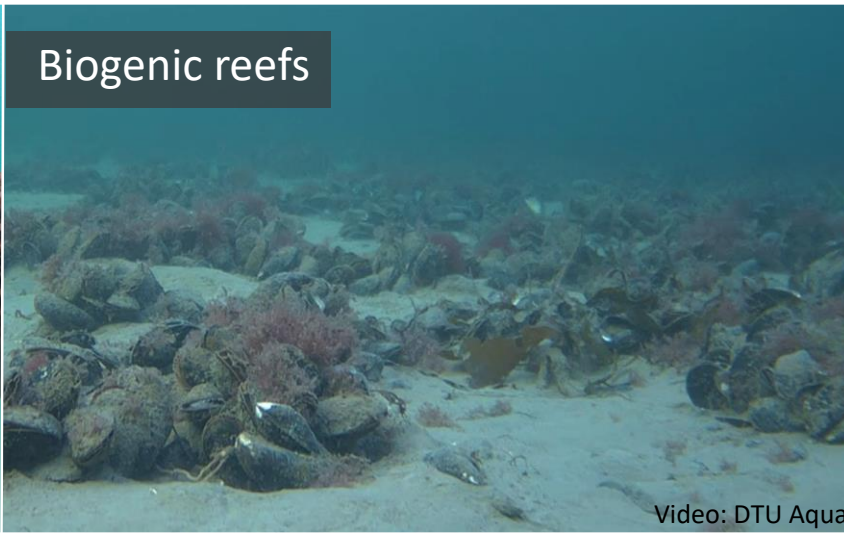




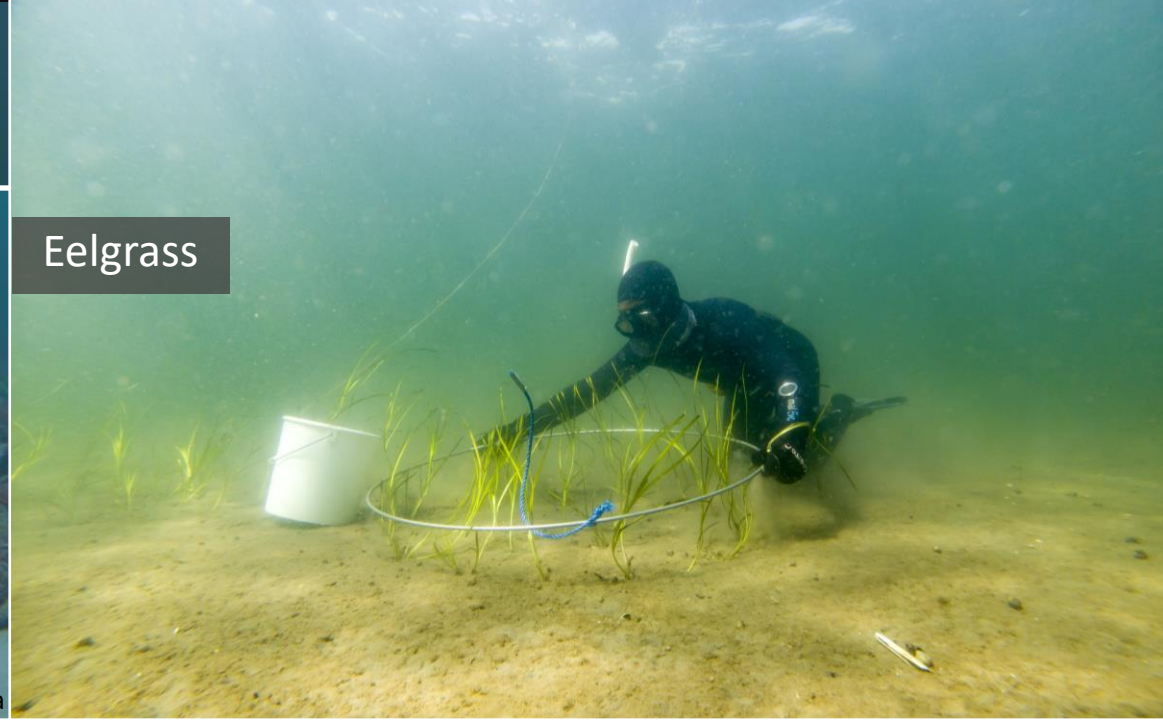
SUND VEJLE FJORD



Biogenic reefs



Video: DTU Aqua



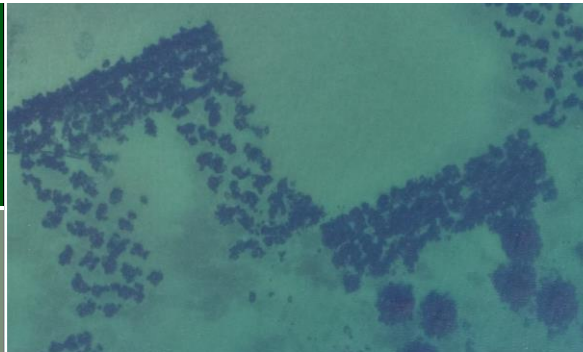
Eelgrass

Marine nature restoration in Vejle Fjord. Restoration of degraded coastal habitats: The Vejle Fjord case study

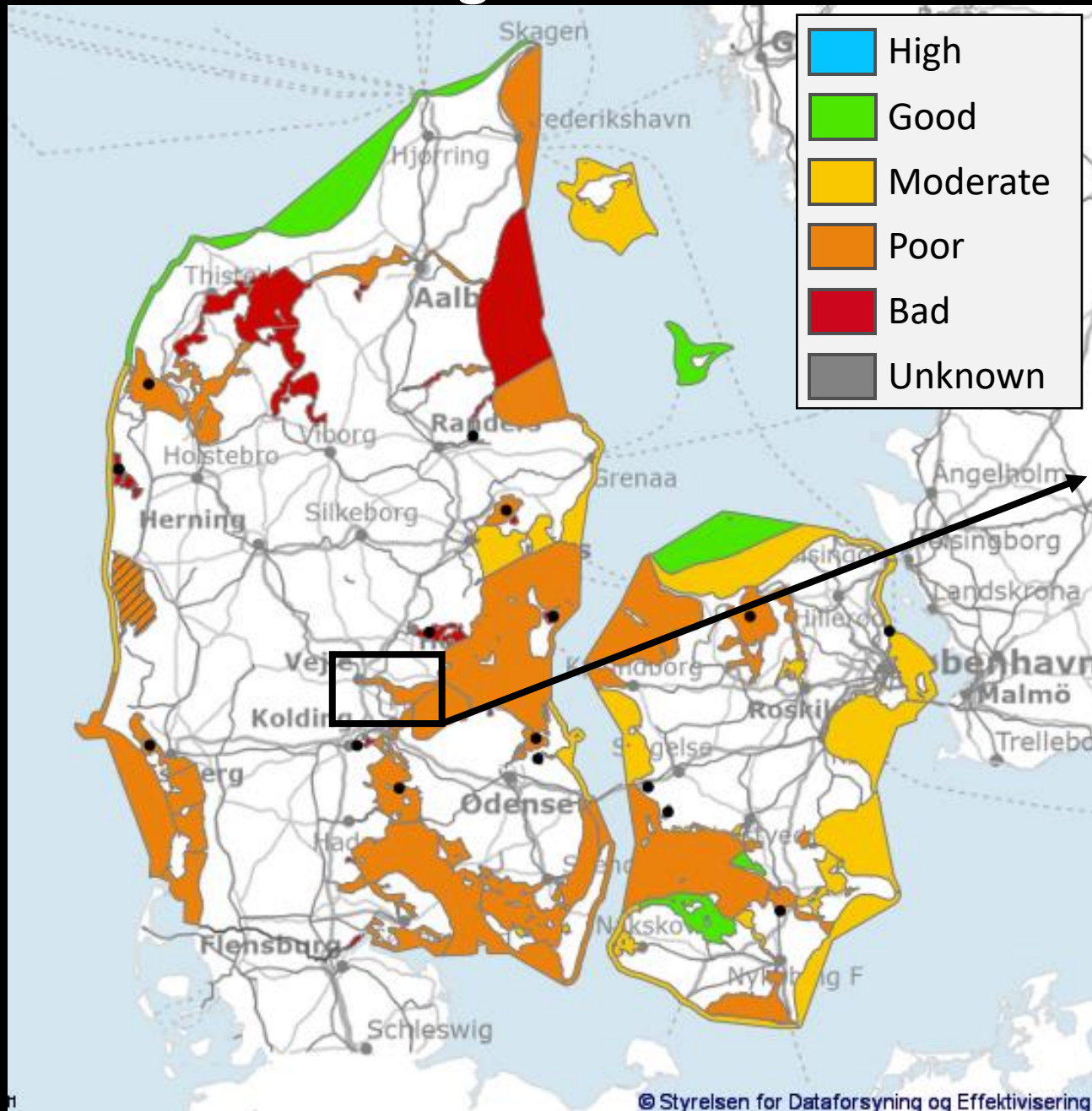
Rune Christian Husted Steinfurth, Postdoc, University of Southern Denmark (SDU)



Boulder reefs



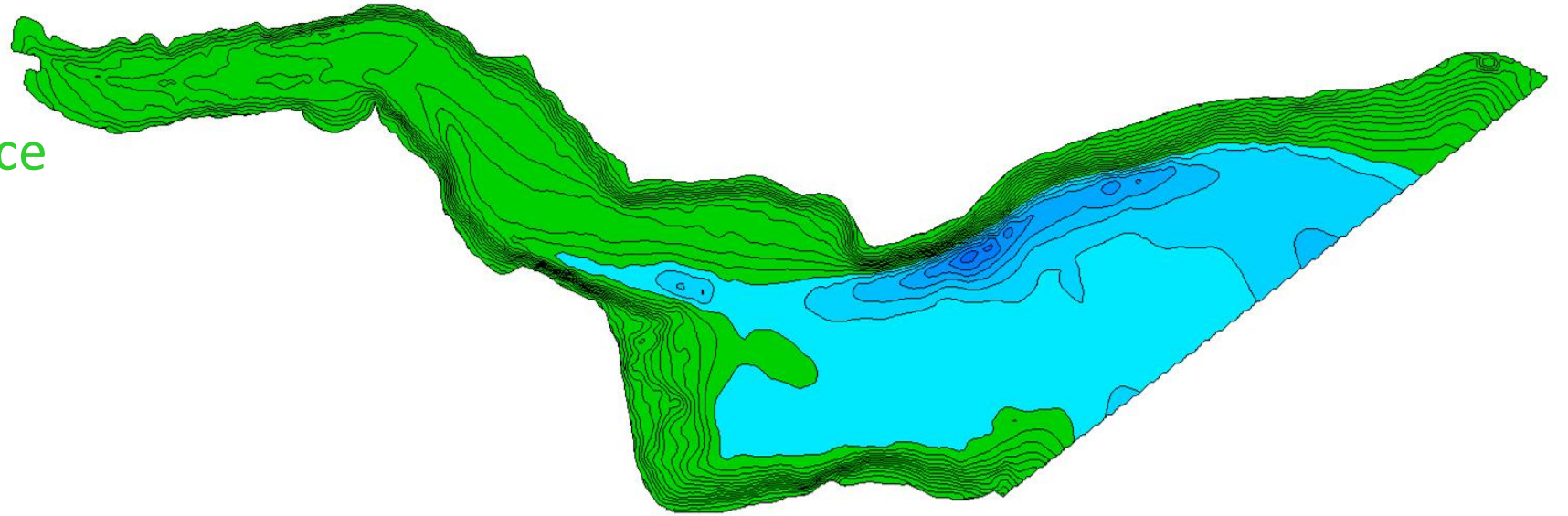
Ecological status



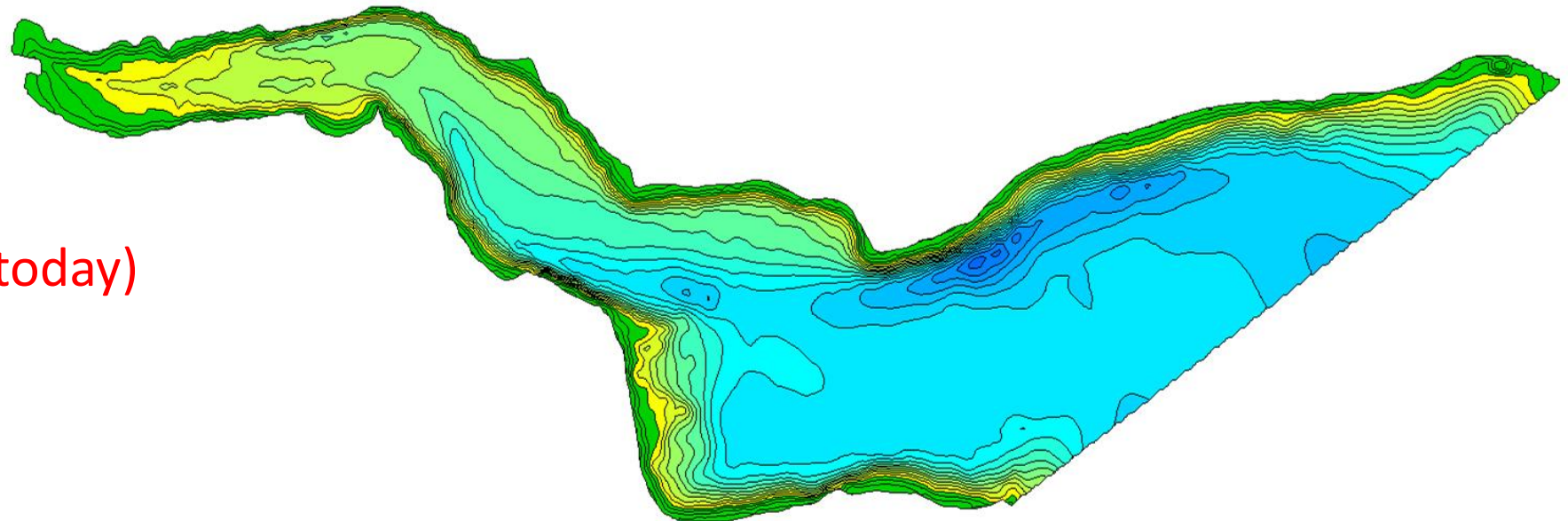
- Denmark's largest marine restoration project, Sund Veje Fjord.

Reduction in eelgrass depth distribution (eutrophication)

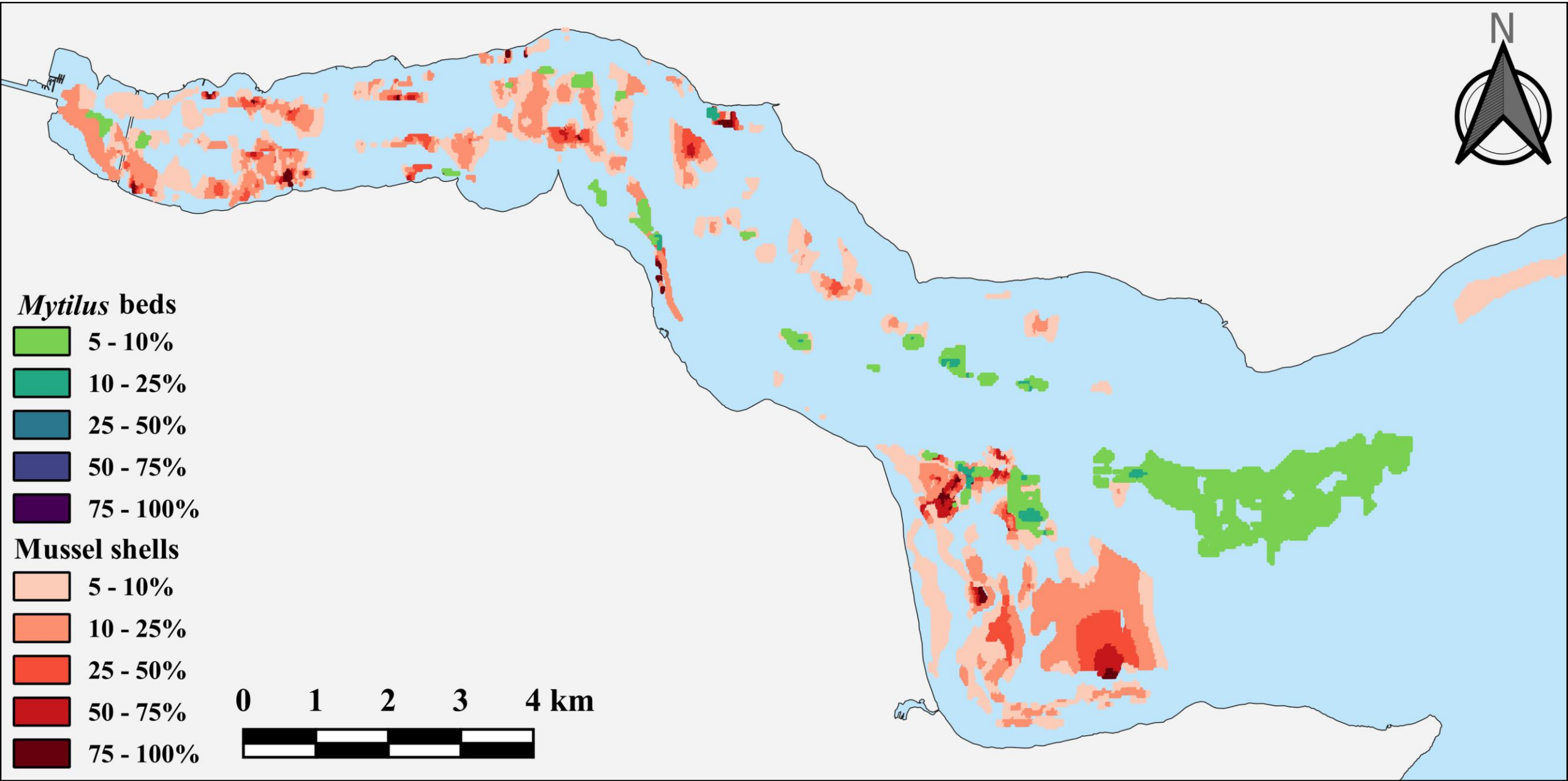
Vejle Fjord – 63 km² reference
condition (11.5 m in 1900)



Vejle Fjord – 14 km² (2.4 m today)



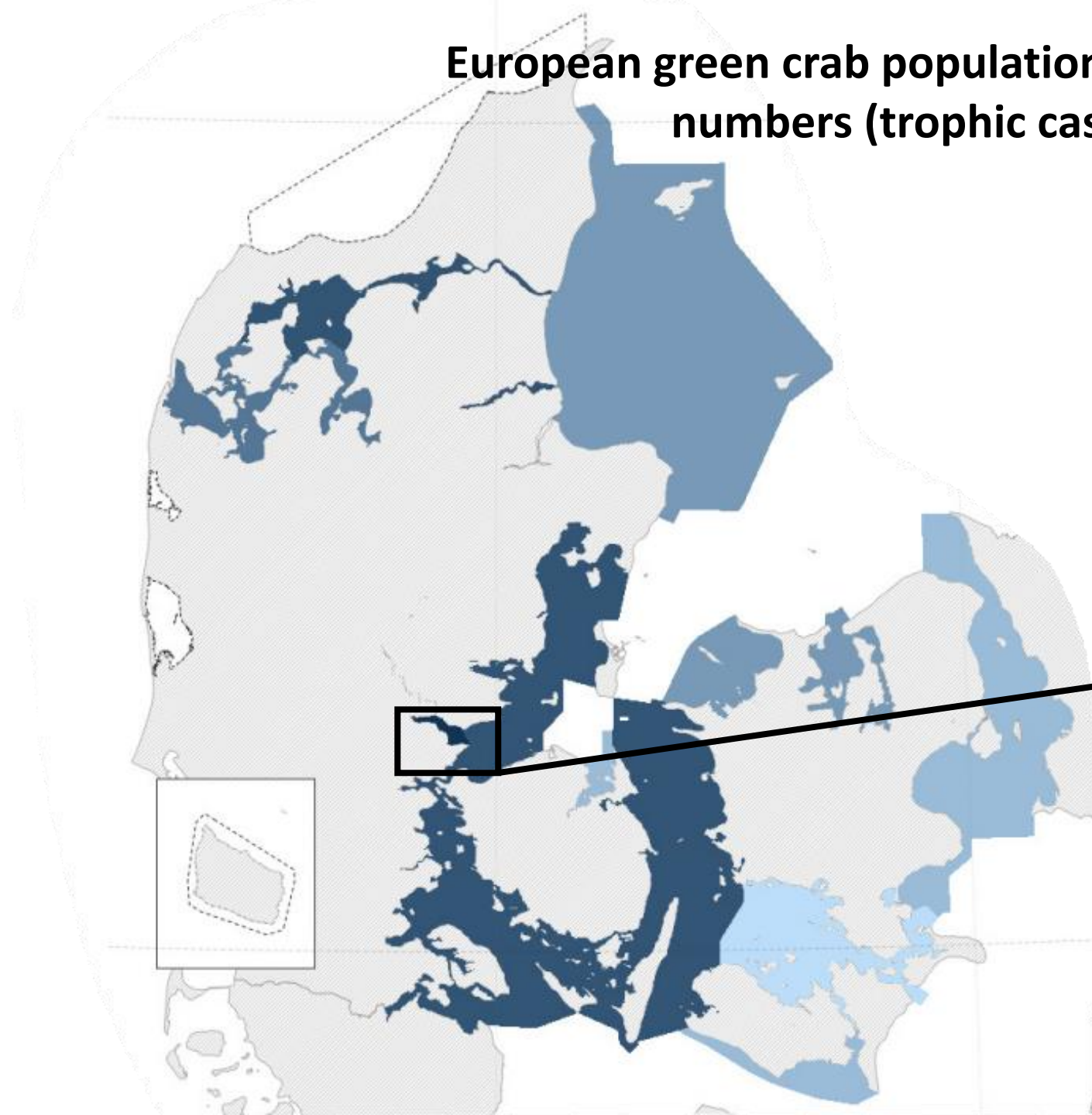
Reduction in blue mussel population (fisheries)



Reduction in boulder reefs (stone fisheries)



European green crab population has exploded in numbers (trophic cascade)



○ Vejle Fjord has the highest density of European green crab in Denmark (DTU Aqua 2017).

Boulder reefs

Biogenic reefs

Boulder reefs

European green
crab fishery

Eelgrass

Boulder reefs

Why restore eelgrass?

Ecosystem services

- Nursery for invertebrates & fish
- High biodiversity
- Nutrient sequestration
- Carbon sequestration
- Coastal protection



Why restore biogenic reefs?



Ecosystem services

- Nursery for invertebrates & fish
- High biodiversity
- Water filtration
- Recreate former habitats that have been fished by bottom trawl

Water filtration by restored biogenic reef in Vejle Fjord



Why restore boulder reefs?



Ecosystem services

- High biodiversity
- Caves provide shelter for cod (important predator on green crabs)
- Shelter for eelgrass transplants
- Hard surface substrate for macroalgae



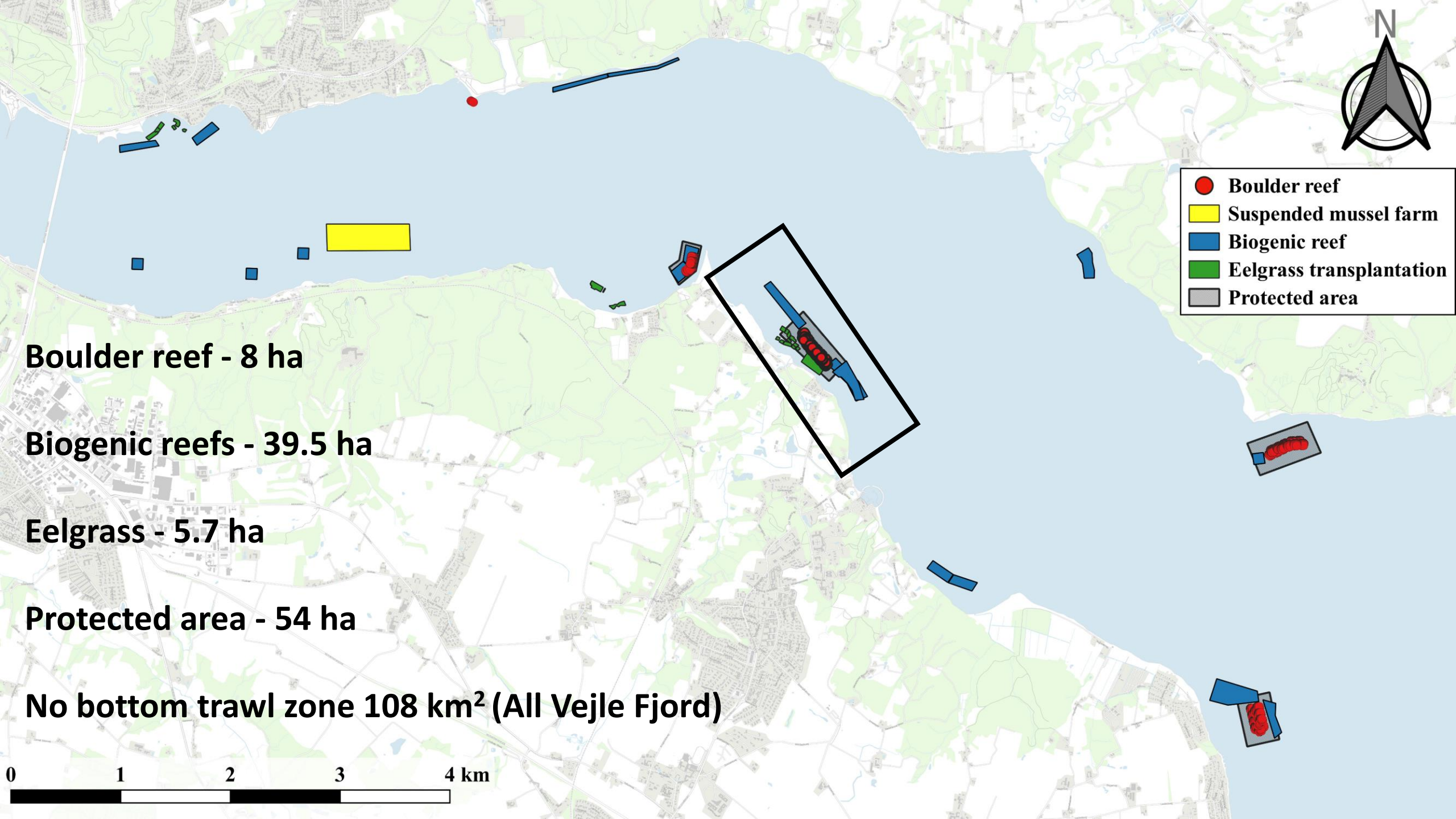
Why fish European green crab?



Negative impact on ecosystem

- More than 400 million crabs in Vejle Fjord
- Imbalanced ecosystem
- Trophic cascade due to lack of predators (e.g. cod)
- They destroy eelgrass shoots and seedling
- Predate on eelgrass seeds
- Predate on blue mussels
- Prevent natural recovery of eelgrass and blue mussel beds





Boulder reef - 8 ha

Biogenic reefs - 39.5 ha




Eelgrass - 5.7 ha

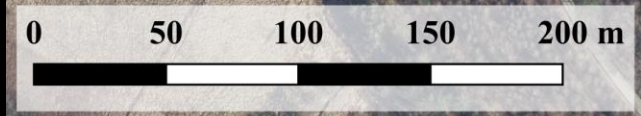
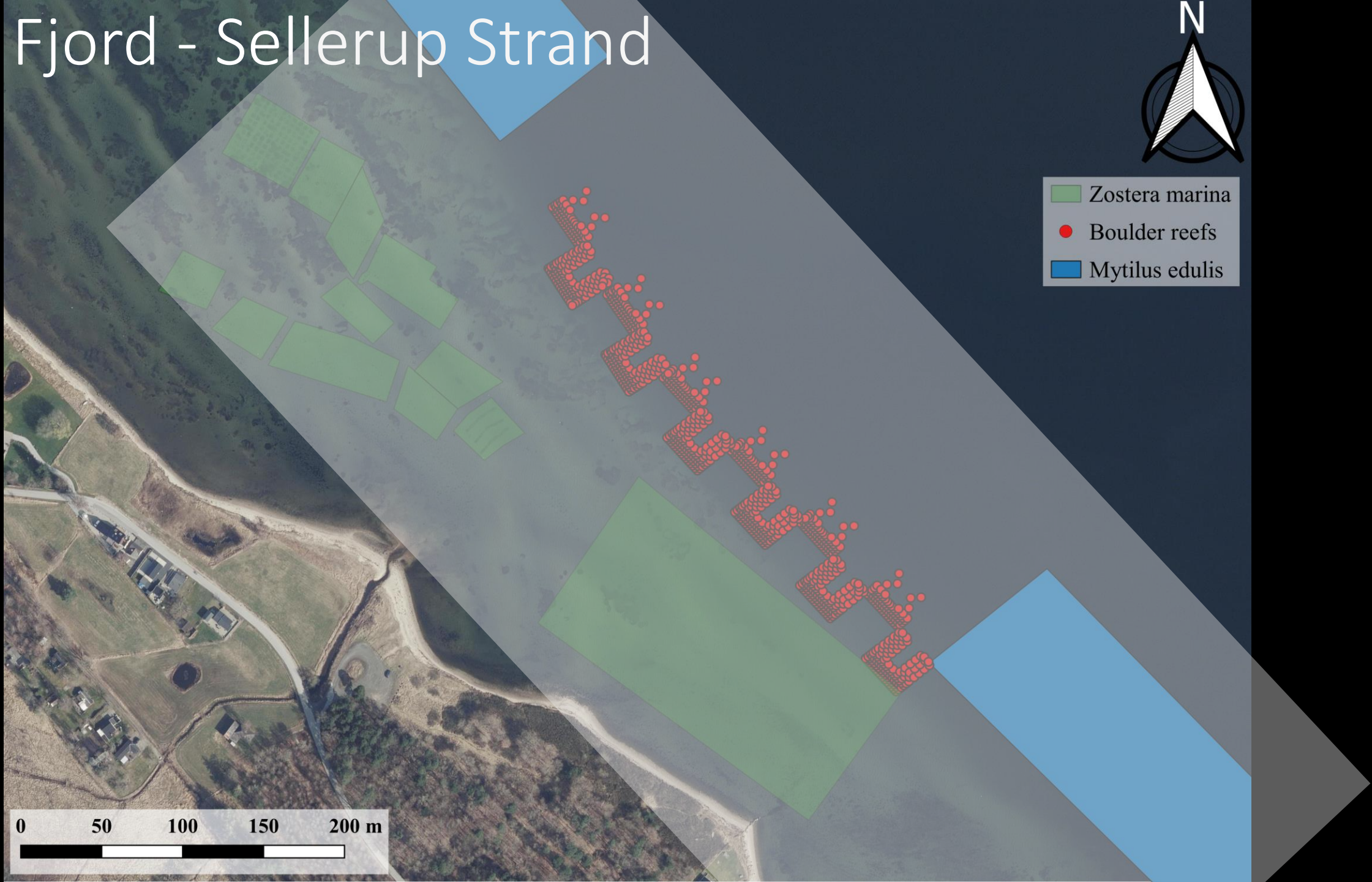
Protected area - 54 ha

No bottom trawl zone 108 km² (All Vejle Fjord)

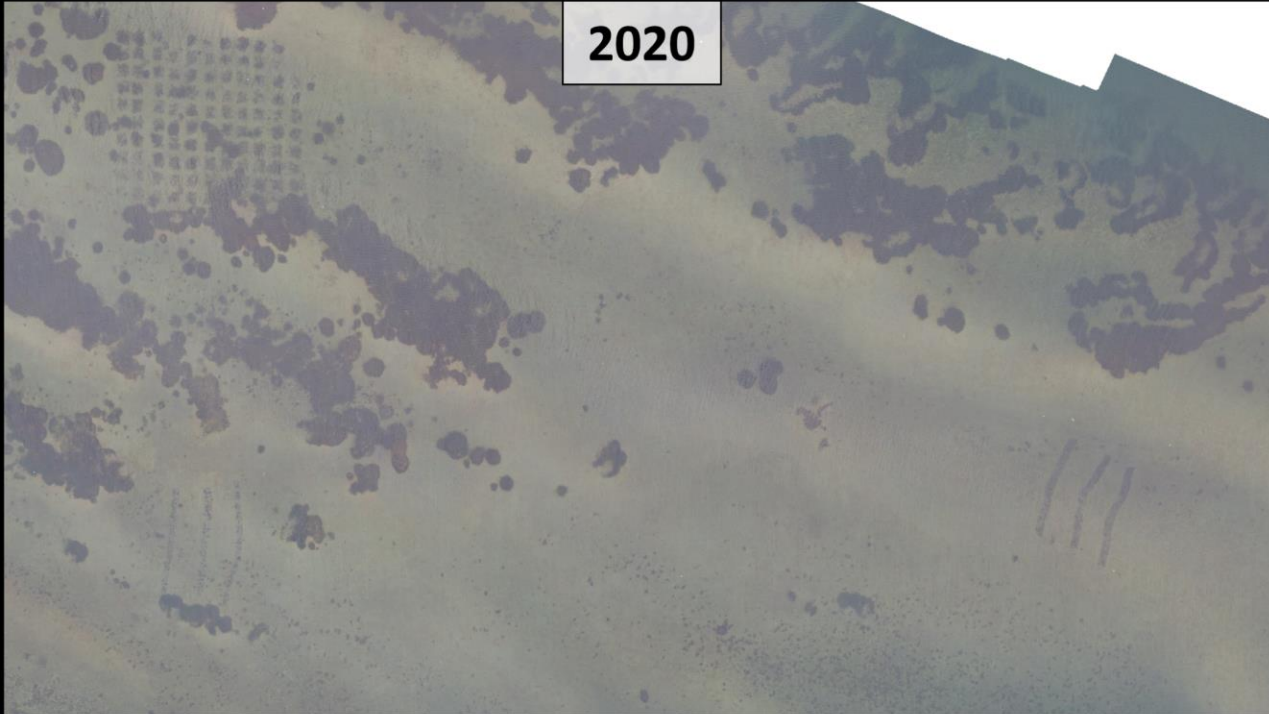
Vejle Fjord - Sellerup Strand



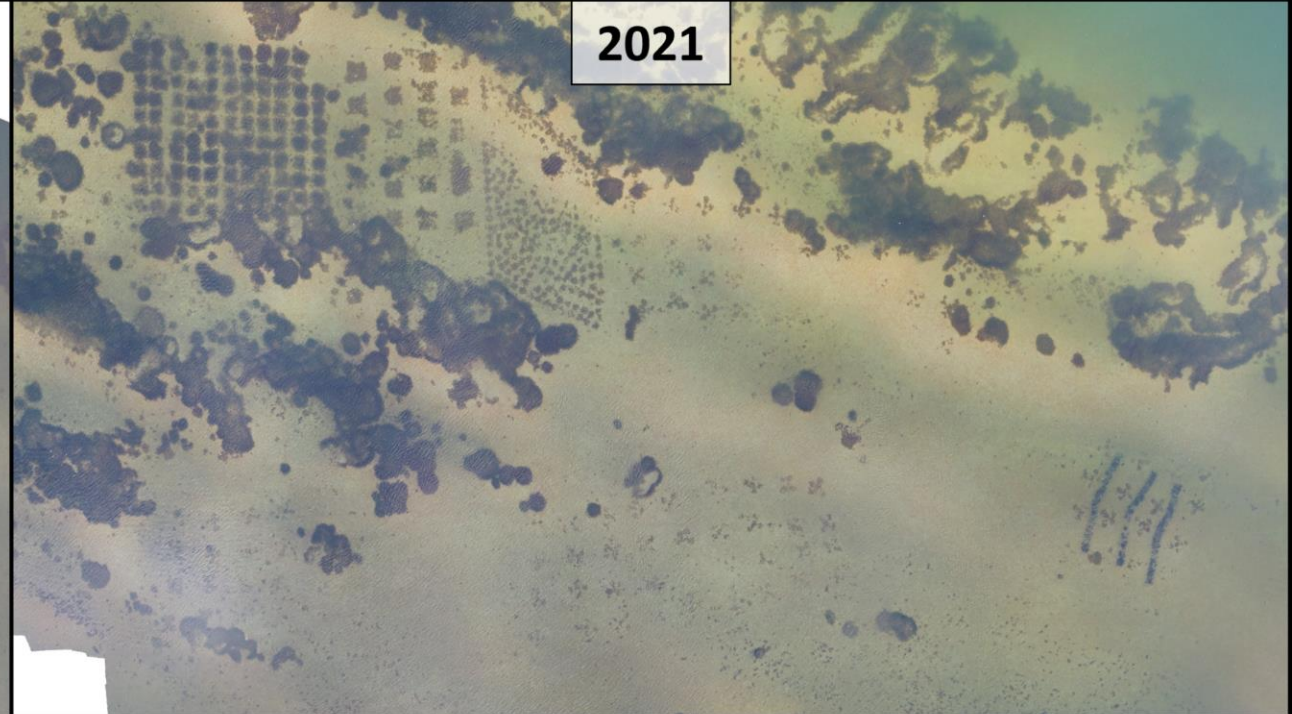
-  *Zostera marina*
-  Boulder reefs
-  *Mytilus edulis*



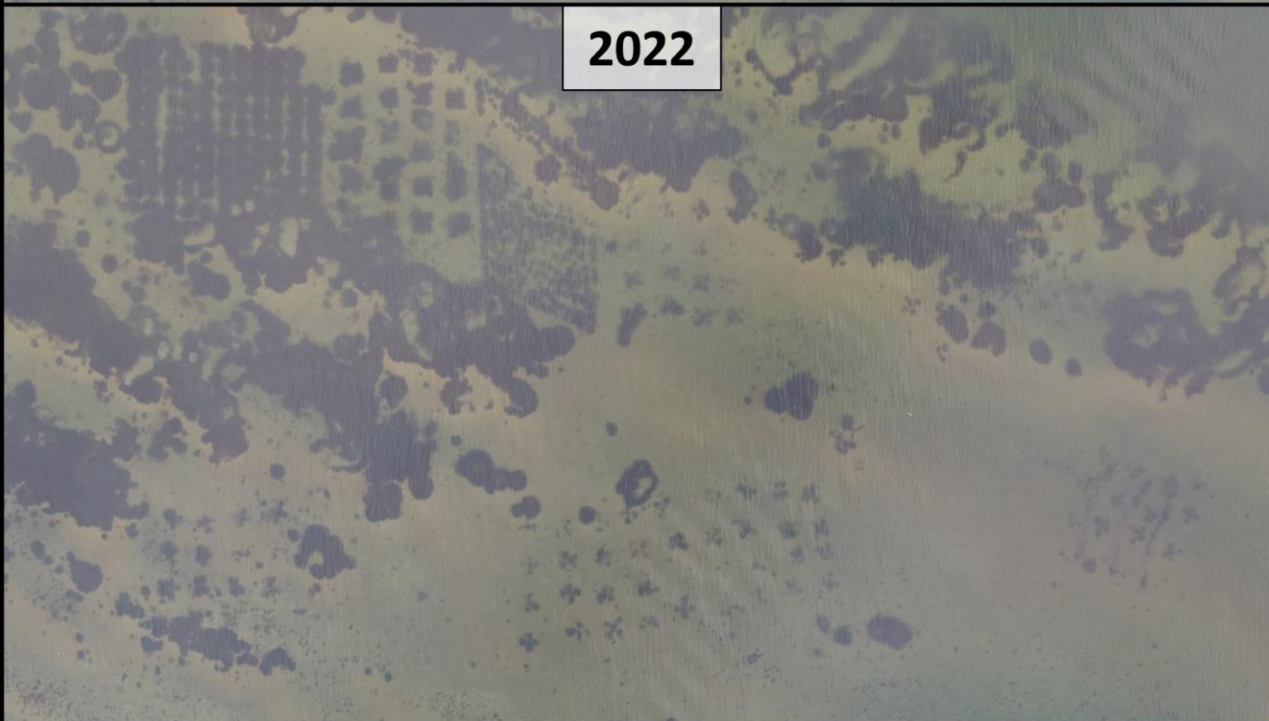
2020



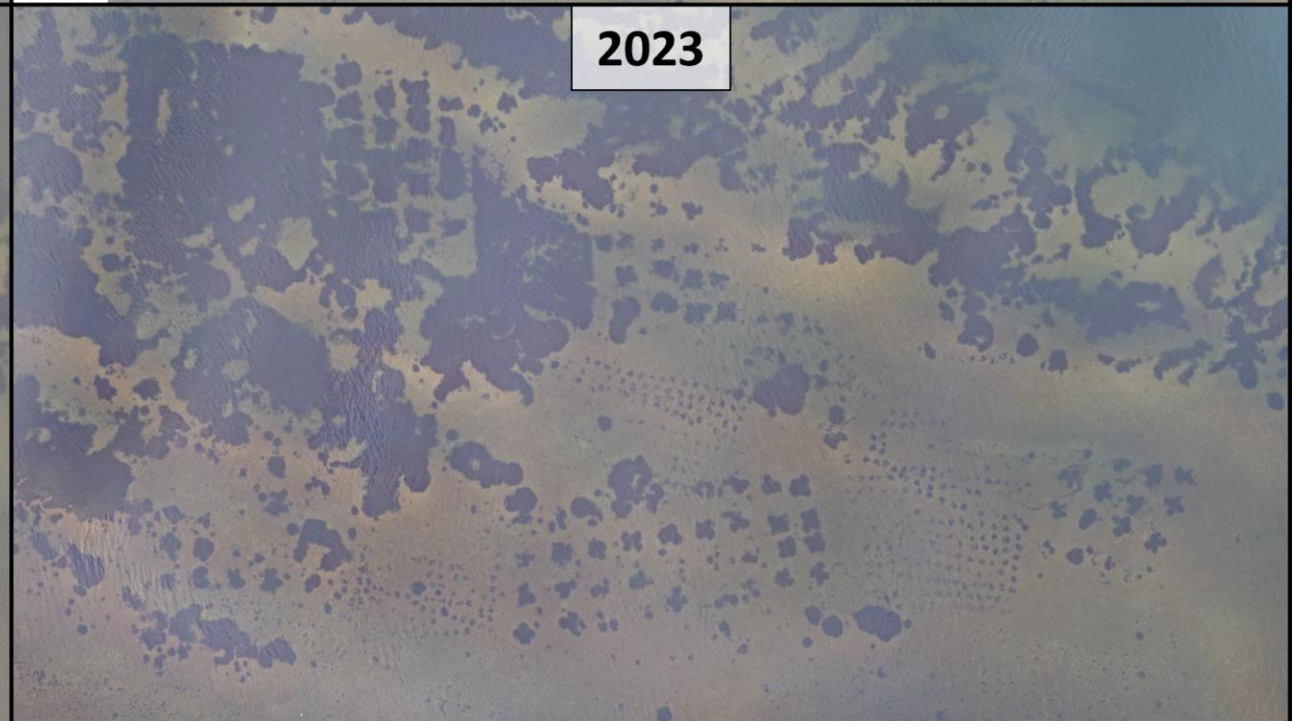
2021



2022



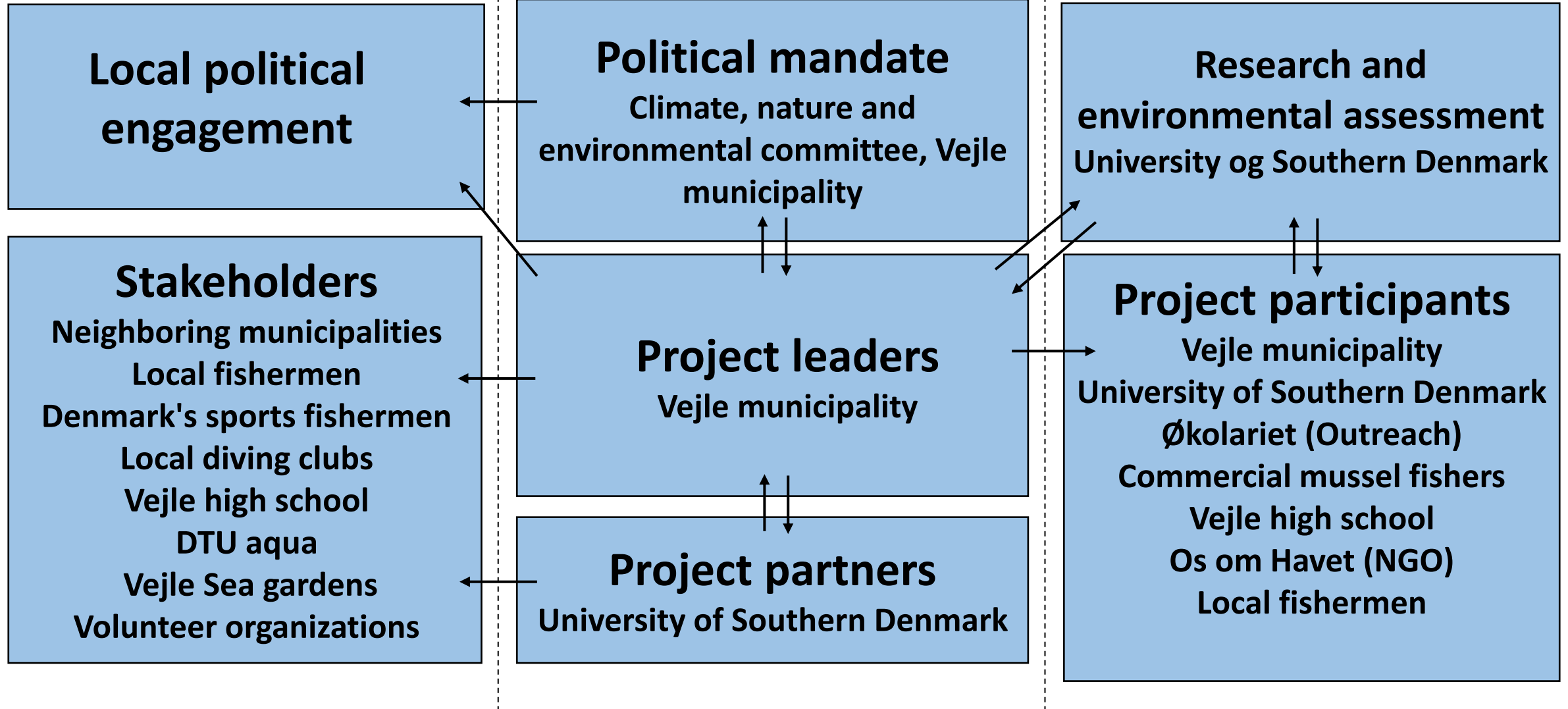
2023



Local stakeholder engagement

Project ownership

Project execution





Local organizations that use the fjord



Vejle highschool



Local sports divers

Volunteer organizations

Volunteers make a difference



Local fishermen

Closing comments

- Address the issues that lead to habitat degradation
- Find solutions to restore habitats that do not recover naturally
- Protect the restored habitats to prevent future habitat degradation
- Engage local stakeholder and volunteers to make them invested in the project