

# COEXIST

## Bio-economic model – application to WP3

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# Overview of presentation

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- Introduction
- FISHRENT
- Spatial bio-economic model

# Introduction

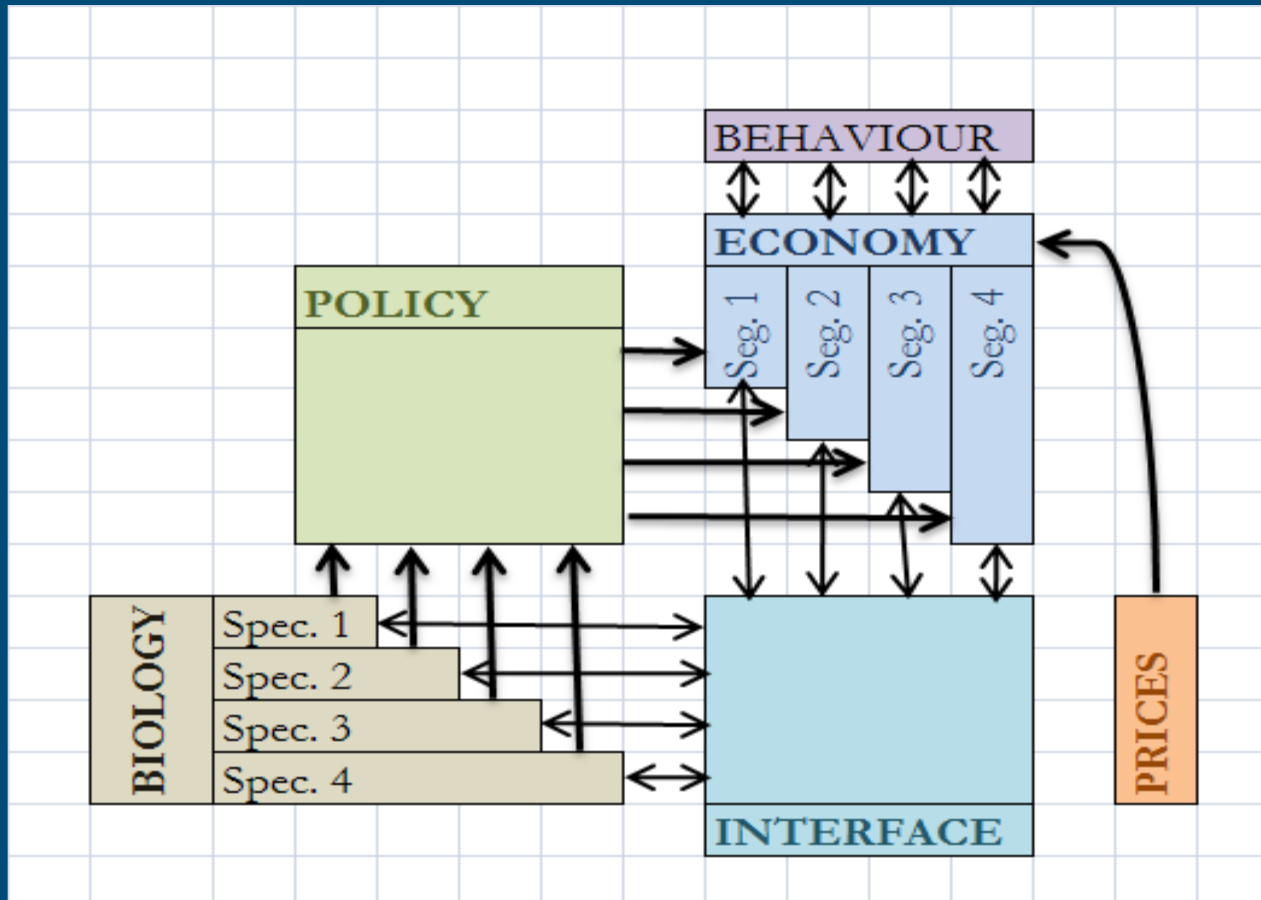
## ■ The FISHRENT model

- Flexible multi-species and multi-segments bio-economic model
- Available in GAMS and excel
- A dynamic simulation model, running for a period of 25 years. Extension to a longer period is possible.

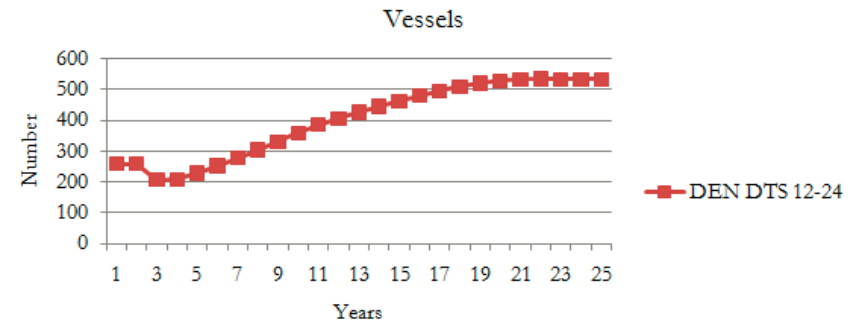
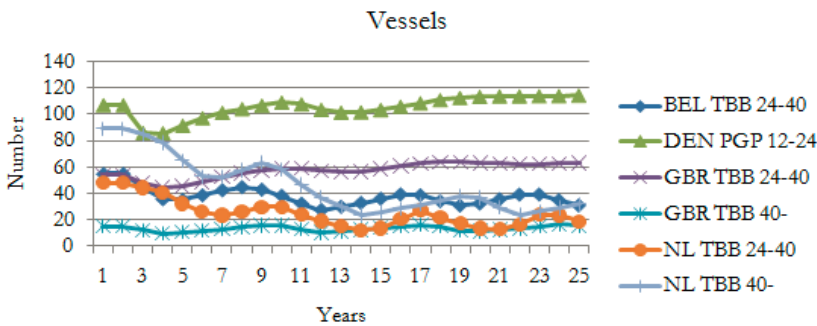
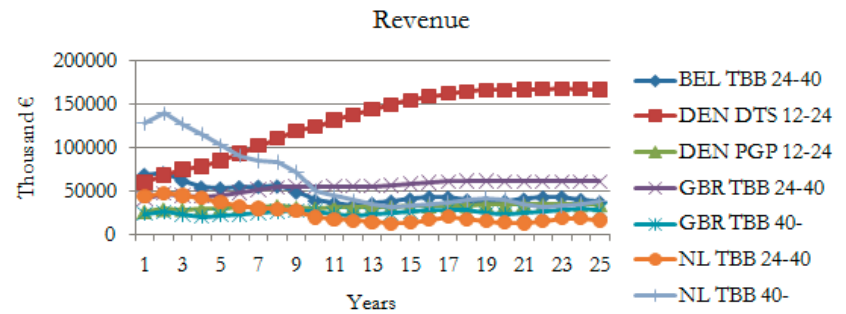
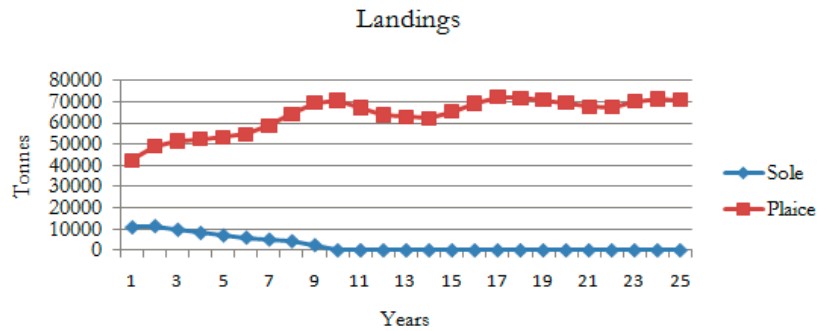
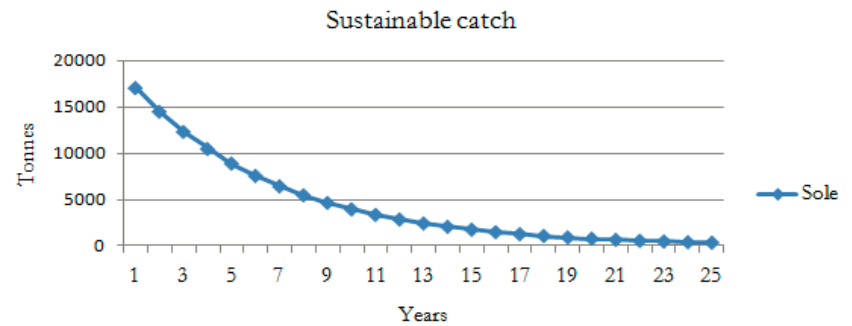
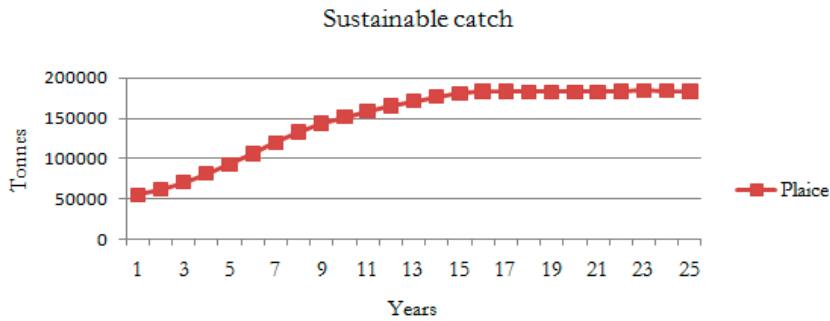
## ■ FISHRENT – develop into a spatial optimization model

- vms data since 2006
- speed, location and direction of vessels
- harvests and transport costs per location per vessel
- optimization of profits to find fishers choices of location

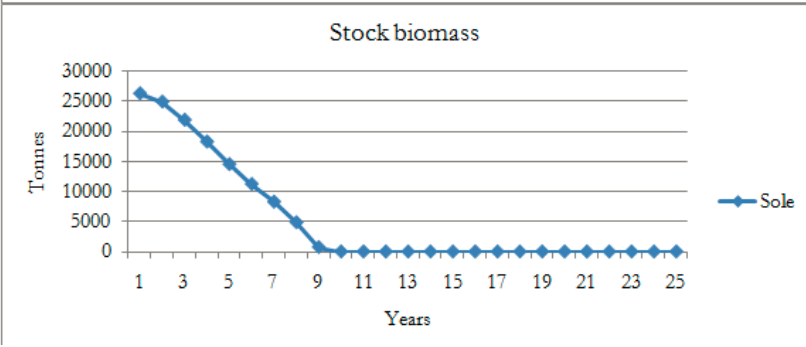
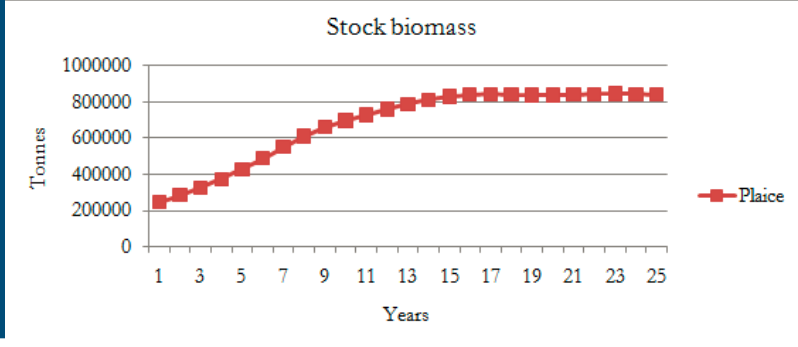
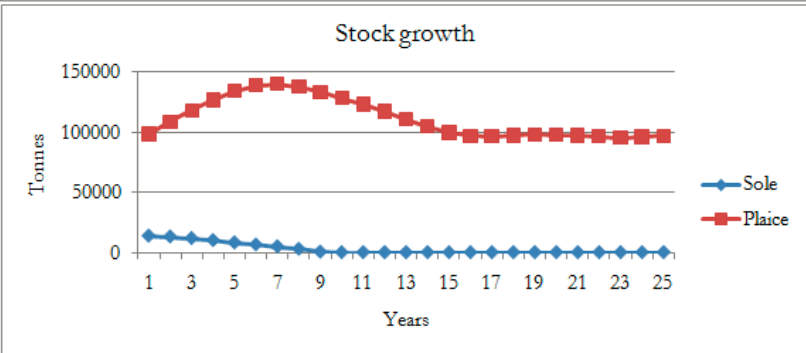
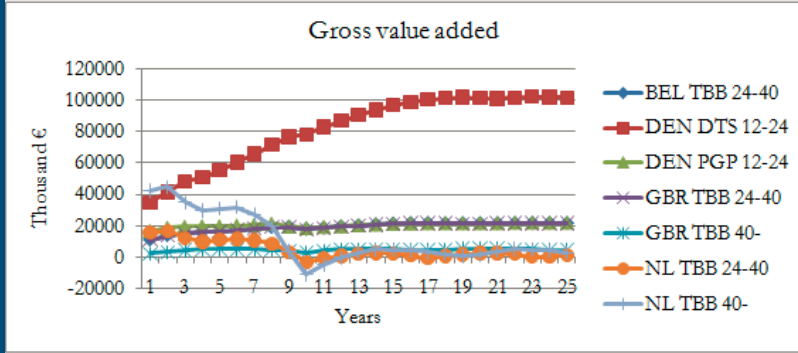
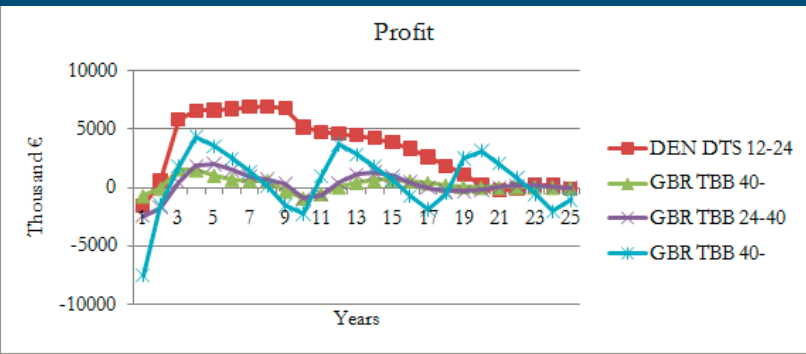
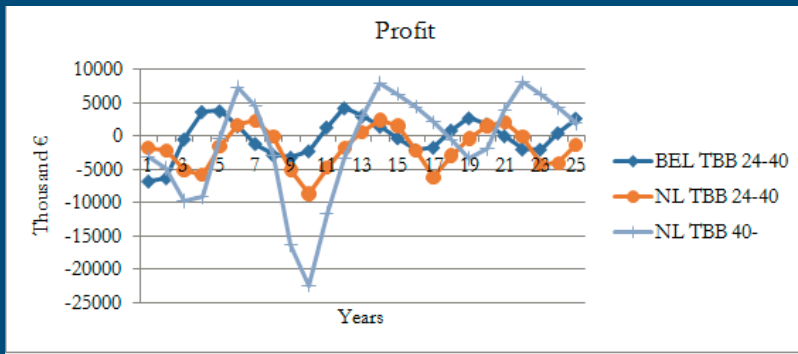
# FISHRENT – multispecies and multifleet



# FISHRENT: Outcomes- ex. with TACmax.



# FISHRENT: Outcomes- ex. with TACmax. cont.



# Spatial FISHRENT

- Optimization problem, partial equilibrium
- Profit is maximized given location
  - Income (price\*harvest) given location
  - Transport cost given location
- Vessel limitations per area and time
- The results will be a certain distribution of the fleet over the whole area, based on the distribution of revenues and costs of steaming in the area in the past
- Different choices of fishers will be seen – resulting in different profits obtained by the sector

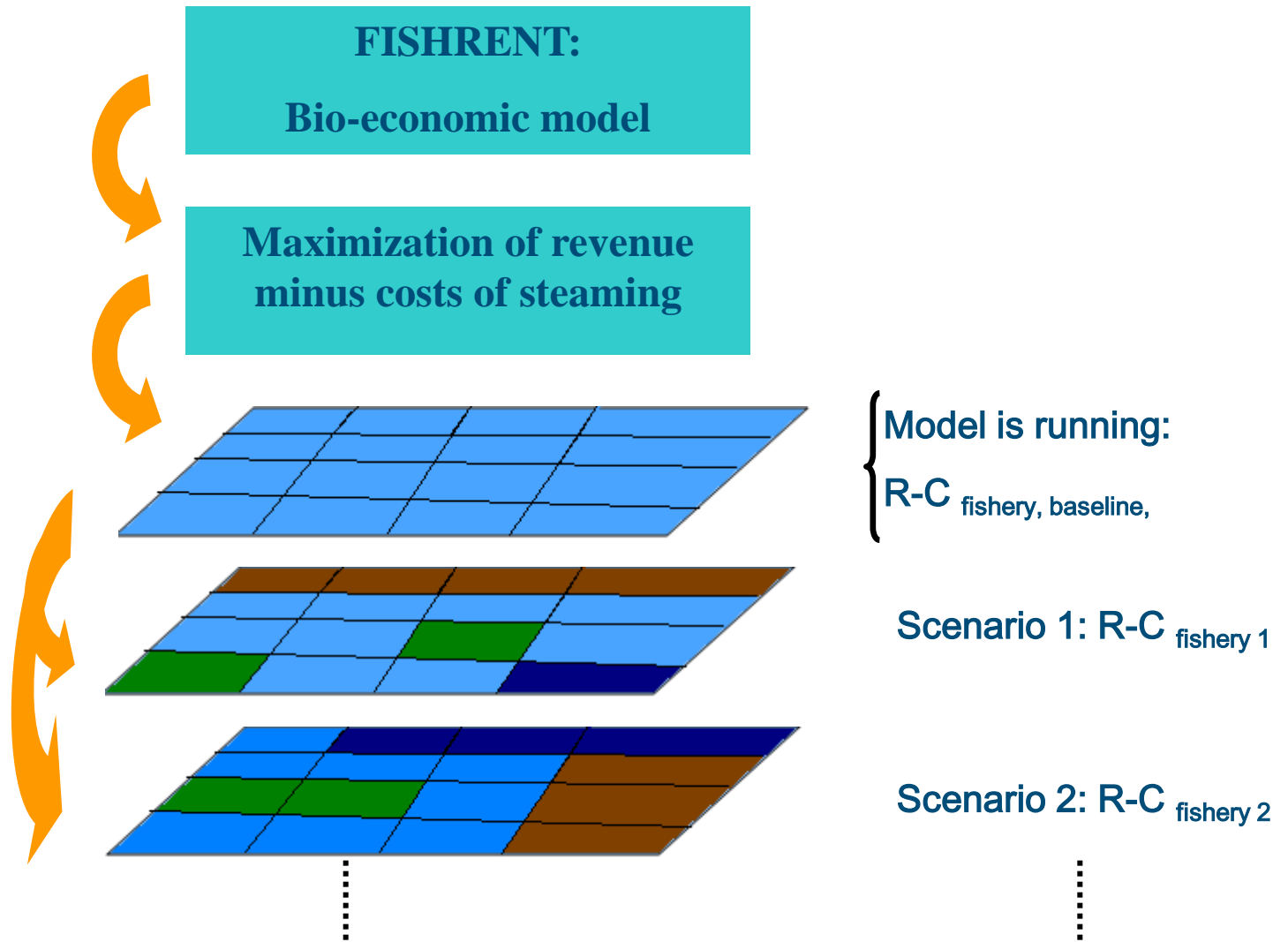
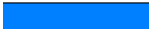





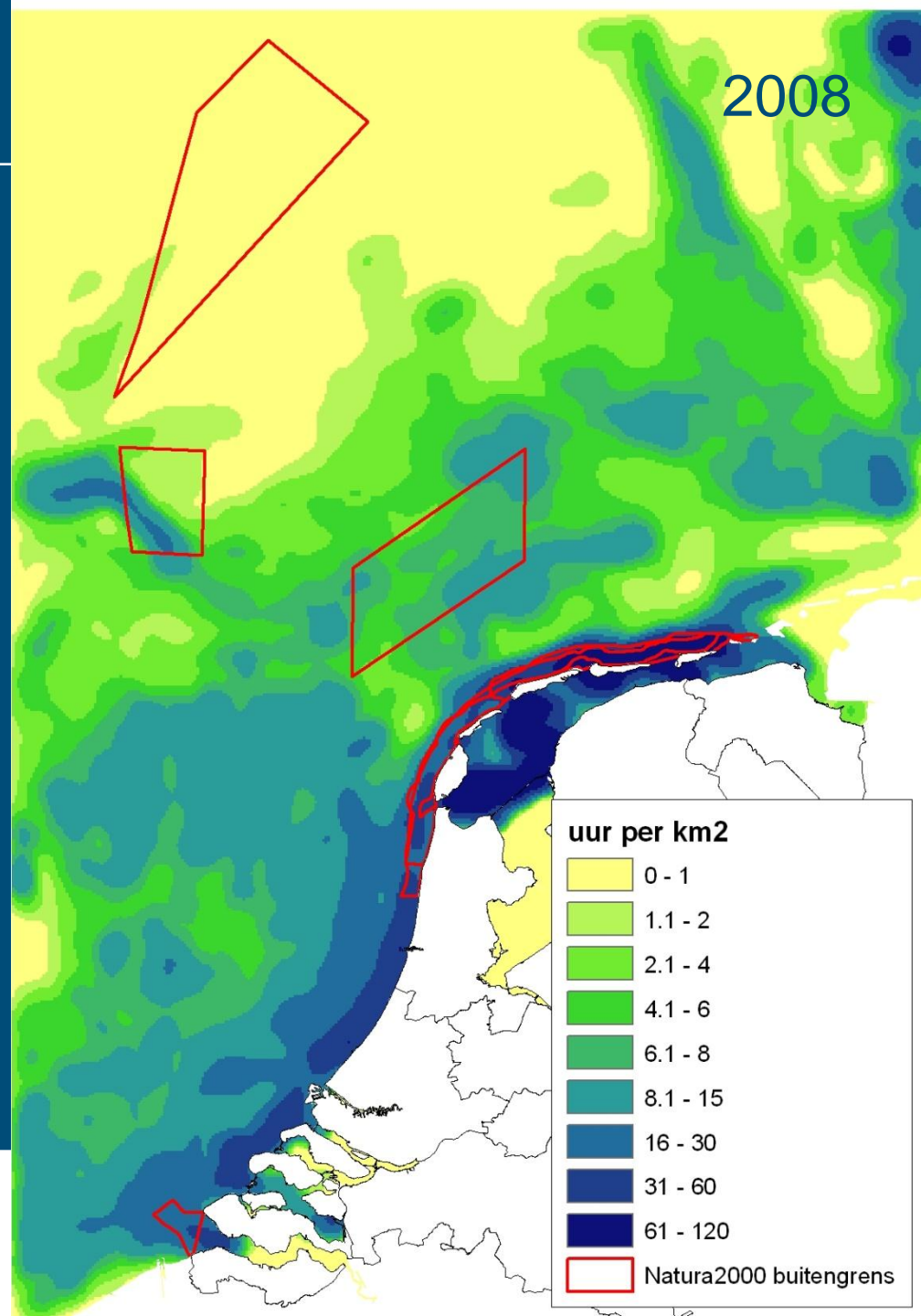
Figure explanations	
R	Revenue of harvested fish
C	Fuel costs
	Fishery sector
	Mussels
	MPAs
	Shipping



# Fishing effort

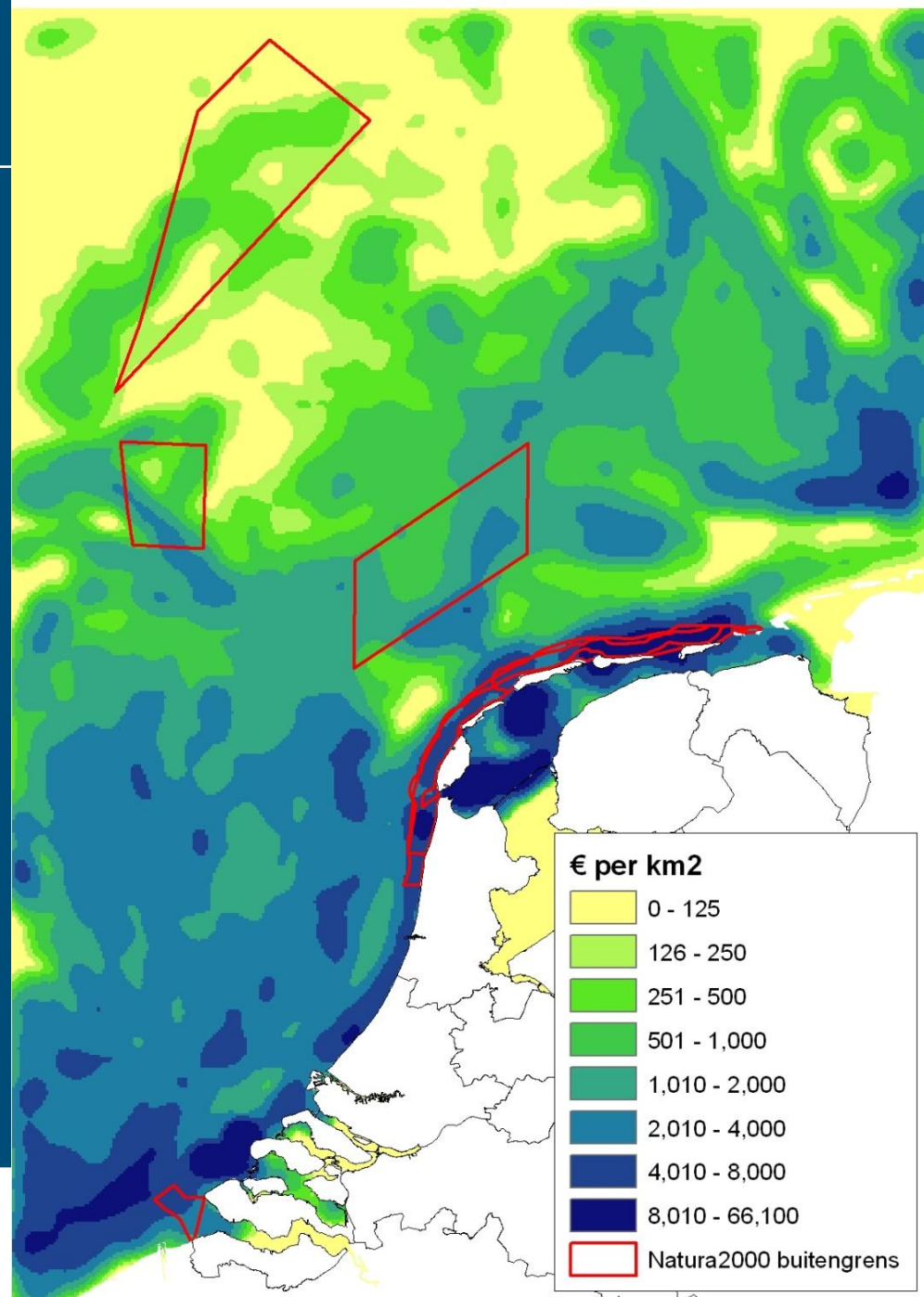
Effort in hours fishing  
(Hours per km<sup>2</sup>)

Source: Dutch Ministry (LNV) supported the project:  
'Distribution maps of the North Sea fishery', Methods and  
adaptations to the Natura 2000 areas. 2010.



# Value (\*1000 Euro) Average 2006-2008

Dogger Bank	2,664
Frisian Front	1,528
Cleaver Bank	934
Coastal zone	164
Vlakte van de Raan	189



Source: Dutch Ministry (LNV) supported the project: 'Distribution maps of the North Sea fishery', Methods and adaptations to the Natura 2000 areas. 2010.

# Spatial FISHRENT cont.

- Once the model is working, then the effects of closing different area's for fisheries (windmills, aquaculture, etc) can be calculated
- Compare with profits obtained in other sectors
- Different scenarios will be applied with respect to locations of static activities:
  - Mussels
  - Marine Protected Areas (MPAs)
  - Shipping
  - Wind farms

# Spatial FISHRENT cont.

- Possibilities to expand approach by for example:
  - Include recreational fishery
  - Include the other sectors in the model

# End

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