

# Wageningen IMARES

## The North Sea, past and present: shifting baselines and human uses

Han Lindeboom

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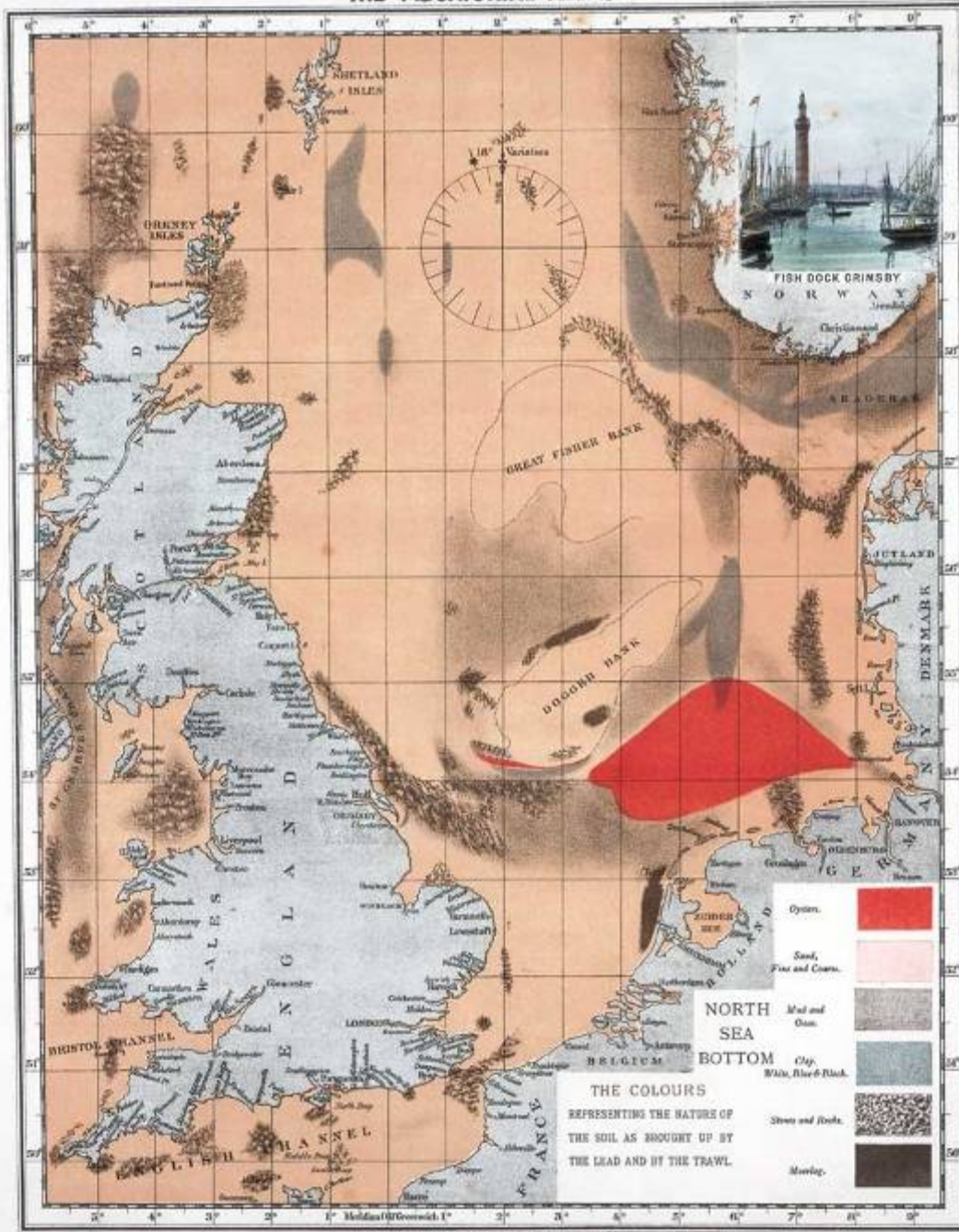


**The North Sea**

**12.000 years ago**



THE PISCATORIAL ATLAS.



The North Sea  
in 1880

Olsen, Piscatorial Atlas (1883)



**Mud, silt**

**Oysters**

**Stones**

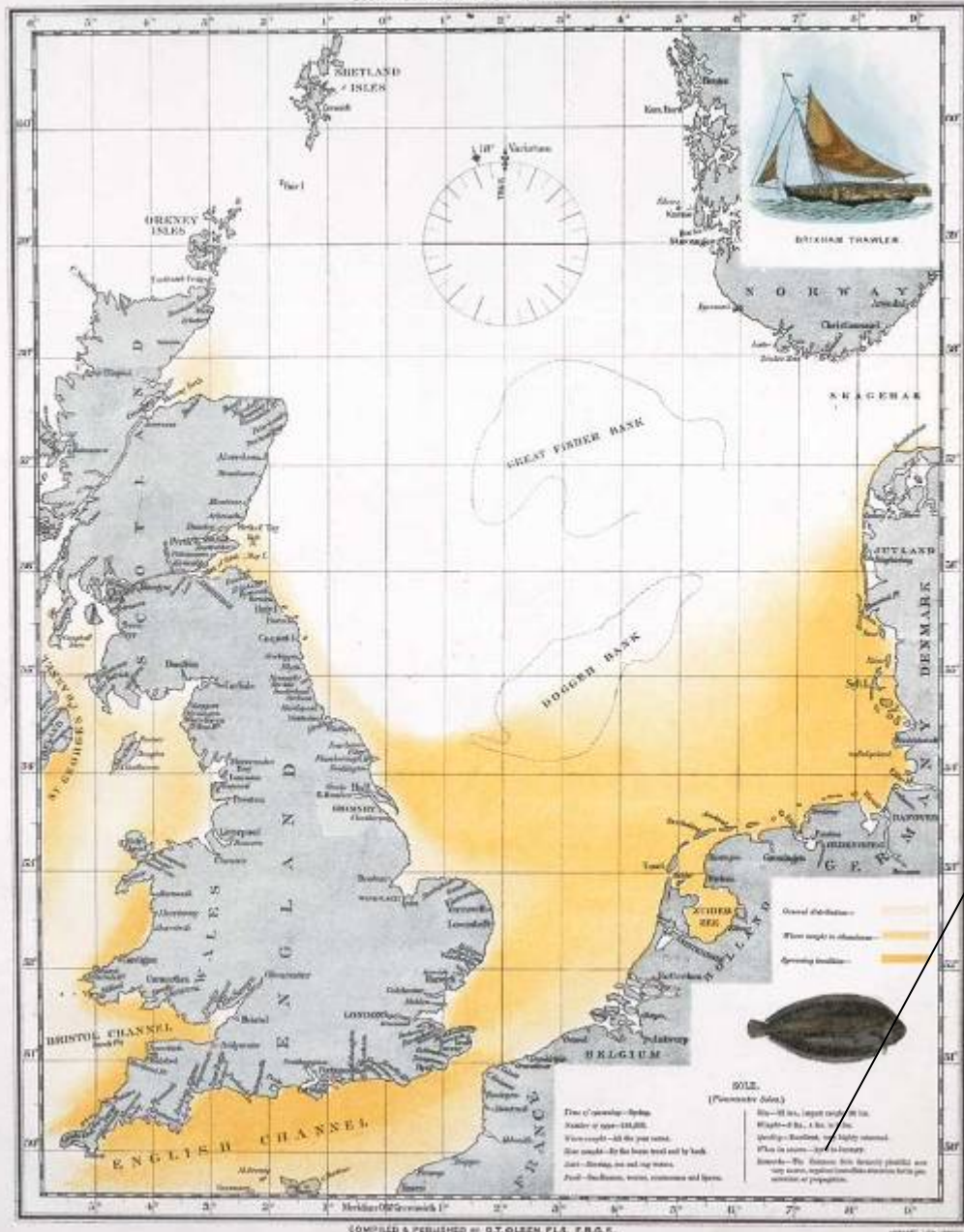
**Moorlog**

**Sand**

Olsen, Piscatorial Atlas (1883)



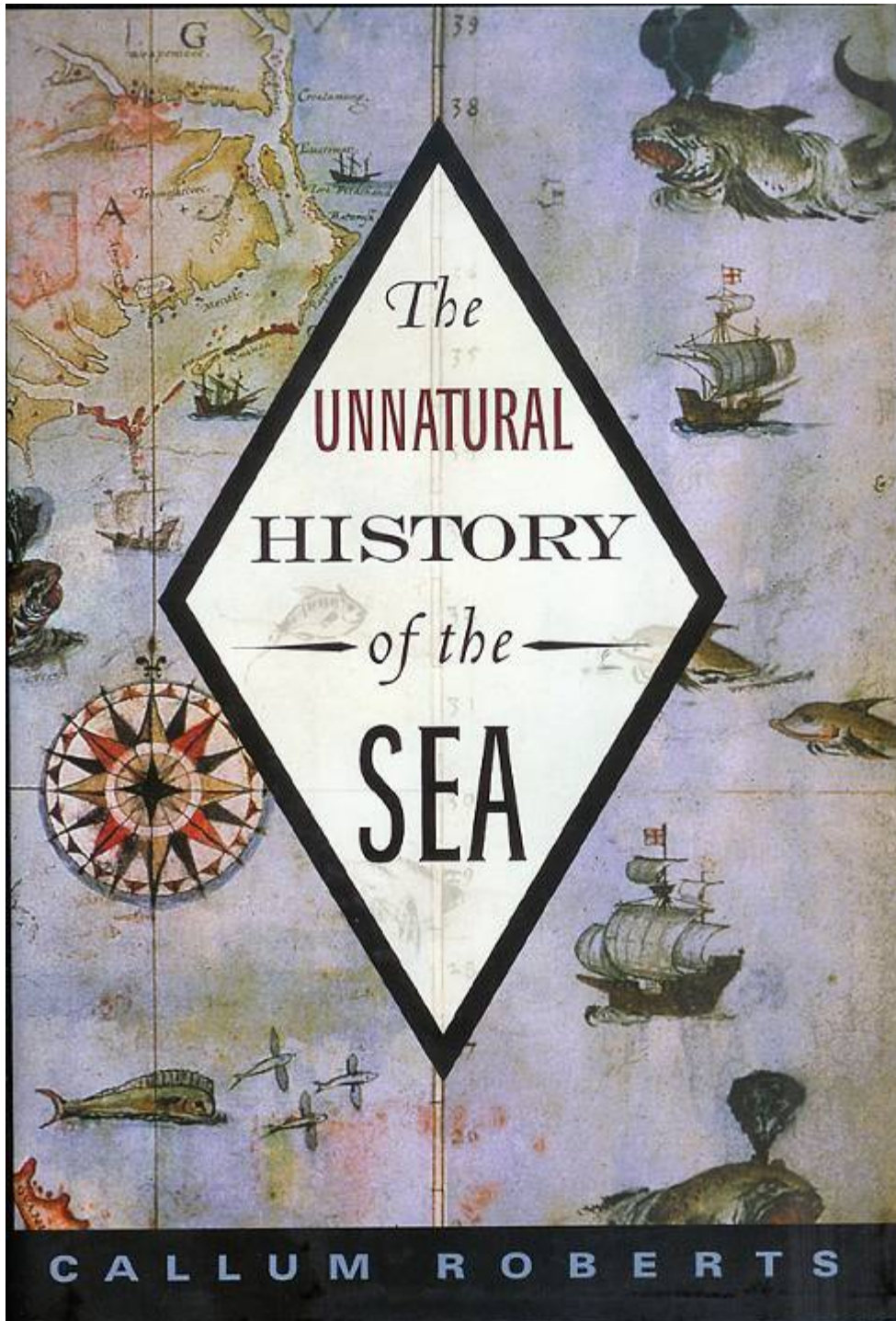
THE PISCATORIAL ATLAS.



The sole

The Common Sole formerly plentiful now very scarce, requires immediate attention for its preservation or propagation. (Olsen, 1883)

Olsen, Piscatorial Atlas (1883)



## Shifting baselines



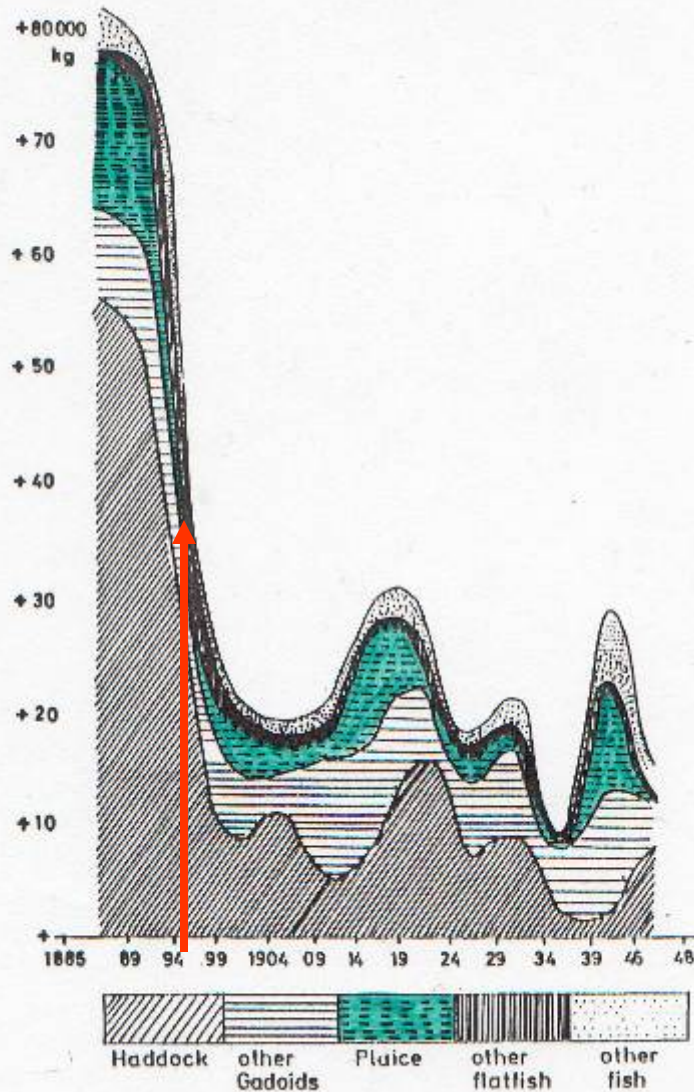


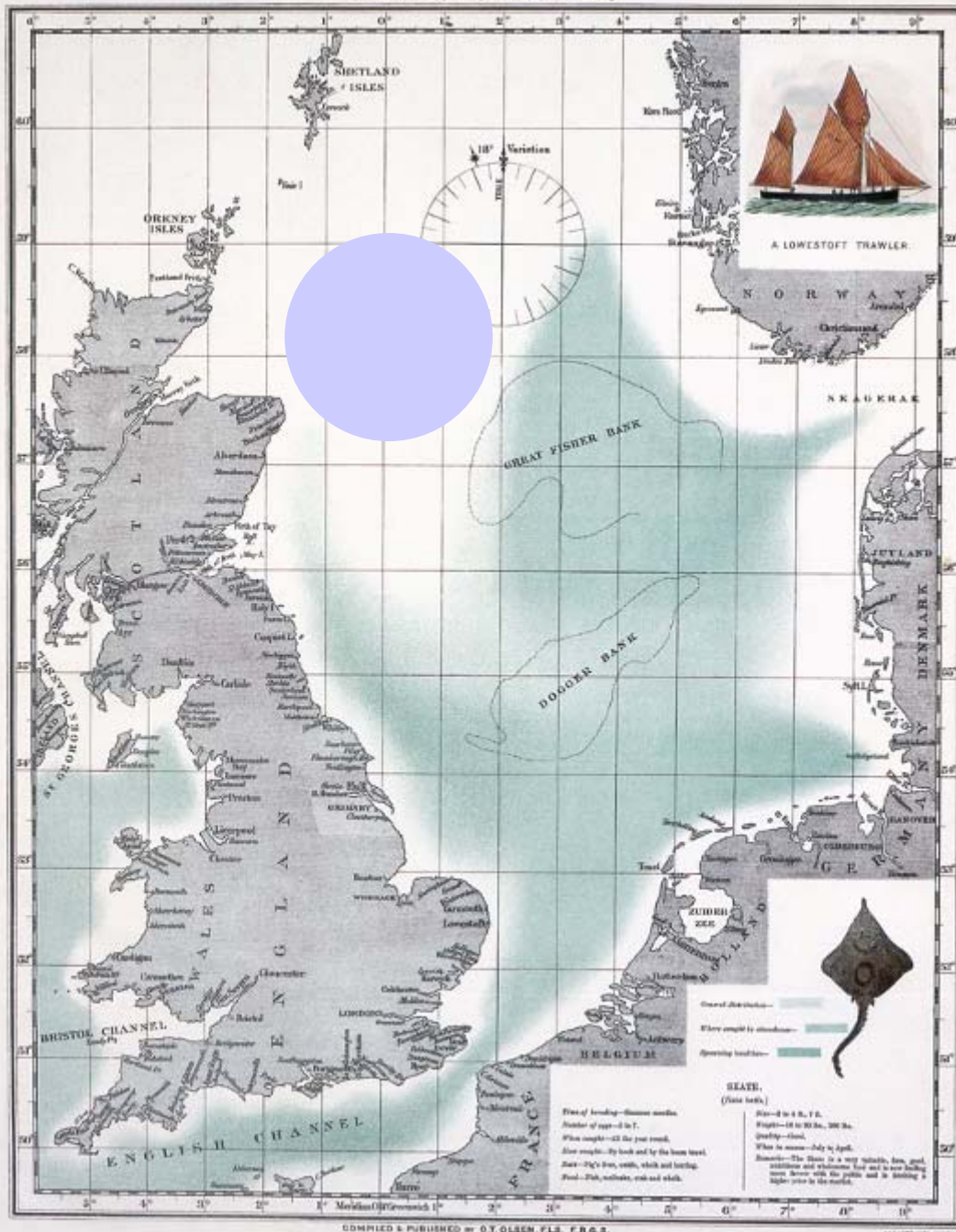
Figure 122. Catch/10-d trip (corrected effort) of a standardized German trawler in the southern North Sea (from Lundbeck, 1962)

**Around 1895  
the North Sea  
fisheries collapse**

Lundbeck (1962)



# THE PISCATORIAL ATLAS.

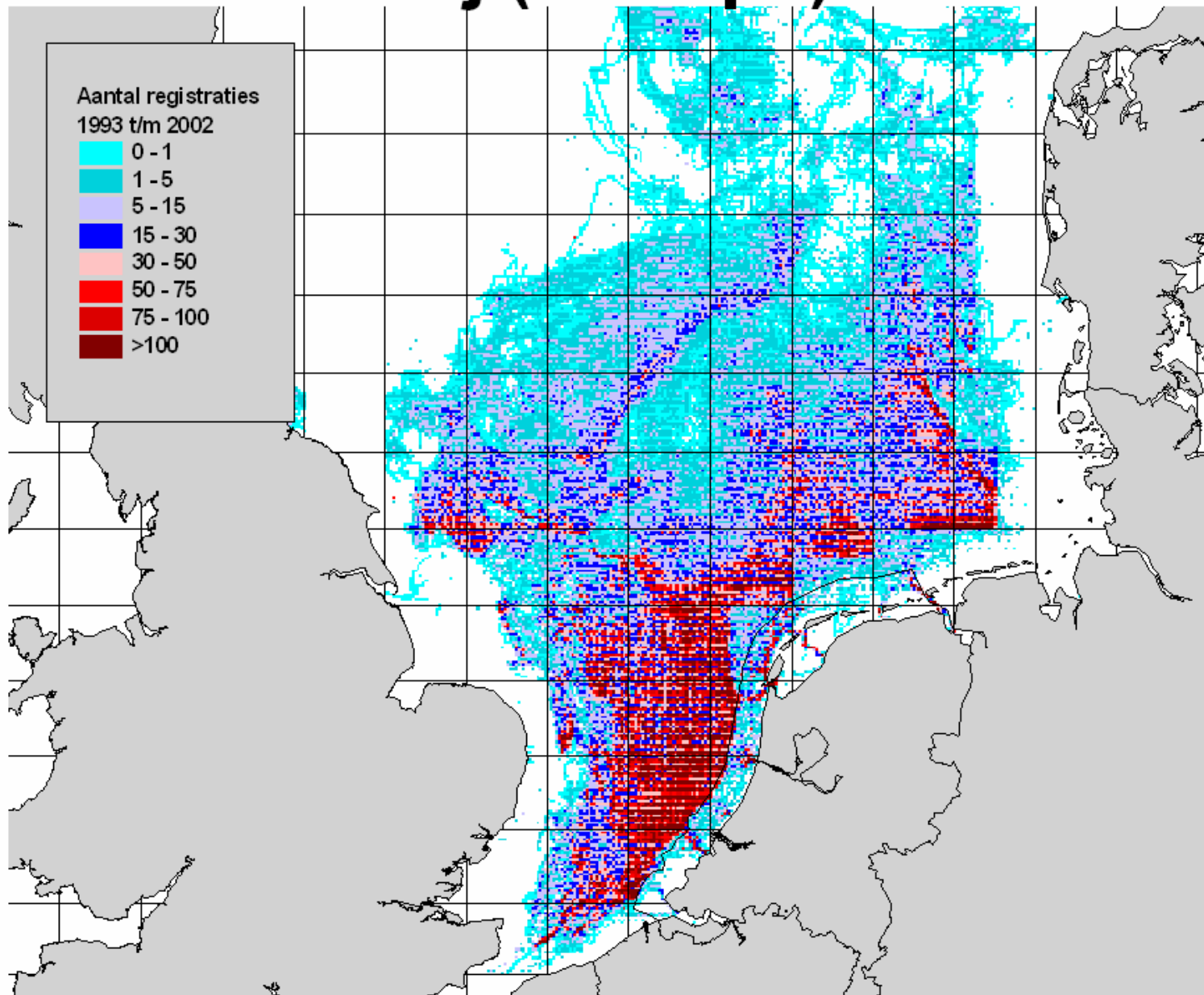


Skate

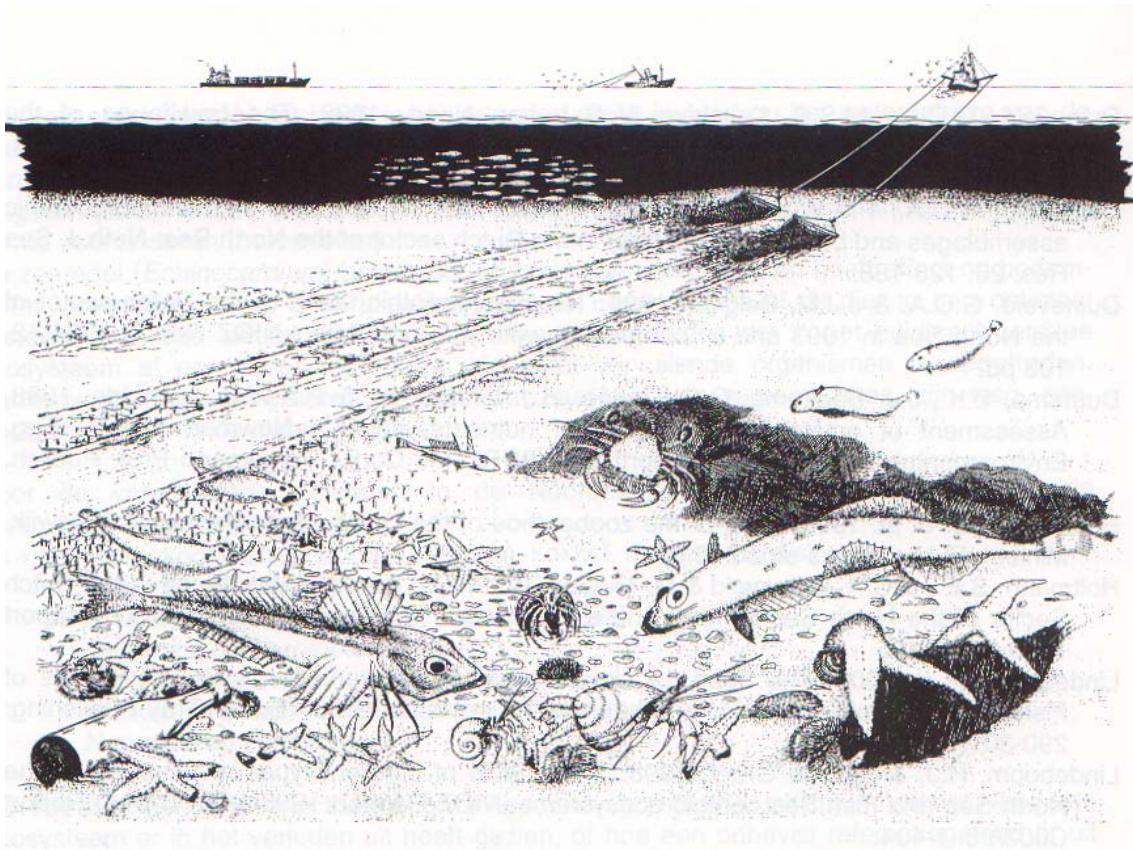
Olsen, Piscatorial Atlas (1883)



# Visserij (>300 pk)



## Effects beam trawling



**Killing target and non-target species**

**Food → birds**

**Changing:**

**species ↓**

**age ↓**

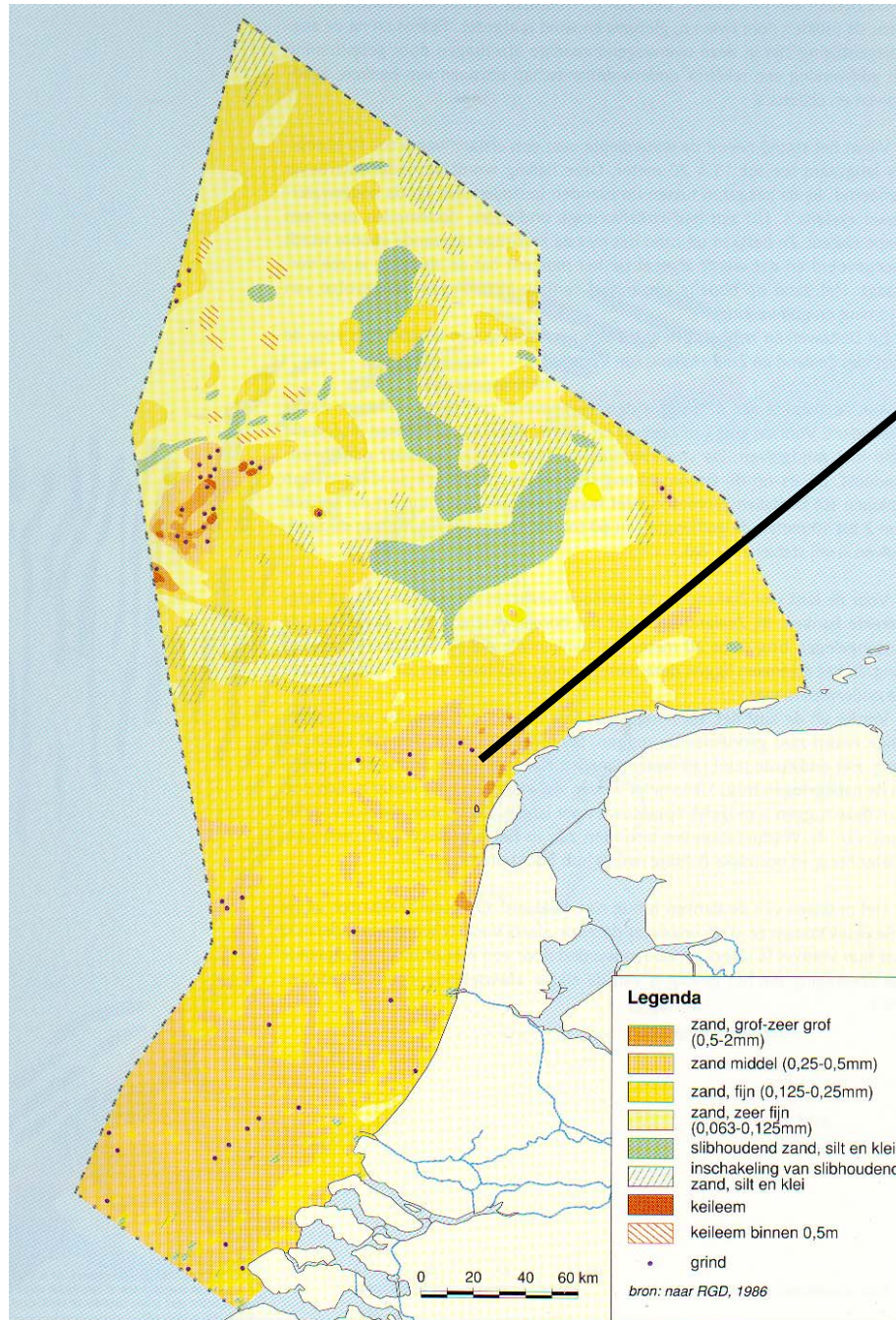
**habitats ↓**



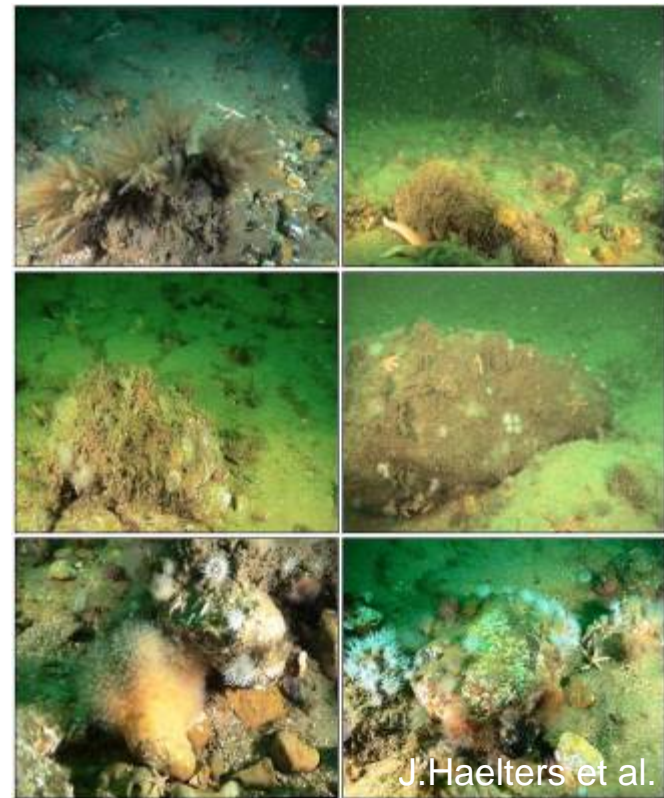
Before

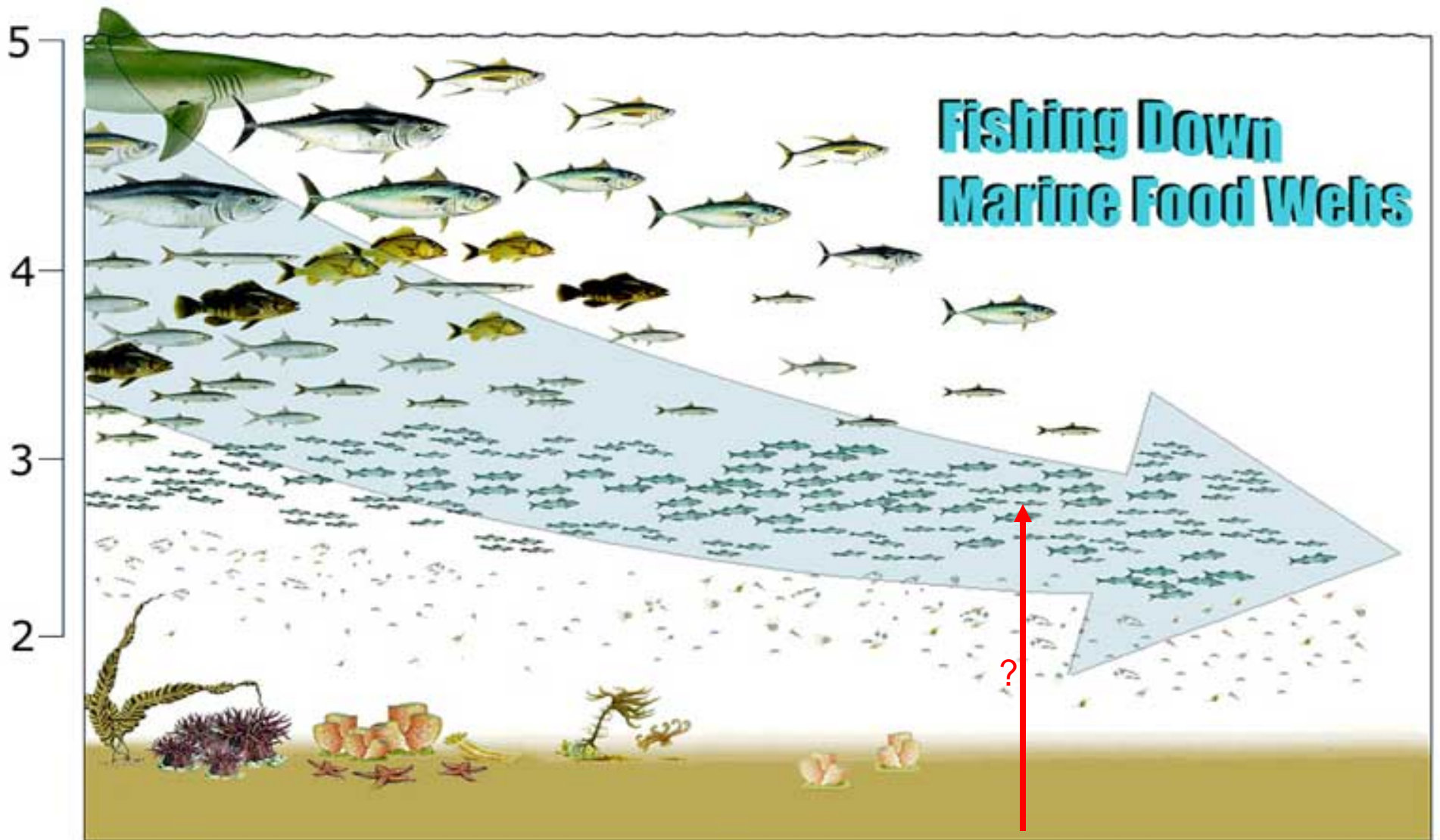
After



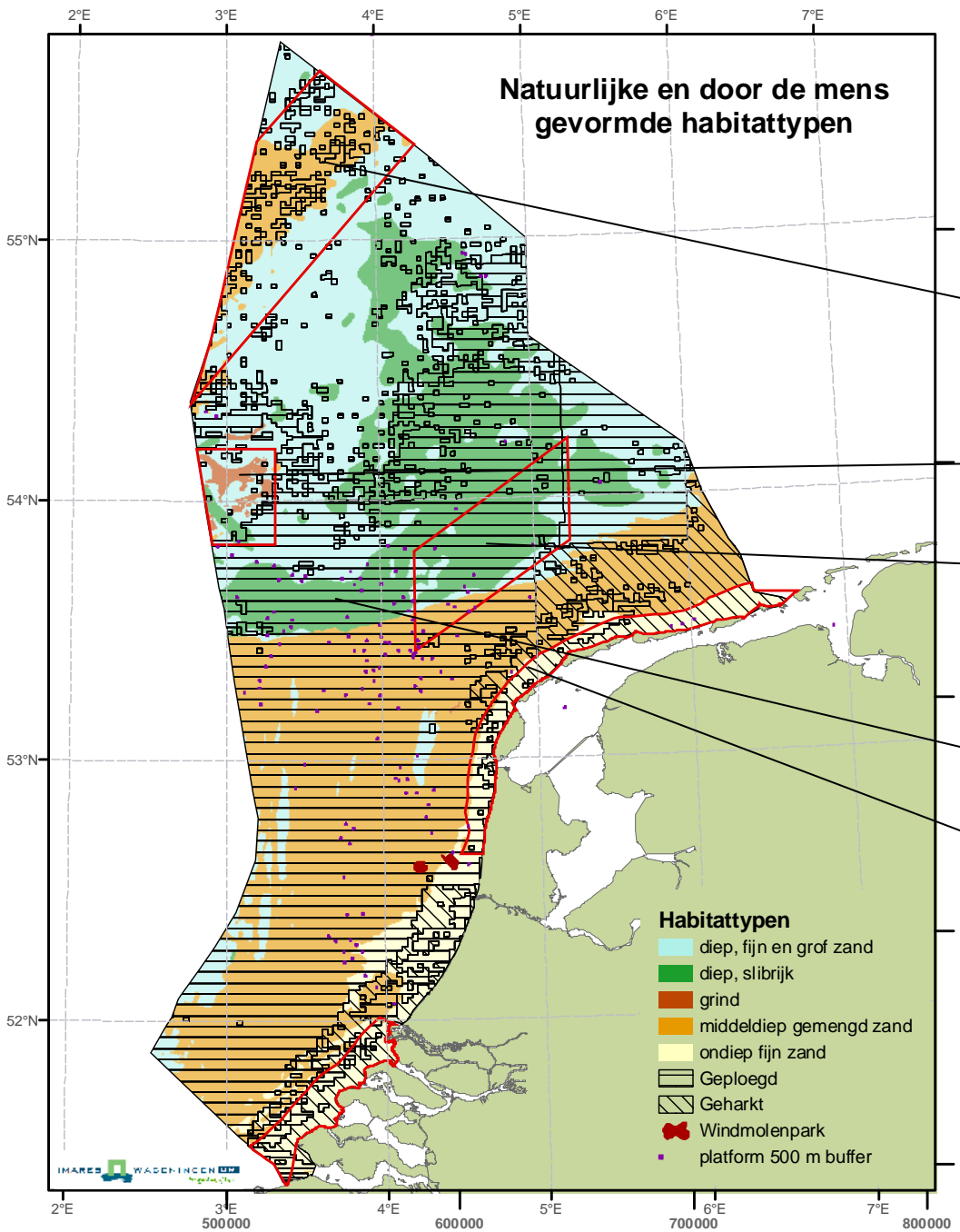


## Texel stones





Pauly et al.



# Habitat types in the North Sea

“Old habitat types”

Sand bank

Gravel

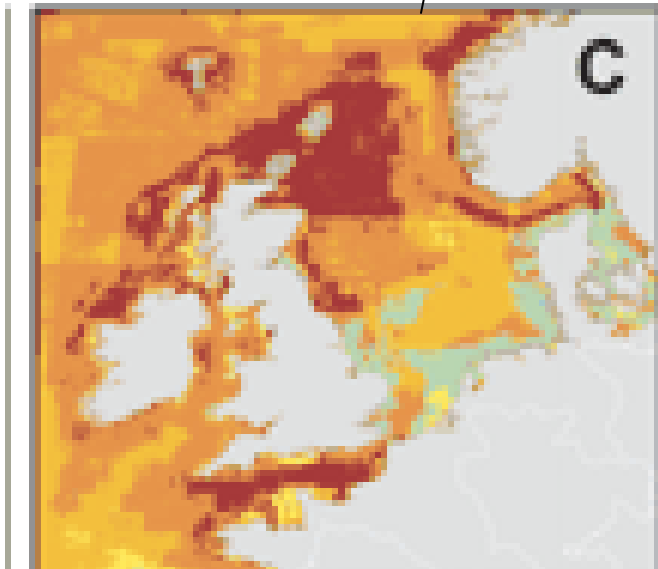
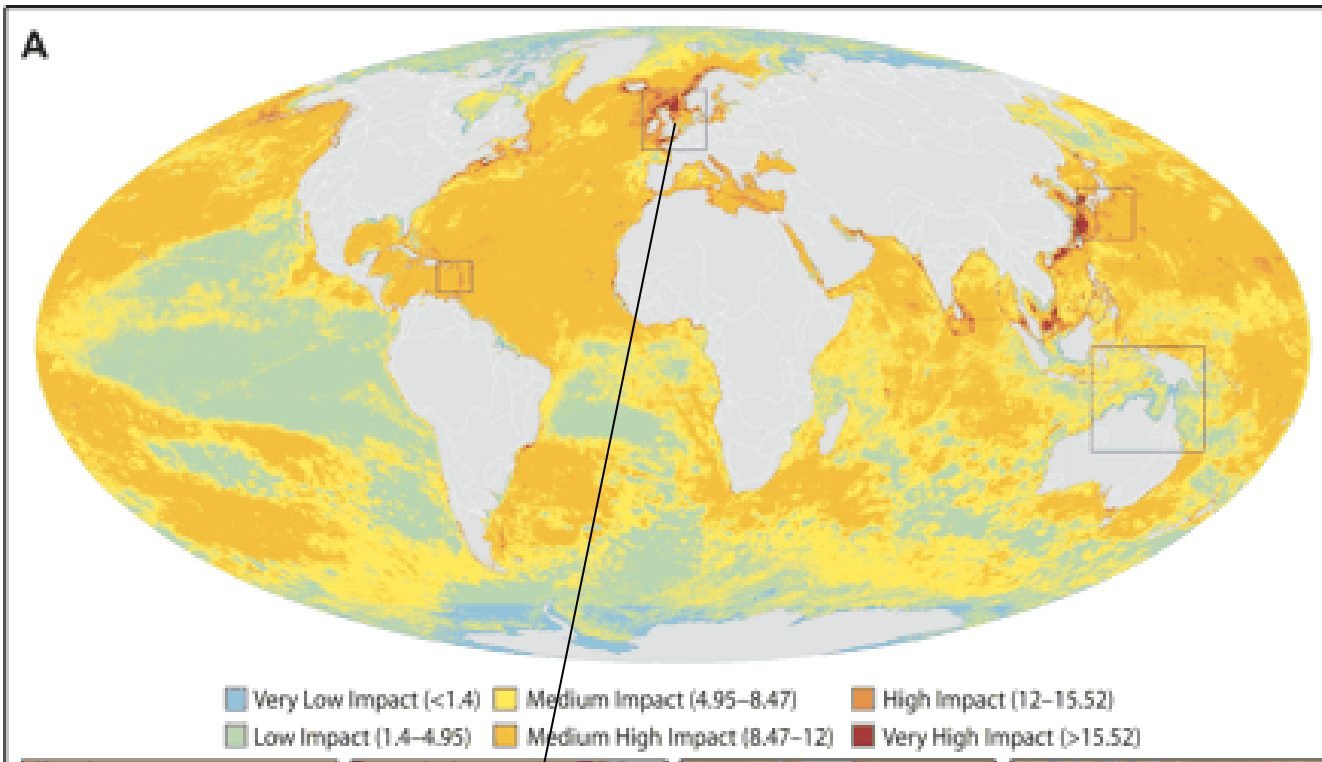
Silt

“New habitat types”

Ploughed habitat

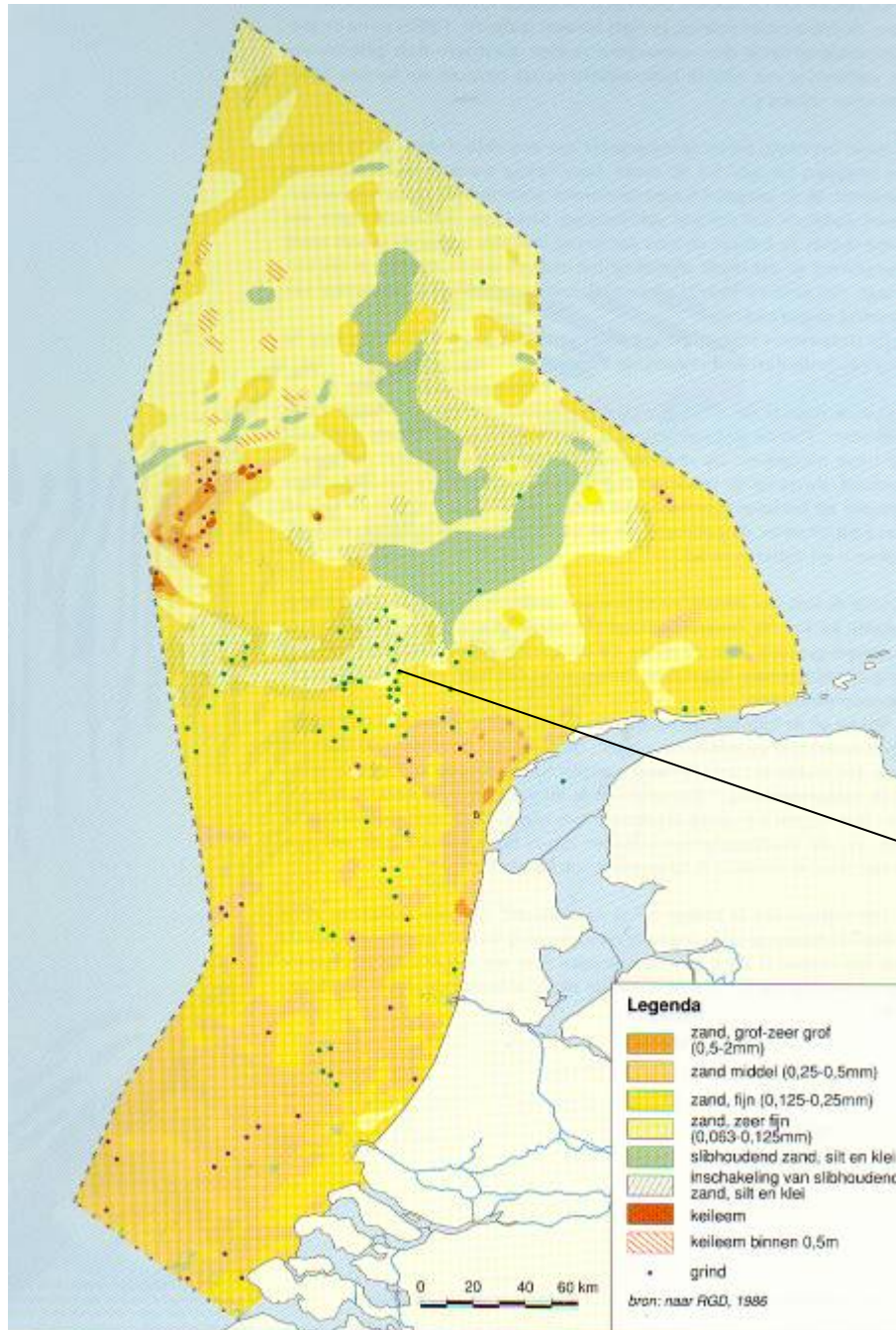
Raked habitat

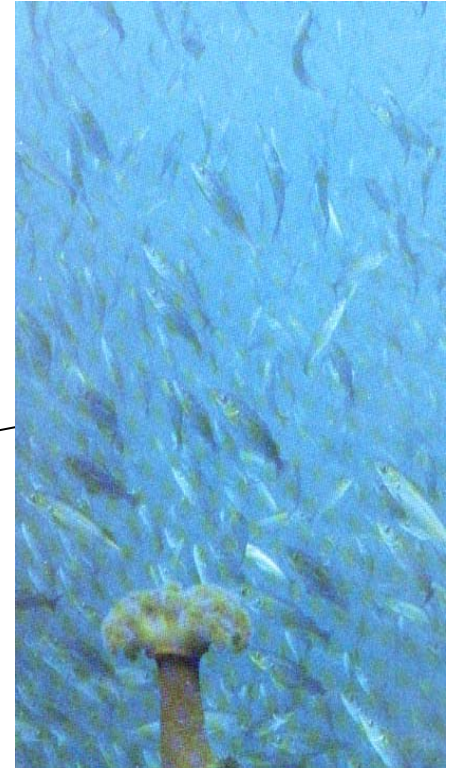
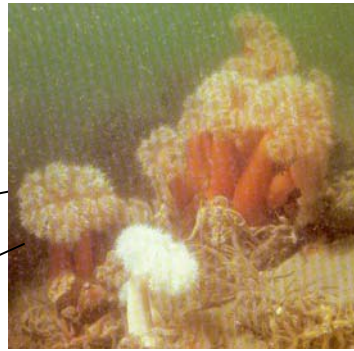
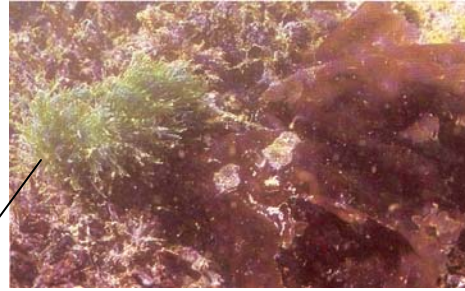


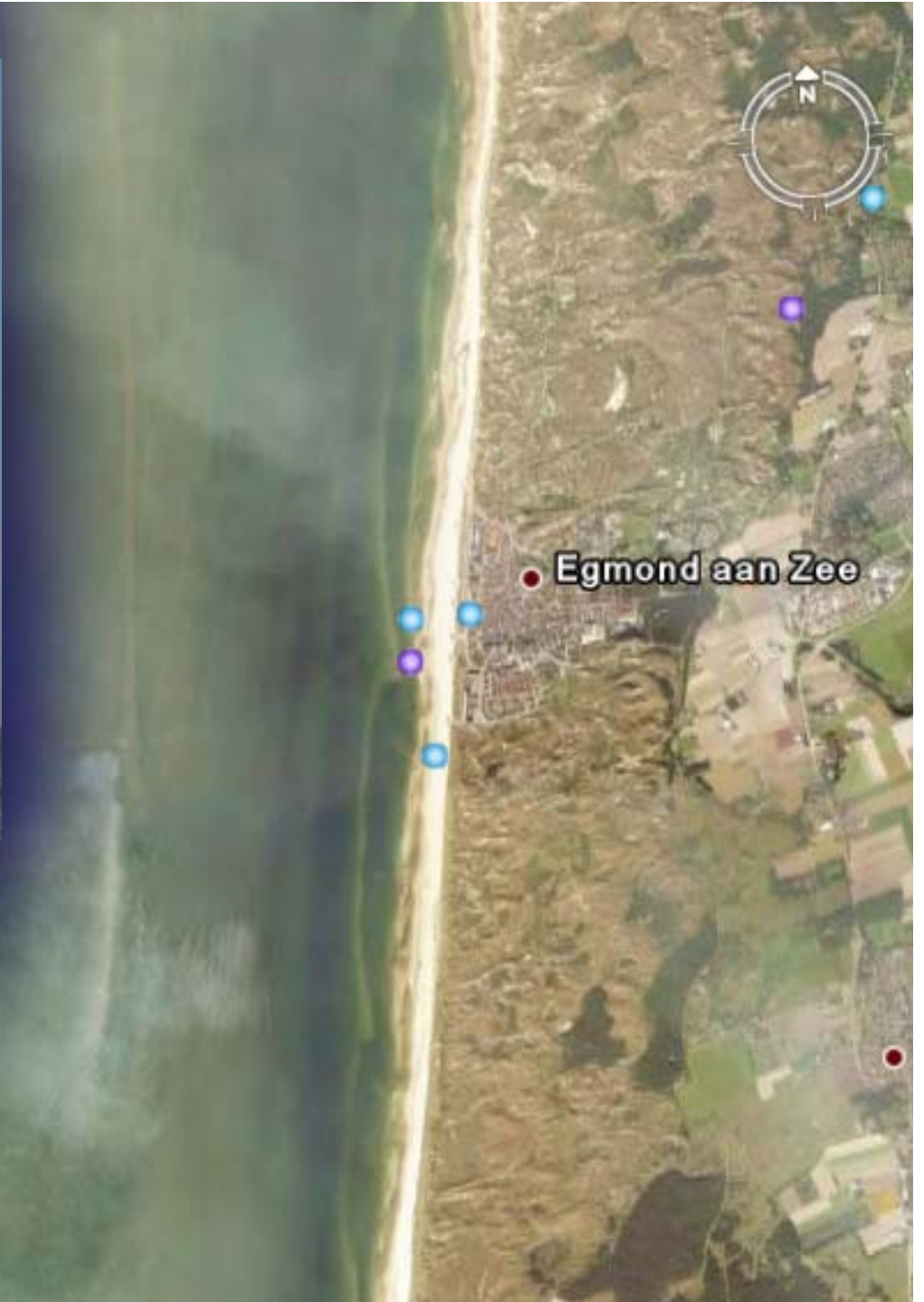


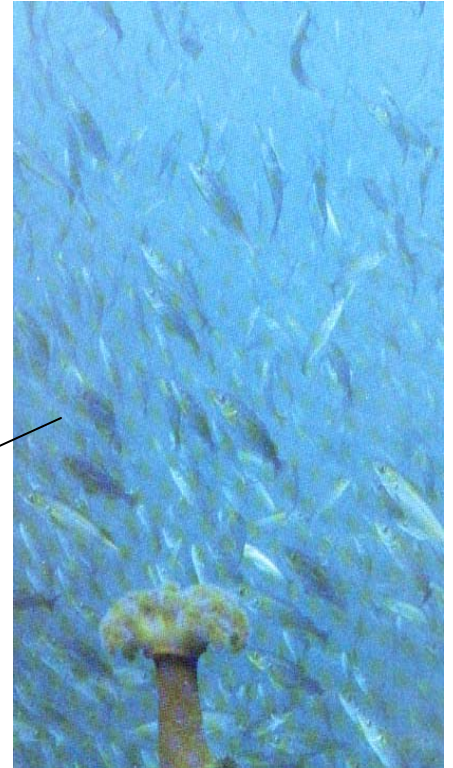
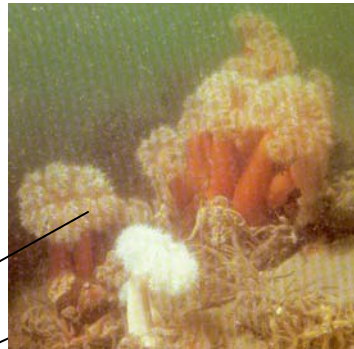
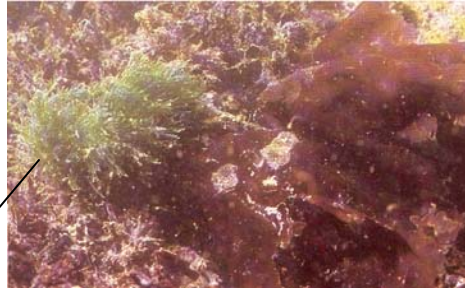
Halpern et al., 2008. Science 15 Febr.

# Gas- and Oil- platforms







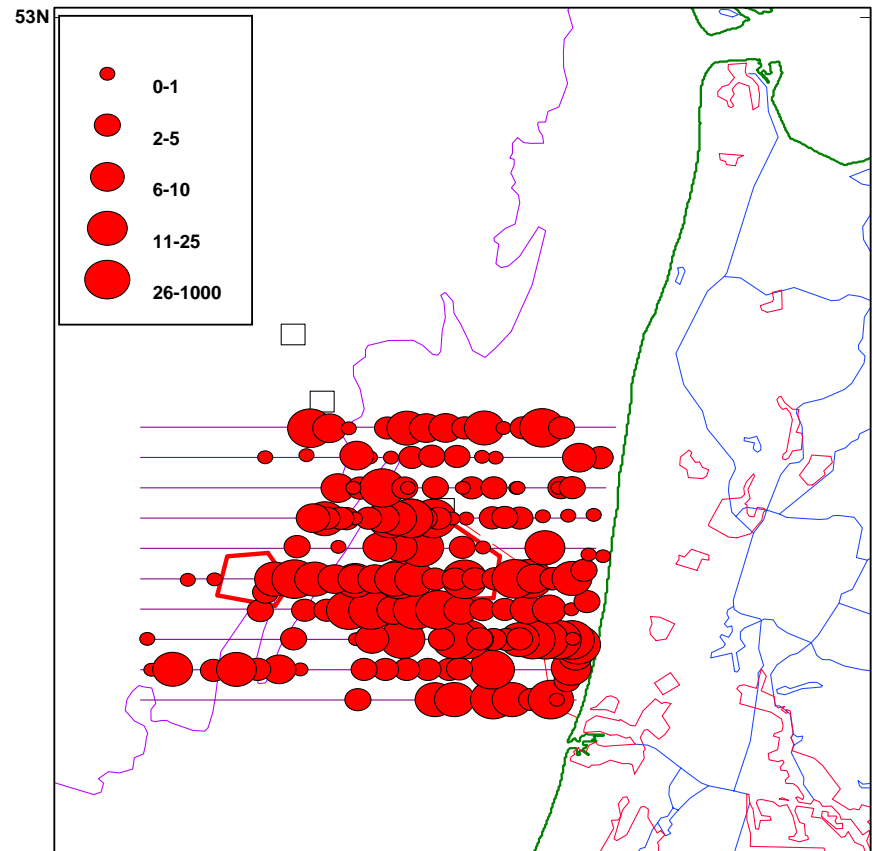




# Great cormorant



## June 2007 alscholver







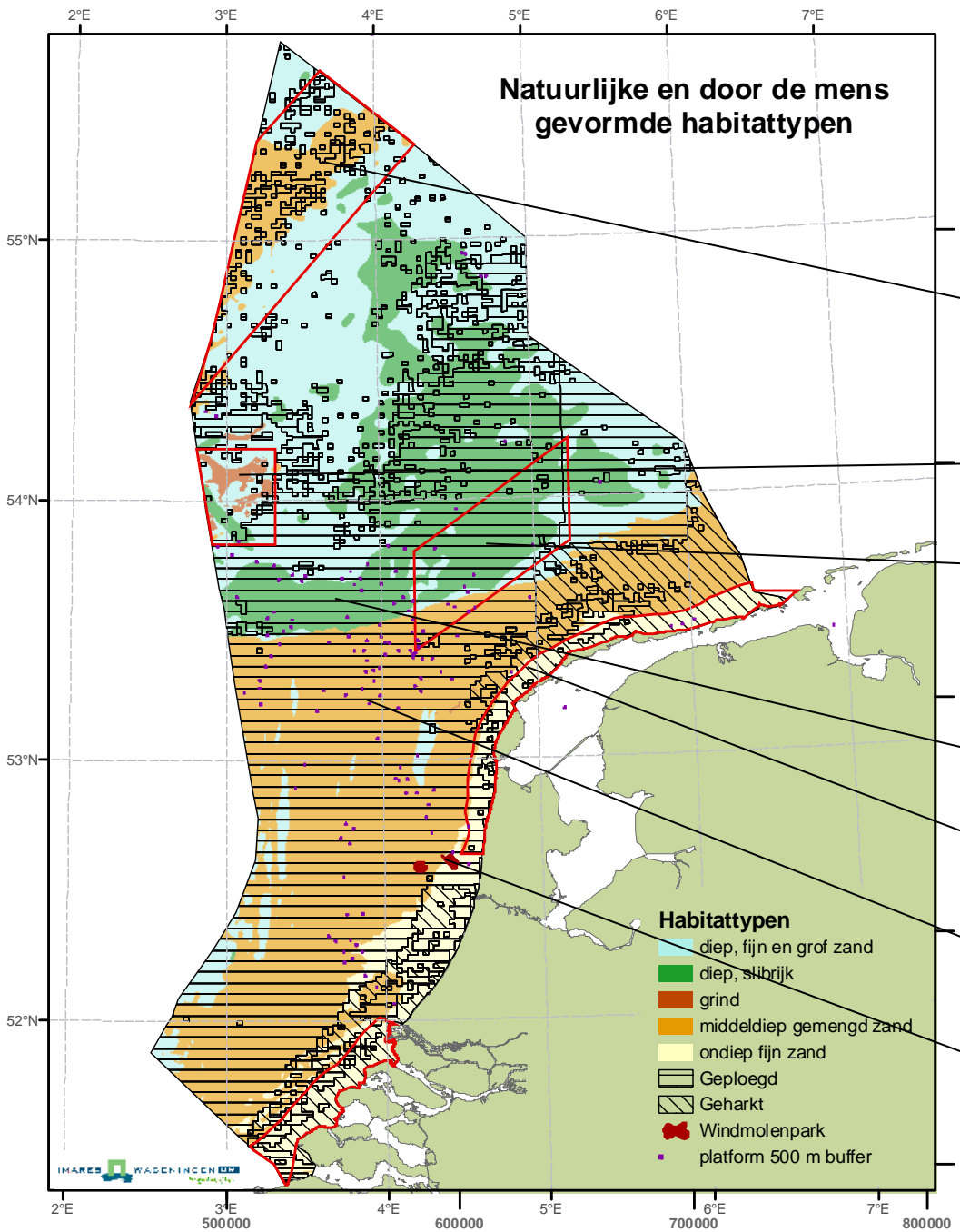


Rudolf  
D A S



Lievense

KEMA



# Habitat types in the North Sea

## “Old habitat types”

Sand bank

Gravel

Silt

## “New habitat types”

Ploughed habitat

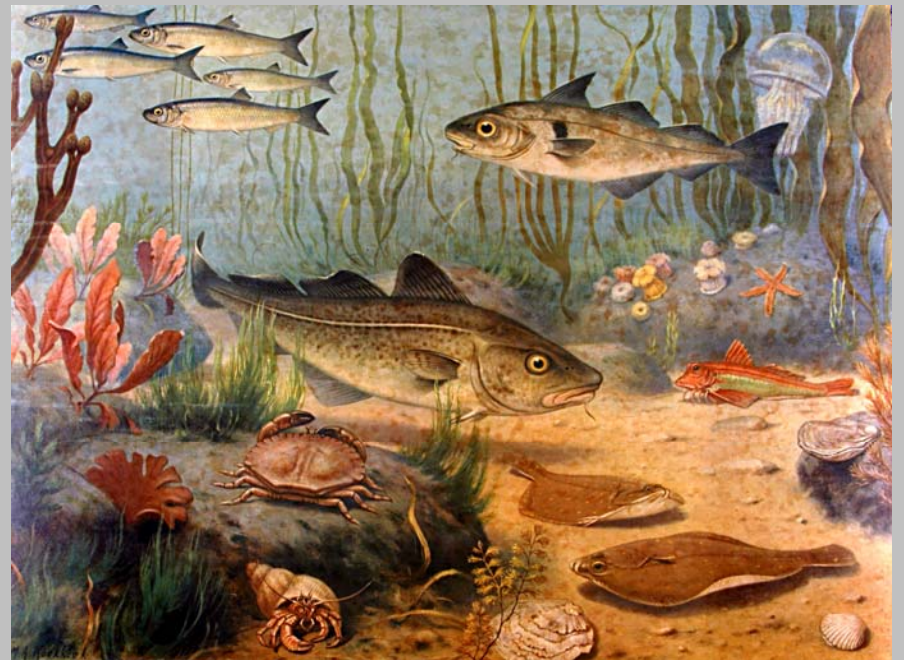
Raked habitat

Platforms

Wind park

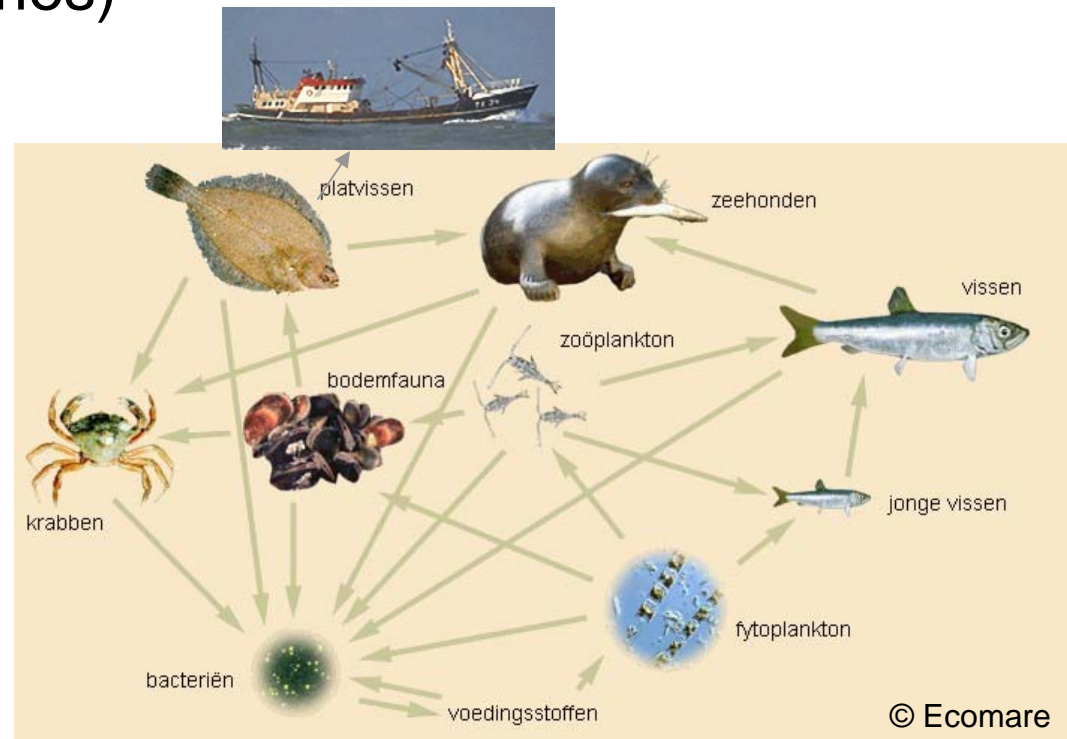
# The marine ecosystem, a matter of:

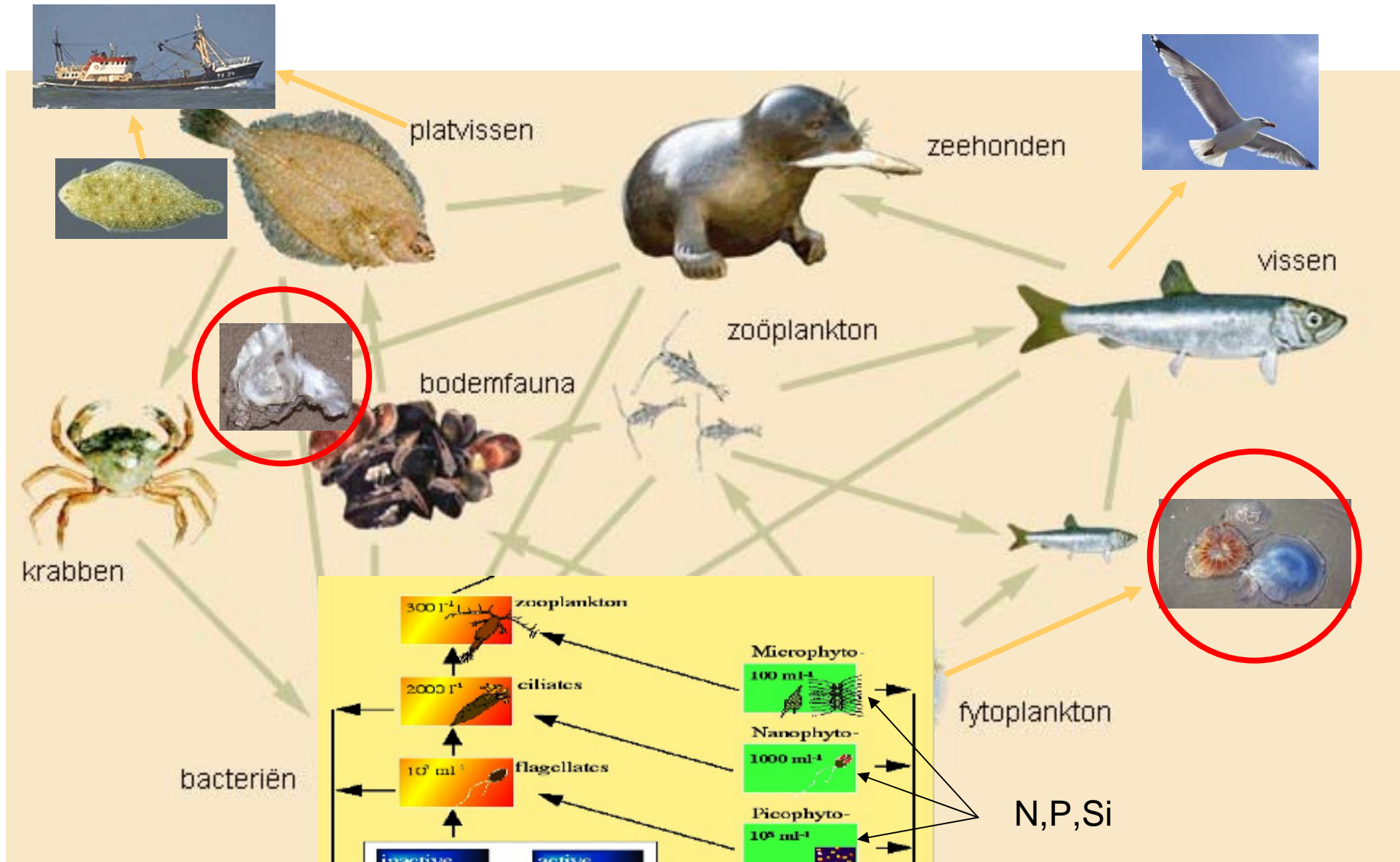
- Habitat types
- Complexity
- Timing
- Man and nature



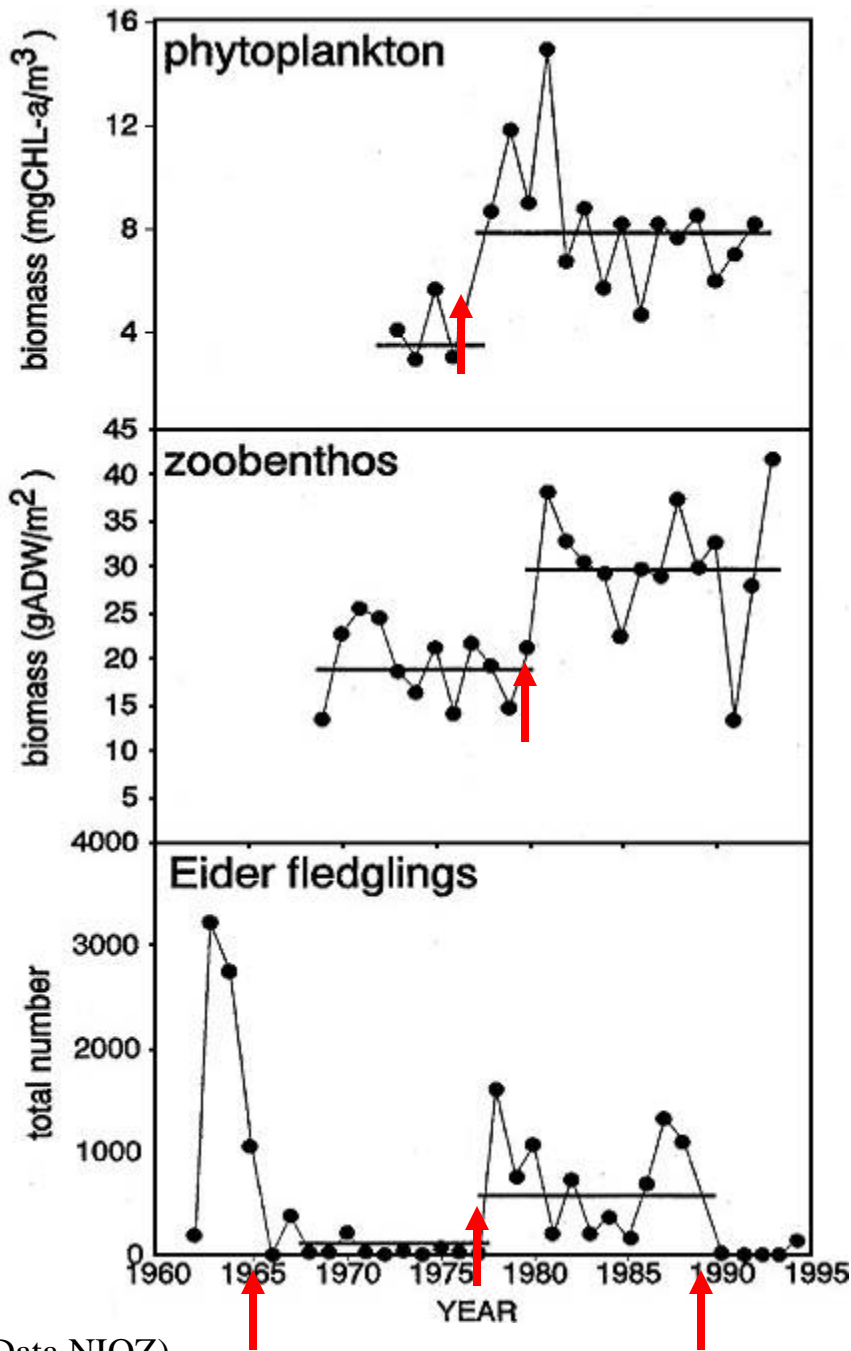
# A combination of factors determine the numbers:

- Food: quantity, place, timing, quality
- Predation (incl. fisheries)
- Recruitment
- Habitat
- Climate
- ??

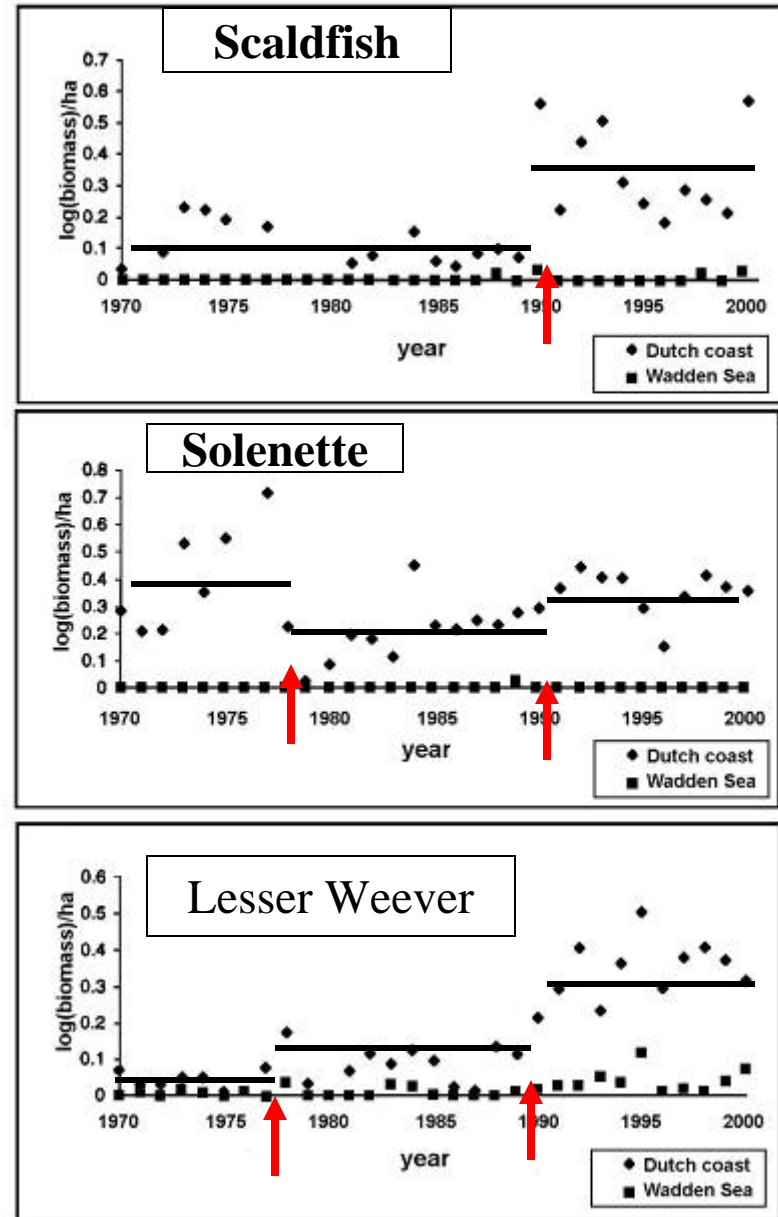




© Ecomare



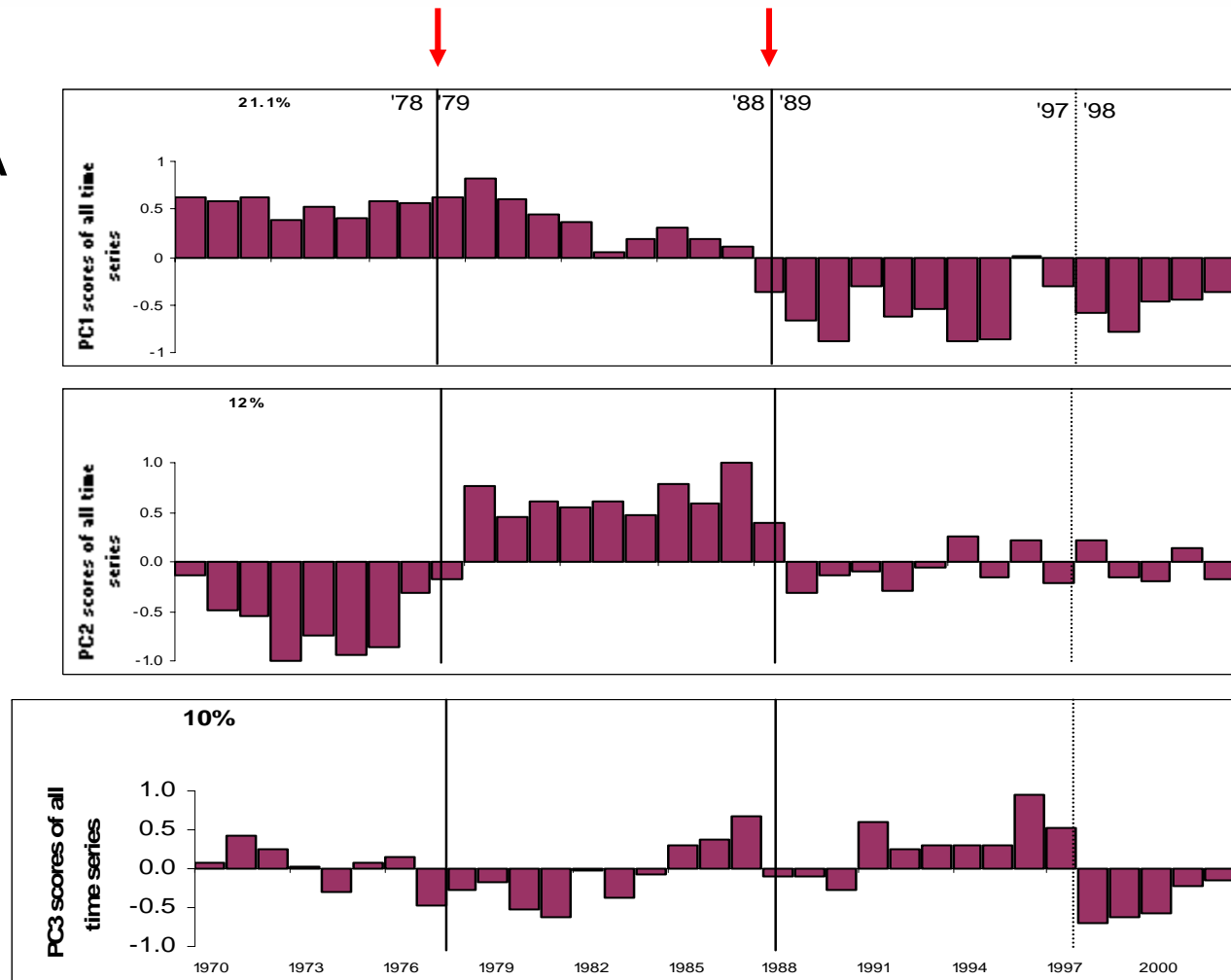
Benthic fish (Data RIVO)

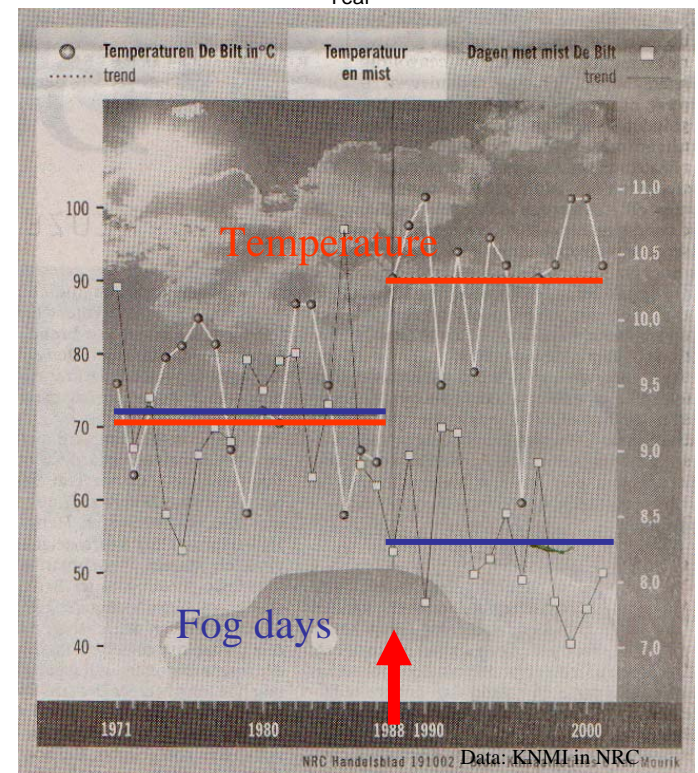
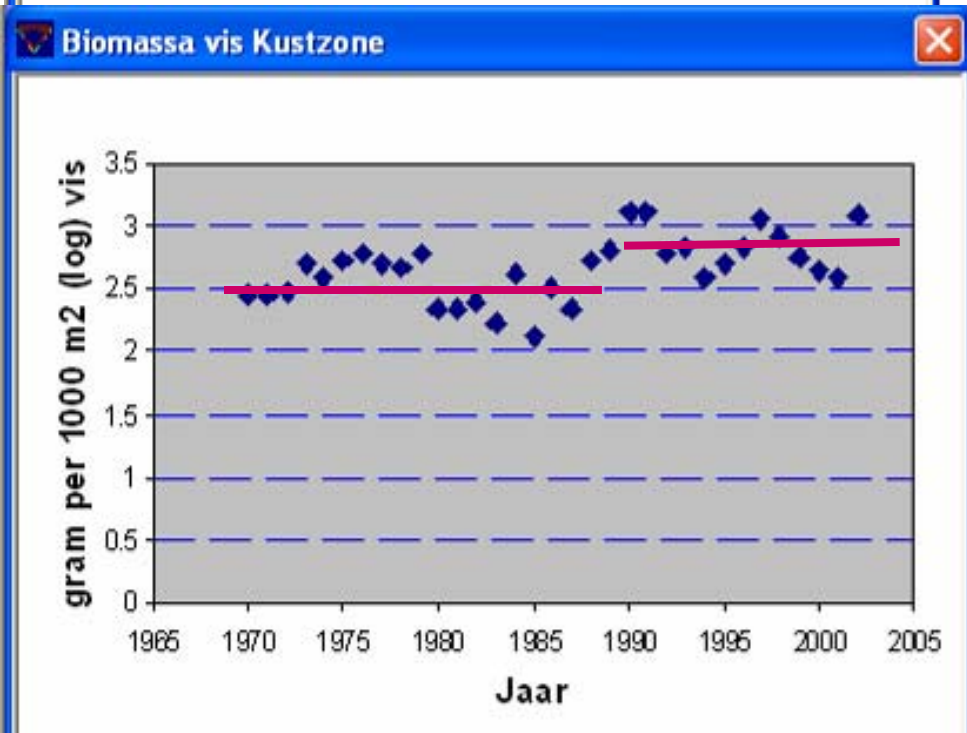
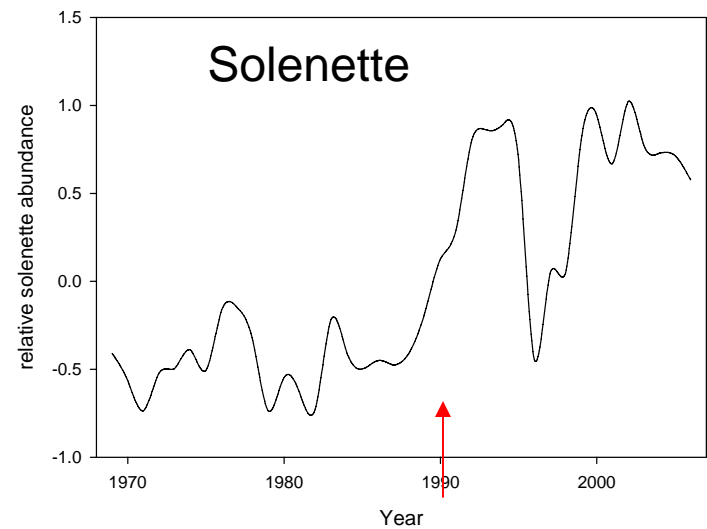
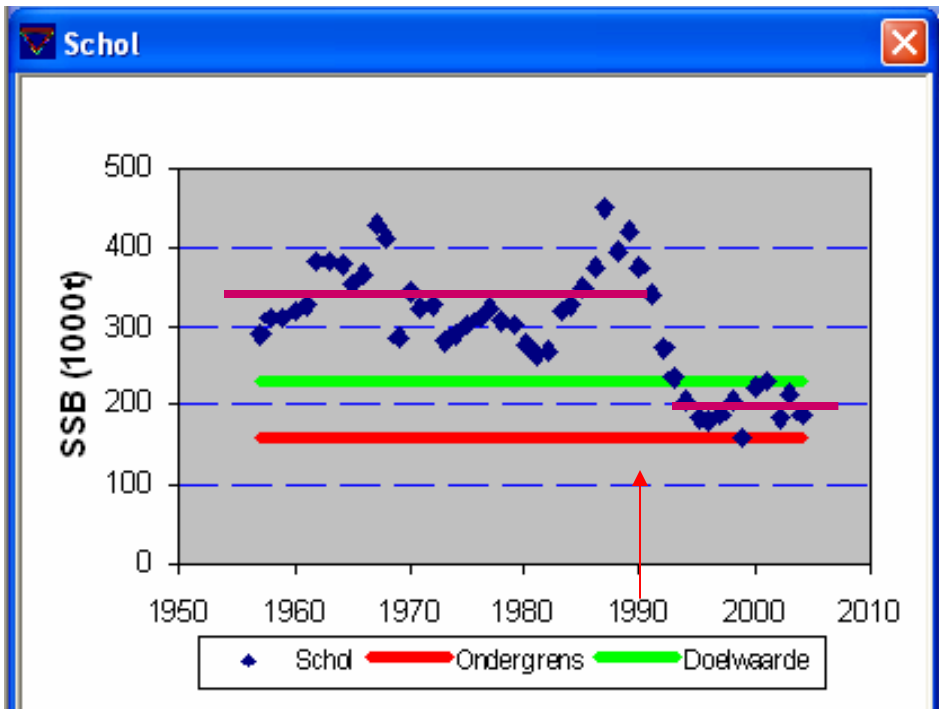


# Regime shifts in marine ecosystems of the North Sea and Wadden Sea

Mariska Weijerman<sup>1</sup>, Han Lindeboom<sup>1,\*</sup>, Alain F. Zuur<sup>2</sup>

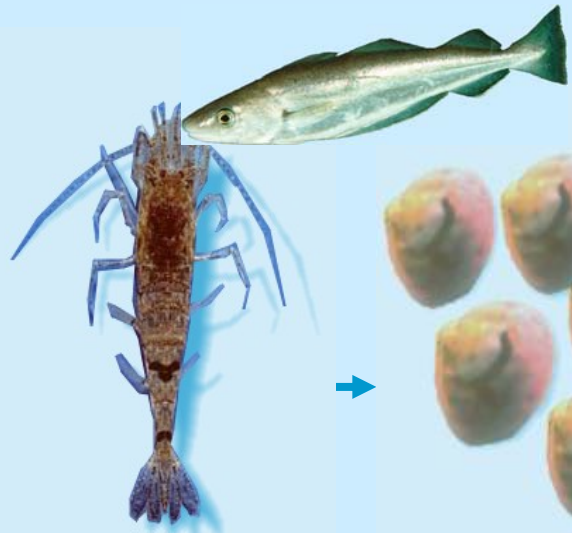
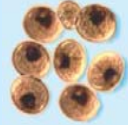
Resultaten: PCA







**Low temperature**



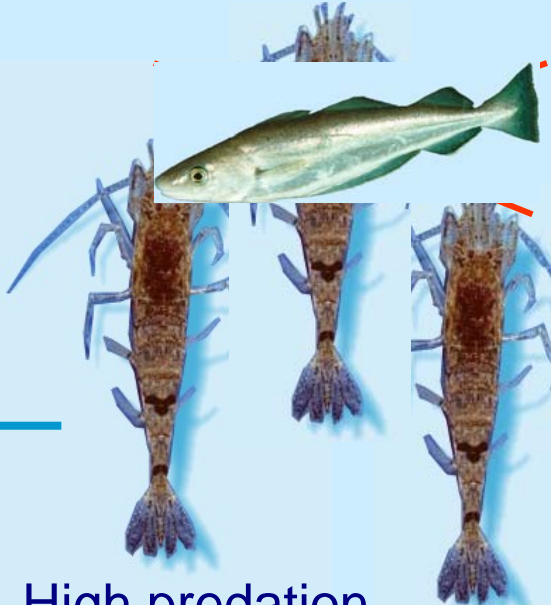
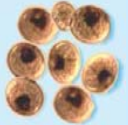
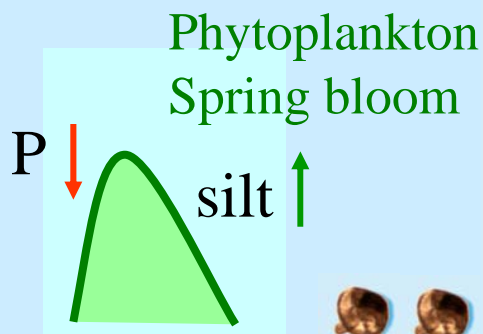
Eggs late

Early metamorphoses

Low predation

High recruitment

**High temperature**



Eggs early

Late metamorphoses

High predation

Low recruitment

After Katja Philippart, NIOZ

## Tropiske fisk på vej nordpå

I takt med at havets temperatur stiger, rykker tropiske fisk længere mod nord. En undersøgelse foretaget af franske forskere ved Oceanologica Acta for perioden 1960-1995 viser, hvor man har fanget de to tropiske fiskearter Rosa Dory og John Dory.



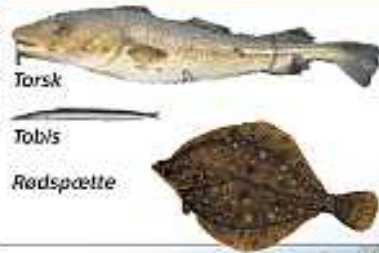
Rosa Dory  
SIGNATUR:



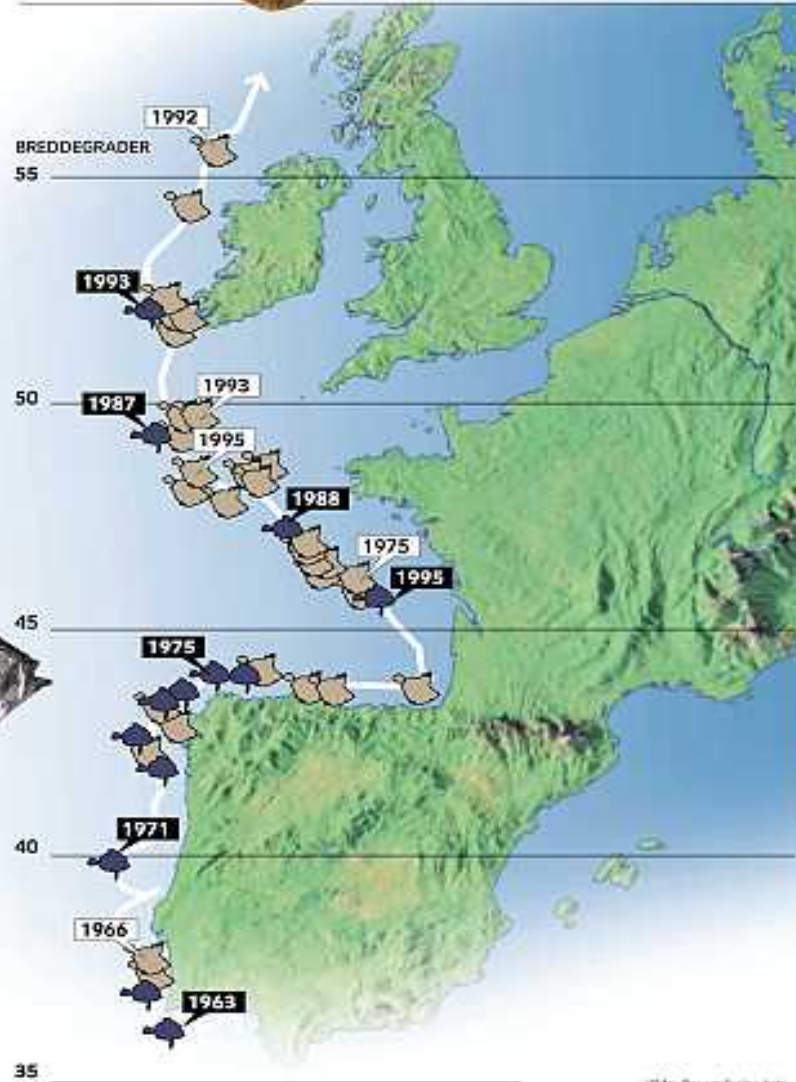
John Dory  
SIGNATUR:

Der findes kun data for disse to fiskearters vej mod nord frem til 1995. Men undersøgelser, der går helt frem til i dag, af planktons bevægelse fra de tropiske egne mod nord viser præcis samme billede - nemlig en vandrings på ca. 50 km mod nord hvert eneste år.

### Danske fiskearter på vej væk



### Nye arter i danske farvande



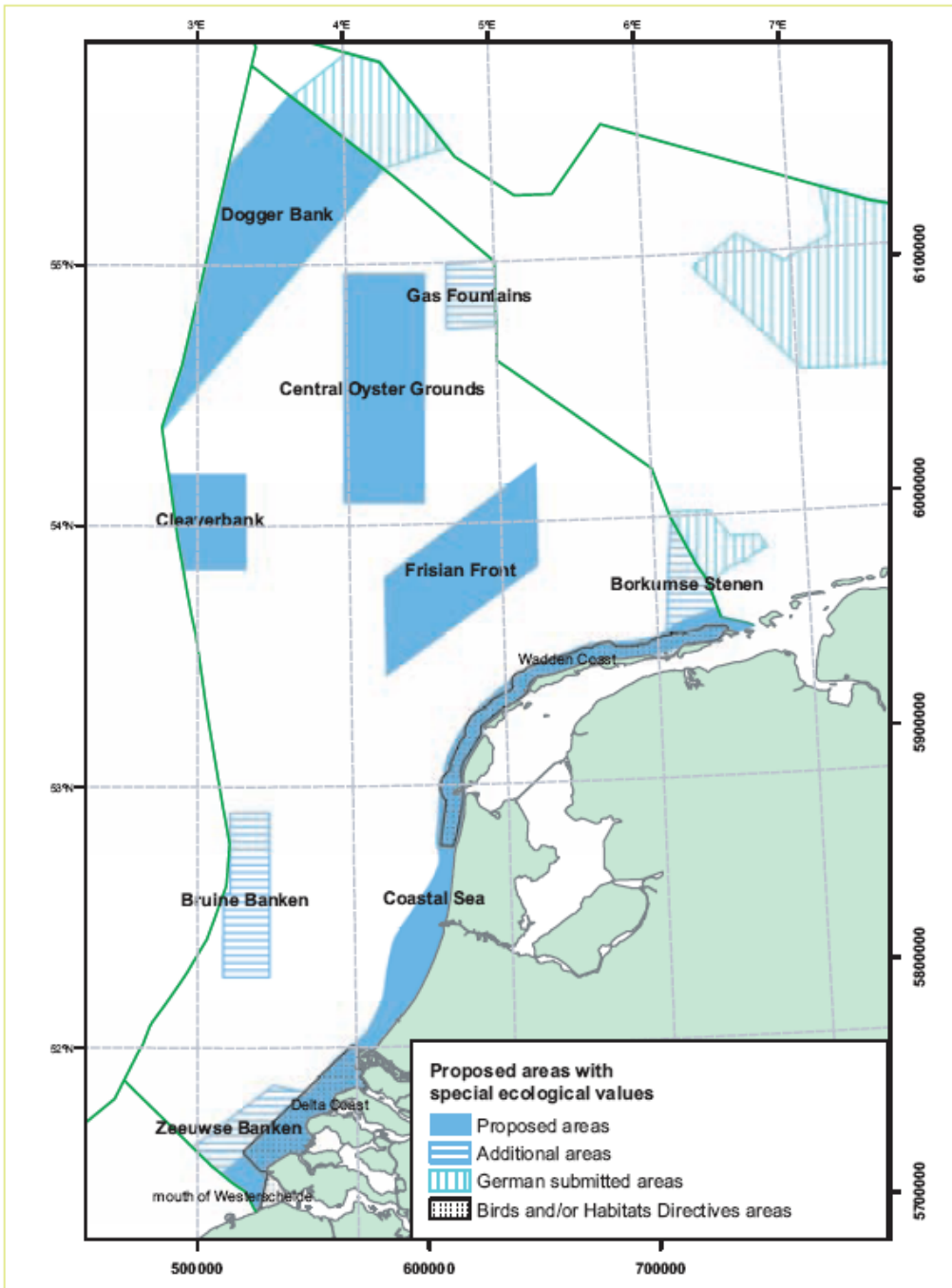
Kilde: Oceanologica Acta  
Figur 1: 1994

# The future of the North Sea in the Anthropocene ?

## What type of nature do we want?:

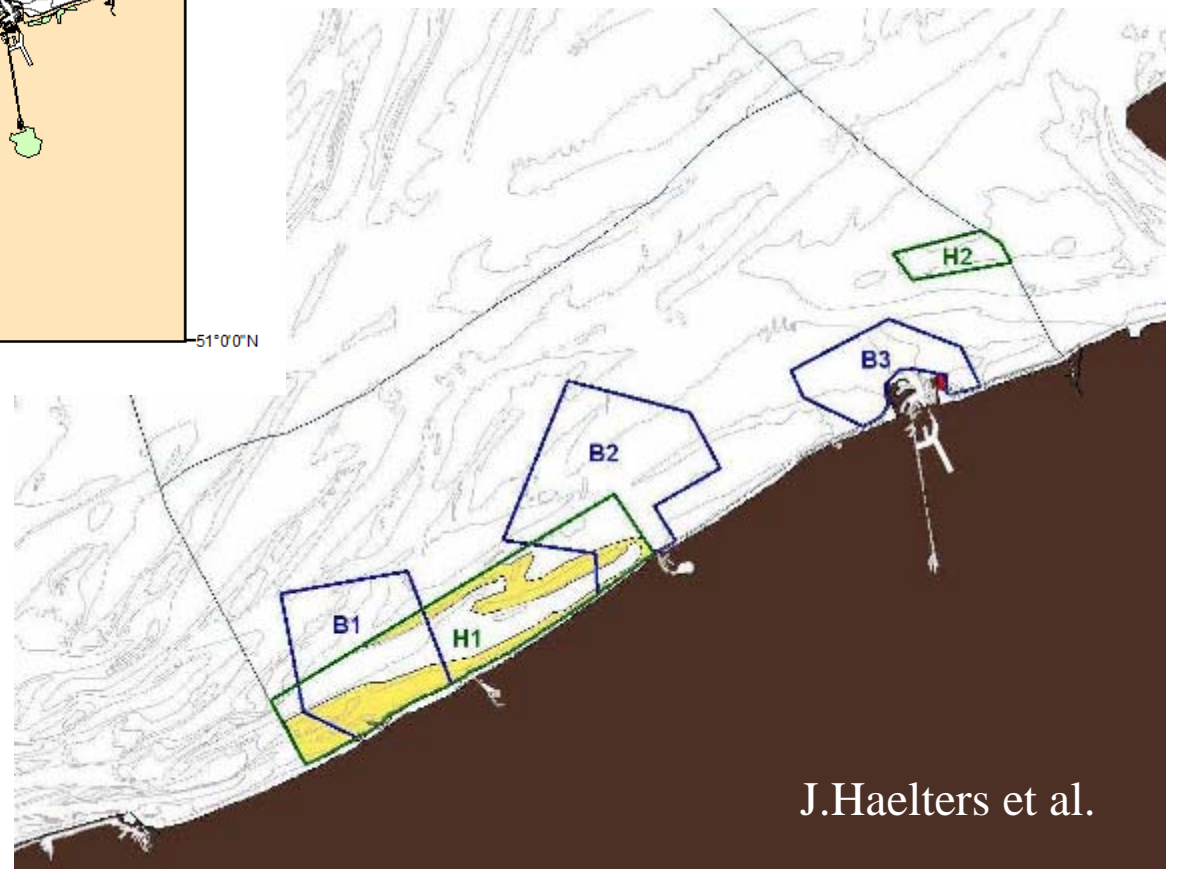
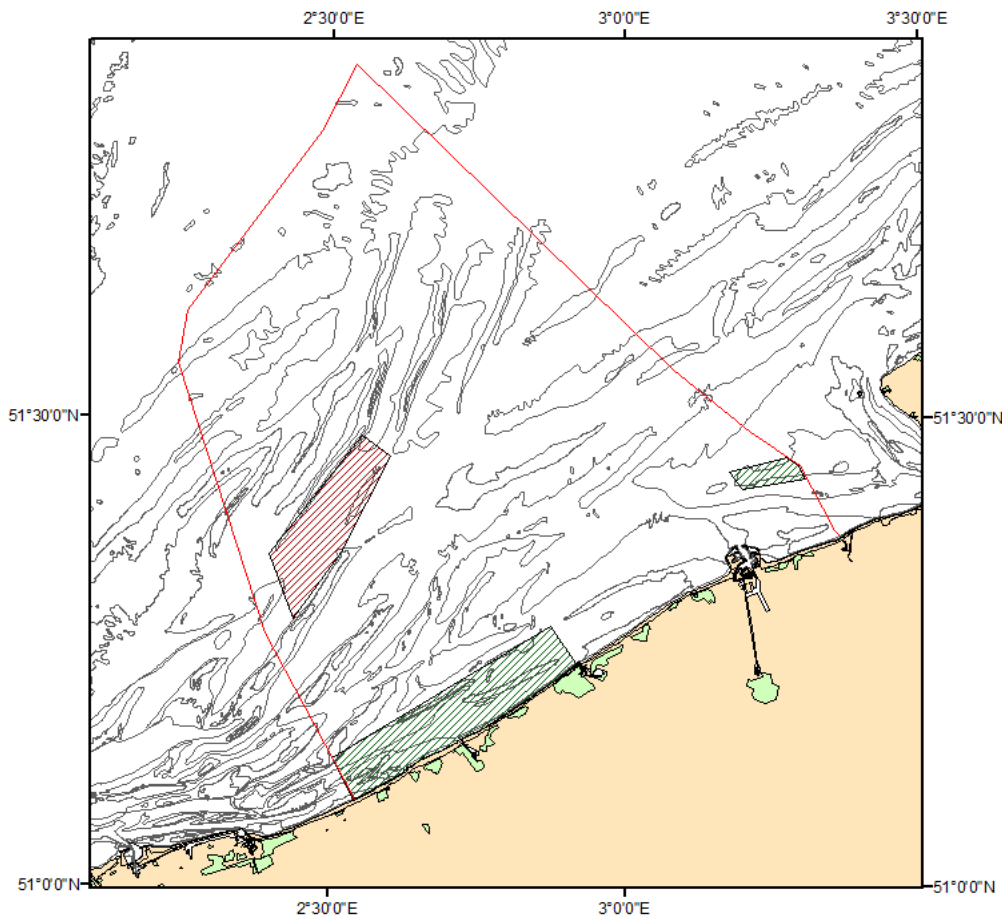
- Wilderness
- Productive nature
- Constructed nature
- Perceptive nature
- Broader context nature
- ??

**Make clear choices in place and time**

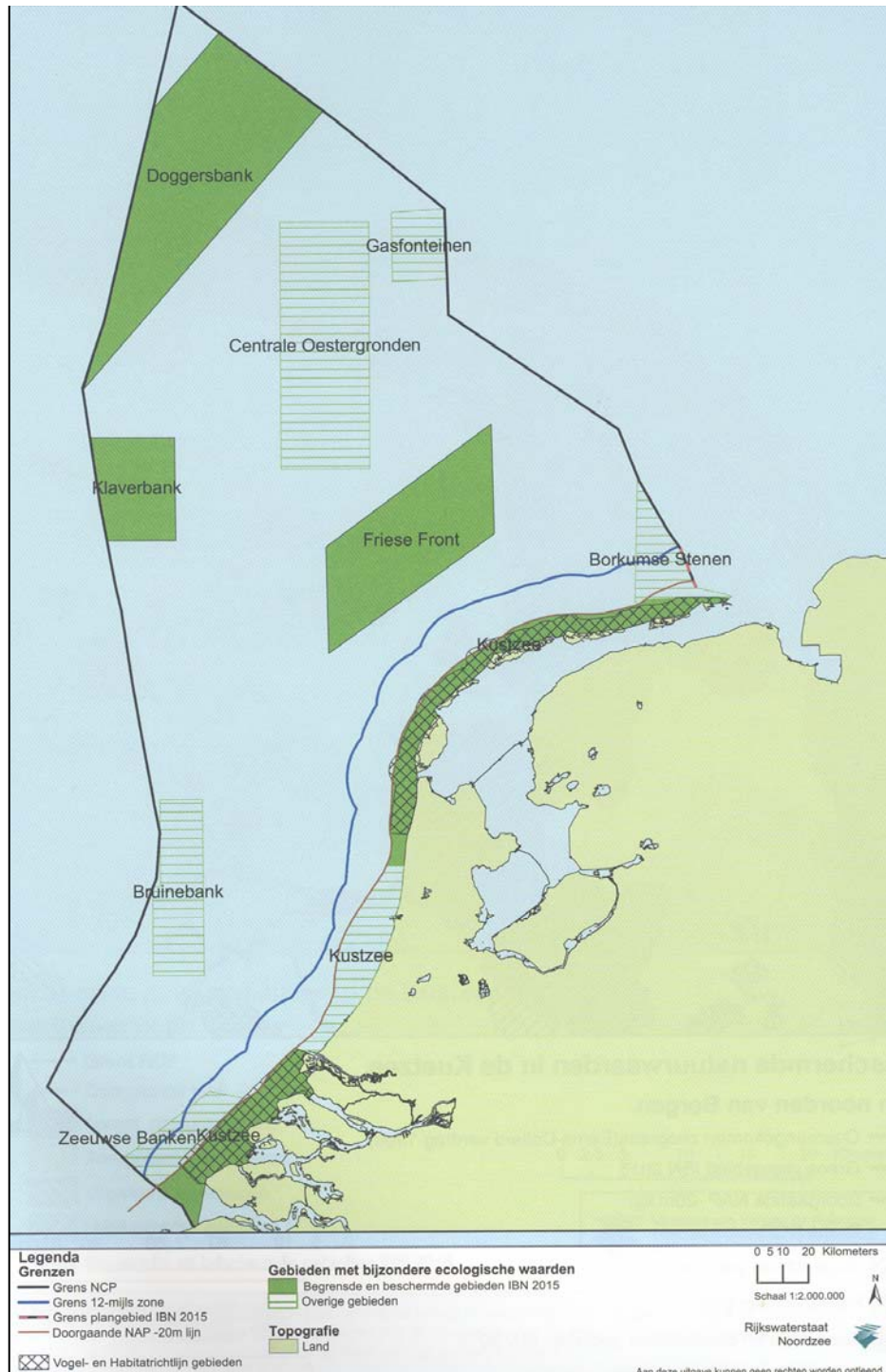


Proposed areas with special ecological values

(Lindeboom et al., 2005)



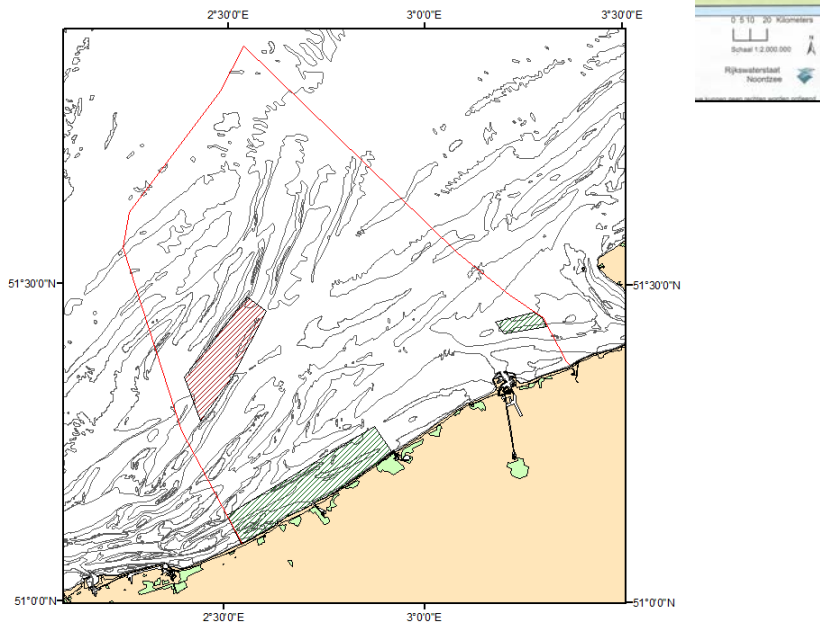
J.Haelters et al.

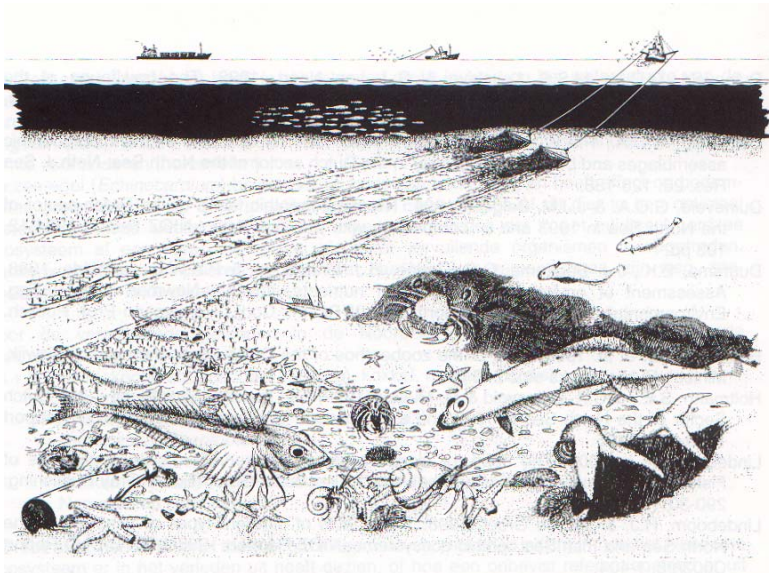


# Integrated Management plan North Sea 2015

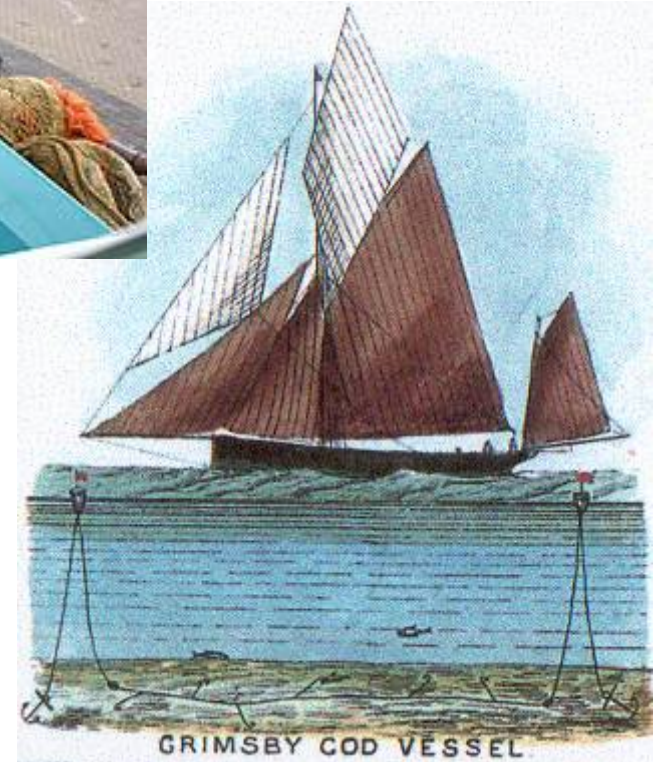
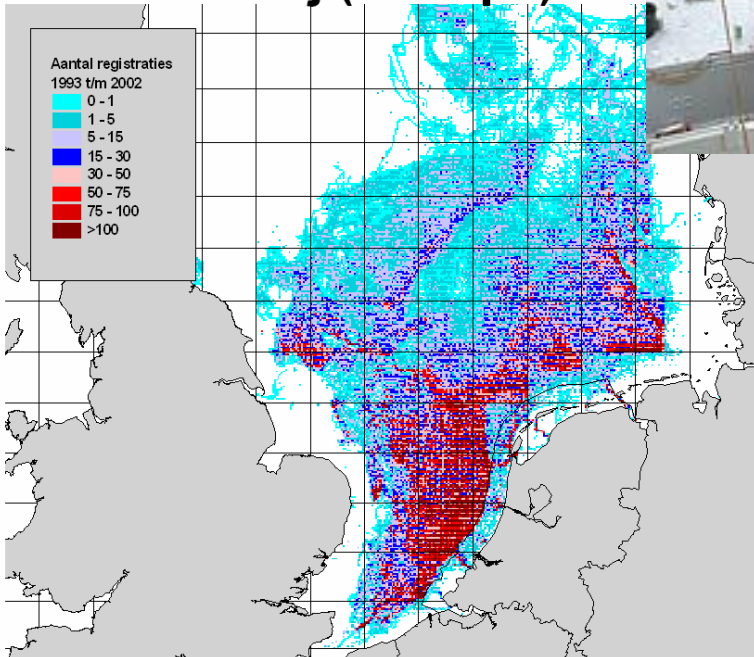
4 areas nominated

Existing use will not change

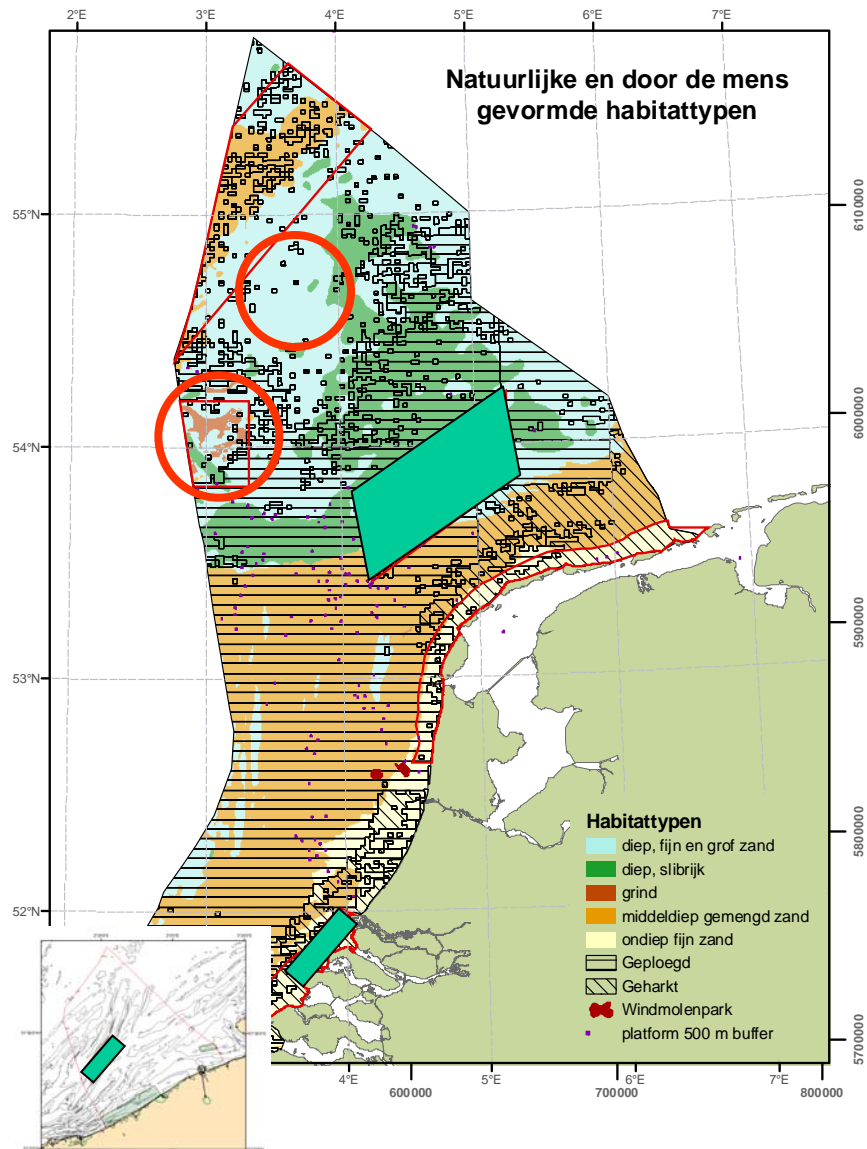




## Visserij (>300 pk)







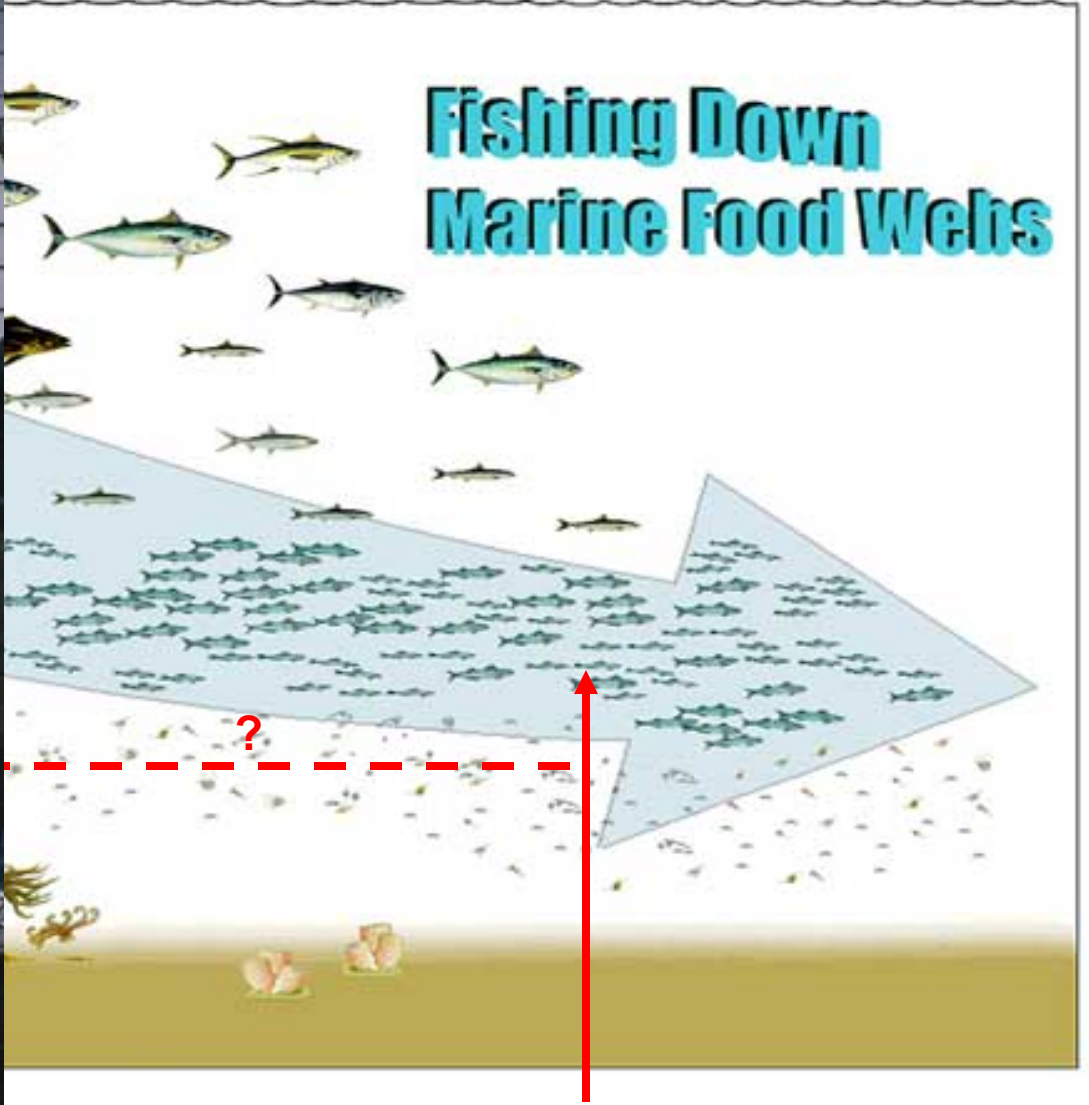
Or real closures ?

5

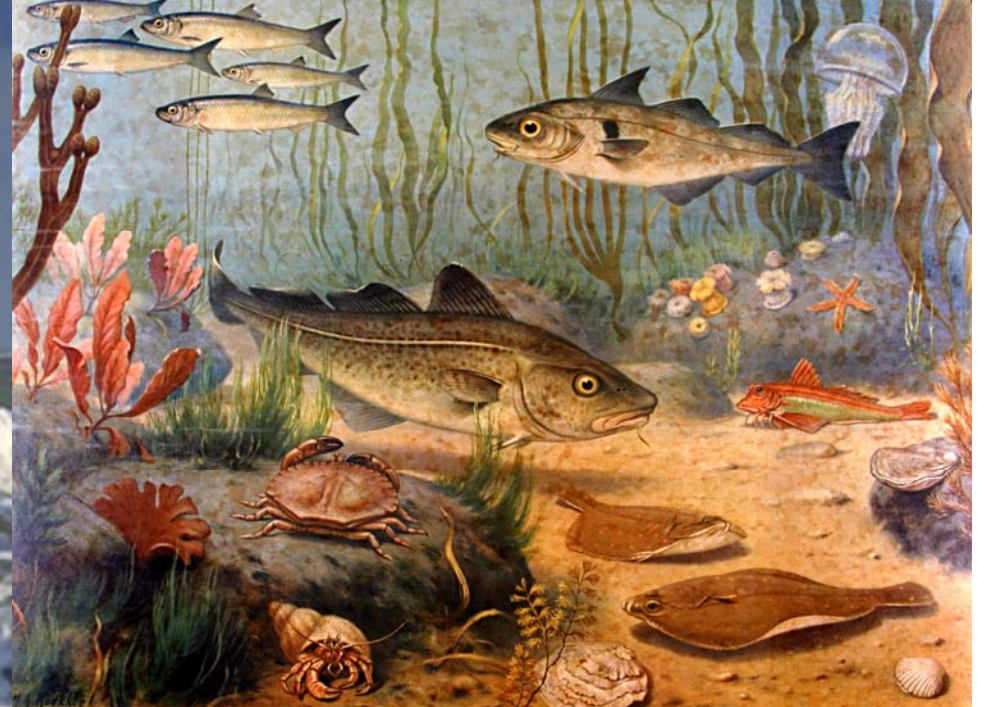
4

3

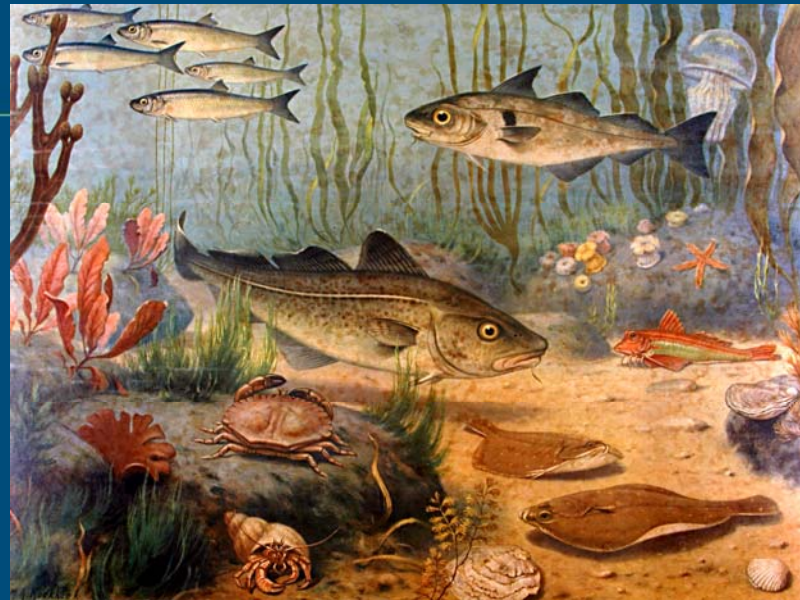
2



Pauly et al.



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