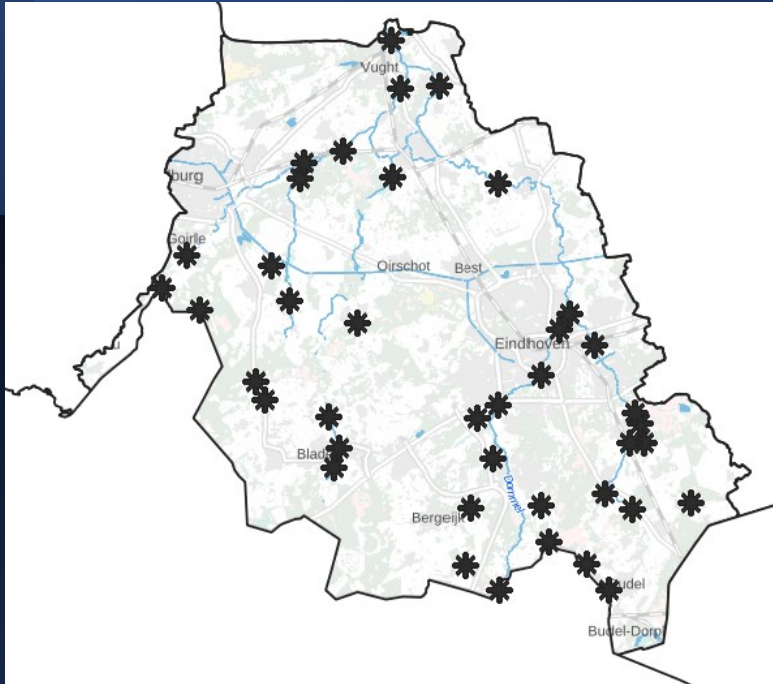
Even 2 cascade fishway were removed !!!







Water quality improvement

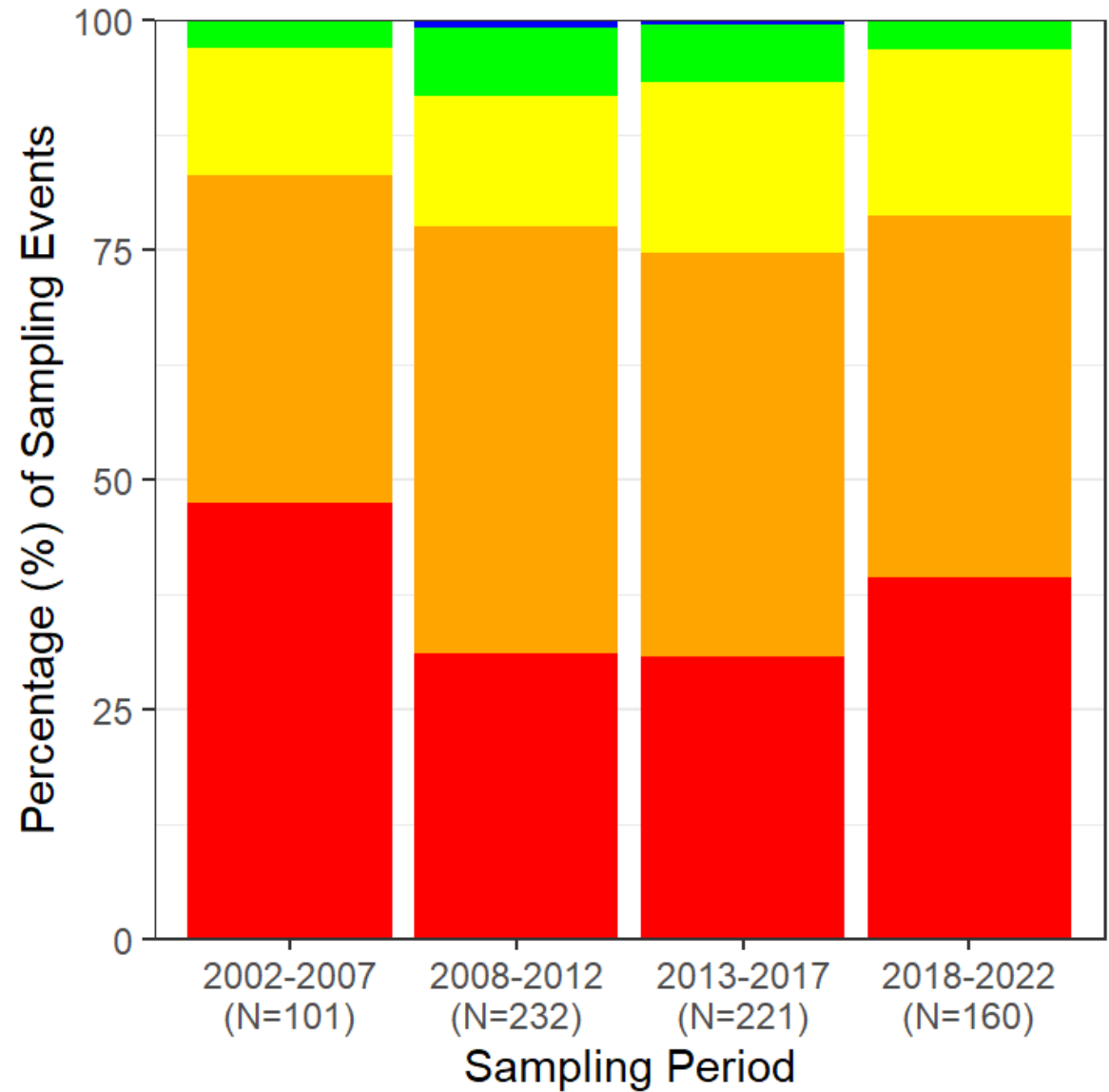
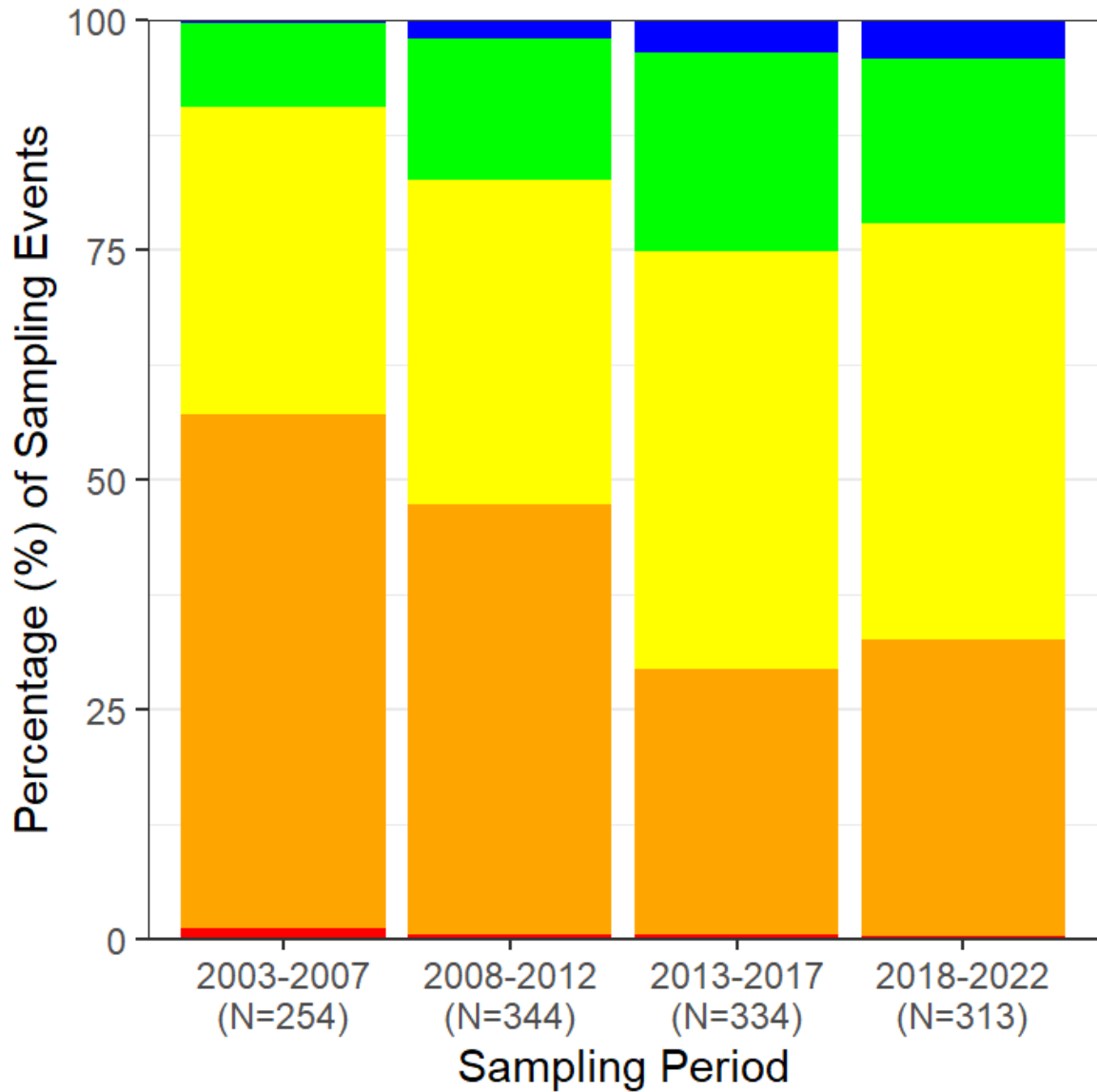


Macroinvertebrates

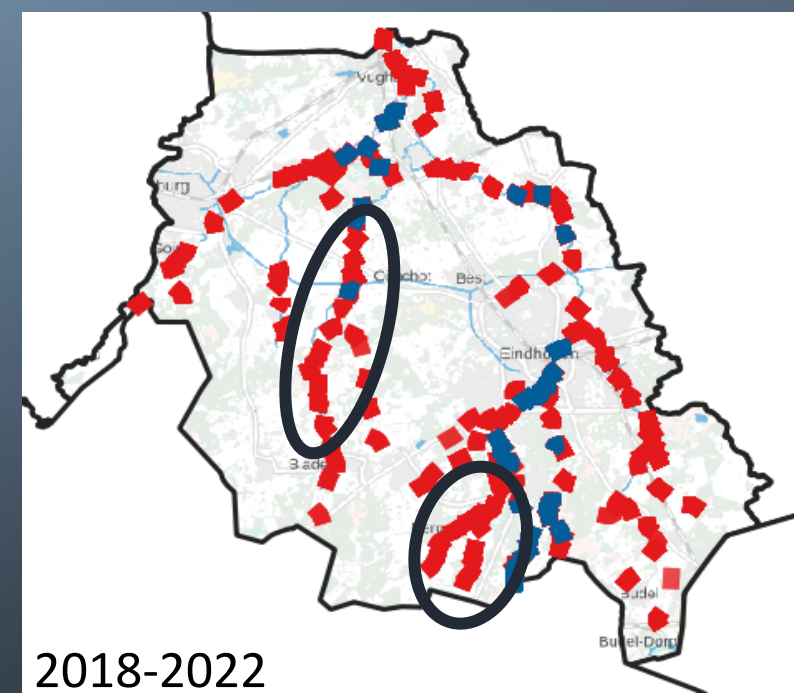
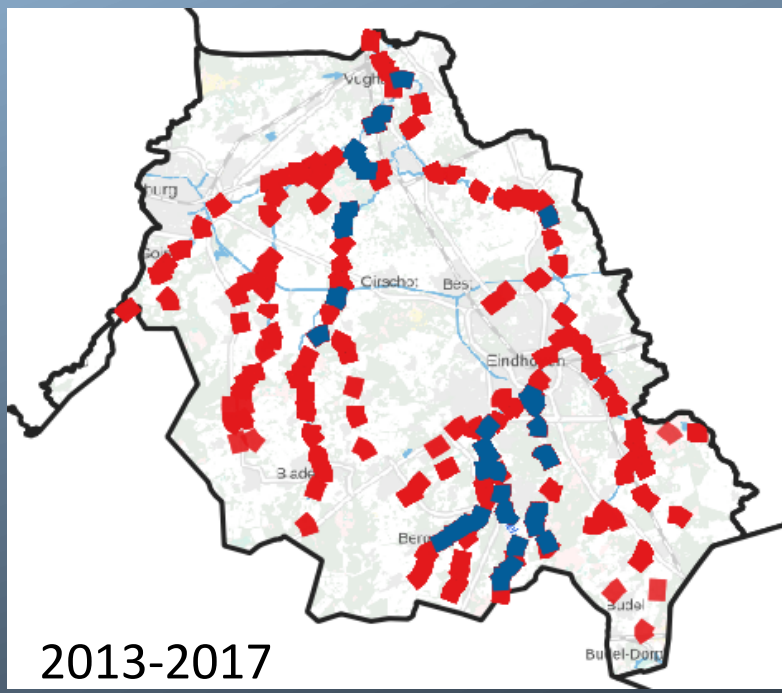
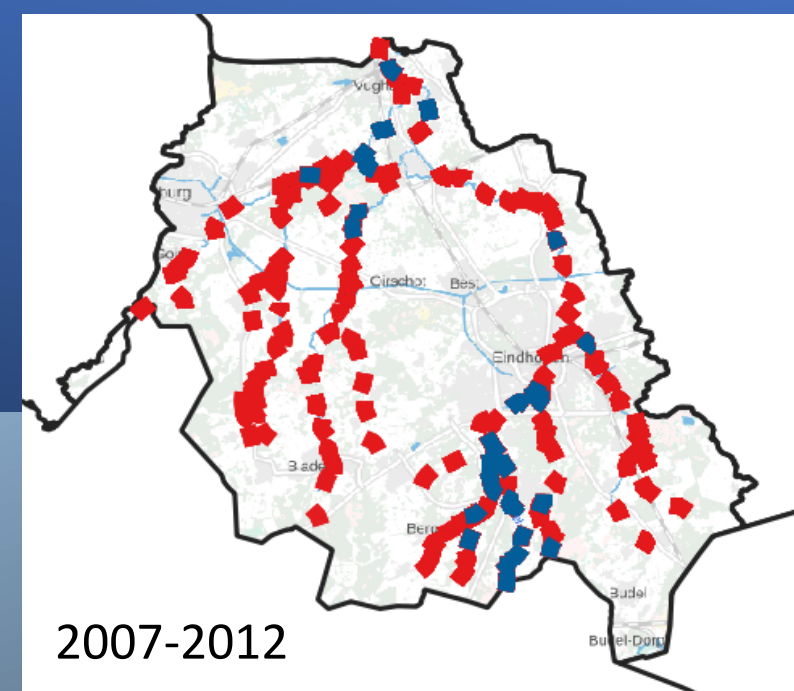
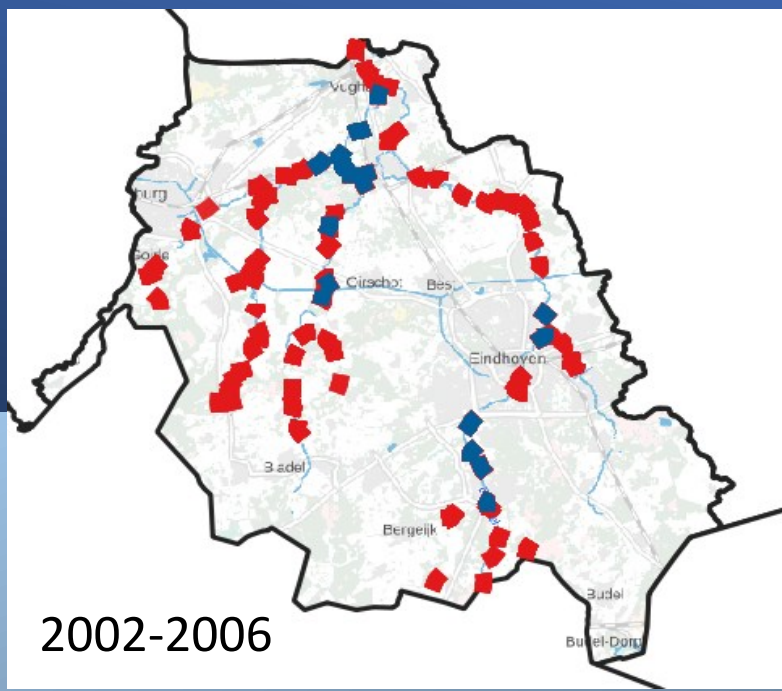
EQR

- High (0.8-1)
- Good (0.6-0.8)
- Moderate (0.4-0.6)
- Poor (0.2-0.4)
- Bad (0-0.2)

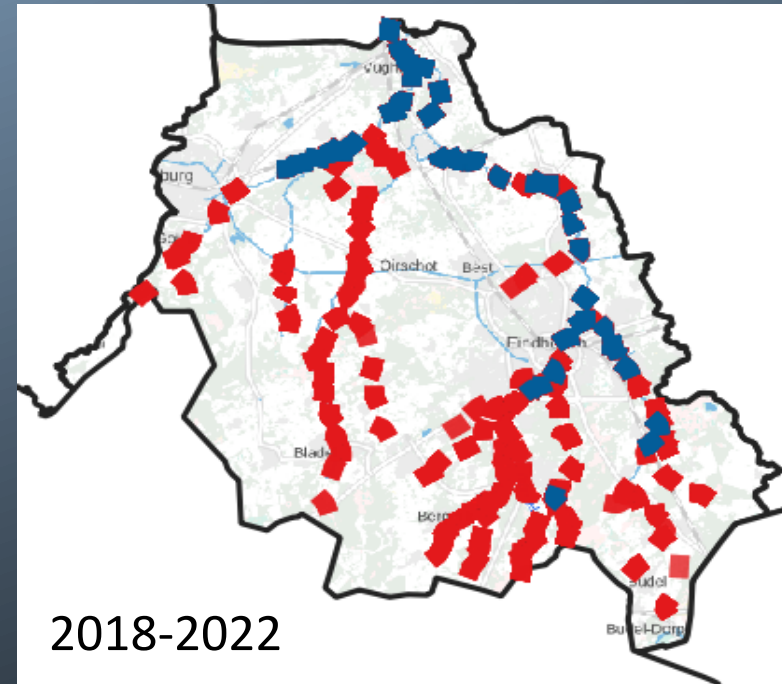
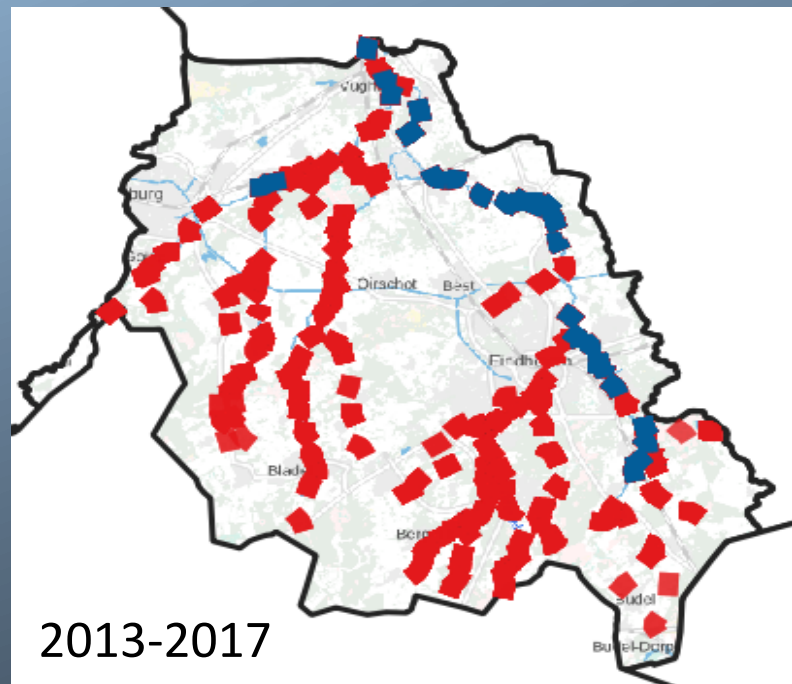
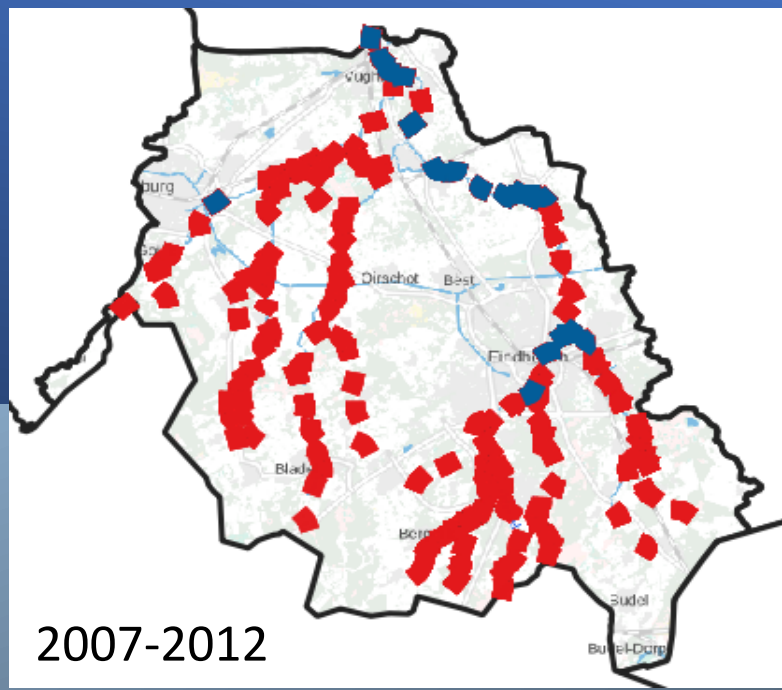
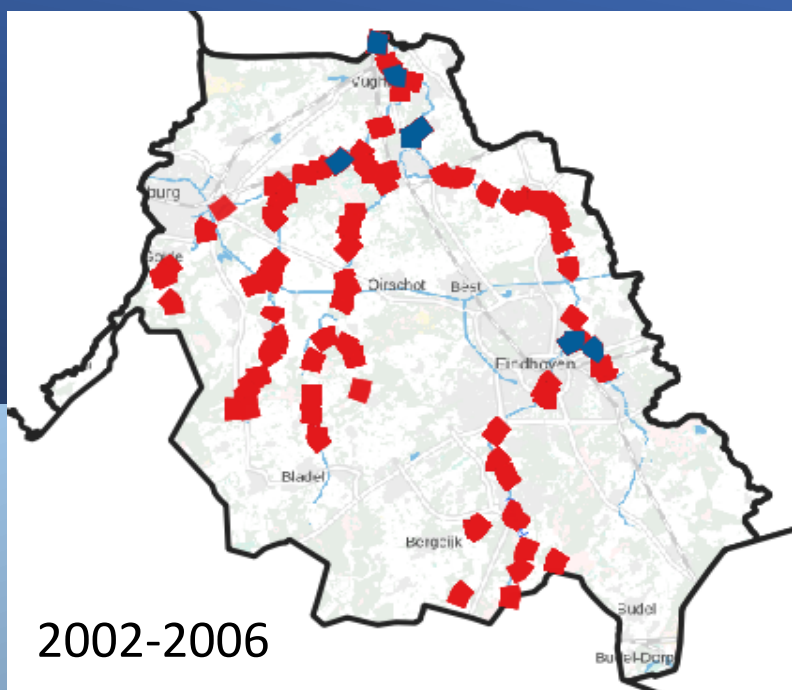
Fish



Chub



Drought 2018-2019

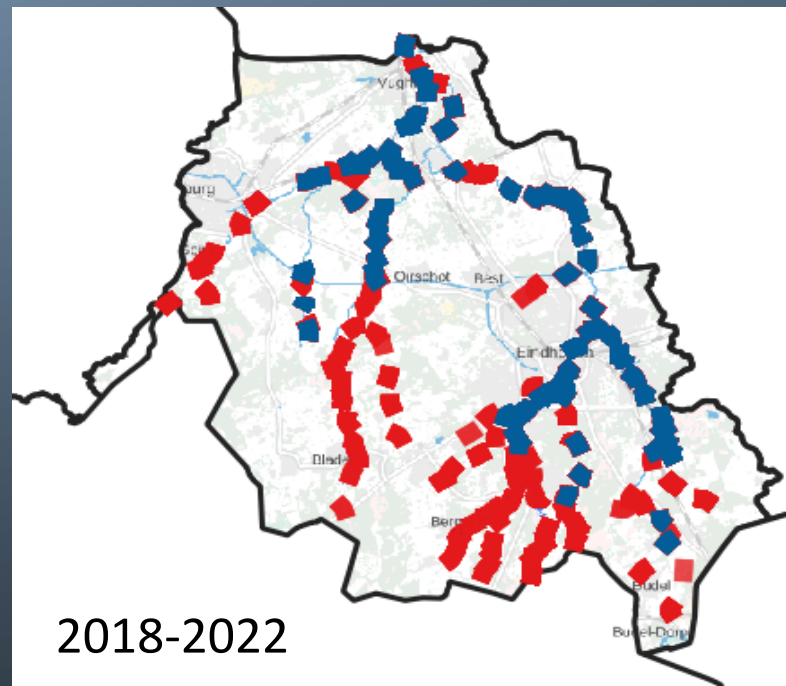
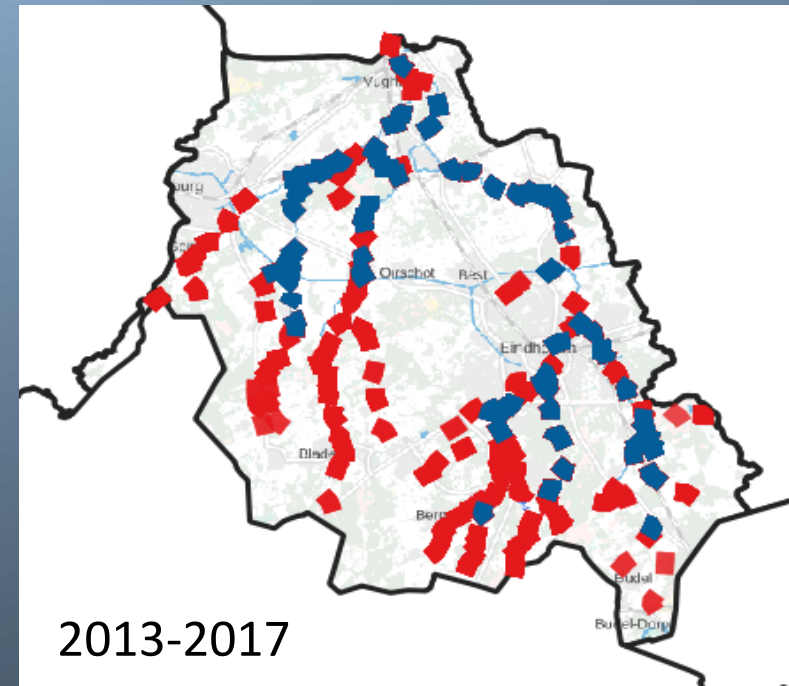
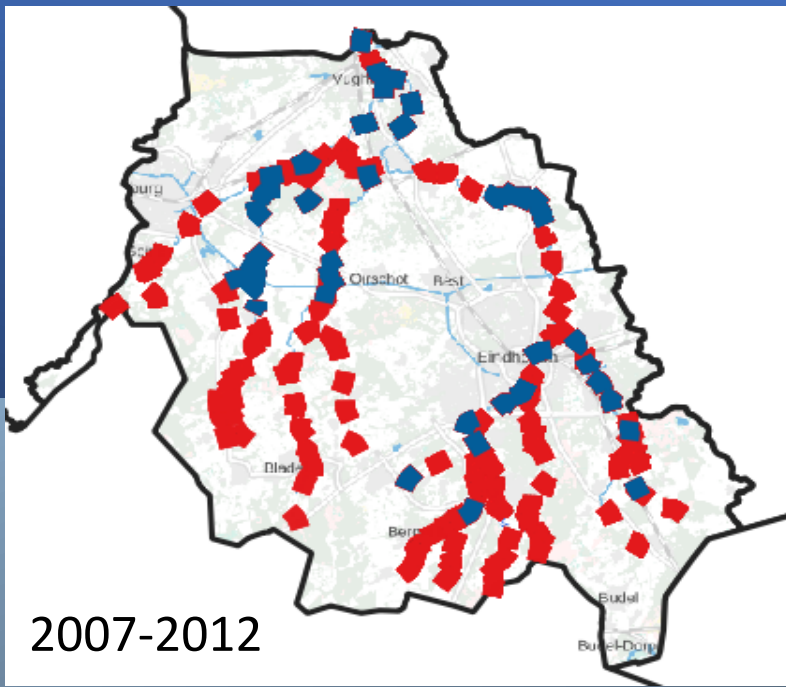
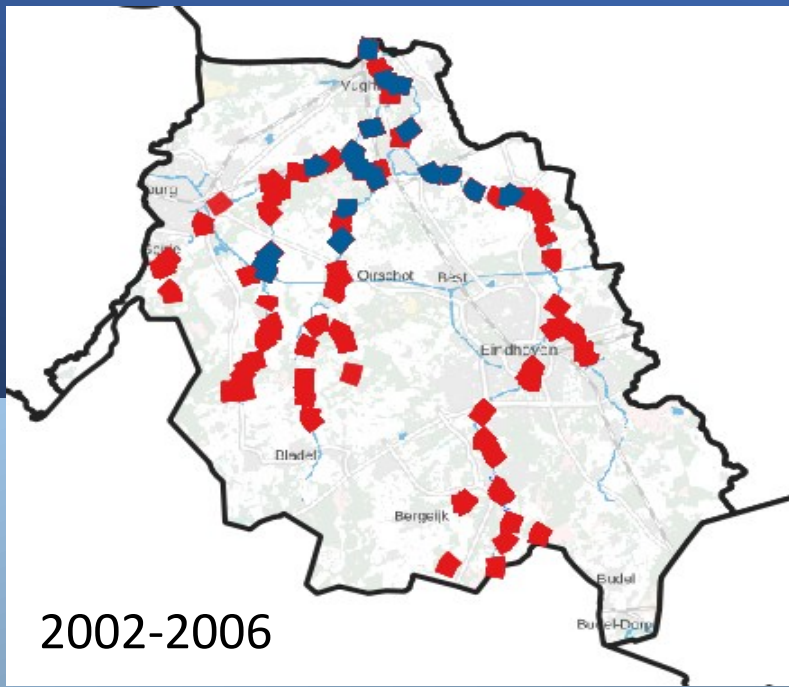


Bitterling



Re-colonisation

Water quality?
Habitat?
Connectivity?



Spined loach



Re-colonisation

Water quality?
Habitat?
Connectivity?

Conclusions

- Improvement in connectivity, water quality and habitats
- Dam removal is becoming mainstream
- EQR macroinvertebrate scores ↑↑↑
- Fast re-colonisation of small-bodied fish (spined loach and bitterling)



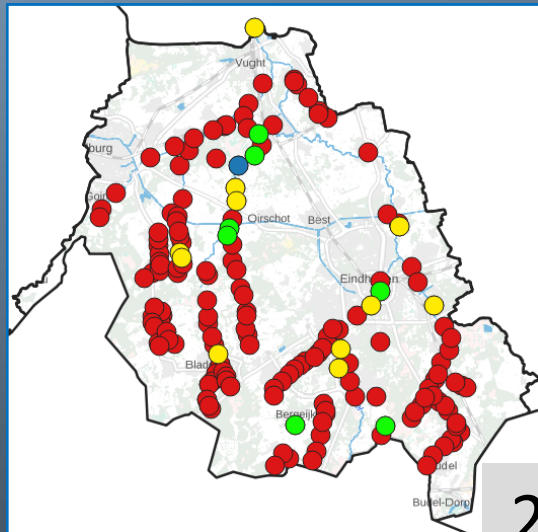
Next steps: Disentangle the effects of habitat suitability, water quality and fragmentation on fish and macroinvertebrate response

De Dommel
Catchment

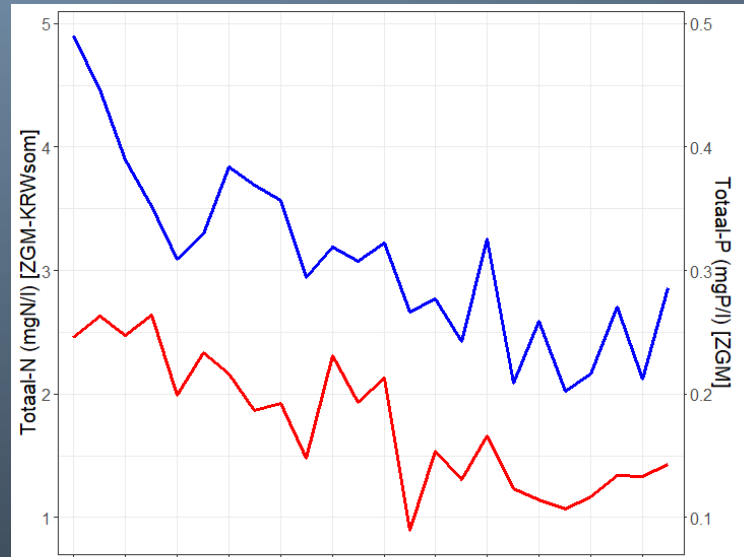
Scale



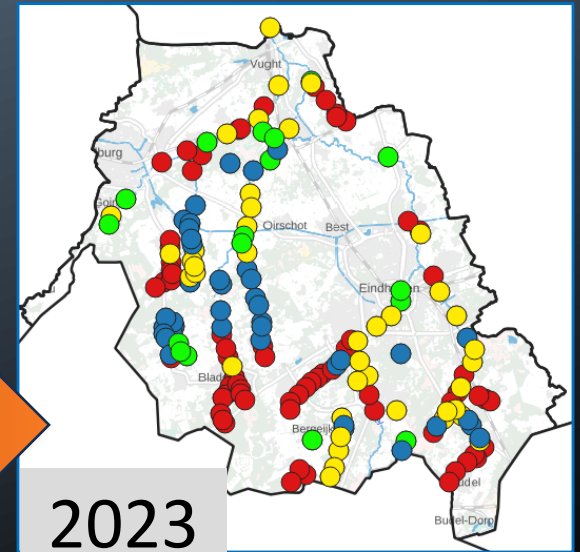
Source population



2002



Time



2023



WAGENINGENUR
For quality of life

