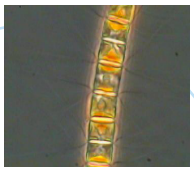
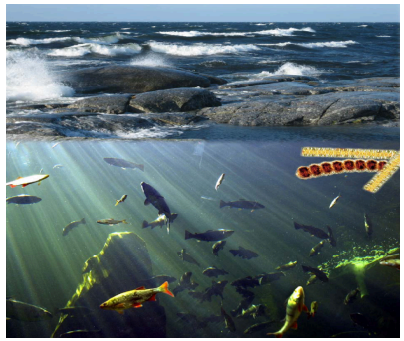
SUBMARINER

Sustainable Uses of Baltic Marine Resources



Environmental Assessment of Innovative Uses of Baltic Marine Resources



Bronwyn Cahill, Informus GmbH

Janka Clauder, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

EUSBSR EU STRATEGY FOR THE BALTIC SEA REGION

Baltic Sea Region Programme 2007–2013

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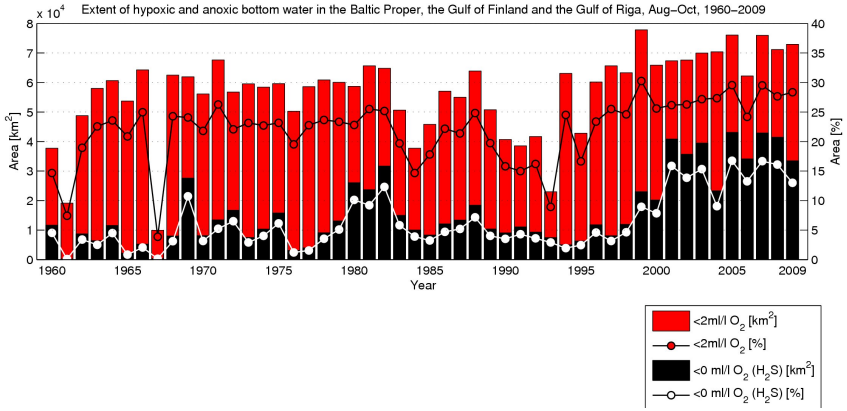
Environmental Challenges

Environmental Challenges for the Baltic Sea

- Water quality, excessive nutrient loading, pollution, eutrophication
- Low biodiversity, fragile ecosystem, alien species
- Declining fisheries
- Climate change, ocean acidification
- Competition for space



Environmental Status

- Despite numerous efforts, environmental status of the Baltic Sea has not improved as expected
- Recent HELCOM assessment of climate change in the BSR indicates that current BSAP nutrient load reduction targets will not be sufficient to achieve "Good Environmental Status" in the future
- More innovative approaches are needed towards environmental remediation
- An important way forward is a more conscious use of sea resources, which contributes to reduce nutrients pollution, and which recognizes the value of ecosystem services.

SUBMARINER New Uses

Do new scientific and technological developments have potential to bring positive environmental benefits?

	Water quality & nutrient recycling	Renewable energy	Biodiversity	Societal: health / food	Spatial efficiency	Economic
Macroalgae Harvesting	✔	✔				✔
Macroalgae Cultivation	✔	✔	✔			✔
Mussel Cultivation	✔	✔	✔	✔		✔
Reed Harvesting	✔	✔	✔			✔
Microalgae Cultivation	✔	✔			✔	✔
Blue BioTech	✔			✔		✔
Wave Energy		✔				✔
Sustainable Fish aquaculture (inc. IMTA)	✔		✔	✔	✔	✔
Offshore Combinations with Wind Parks	✔	✔			✔	✔

✔= main benefit;✔ = by-product of main benefit but not sustainable on its own

What do we know about the impacts of new marine uses on the environment?

Environmental Assessment

Our goal:

- To develop a systematic approach to assessing the positive and negative impacts a single and/or combined new use of marine resource may have on the natural environment.

Scope:

- SUBMARINER Marine Uses
- Draws on relevant issues from existing good practice, guidelines, policy and legal instruments (e.g. UNEP CBD, UNFCCC, UNCLOS, MSFD, WFD, HD & Natura 2000, RD, HELCOM BSAP, EUSBSR).
- Not intended to be full EIA
  - Tool to evaluate scope of environmental issues.
  - Highlight gaps in information and research priorities.

Assessment Framework

Objective	Priority	Benefit
Water Quality	Bathing Quality	Improve bathing water quality
	Water Transparency	Improve water transparency
	Eutrophication	Decrease eutrophication
	Biogeochemical Cycling	Stable biogeochemical cycling
Habitat / Species Protection	Food Web Dynamics	Maintain food web dynamics
	Biodiversity	Promote biodiversity
	Benthic Habitats	Protect benthic habitats
	Bird Habitats	Protect bird habitats
	Fisheries	Protect fish populations
	Marine Mammals	Protect marine mammal
	Marine Noise	Minimise marine noise
Coastal Protection	Coastal Morphology	Protect coastal morphology
	Scenery	Preserve scenery
Climate Protection	CO_2 Emissions	Reduce CO_2 emissions

Key Questions

- Which BSR-relevant ecosystem services are pertinent to each new use and how do they influence each other?
- What is the spatial and temporal dimension of the new use?
- Where are there synergies?
  - Potential for macroalgae / mussel cultivation sites to provide nursery grounds for young fish and contribute to recovery of fish populations
  - Using waste streams for microalgae cultivation
  - Combining seaweed cultivation with fish aquaculture (e.g. IMTA) has potential to partially capture and recycle nutrients released through fish feed and faeces.
- Are there secondary and/or cumulative effects?
  - Not dealing with the problem at its source, e.g. nutrient removal / recycling from untreated sewage waste water implies less preventive sewage treatment measures implemented on land.
  - What is the combined effect of several Baltic States exploiting the same resource?
- Where are there conflicts?
  - Optimal timing of reed harvesting and NATURA 2000
- Where are the gaps in information?

Macroalgae Beachcast

Figure 10: Algae beachcast in Trelleborg, Sweden (left) and Kurzeme, Latvia (right).

Important ecological role

Attached	Free floating	Beach cast
• Primary producer • Key species • Critical habitat important for recruitment of many other species • Food source and home for invertebrates • May be of structural importance	• Primary producer • Can still be growing and reproducing • Food source and home for invertebrates	• Important food source and shelter for invertebrates and shore birds • Nesting material for seabirds • Potential beach building material

Trelleborg Case Study	Est. Biomass	Est. N removal
Macroalgae* (tonnes/yr)	2000 - 6000	50 - 150

Environmental Assessment

Objective	Priority	Macroalgae Harvesting (Beachcast)				
Water Quality	Bathing Quality	■				
	Water Transparency	■				
	Eutrophication	■				
	Biogeochemical Cycling		■			?
Habitat / Species Protection	Food Web Dynamics			■		?
	Biodiversity			■		?
	Benthic Habitats					
	Bird Habitats			■		?
	Fisheries					
	Marine Mammals					
	Marine Noise					
Coastal Protection	Coastal Morphology				■	
	Scenery	■				
Climate Protection	CO_2 Emissions		■		■	

Strongly supportive ■ ; Moderately supportive ■; Strongly NOT supportive ■; Moderately NOT supportive ■
Information gaps/further research needed ?

Environmental Assessment

Objective	Priority	Macroalgae Harvesting (Mats)				
Water Quality	Bathing Quality	■				
	Water Transparency	■				
	Eutrophication	■				
	Biogeochemical Cycling		■			?
Habitat / Species Protection	Food Web Dynamics		■		■	?
	Biodiversity		■		■	?
	Benthic Habitats		■			?
	Bird Habitats					
	Fisheries		■		■	?
	Marine Mammals					
	Marine Noise				■	
Coastal Protection	Coastal Morphology				■	
	Scenery	■				
Climate Protection	CO_2 Emissions		■		■	

Strongly supportive ■ ; Moderately supportive ■; Strongly NOT supportive ■; Moderately NOT supportive ■
Information gaps/further research needed ?

Environmental Assessment

Objective	Priority	Macroalgae Cultivation				
Water Quality	Bathing Quality		■			
	Water Transparency		■			
	Eutrophication	■				
	Biogeochemical Cycling	■		■		?
Habitat / Species Protection	Food Web Dynamics	■		■		?
	Biodiversity	■		■		?
	Benthic Habitats			■		
	Bird Habitats	■				
	Fisheries	■				
	Marine Mammals				■	
	Marine Noise				■	
Coastal Protection	Coastal Morphology	■				
	Scenery					
Climate Protection	CO_2 Emissions		■		■	

Strongly supportive ■ ; Moderately supportive ■; Strongly NOT supportive ■; Moderately NOT supportive ■
Information gaps/further research needed ?

Environmental Assessment

Objective	Priority	Mussel Cultivation				
Water Quality	Bathing Quality	■				
	Water Transparency	■				
	Eutrophication	■				
	Biogeochemical Cycling			■		
Habitat / Species Protection	Food Web Dynamics			■		?
	Biodiversity		■	■		
	Benthic Habitats		■	■		
	Bird Habitats	■				
	Fisheries	■		■		
	Marine Mammals				■	
	Marine Noise					
Coastal Protection	Coastal Morphology		■			
	Scenery				■	
Climate Protection	CO_2 Emissions					

Strongly supportive ■ ; Moderately supportive ■; Strongly NOT supportive ■; Moderately NOT supportive ■
Information gaps/further research needed ?

Environmental Assessment

Objective	Priority	Reed Harvesting				
Water Quality	Bathing Quality					
	Water Transparency		■			
	Eutrophication		■			
	Biogeochemical Cycling	■		■		?
Habitat / Species Protection	Food Web Dynamics	■		■		?
	Biodiversity	■		■		?
	Benthic Habitats			■		
	Bird Habitats			■		
	Fisheries			■		
	Marine Mammals					
	Marine Noise					
Coastal Protection	Coastal Morphology				■	
	Scenery				■	
Climate Protection	CO_2 Emissions		■			

Strongly supportive ■ ; Moderately supportive ■; Strongly NOT supportive ■; Moderately NOT supportive ■
Information gaps/further research needed ?

Summary

What have we learnt?

- Each assessment is very dependent on location, and the spatial and temporal dimension of the application, specifics vary regionally.
- Technology can play a critical role.
- Timing of harvesting activities can also be critical.

General Comments

- Environmental assessment framework important starting point for valuation of ecosystem services.
- Reveals scope of environmental issues but also their uncertainty, conflicts and gaps in information.
- Also shows where there may be positive potential.
- Provides guidance toward research priorities and requirements for detailed assessments.

Thank You