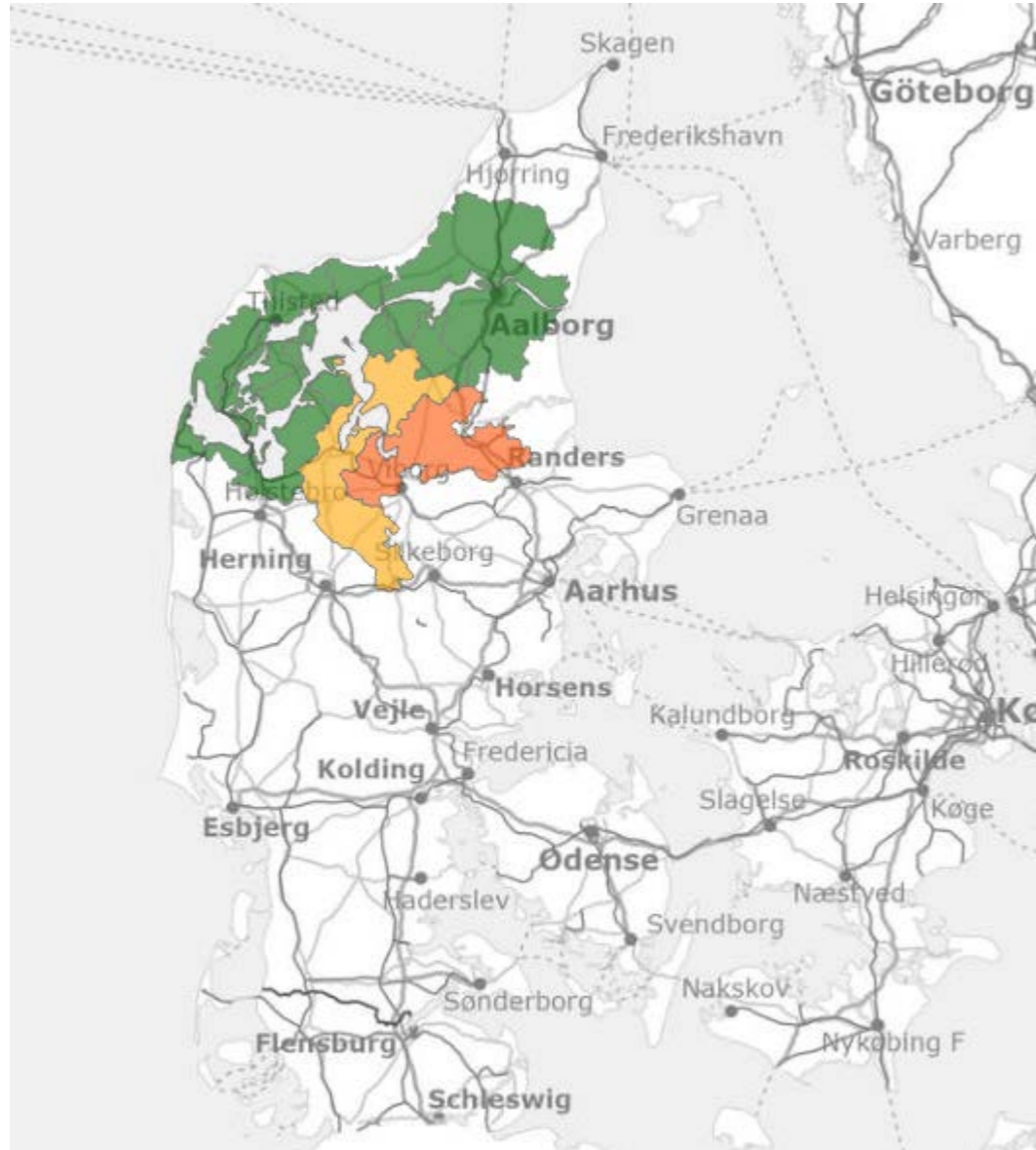


Costal Water Board

Central Limfjord, Denmark



Kristoffer Piil¹, Jørgen Windolf²; Torben B. Jørgensen¹, Hans E. Andersen², Brian Kronvang², Jørgen Jørgensen³, Anders Gade³

¹Limfjord catchement council

²Aarhus University – Ecoscience

³Municipality of Viborg

Partners:



AARHUS
UNIVERSITY



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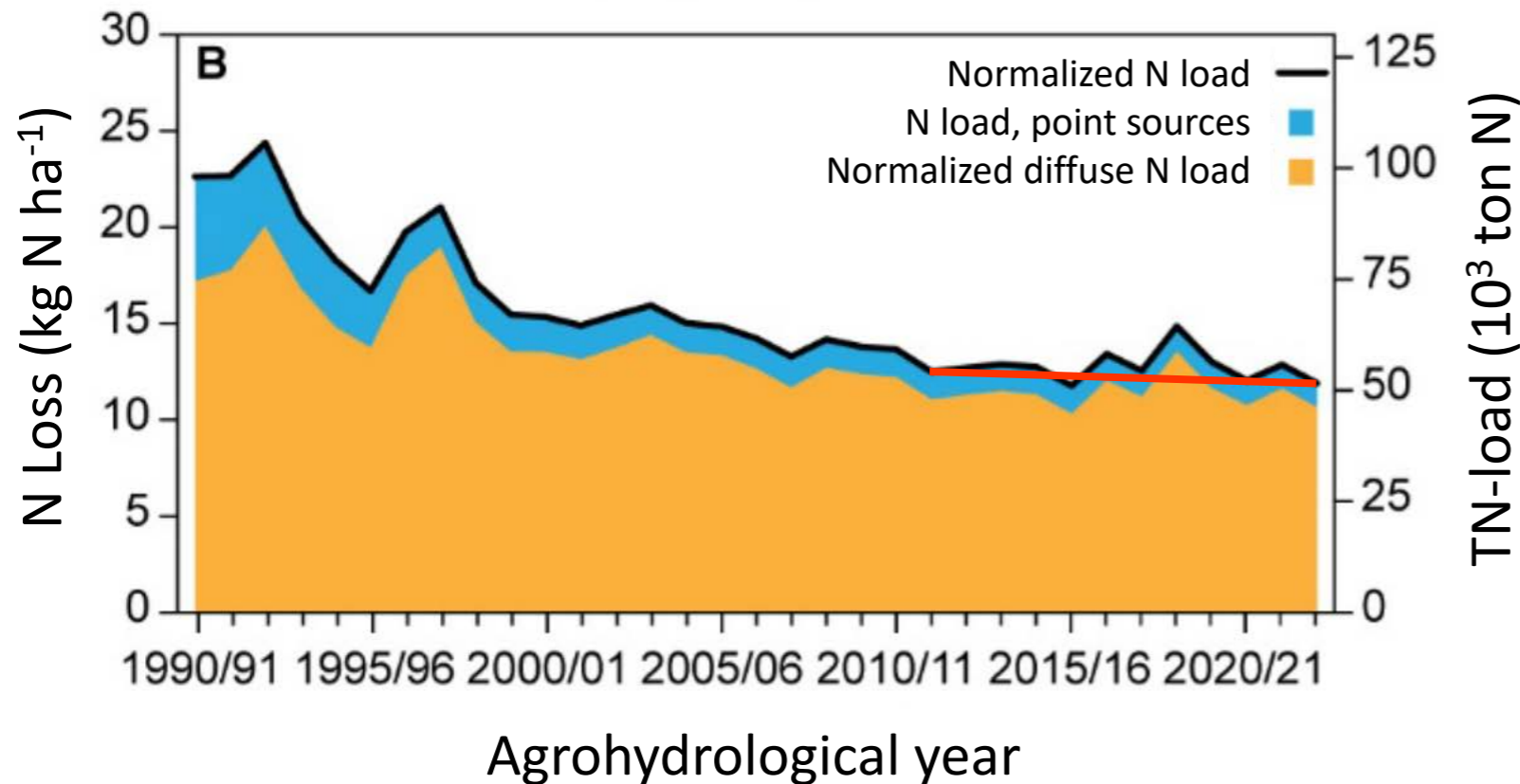


Limfjordsrådet

Limfjordsrådet

Background – the national context

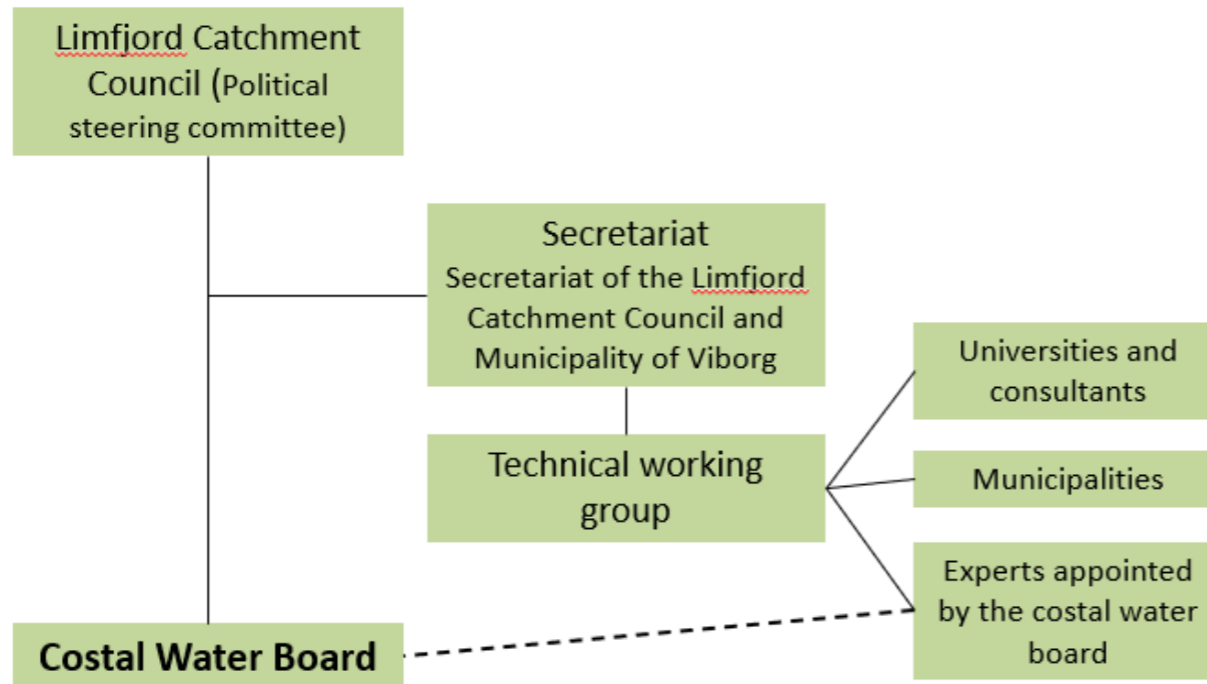
- 50% reduction of nitrogen load to the marine environment
- Water management planning at the national level – focused on reducing N loss from agriculture
- Largely achieved by national legislation (regulation of nitrogen fertilizer use, covercrops, wetland restoration) Command and control measures!
- No reductions in the last 10 – 15 years



Thodsen et al. 2024

Costal Water Board – Central Limfjord

- 2023: Funding for 4 pilot Costal Water boards
 - Identify the main pressures on the costal ecosystem
 - Suggest an action plan that can bring the ecosystem in a good ecological status
- 2023: Central Limfjord Costal waterboard:
 - The costal water board consist of local representatives from the business community (farmers, aqua culture, fisheries) and green organisations and recreational users of the fjord (E.g. The Danish society for Nature Conservation, hunters, bird life Denmark, recreational fishing societies, sailing clubs)



Scientific partners:



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Limfjordsrådet

Why is the central Limfjord – not in good ecological state?

- Prolonged oxygen deficits in summer and autumn
- Muddy bottom substrate hard for eelgrass to root in due to years of high organic input
- Eutrophication is the problem!



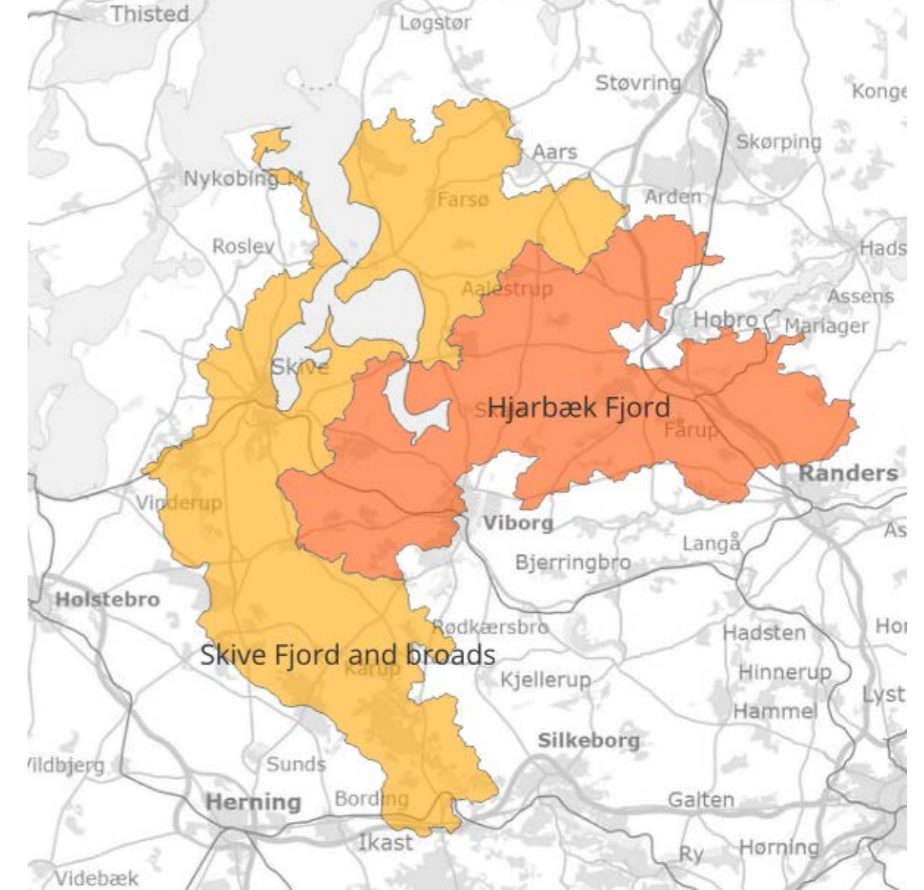
Skive Fjord, oxygen depletion

Status nutrient load

Nitrogen	Skive Fjord and Broads	Hjarbæk Fjord
Total N load (tons N)	1780	1845
WFD target	1425*	630
Agriculture (% of total)	72	63
Background (%)	25	30
Point sources (%)	3	7

* Target in Skive Fjord requires that the target in Hjarbæk fjord is met

Phosphorous	Skive Fjord and Broads	Hjarbæk Fjord
Total P load (tons P)	56,2	44,5
Agriculture (% of total)	29	38
Background (%)	49	46
Point sources (%)	22	16

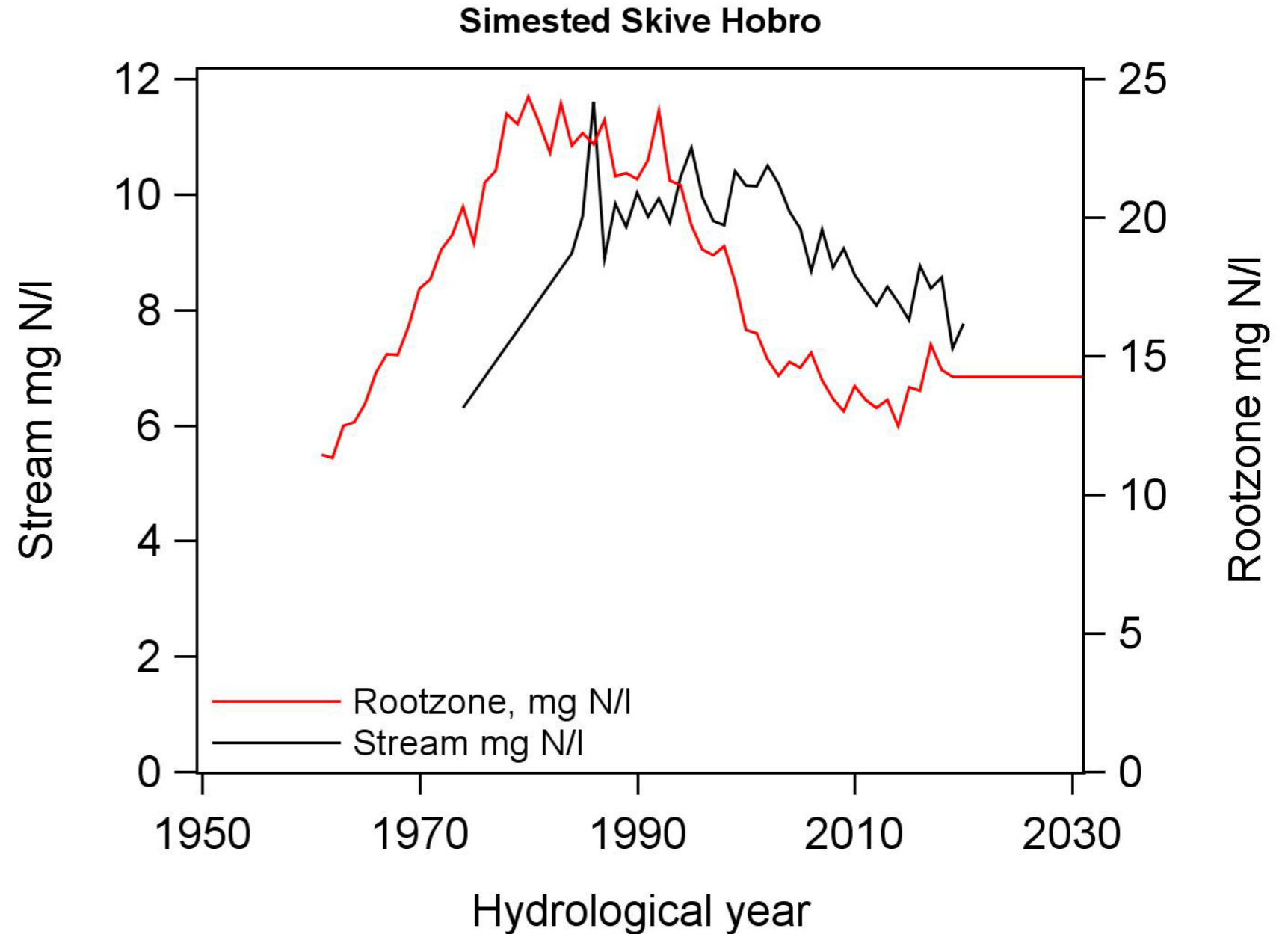
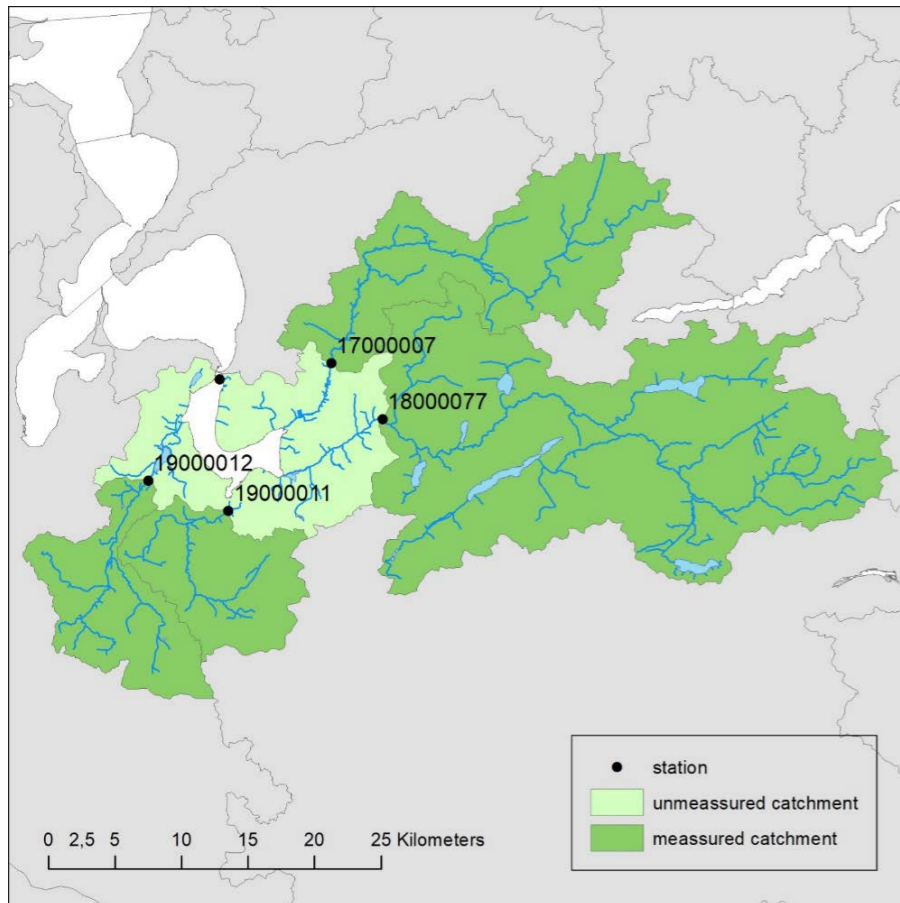


- Aquaculture contributes 40% – 50% of point source load for N and 30% – 40% for P
- P limitation in spring in both areas
- 1 ton P load reduction corresponds to 18-22 tons N load reduction
- But P loads area harder to reduce

Both tables reworked from Kronvang et al. 2023
Data for the agrohydrological years 2015/16 – 2018/2019

Time lag

- Time lag of ~20 years before changes in rootzone nitrogen concentrations can be seen in stream discharge in parts of the catchment



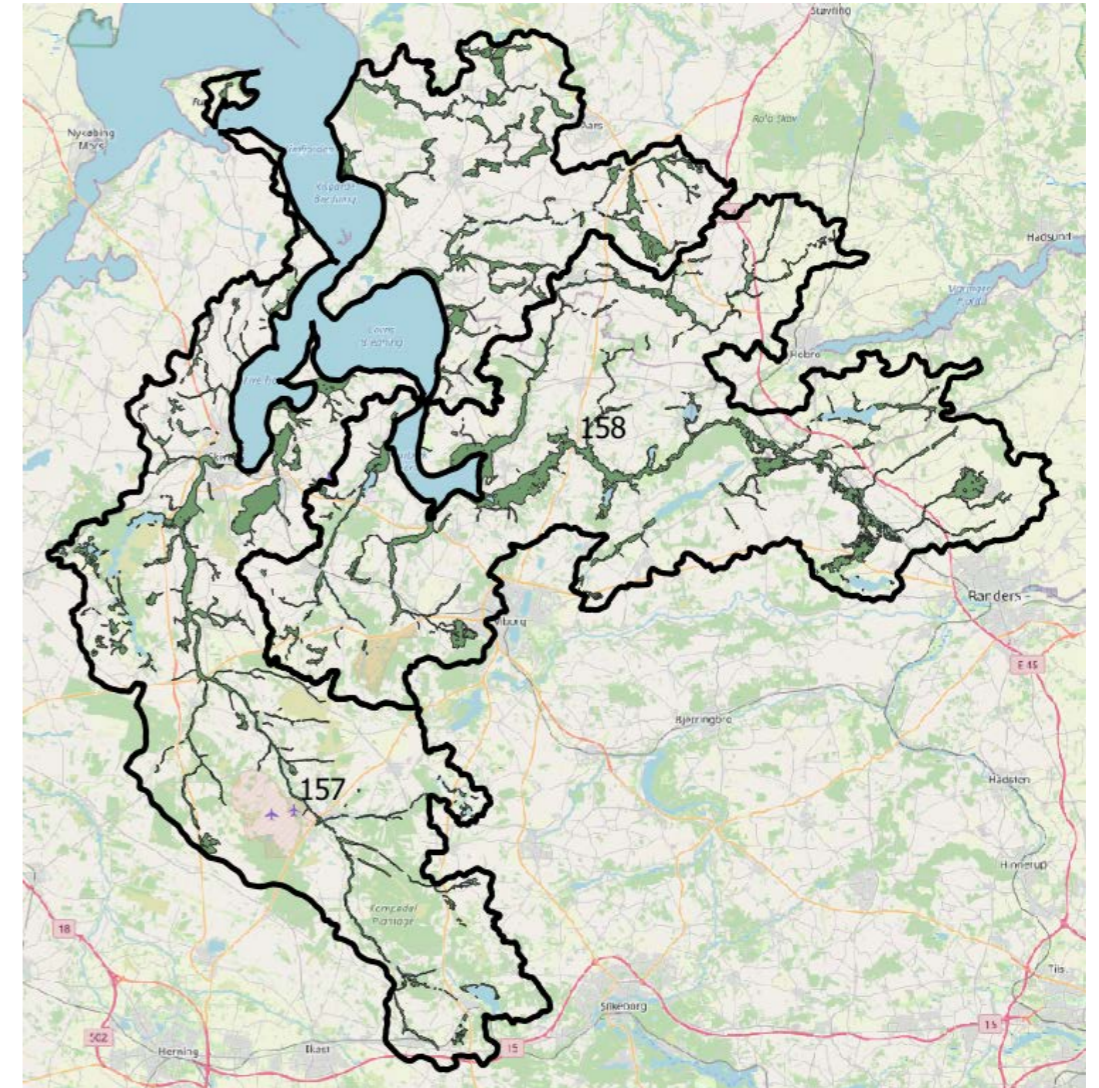
Costal water board Action plan

Nitrogen:

- Account for time lag of N load (5-20 yrs)
- Wetland restoration: ~10.000 ha
- Buy and close 50% of fish farms in catchment
- Improve wastewater treatment, and divert wastewater to less sensitive marine areas
- Convert land to forest, nature, grassland or solar farms
- Increased use of cover crops and other agronomic improvements



Costal water board meeting, Oktober 2023



Costal water board Action plan

Phosphorus:

- Buy and close 50% of fish farms in catchment
- Improve wastewater treatment, and divert wastewater to less sensitive marine areas
- Plant trees on stream banks to reduce erosion



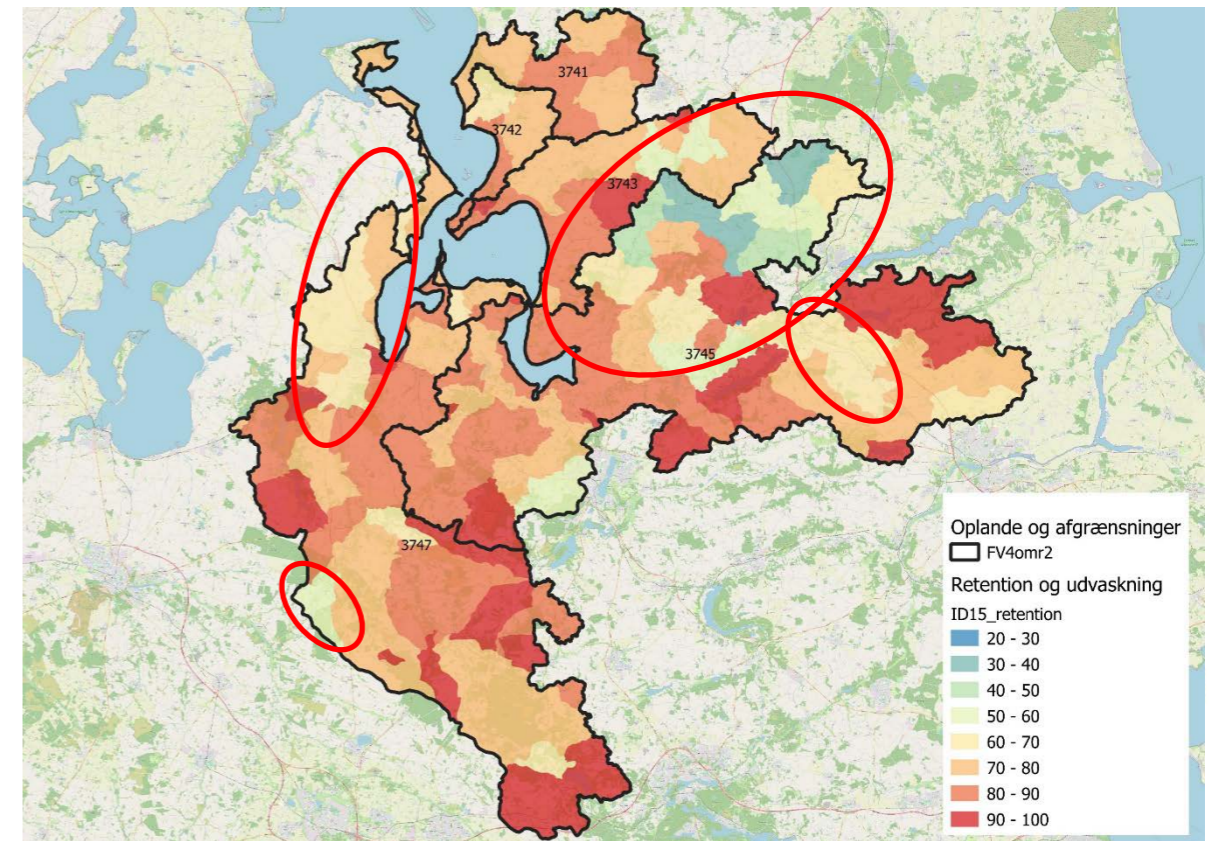
Costal council meeting, Oktober 2023



Consequences for agriculture

	Skive Fjord and Broads	Hjarbæk Fjord
Rotational land	78.000	69.500
Converted to nature, forrest, energy crops or solar farms	6% (3%-points forrest or nature)	21% (11%- forest or nature)
Grassland for biorefining	3%	11%

- No farming in the stream and river valleys
- Large scale conversion of farmland to other use. The conversion is targeted to areas with low N retention – so some areas are hit hard!
- The water board underlines that adequate compensation should be given – also for buildings, livestock and machinery



How to implement the recommendations from the costal water board

Green tripartite agreement between the Danish government, Danish agriculture and food council, the Danish nature conservation society + 3 unions and the Danish municipalities

National agreement that gives € 6 billion + € 1,3 billion to land conversion.

- Restore 140.000 ha wetlands and adjacent areas. Mainly in stream and river valleys.
- Establish 250.000 ha of forest, of which 100.000 ha should be optimized for biodiversity

Conversion is voluntary, but new nitrogen regulations will put pressure on the farmers



Costal water board - experience

- Involving local stakeholders increases ownership to the action plans and contributes new ideas
- Agreements on the facts, which should ease the implementation process
- Builds trust between stakeholders
- There is indeed local knowledge that can improve water management plans

- The work must build on quantitative data and recognized methods - the water boards should be quantitative when suggesting solutions
- Costal water boards is a good supplement to the national water management plans - but cannot replace these (water management plans should be consistent on the national level)



Questions?



Foto: Anders Gade – Viborg kommune



Limfjordsrådet