



# Practical evidence from the implementation of EBM in the North Sea

## WP8↔CS1

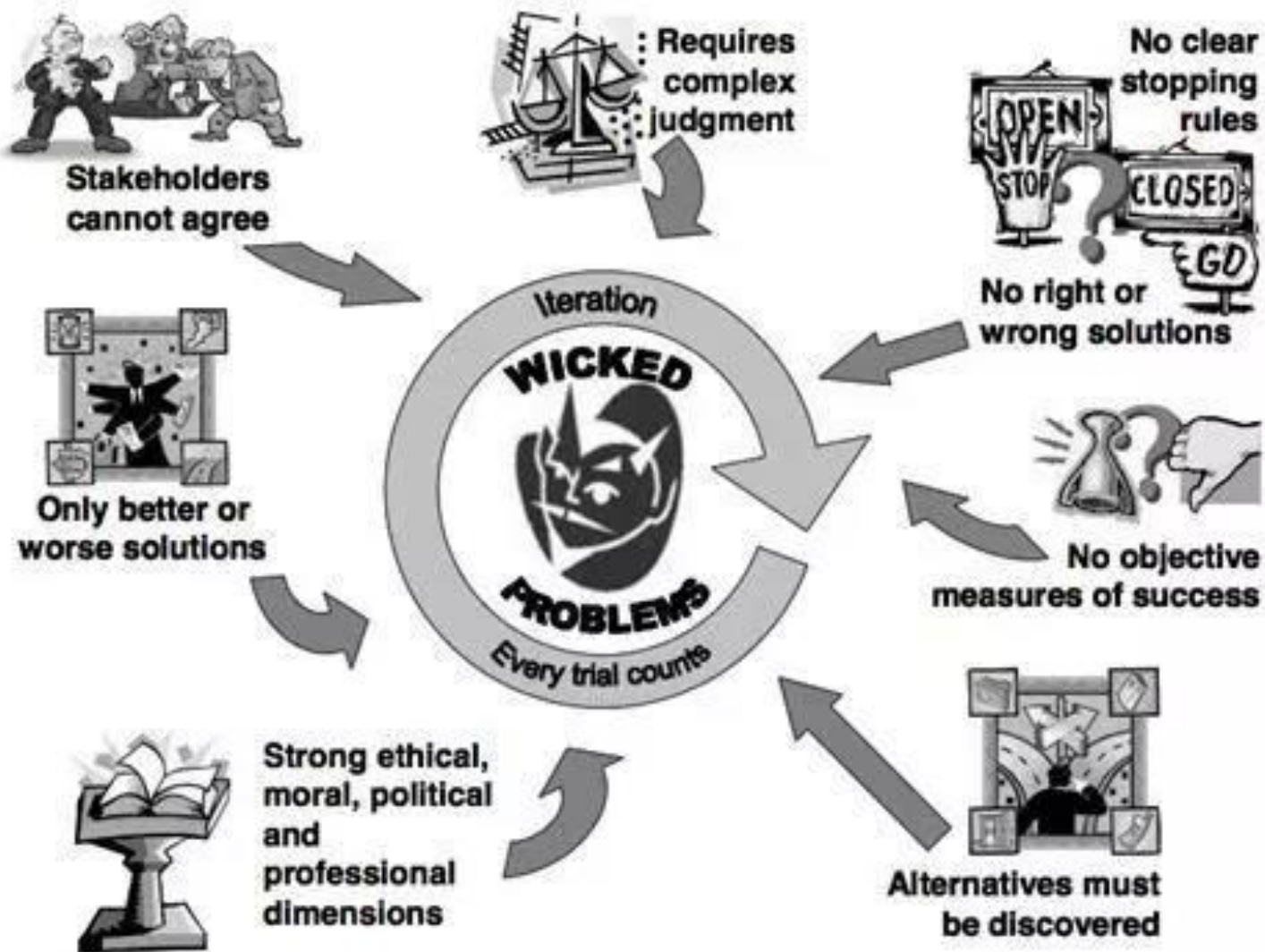


Gerjan Piet, WMR

The AQUACROSS project has received funding from the European Union's Horizon2020 for Research, Technological Development and Demonstration under Grant Agreement Number 642317.



# EBM: a “wicked problem”



# Ecosystem-Based Management

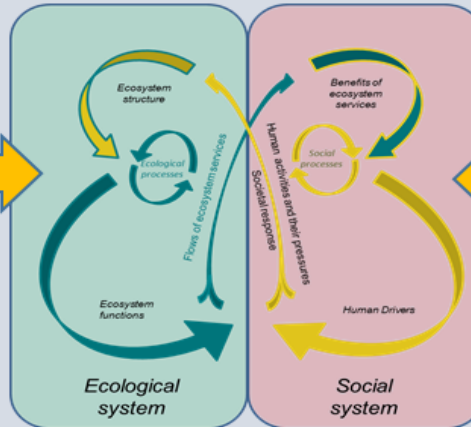
Stakeholders

Phase I: Societal goals

Stakeholders

Phase II: Scoping and Risk assessment

Relevant components  
(e.g. human activities,  
pressures, ecosystem  
taxa) and an indication  
of status and impact



Relevant components  
(actors, institutions....)  
and an indication of how  
they drive the processes

Phase III: Planning of EBM

Management measures  
(e.g. technical, MPAs)  
and policy instruments  
(regulatory, economic,  
awareness-raising)



Evaluation of ecological  
(management measures)  
and social (policy  
instruments) components  
of the EBM plan

Phase IV: Implementation, Monitoring and Evaluation

# Structure of the EU 2020 Biodiversity Strategy

Maintain and restore ecosystems and their services

Help avert global biodiversity loss  
MSFD D1, D6

## 2050 VISION

2020 headline target

*halt biodiversity loss – restore ecosystem services – global contribution*

## SIX TARGETS

1

Enhance implementation of nature legislation

2

Restore ecosystems establish Green Infrastructure

3

Sustainable agriculture and forestry

4

Sustainable fisheries

5

Combat Alien Invasive Species

6

Contribute to averting global biodiversity loss

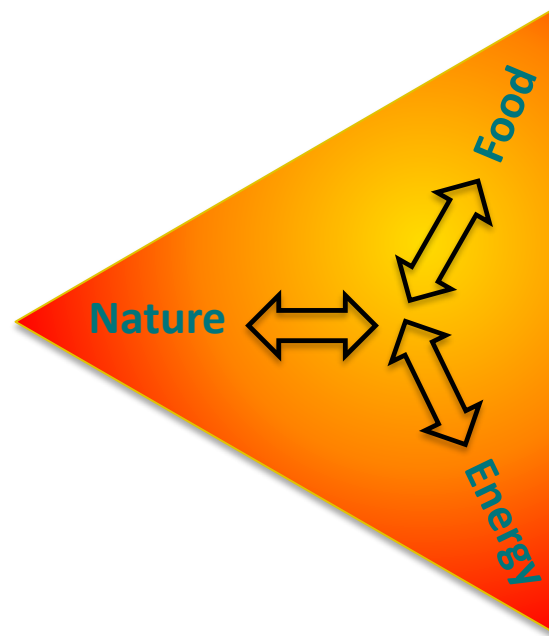
Fully implement the Birds and Habitats Directives  
MSFD D1, D6

## ACTIONS

Ensure the sustainable use of fisheries resources  
CFP, MSFD D3



# Societal goals after stakeholder consultation



**Sustainable food supply**

**Clean and renewable energy**



# Ecosystem-Based Management

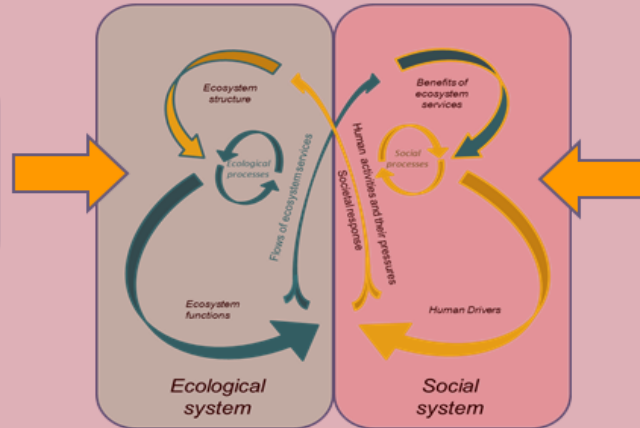
Stakeholders

Phase I: Societal goals

Stakeholders

Phase II: Scoping and Risk assessment

Relevant components  
(e.g. human activities,  
pressures, ecosystem  
taxa) and an indication  
of status and impact



Relevant components  
(actors, institutions....)  
and an indication of how  
they drive the processes

Phase III: Planning of EBM

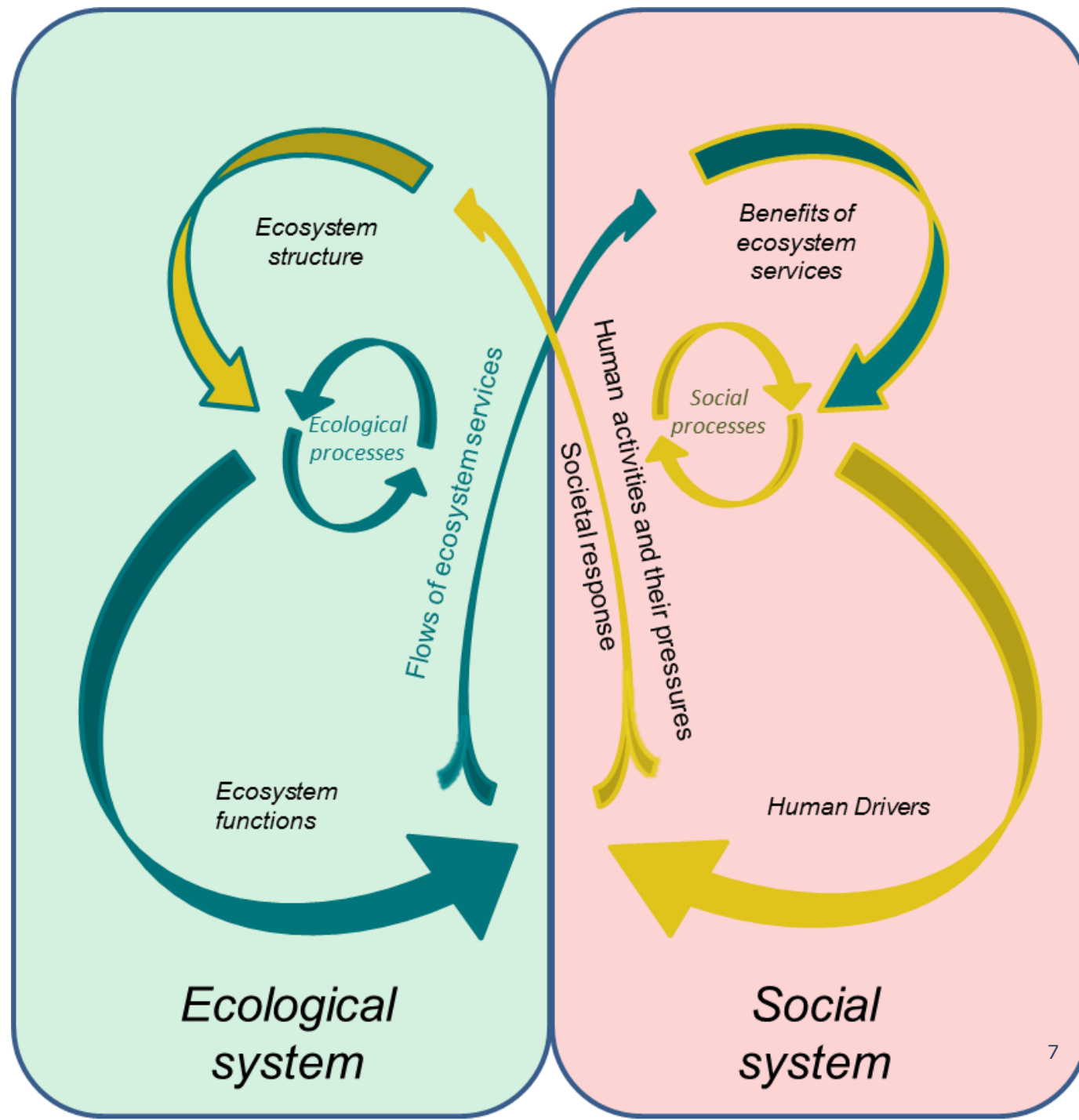
Management measures  
(e.g. technical, MPAs)  
and policy instruments  
(regulatory, economic,  
awareness-raising)



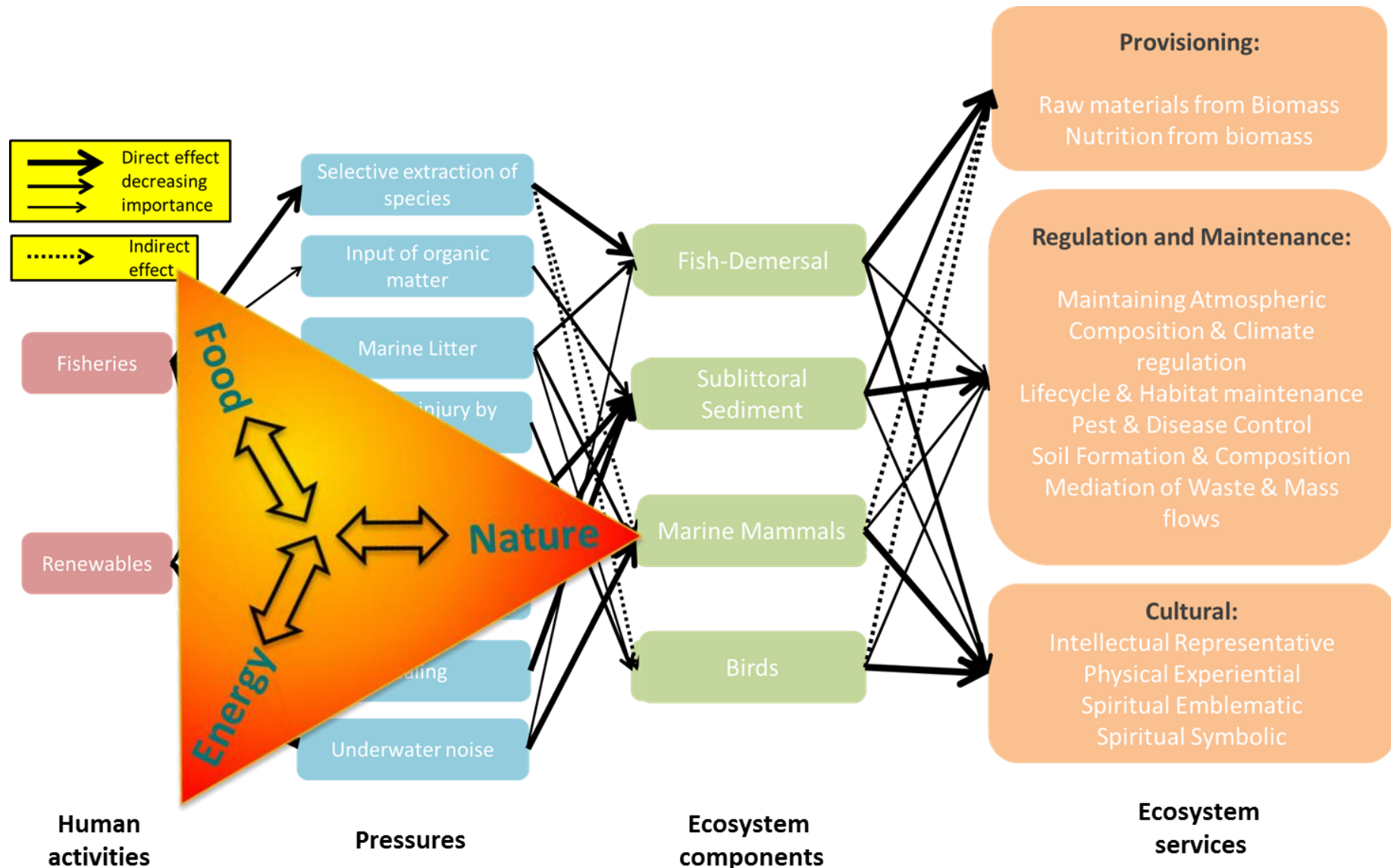
Evaluation of ecological  
(management measures)  
and social (policy  
instruments) components  
of the EBM plan

Phase IV: Implementation, Monitoring and Evaluation

# Socio- Ecological System

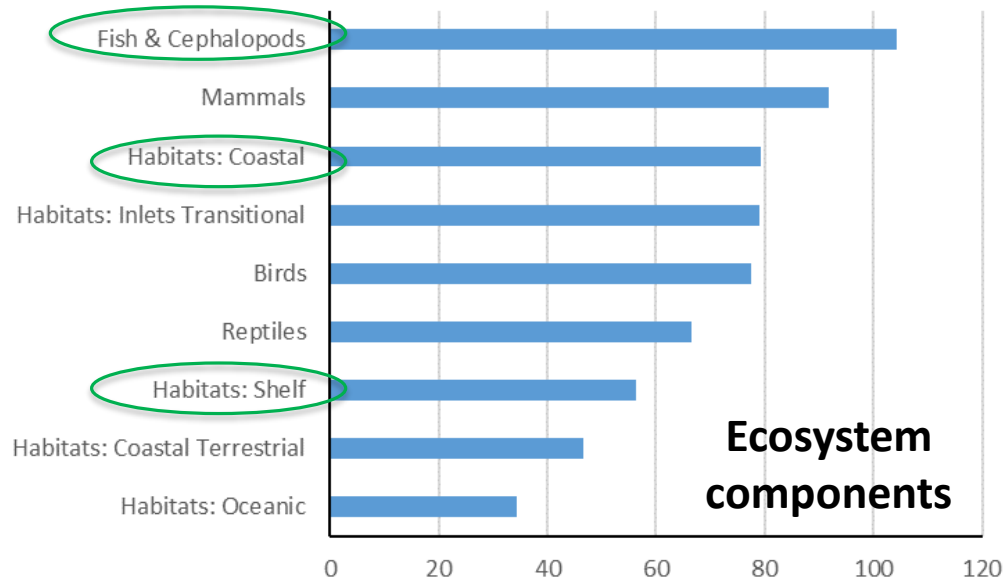
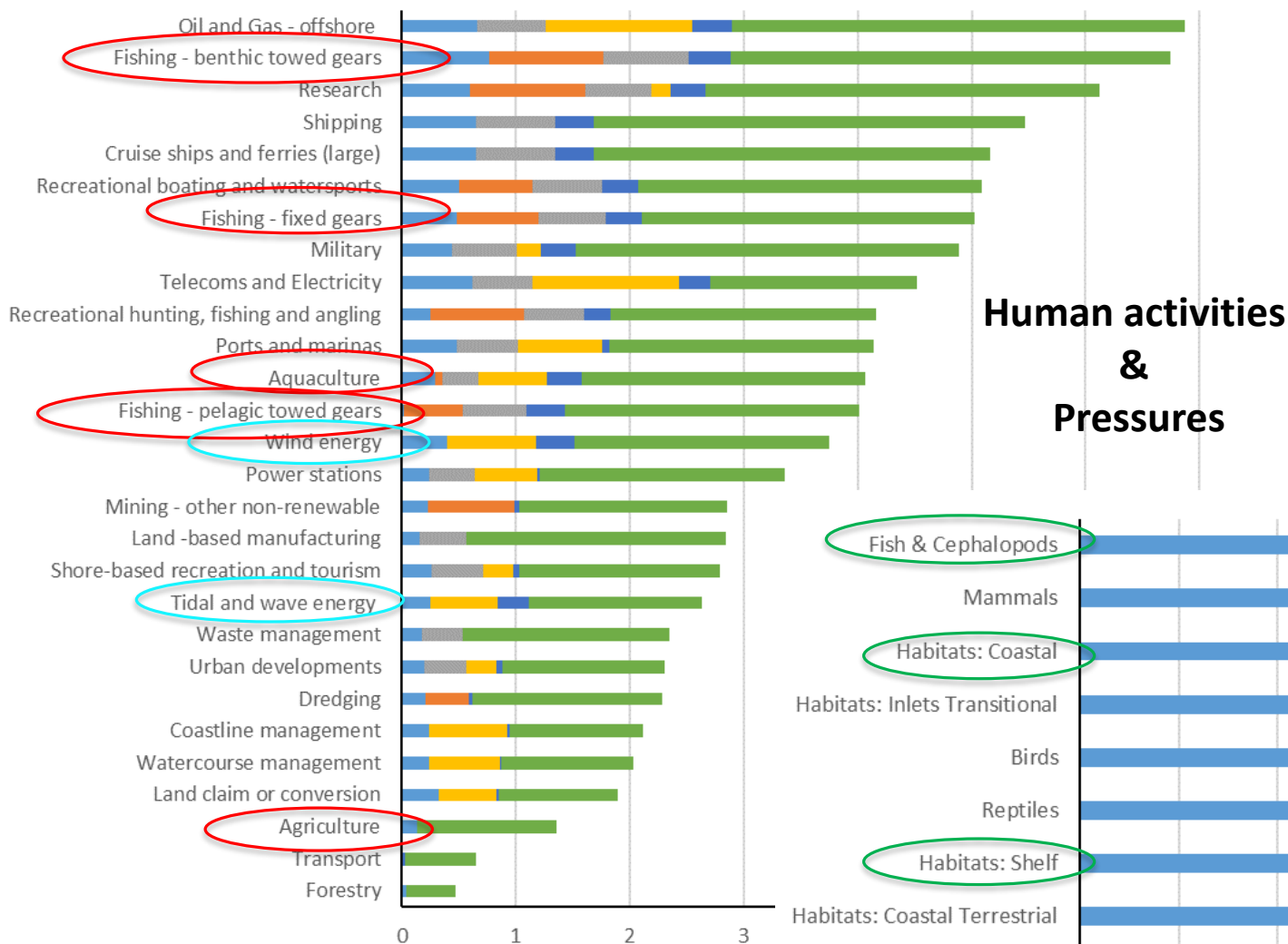


# Social-Ecological System: Linkage Framework





# Cumulative effects: Integrated perspective



# Ecosystem-Based Management

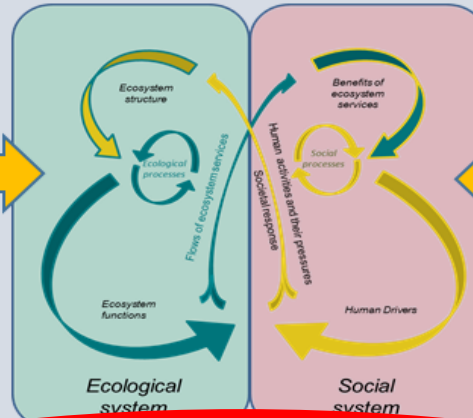
Stakeholders

Phase I: Societal goals

Stakeholders

Phase II: Scoping and Risk assessment

Relevant components  
(e.g. human activities,  
pressures, ecosystem  
taxa) and an indication  
of status and impact



Relevant components  
(actors, institutions....)  
and an indication of how  
they drive the processes

Phase III: Planning of EBM

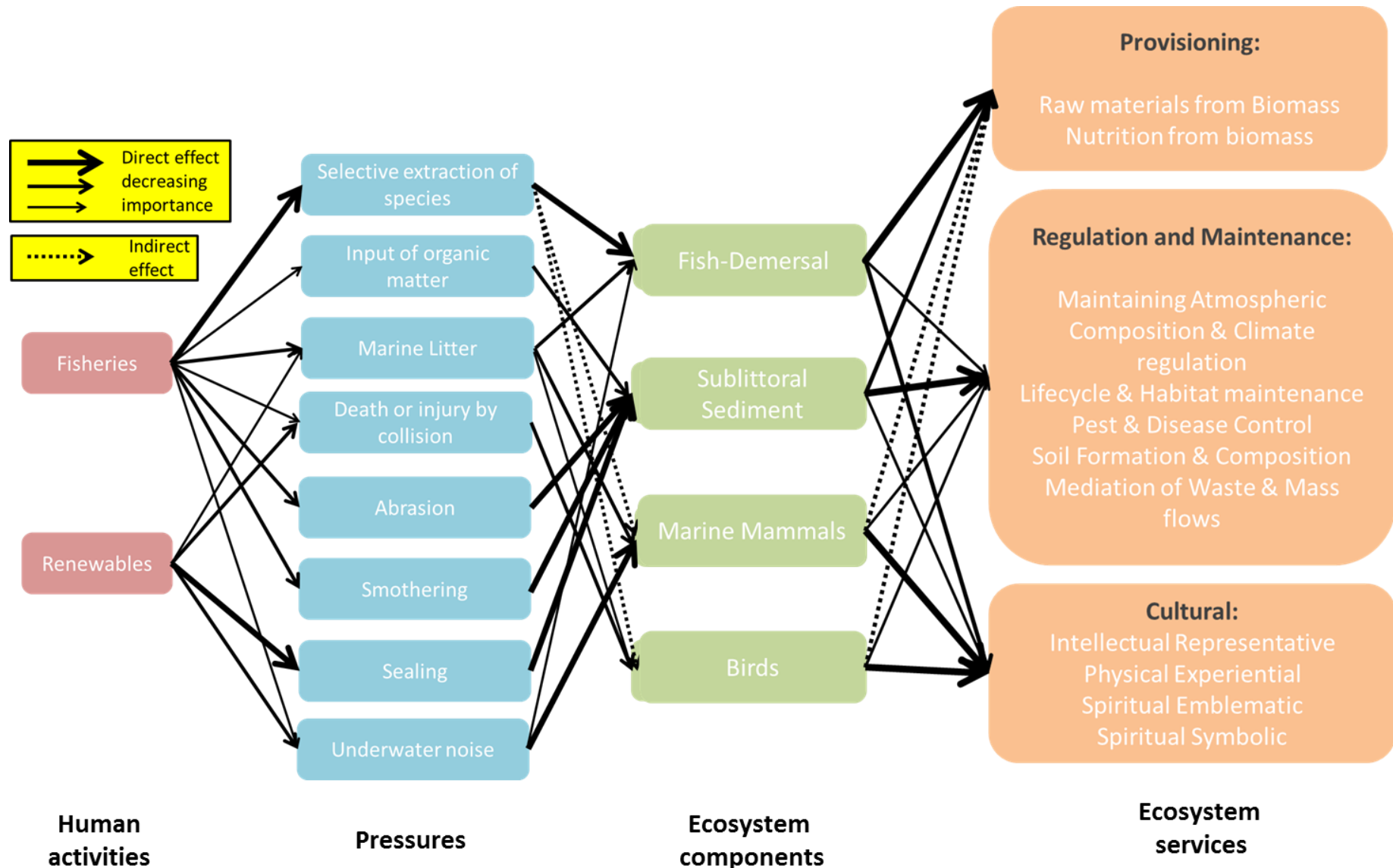
Management measures  
(e.g. technical, MPAs)  
and policy instruments  
(regulatory, economic,  
awareness-raising)



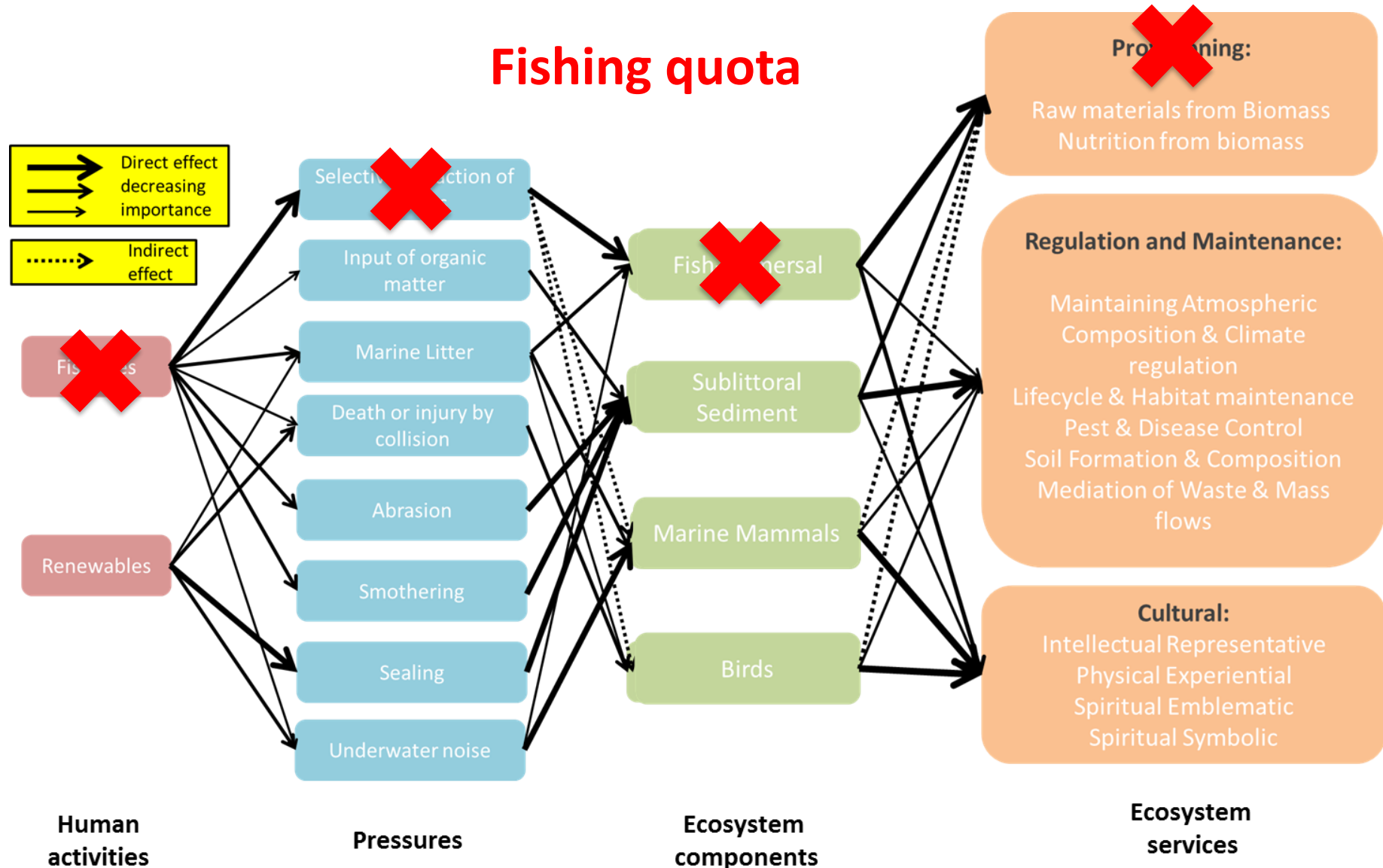
Evaluation of ecological  
(management measures)  
and social (policy  
instruments) components  
of the EBM plan

Phase IV: Implementation, Monitoring and Evaluation

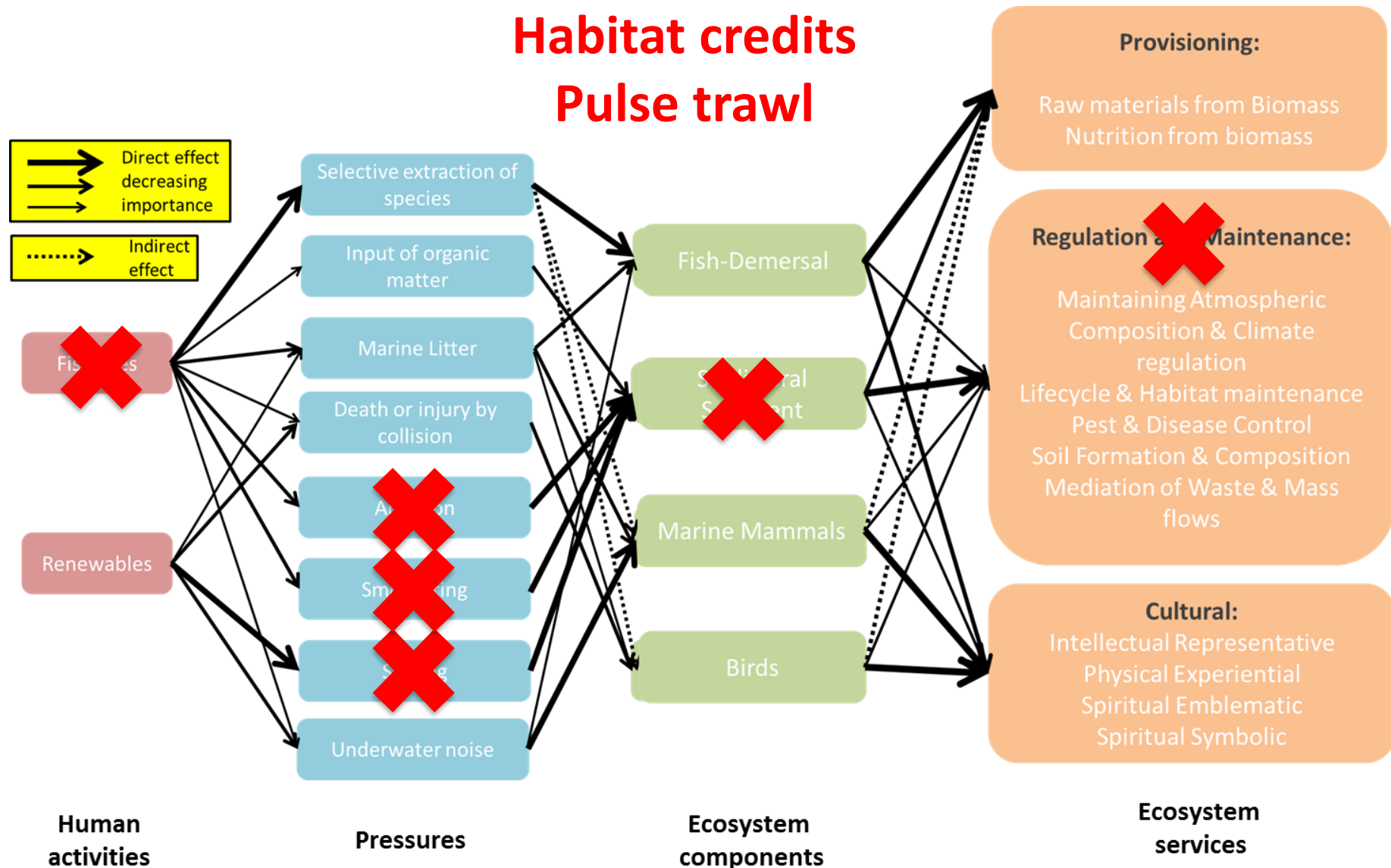
# Social-Ecological System: Linkage Framework



# Social–Ecological System: Linkage Framework



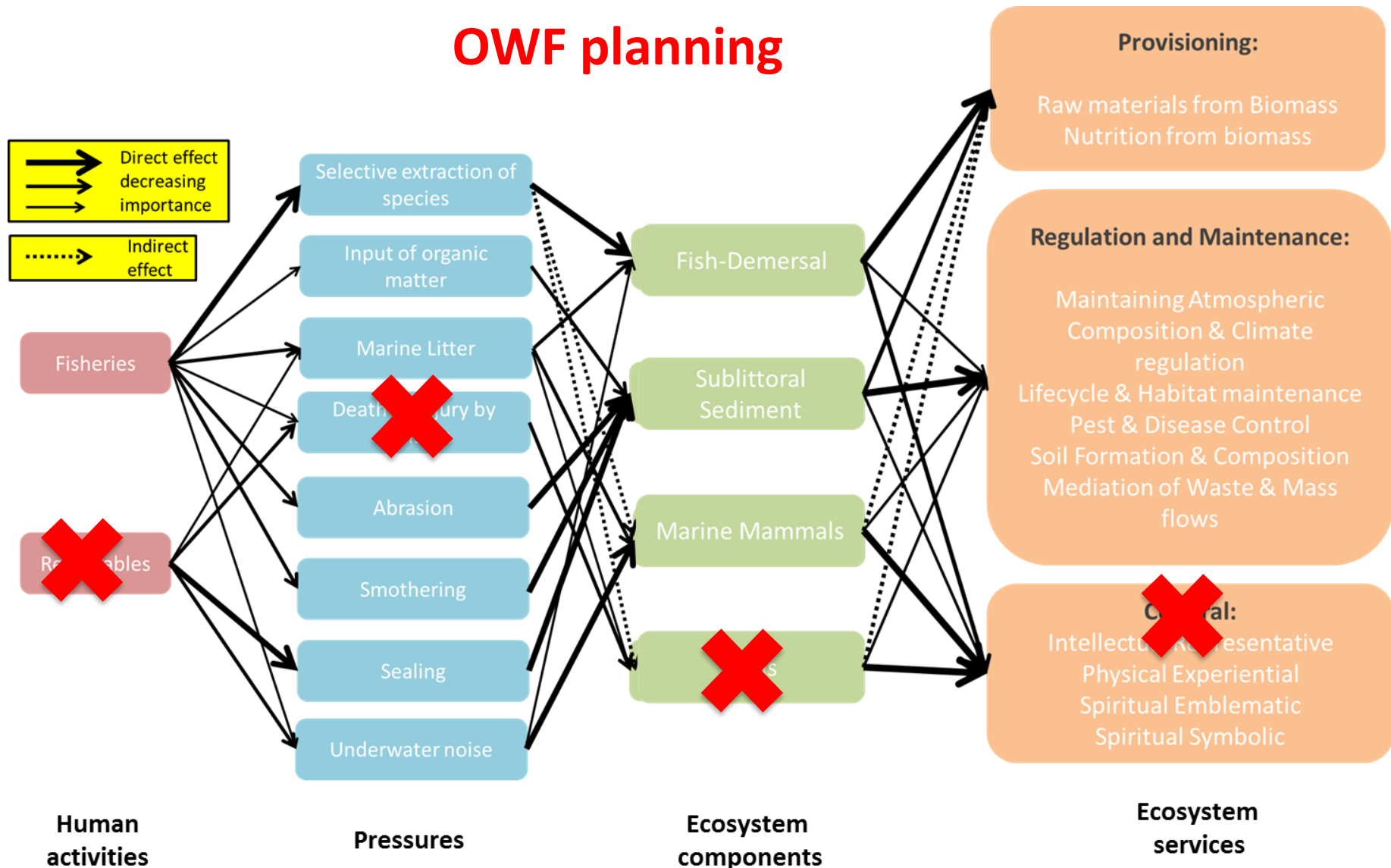
# Social-Ecological System: Linkage Framework





# Social-Ecological System: Linkage Framework

## OWF planning



# Integrated EBM toward different societal goals



1.1 Less fishing effort.  
Catch = MSY

1.2 “choke species”  
Catch < MSY.

1.3 Habitat credits

1.4 Pulse trawl

2.1 MPAs

3.1 OWF Turbines  
< bird mortality

3.2 OWFs positioning  
< bird mortality

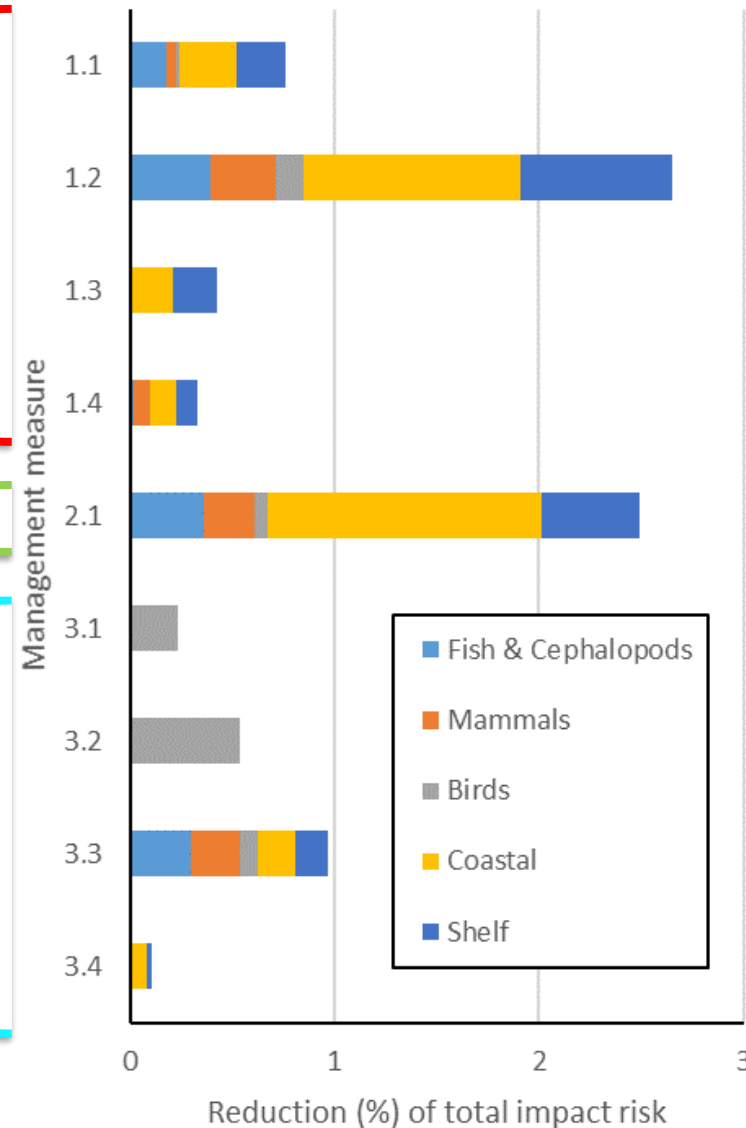
3.3 OWFs trawl ban

3.4 OWF hard substrate

Sustainable  
food  
supply

Healthy  
ecosystem

Clean  
energy



# Anthropogenic scenarios



PBL Netherlands Environmental  
Assessment Agency

## The future of the North Sea

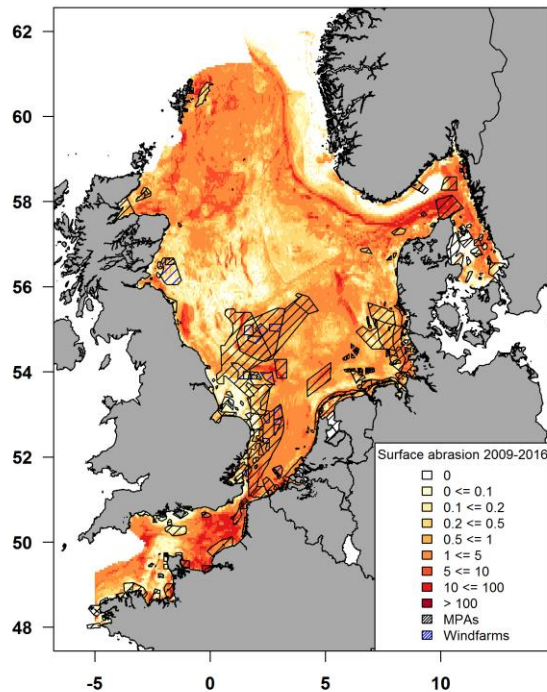
The North Sea in 2030 and 2050:  
a scenario study



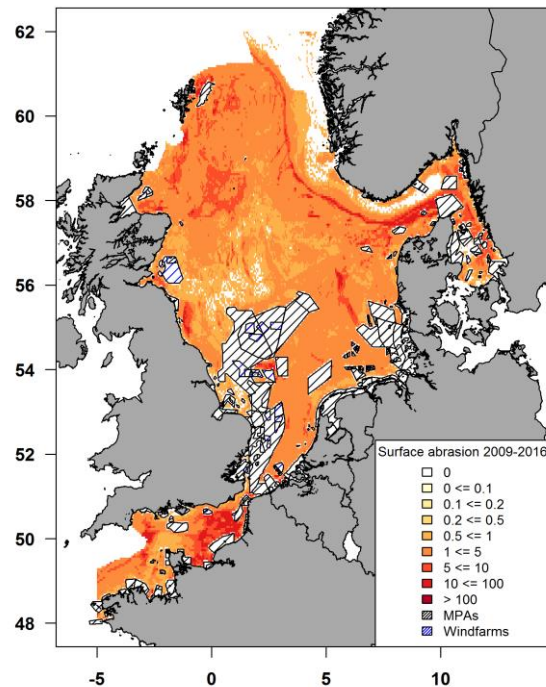
Future scenario	I	II	III	IV
2030	4.5	7.5	11.5	15
2050	12	22	32	60

# Effectiveness protecting the seafloor: issues

## Baseline



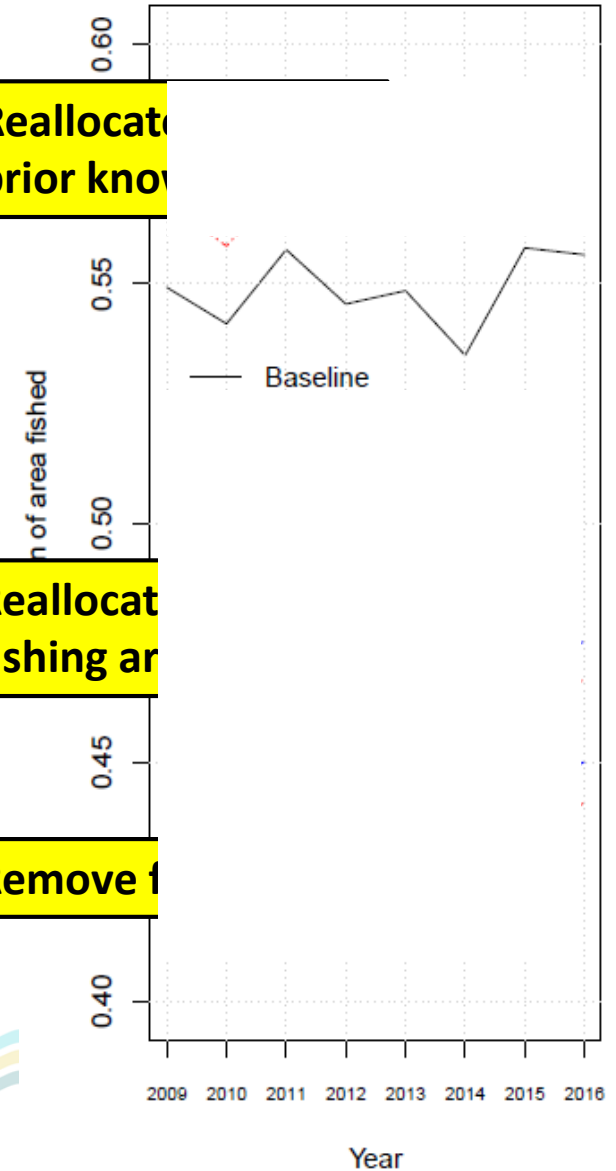
## Alternative



Reallocate  
prior know

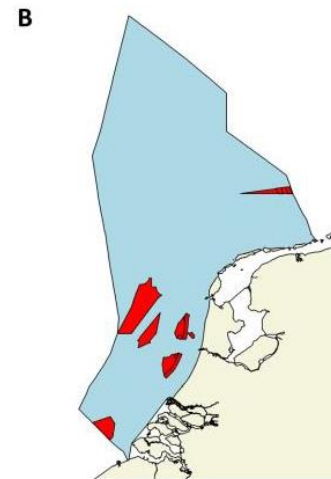
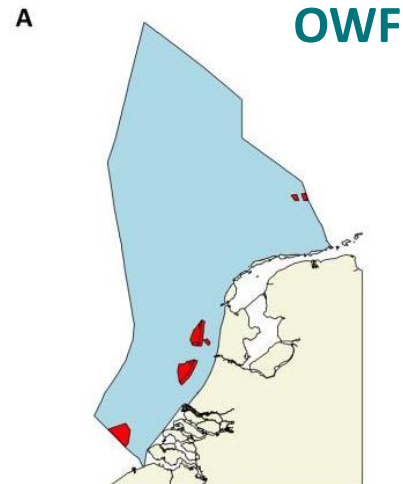
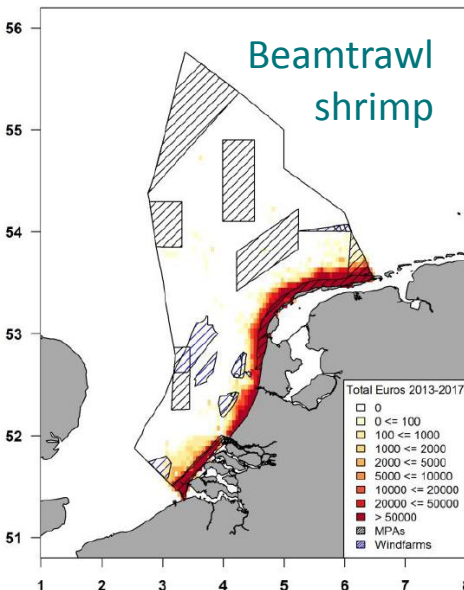
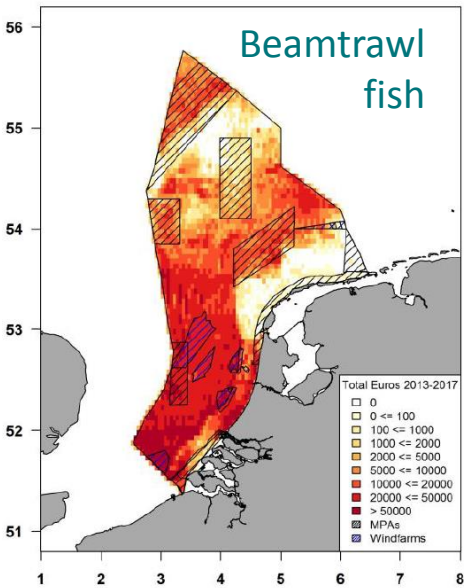
Reallocate  
fishing ar

Remove f



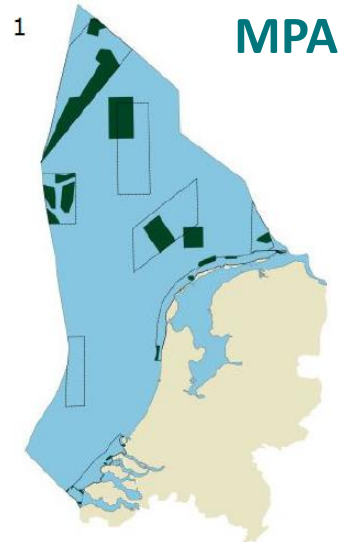


# Marine Spatial Planning (MSP): Issues



Efficiency = % loss fishery

Scenario	(%)
Baseline	0
OWF A	64
OWF B	23
MPA 1	-61
MPA 2	50



Equity = % loss in revenue

Scenario	M€/y	
	Fish	Shrimp
Baseline	0	0
OWF A	3	0
OWF B	5	0
MPA 1	1	1
MPA 2	9	23



# EBM main messages

## Integrated, Ecosystem-based

- Activities–pressures with biggest impact
- Ecosystem components mainly threatened
- Appropriate level of detail

## Adaptive

- Cyclical piecemeal process

## Knowledge base

- Integrated risk-based approaches covering the full breadth of the social-ecological system
- Detailed quantitative analysis of the main threats/issues
- Coupled Social–Ecological System (including governance)
- Trans-disciplinary

