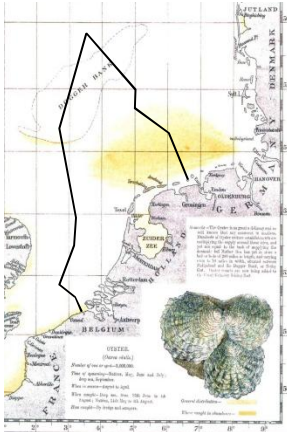

Toekomstvisie Noordzee

Han Lindeboom



Het verleden: Inspiratie

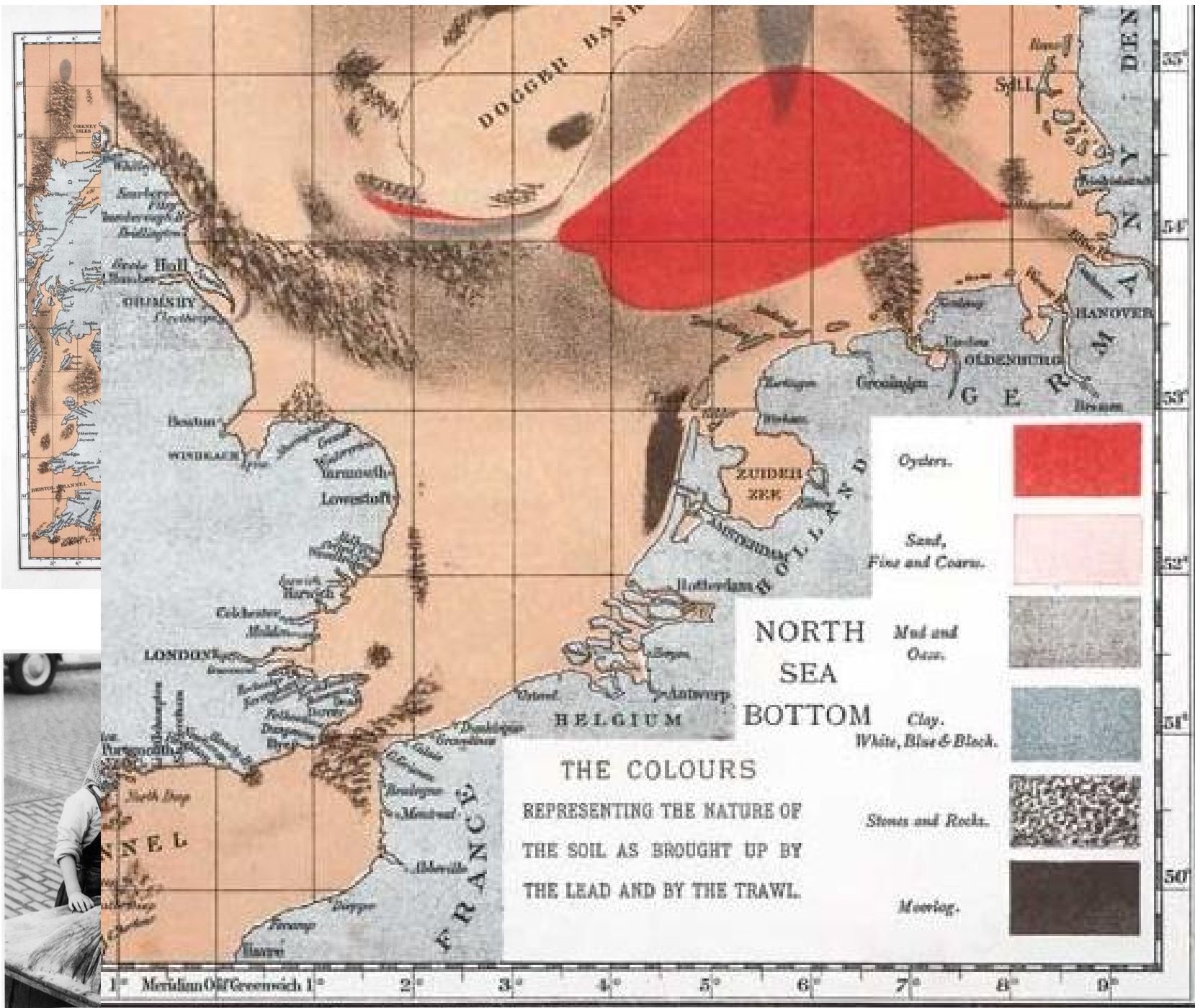


Het heden: Uitgangspunt



De toekomst: Zoneren en duurzaamheid





COMPILED & PUBLISHED BY O.T. OLSEN, F.L.S., F.R.G.S.

WINDMILL LANE, LONDON.



Trawling, North 1850

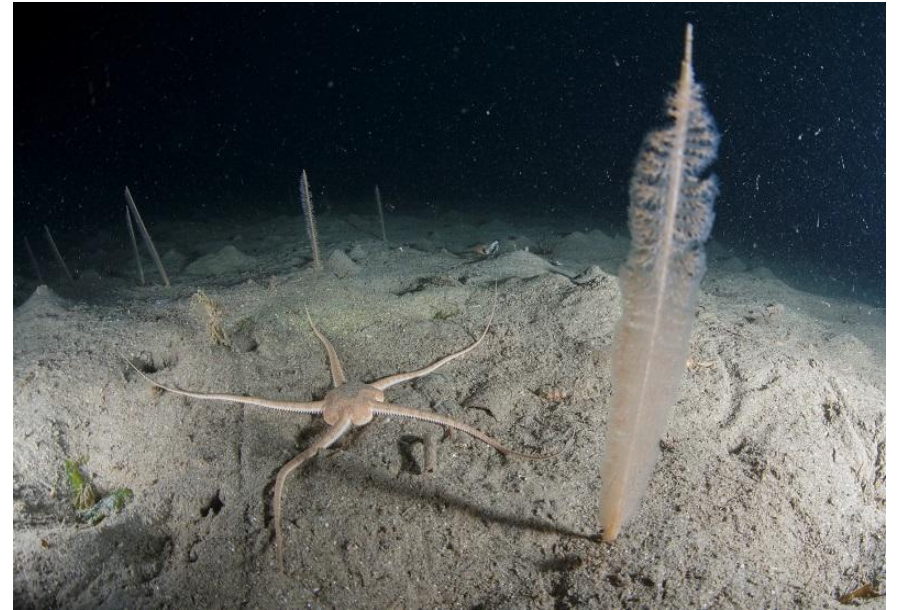


De Noordzee nu





Een paardenmosselbank in een Noordzeereservaat
Foto: Melvin Redeker / IndeNoordzee.nl



Noordzeebodem met zeeveren
Foto: Melvin Redeker / IndeNoordzee.nl



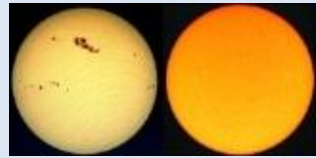
Grote delen van de Nederlandse Noordzeebodem
Foto: Udo van Dongen



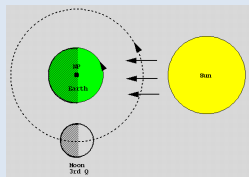
Noordzeebodem tussen de Borkumse Stenen
Foto: Oscar Bos

The Functioning of Marine Ecosystems

Four major Elements



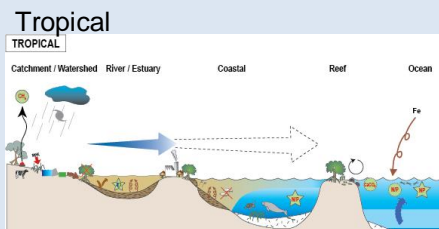
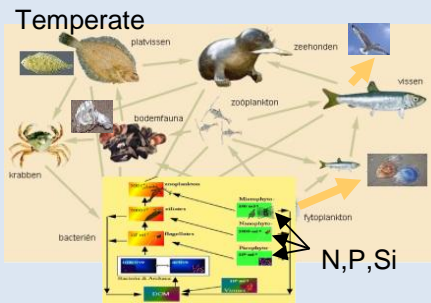
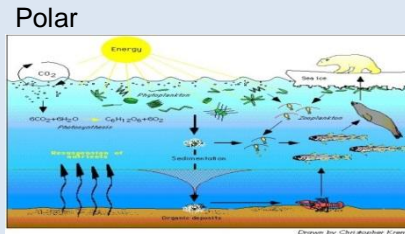
11-year cycle



18-year cycle

Energy

Natural driver of change



Anthropocene



Man

Man-made drivers of change

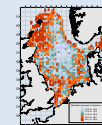
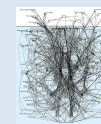
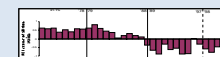
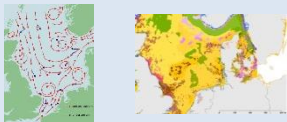
Setting the stage

Habitat

(Intrinsic properties non-living nature)

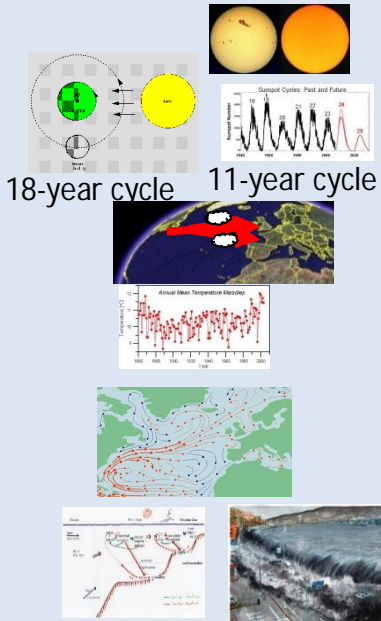
Determines reaction

Intrinsic properties living nature



The Functioning of Marine Ecosystems

Four major E



Energy

Sun/moon

(Light/heat/kinetic)

Climate

Temperature

Wind

Precipitation

Tides/Currents

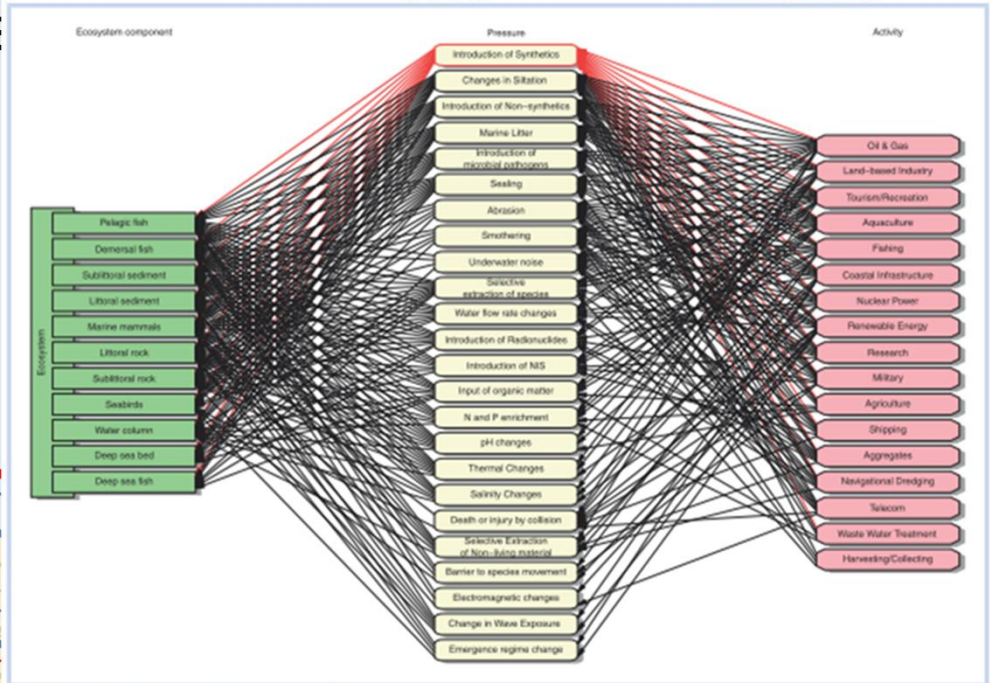
Nutrient availability

Tectonics

Volcanism

Earth quakes

Tsunamis



Habitat

(Intrinsic properties non-living nature)

Depth

Bottom type

Currents

Salinity

Waves (splash zone)

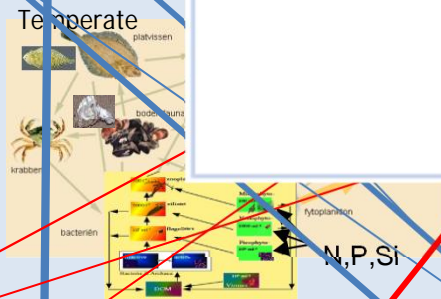
Hydrothermal vents

Gas seeps

Ice

Biogenic structures

Man-made structures



CO₂ emissions (climate change) (Eamus et al. 2015)

Intrinsic properties living nature

Features

Processes

Biodiversity

Evolution

Behavior

Regime shifts/sudden

Production

changes

Recruitment

Resilience/sensitivity

Predation

Feedbacks

Diseases

Match/mismatch

Reef building

Complexity/chaos



De Noordzee:

In het Antropoceen, de keus is aan ons

EU criteria: Biodiversiteit

Voedselweb

Zeebodemintegriteit

Duurzame transportroute

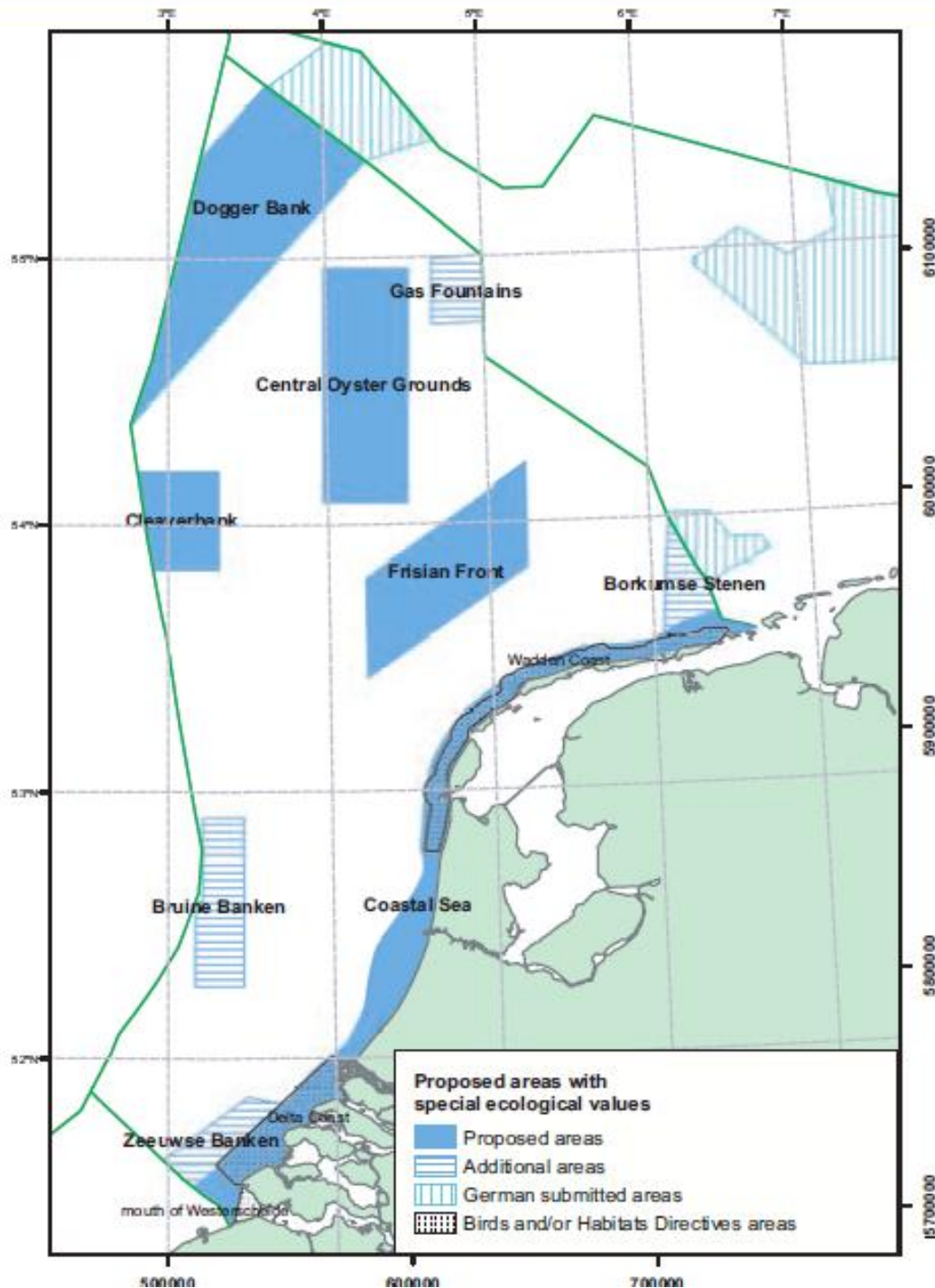
Veiligheid

Duurzame visserij

Duurzame energieproductie

Toekomstige voedsel en organische stof productie

.....



Voorgestelde Beschermd Gebieden

Nederlands Continentaal Plat

Het gaat om ecosysteembescherming:

Biodiversiteit, voedselweb,
zeebodem integriteit

Dus hier geen windparken
ivm effecten op vogels

De toekomst van de (duurzame) visserij



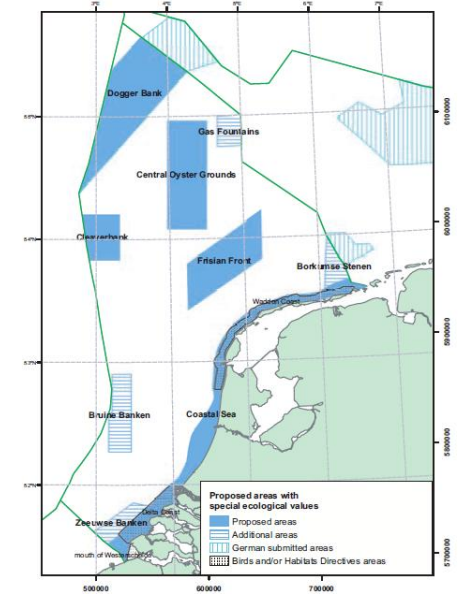
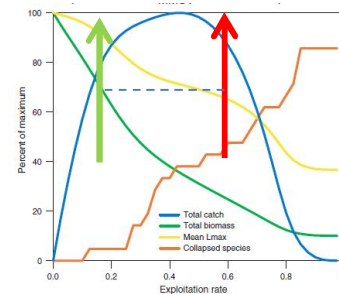
Andere milieuvriendelijke technieken

Visserij in evenwicht met visbiomassa en aanwas

Beschermde gebieden / Zeereservaten

Aanlandplicht ?

“License to produce” in 75% van de Noordzee



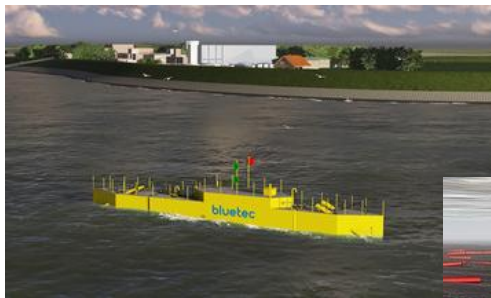
Duurzame Energie



Op land



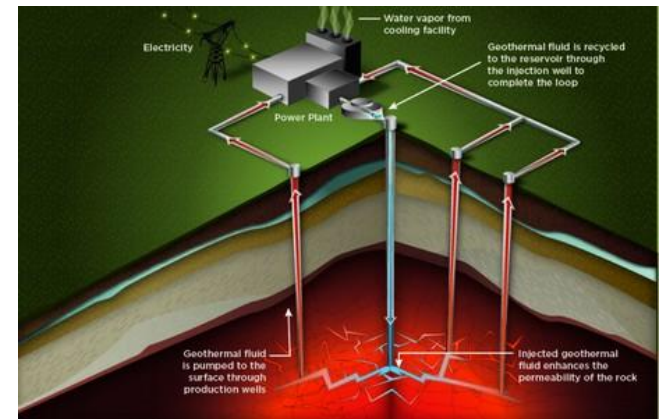
Op zee



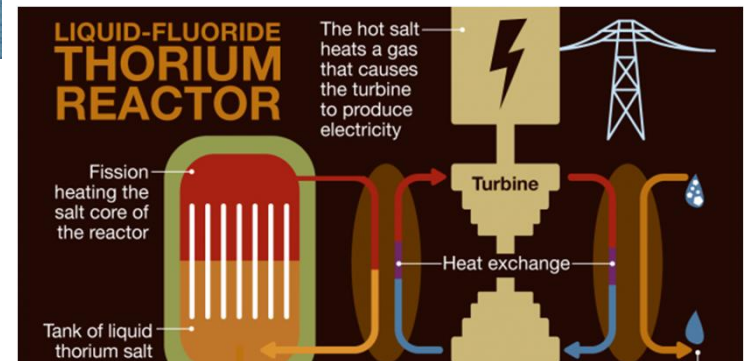
Getijden en golven



Zon direct



Geothermisch



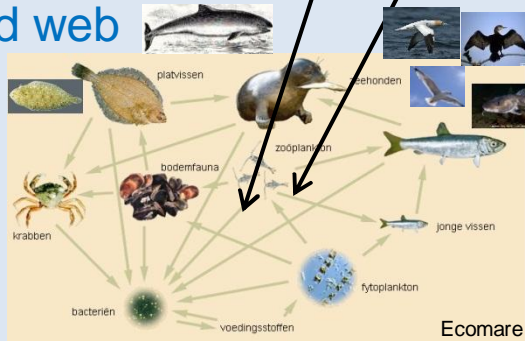
4^{de} generatie reactoren

Integraal Adaptief Management in Windparken op Zee

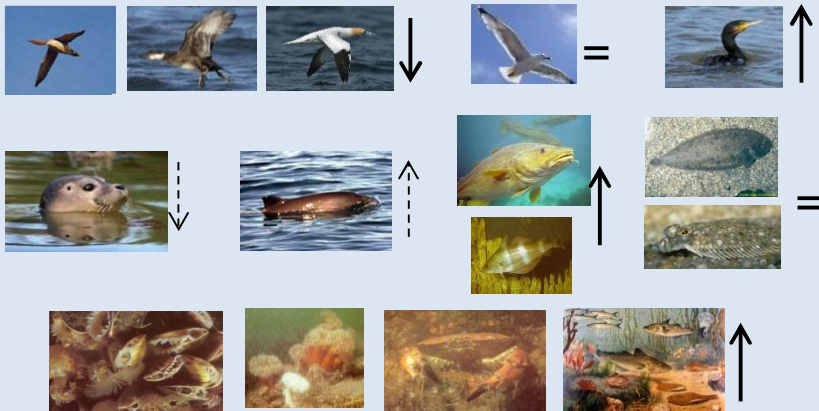
Climate



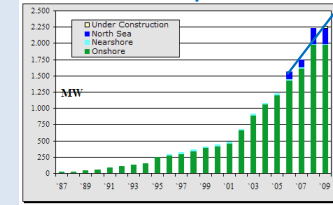
Food web



Biodiversity



development



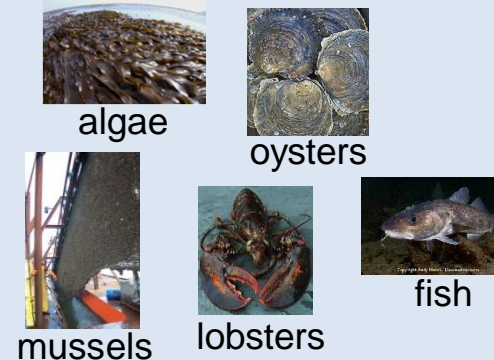
A-selective fisheries



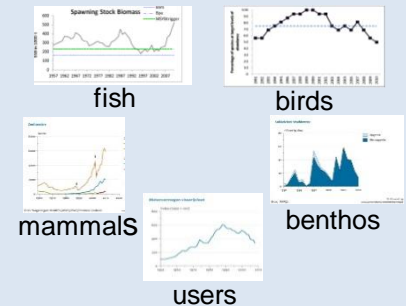
Selective fisheries

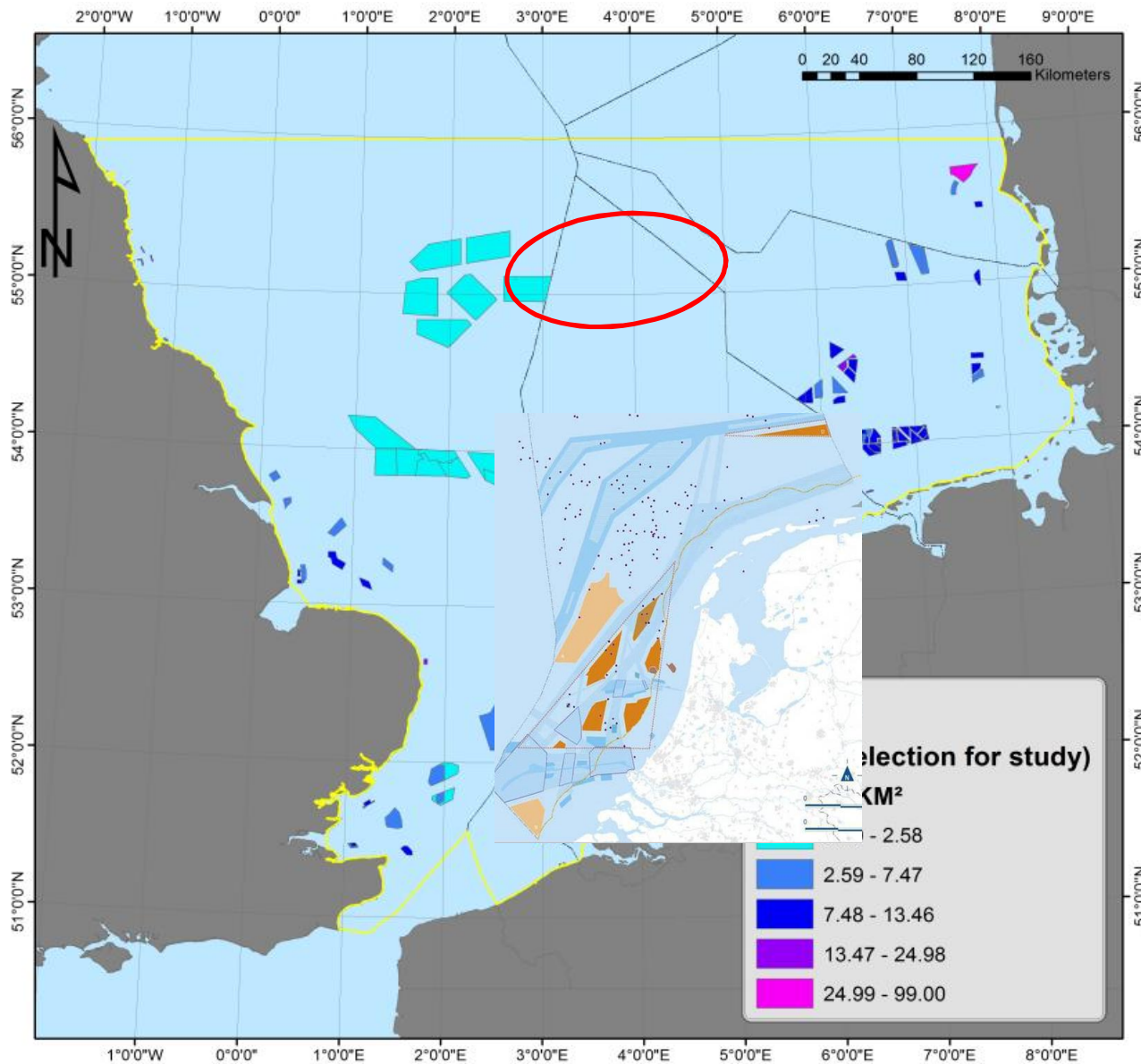


Aquaculture



Monitoring !





Van 1.500 naar
16.000 turbines
in 10 jaar

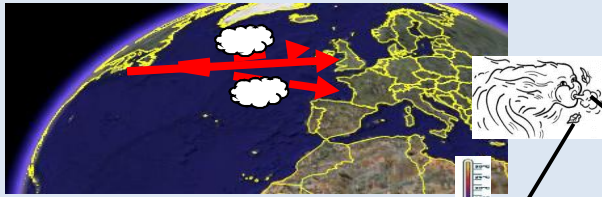
En daarna ?

Zorg voor optimale
Ruimtelijke Planning

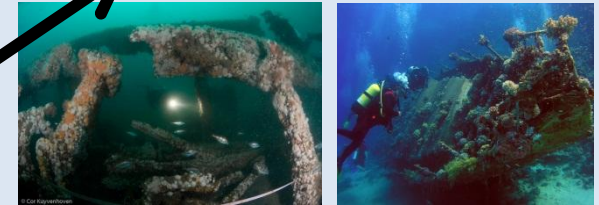
100 bestaande en geplande windparken

Hergebruik en decommissioning offshore platformen

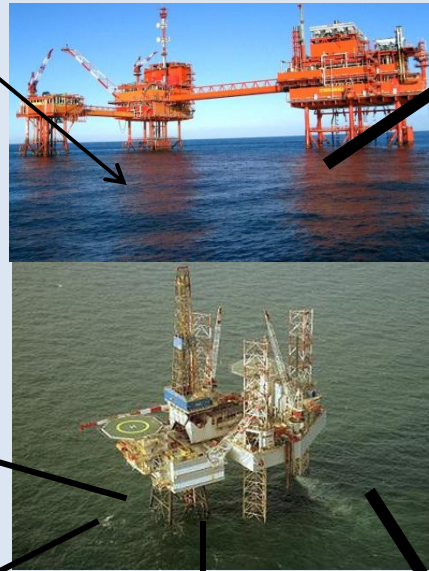
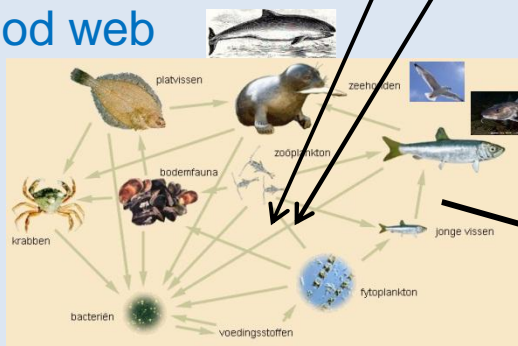
Climate



Rigs to reefs



Food web



Biodiversity remains

Selective fisheries



angling



traps

Aquacultuur



mussels



oysters



fish

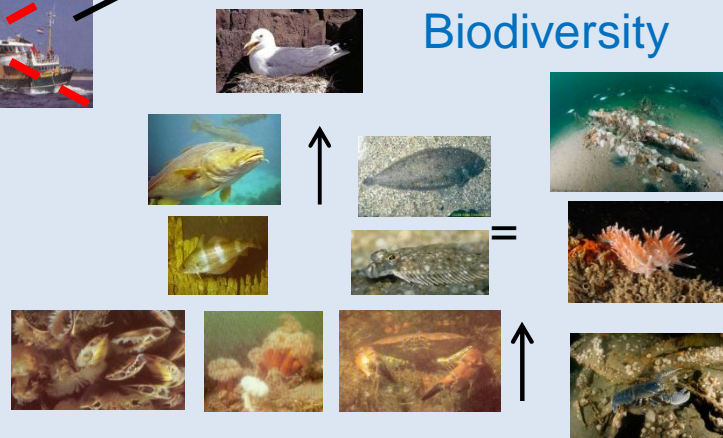


lobsters

No fisheries within 500m



Biodiversity



Tourism



Complete removal

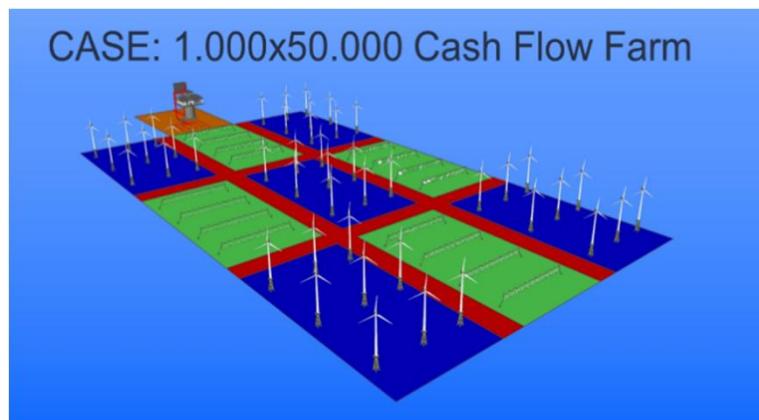
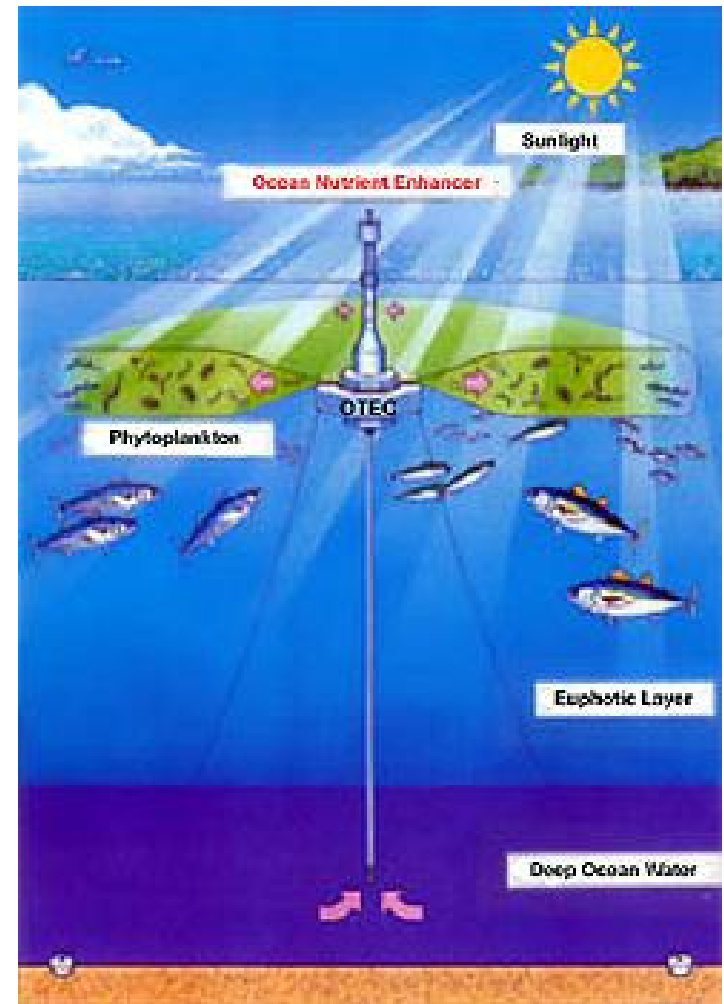
Biodiversity lost



0.6 km² > trawled



Aquacultuur in open zee en oceaan



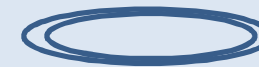
Multifunctionele energie-eilanden op zee



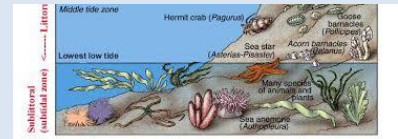
Idee Gunter Pauli



Energiewinning



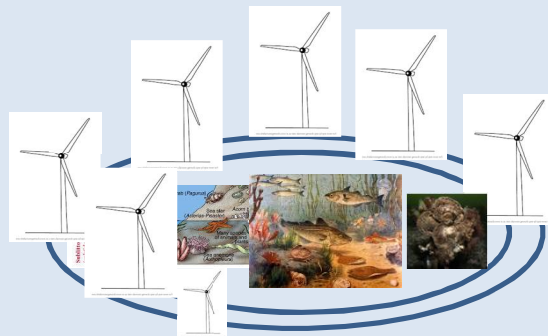
Energie opslag



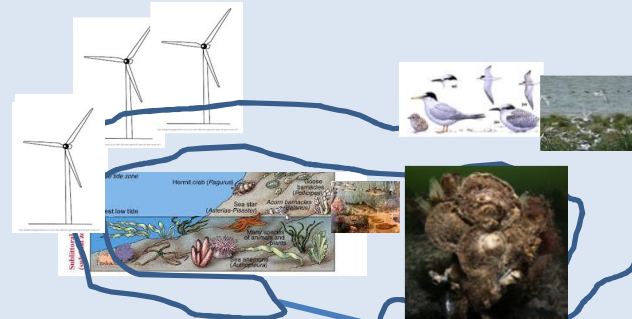
Algenproductie



Oesterproductie & viskweek



Energie atollen



Productie lagunes

De uitdaging:
Beschikbare zeeruimte
inzetten voor optimale
combinatie van
duurzaam gebruik



Kansen: energiewinning, energieopslag, voedselproductie, veiligheid, natuur, transport, toerisme,

Valkuilen: turbiditeit, slibinvang, onderhoud, stormvloed, ecosysteemeffecten?,

Mariene Ruimtelijke Planning

75%	Visserij		Geen visserij	
	Niet beschermd		Energie gebieden	
Beschermd	Innovatie gebieden		Zeereservaten	
	5%		15%	
				25%

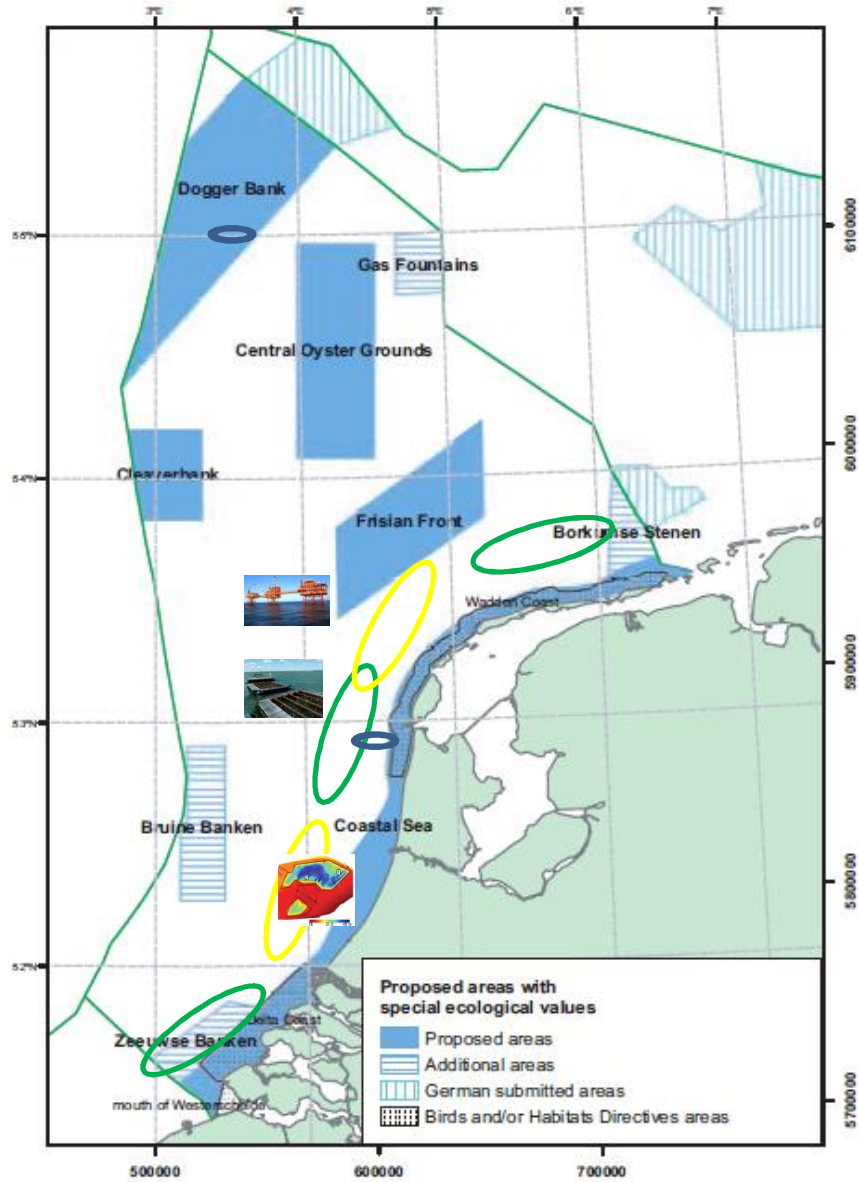
Detailed description of the table: The table is a 2x2 grid with a 2x2 sub-grid inside. The top-left cell contains '75%' and 'Niet beschermd'. The top-right cell contains 'Energie gebieden' and '5%'. The bottom-left cell contains 'Innovatie gebieden' and '5%'. The bottom-right cell contains 'Zeereservaten' and '15%'. A large '25%' is positioned at the bottom right of the table area. The 'Visserij' header spans the top two columns, and 'Geen visserij' spans the top two columns. The '75%' is positioned to the left of the top two rows, and 'Beschermd' is positioned to the left of the bottom two rows. The '5%' and '15%' are positioned to the left of their respective sub-cells. The '25%' is positioned to the right of the bottom two rows.



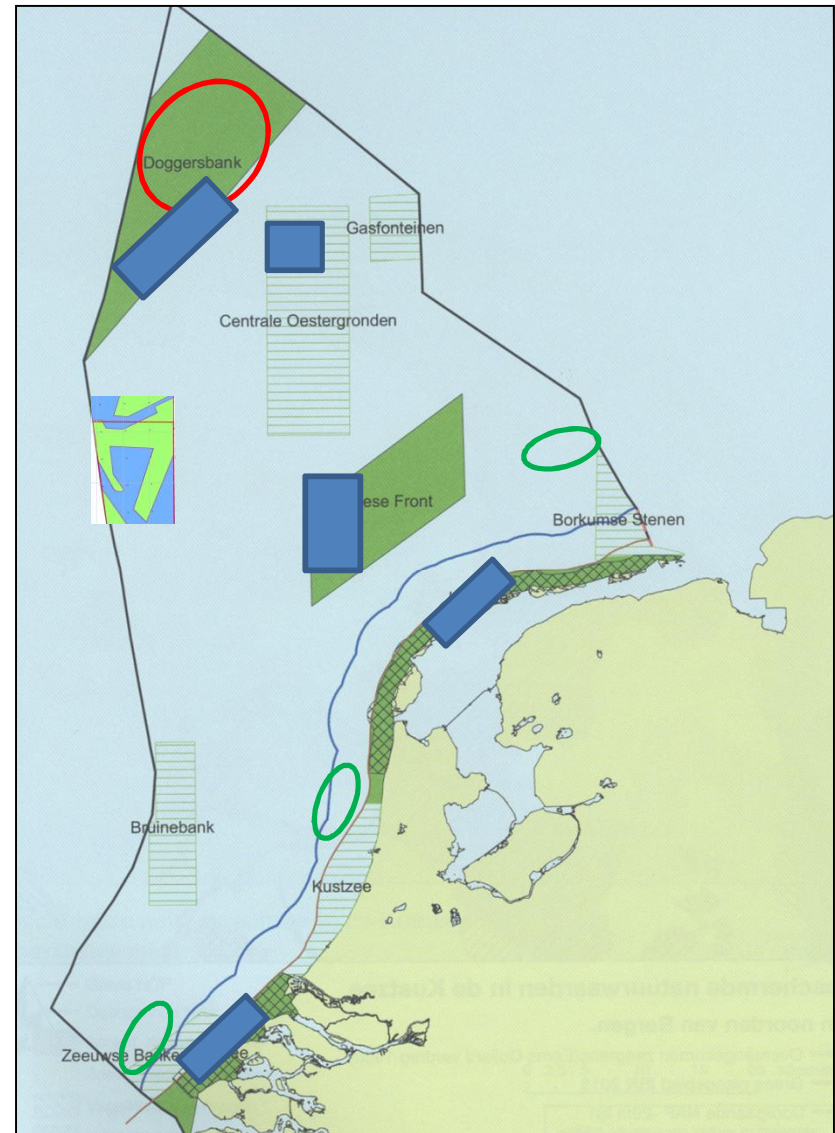


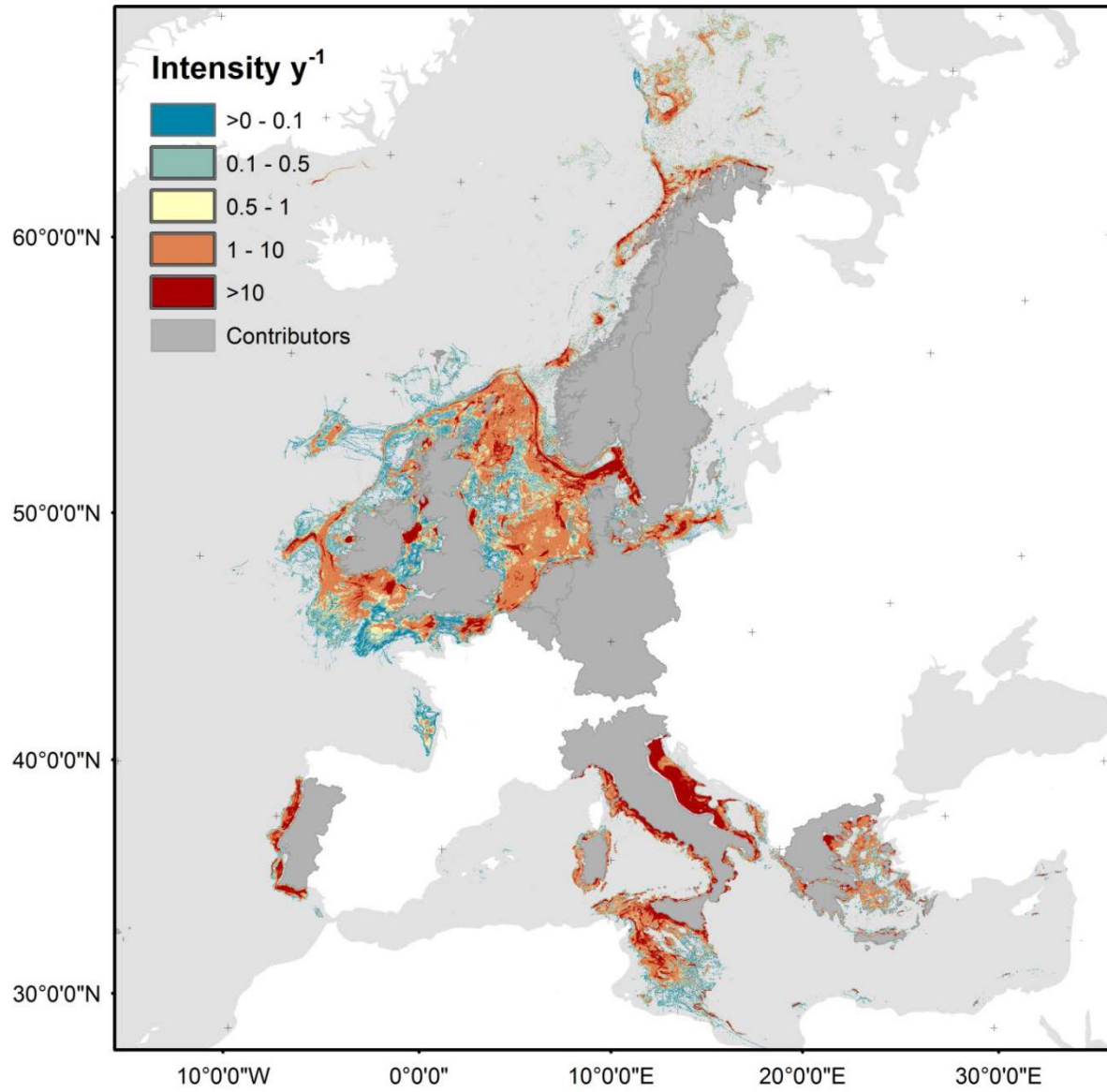
Discussie

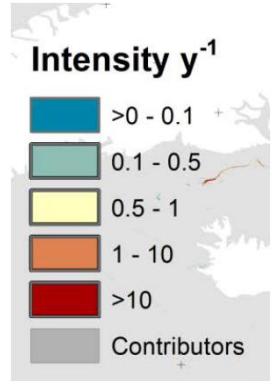
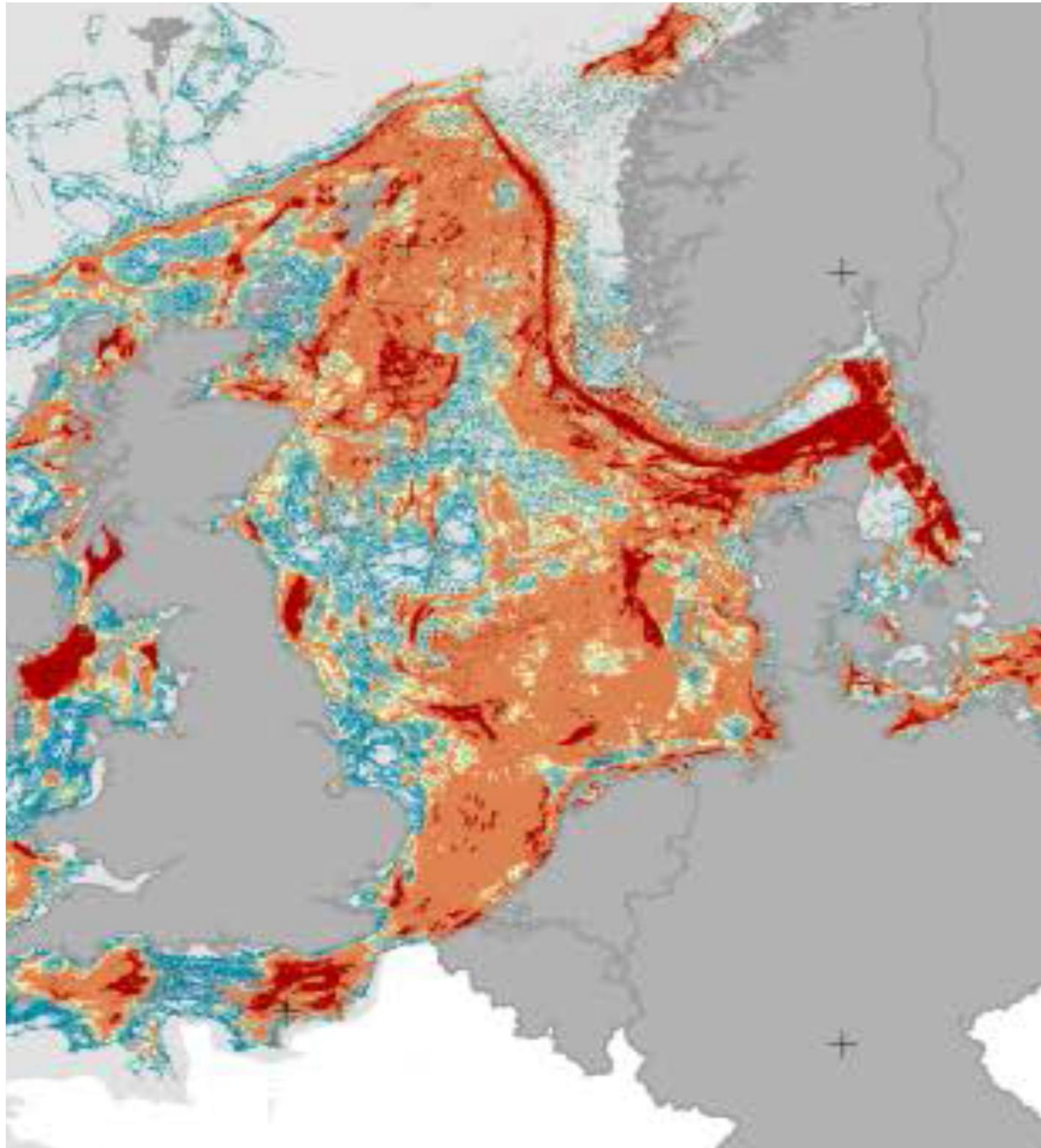
Visie



Realiteit







Dank u

Vragen?

Meer informatie colleges Noordzee Univ. van Nederland:

Historie <https://youtu.be/XD-NUHu8LAs>

Gebieden <https://youtu.be/0HoDuLj7-L8>

Visserij <https://youtu.be/PeDcZ0xzffs>

Wind parken <https://youtu.be/5fODLiOEq14>

De toekomst? <https://youtu.be/0hMxFYSOidU>

