

IZEUT

Identification of Belgian maritime Zones affected by EUTrophication

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OSPAR
***Convention for the Protection of the Marine
Environment of the North-East Atlantic***



***“To achieve for 2010 and maintain a healthy marine environment
where eutrophication does not occur”***

***Strategy to combat eutrophication in the OSPAR maritime area
(Sintra, 1998)***



***Classification of maritime areas in problem, potential problem
and non-problem areas with regard to eutrophication***

Common Procedure for the identification of eutrophication status

-  Identification of common criteria based on a holistic assessment of eutrophication status**
 - causes (nutrient enrichment)
 - direct effects (algal blooms)
 - indirect effects (anoxia, mortality)
-  Development of quantitative assessment criteria specific to each OSPAR maritime region → EcoQO's**

OSPAR guideline

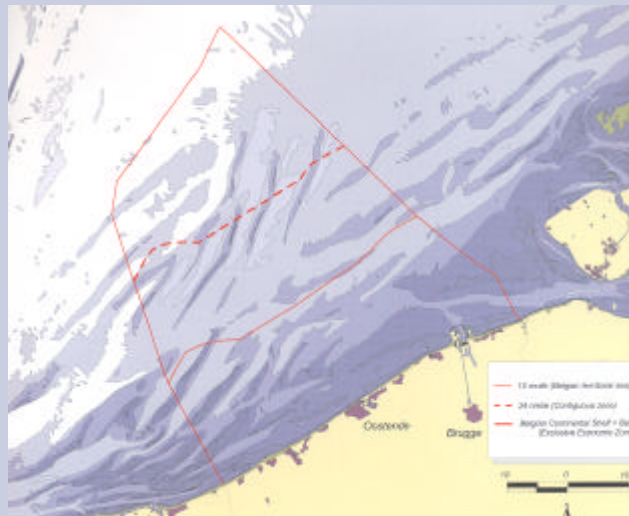
**Nutrient-oriented approach : nutrient over-enrichment
= 150 % region-specific background**

The project IZEUT

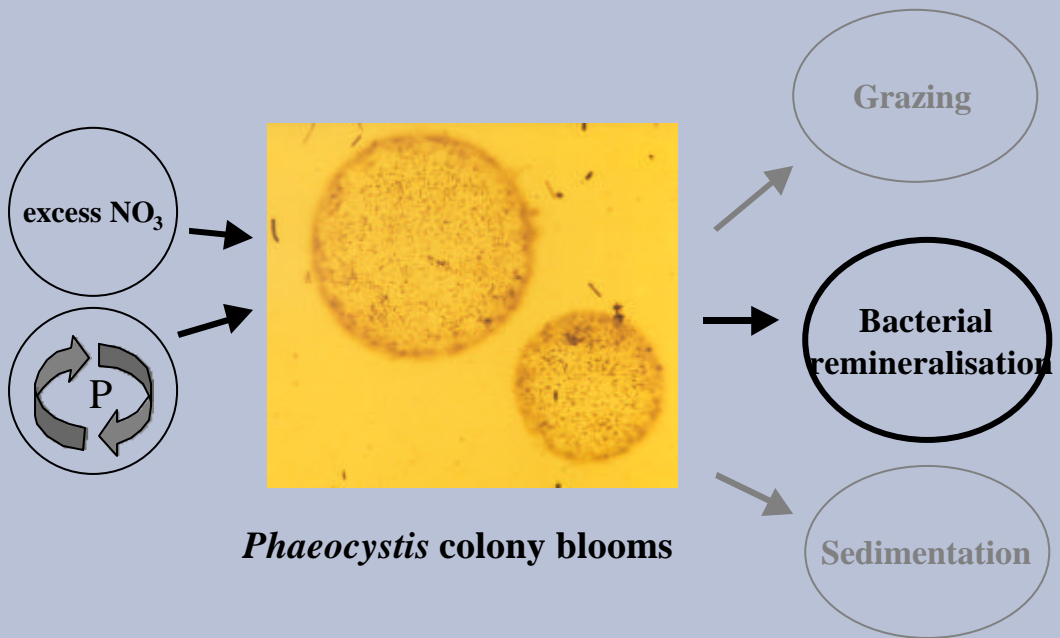
Implementation of the OSPAR Common Procedure



Development and application of eutrophication criteria for the identification of problem, potential problem and non problem areas in Belgian coastal waters



Eutrophication of the Belgian coastal zone



Known local damage

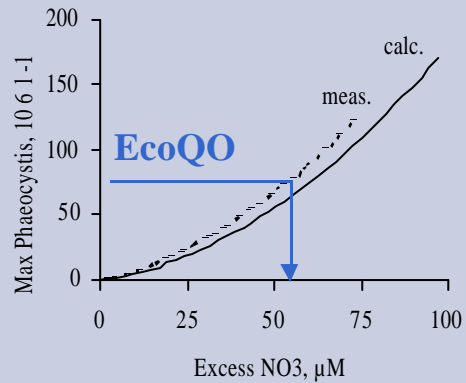
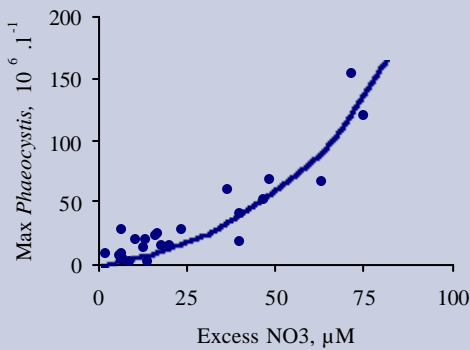
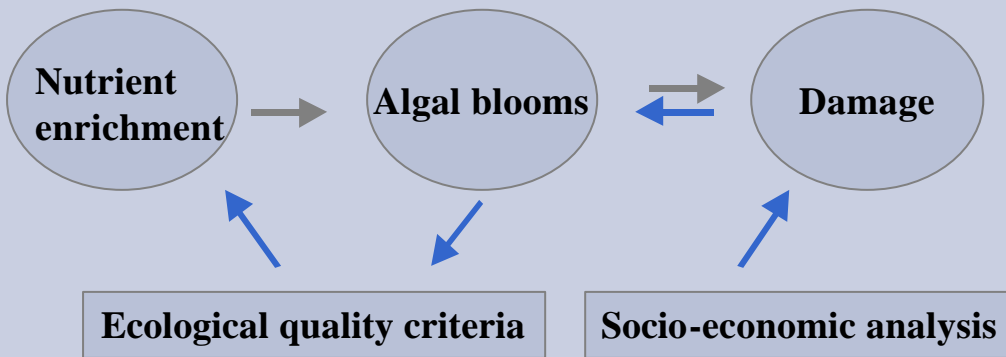
- ✎ deposits of foam on beaches*
- ✎ clogging of nets*




Unknown impact


- ✎ on local biological resources*
- ✎ on adjacent areas*

IZEUT Strategy = damage-oriented approach



$NO_3 \text{ excess} = NO_{3,winter-Si}/1.7$

 Collection and comprehensive synthesis of existing data on eutrophication (nutrient loads, enrichment of the coastal area, phytoplankton blooms) in the Eastern Southern Bight of the North Sea

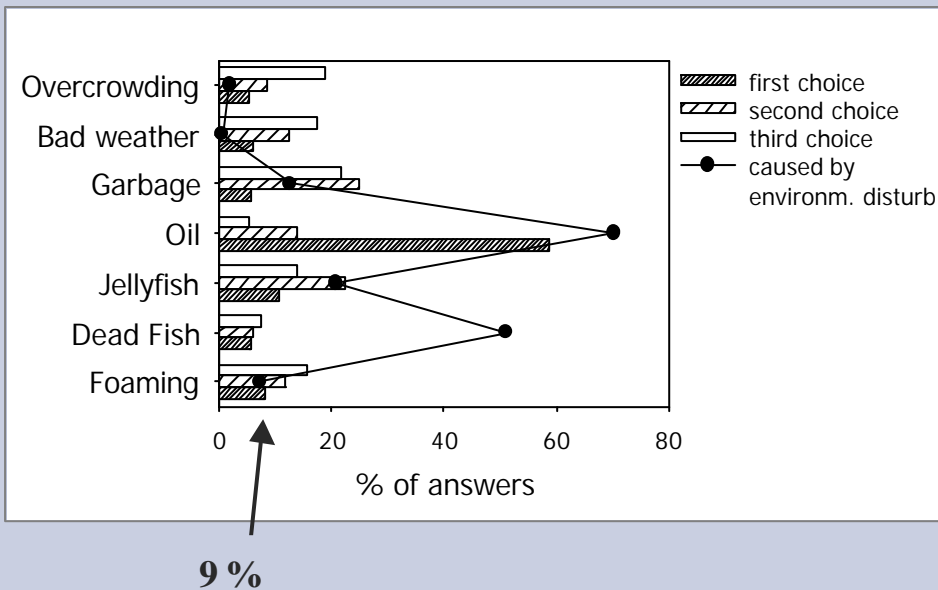
 Impact assessment based on questionnaires to tourists and fishermen and socio-economic methods

Perception of Phaeocystis blooms and related damage by the coastal civilian community

Questionnaire:

- ✎ Random selection: 84 % tourists - 16 % residents
- ✎ Identification of the phenomenon ?
- Relative impact of foam on the beaches ?

Perception of pollution on the beaches

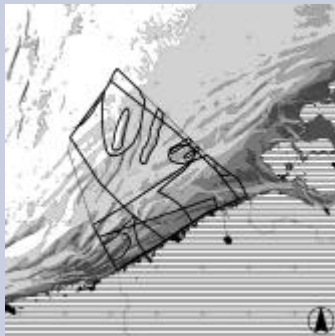


Perception of *Phaeocystis* blooms by fishermen

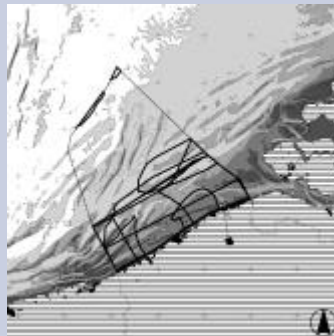
Questionnaire:

- ✎ Coastal fishermen
- ✎ Algal bloom : when and where?
- Cause of algal blooms ?
- Effect of bloom on fishing and foam events?

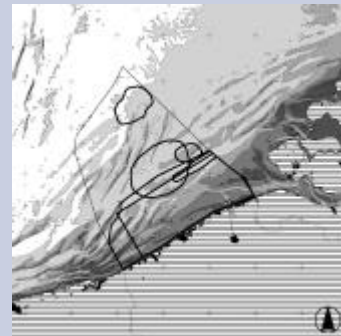
Fishing grounds



Flatfish
(sole, lemon sole, plaice)

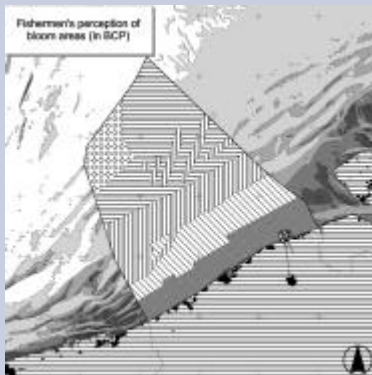


Shrimp



Roundfish
(cod, herring)

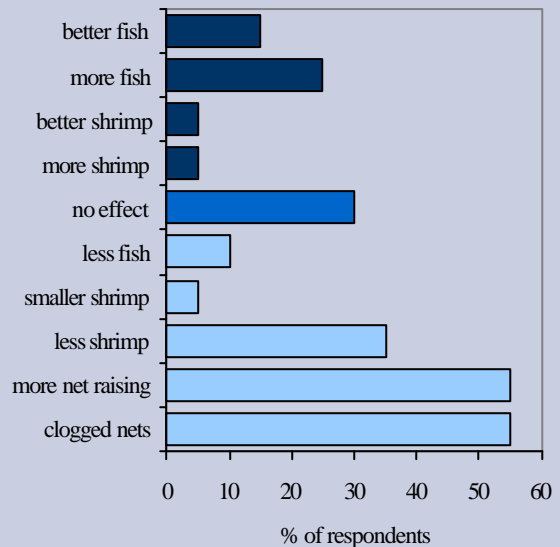
Bloom perception



Period: End March - end May

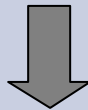
Causes: temperature 76 %
nutrients 12%
wastewater 12%

Effect of blooms on fishing

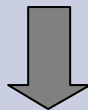


Conclusions

- **Perception of *Phaeocystis* blooms and related damage by tourists and coastal fishermen**
 - **not a nuisance**
 - **probably limited economic losses**



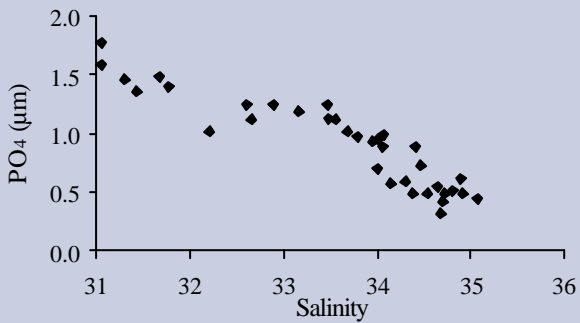
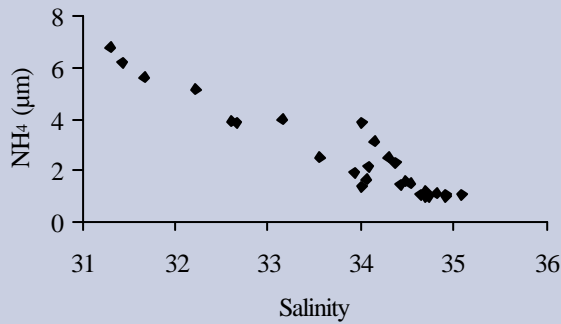
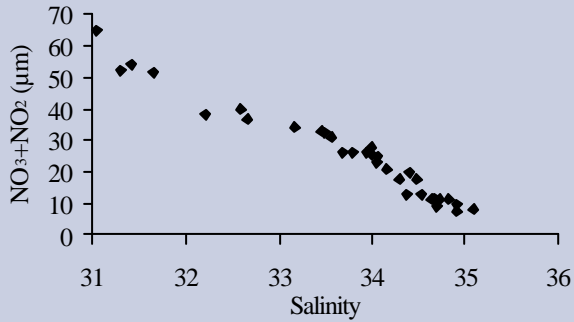
At this stage, identification of eutrophication status of BCZ can't be derived from criteria based on undesirable effects



Nutrient enrichment-based approach

Global nutrient enrichment of the Belgian coastal waters

winter nutrient-salinity relationships in the salinity range 28-35



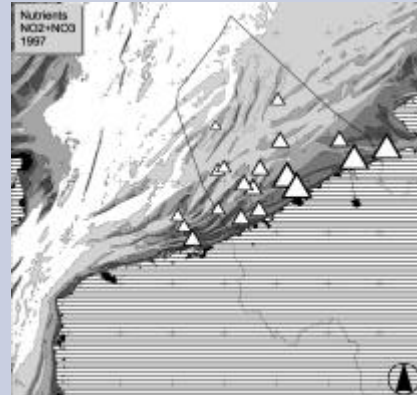
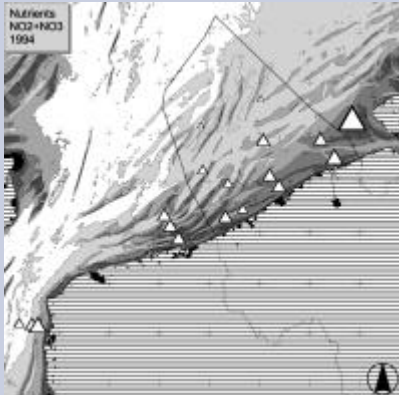
Data source:
CIPS, UGMM,
IFREMER, ICES

Period: 1972-1998

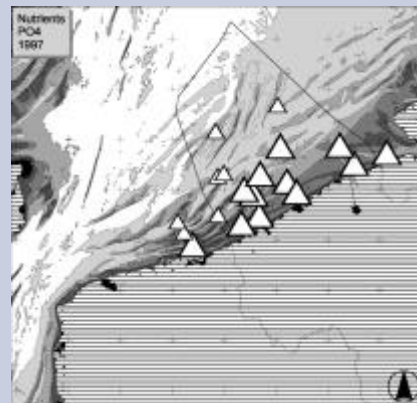
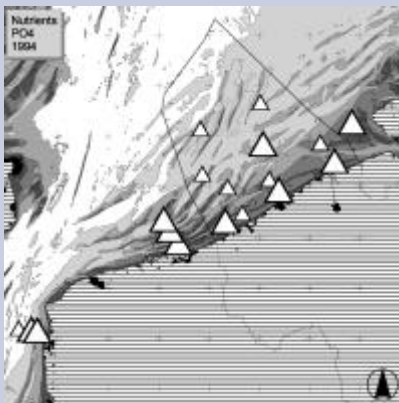
The nutrient enrichment of Belgian coastal waters depends on anthropogenic but also climatic forcings

1994

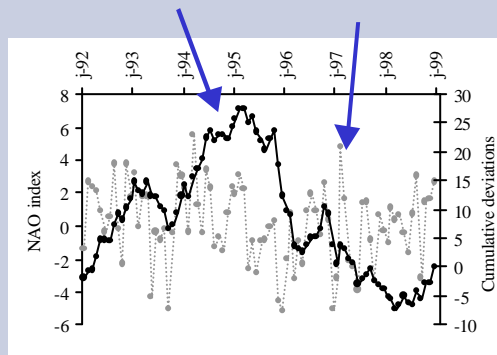
1997



NO_3 , μM



PO_4 , μM

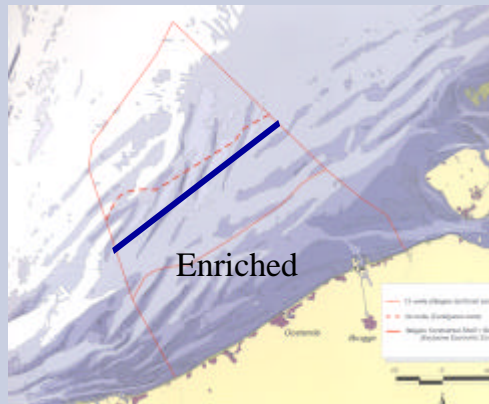


Identification of problem, potential problem and non problem areas in the Belgian maritime zone

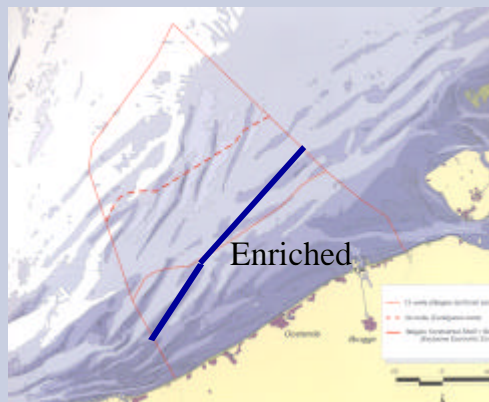
OSPAR assessment criteria for over-enrichment

Geographical background for BCZ

DIN 10 μM	\Rightarrow	> 15 μM
DIP 0.6 μM	\Rightarrow	> 0.8 μM

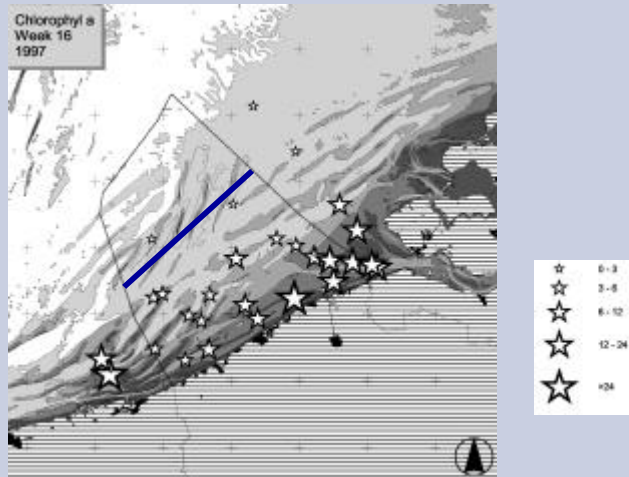


DIN



DIP

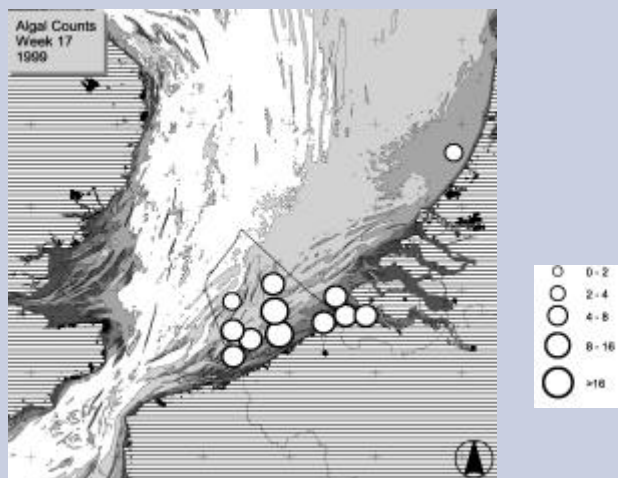
Assessment of Chl a level



➔ Chl *a* level = 9 mg m⁻³

As 1 mg Chl *a* m⁻³ = 2 · 10⁶ l⁻¹ *Phaeocystis* cells

➔ *Phaeocystis* level = 18 · 10⁶ cells l⁻¹





Opinion to be considered further:

- ✎ Coastal municipalities (residents, restaurant managers, travel agencies, sporting, traditional activities)
- ✎ Future investment in aquaculture
- ✎ Biological impact on ichthyofauna, fish nurseries and benthic communities