

The Baltic Sea under a changing climate: Insights for marine protection

Expert Dialogue: Climate-ready Marine Protected Areas: Building Resilience and Supporting Marine Adaptation

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EU MISSIONS RESTORE OUR OCEAN & WATERS Concrete solutions for our greatest challenges

The Baltic Sea and Climate Change: setting the scene - what do we know and what does it mean?

Credits: Juuso Haapaniemi

The Relationship of Society and the Sea







HELCOM	HUMAN ACTIVITIES		PRESSURES	
	Land claim	N A	Input of nutrients	HELCOM
PHYSICAL	Canalisation, other watercourse modifications			
RESTRUCTURING	Coastal defence, flood protection	ALL ALLA	Input of organic matter	
	Offshore structures			SUBSTANCES
	Restructuring of seabed morphology Extraction of minerals		Input of hazardous substances	
EXTRACTION OF NON-LIVING RESOURCES	Extraction of oil and gas			
NON-LIVING RESOURCES	Renewable energy generation and infrastructure		Input of litter	
PRODUCTION	Non-renewable energy production		Input of sound	
OF ENERGY	Transmission of electricity and communications		The sound	ENERGY
	Fish and shellfish harvesting		Input of other forms of energy	ENERGI
EXTRACTION OF	Fish and shellfish processing		input of other forms of energy	
LIVING RESOURCES	Marine plant harvesting		Input or spread of	
	Hunting and collecting for other purposes	VIII VIII VIII VIII VIII VIII VIII VII	non-indigenous species	
	Aquacuture – marine		Input of genetically modified species, translocation of native species	
CULTIVATION OF	Agriculture		transforation of native species	
LIVING RESOURCES	Forestry		Input of microbial pathogens	BIOLOGICAL
	Transport infrastructure			
TRANSPORT	Transport – shipping		Disturbance of species	
	Transport – land		Extraction of species	
	Urban uses		or mortality/injury to species	
URBAN & INDUSTRIAL	Industrial uses			
	Waste treatment and disposal		Physical disturbance to seabed	
TOURISM &	Tourism and leisure infrastructure	MAL CON	Develop loss of socked	PHYSICAL
LEISURE	Tourism and leisure activities		Physical loss of seabed	THISTORE
SECURITY & DEFENCE	Military operations	4/	Changes to hydrological conditions	
EDUCATION & RESEARCH	Research, survey and educational activities			

mmm

Baltic Marine Environment Protection Commission

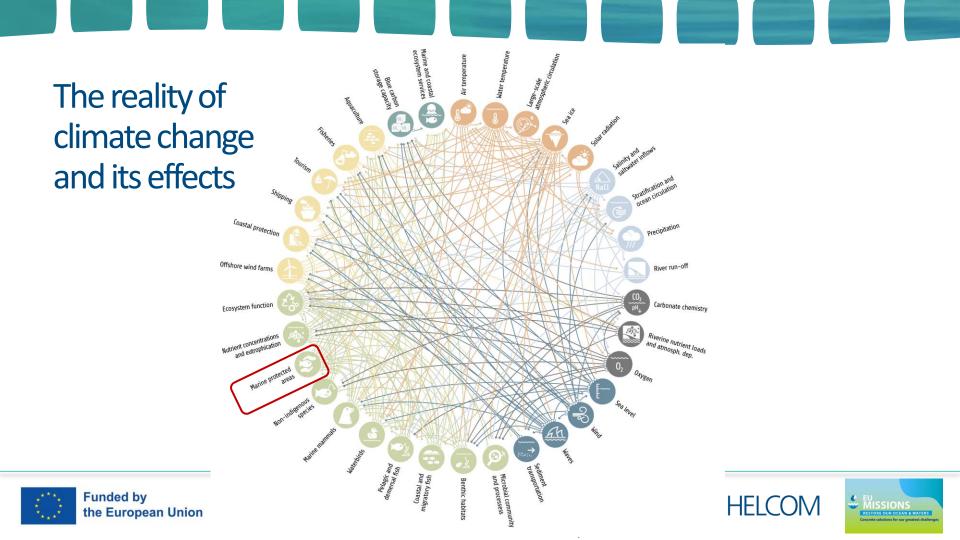
What is the Climate Change Fact Sheet?

- Summary and policy translation of latest climate change research in the Baltic Sea to guide policy making.
- 37 parameters covered: 16 direct parameters, 14 indirect ecosystem parameters (including blue carbon and ecosystem services) and 7 indirect human use parameters.
- Science driven- synthesizes existing detailed, peer-reviewed information, clearly referenced
- Prepared by the over 100 EN CLIME scientist of various disciplines, 22 Lead Authors, Co-Chairs, Secretariat.
- Peer reviewed by external scientists.
- Shows a level of confidence of statements.
- Updated in 2024 (<u>here</u>).

Climate Change in the Baltic Sea 2024 Fact Sheet	¥
Clinate change	Environment Proceedings n°198
hekom.fi —— balik.earth	







Categories

Policy linkages

Linkages between the parameters affected by climate change and various major policies

Energy cycle Water cycle Carbon and nutrient cycle Sea level and wind Biota and ecosystems Human activities Services

The reality of climate change and policy

- The more urgent the crisis, the bigger the relevance for policy.
- More urgency results in more focus on finding solutions, in turn resulting in better governance (the Baltic Sea is a perfect example).
- Different policies target different, but often multiple, parameters.
- The ultimate wicked problem: a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. It refers to an idea or problem for which there is no single solution to the problem.



Air temperature	
later temperature	
arge-scale atmospheric circulation	UN Sustalnable Development Goals
a ice	
lar radiation	
linity and sattwater inflows ratification	EU Biodiversity Strategy
ecipitation	
ver run-off	
rbonate chemistry	
verine nutrient toads and atmospheric deposition	HELCOM Baltic Sea Action Plan
a level	
nd	
IVES	UN Convention on Biological Diversity (CBD)
diment transportation	
ygen	EU Strategy for the Battic Sea Region (EUSBSR)
crobial community and -processes	
nthic habitats	
	EU Green Dez
astal and migratory fish	
tagic and demersal fish	
	EU Marine Strategy Framework Directive (MSFD)
iterbirds	
urine mammais	
	EU Water Framework Directive (WFD)
n-Indigenous species	
arine Protected Areas	EU Maritime Spatial Planning Directive (MSP)
osystem function	EU Habitats Directive (HD)
trient concentrations and eutrophication	
astal protection	EU Common Agricultural Policy (CAP)
Ishore wind farms	EU National Emmissions Cellings Directive (NECD)
	EU Floods directive
pping (EU Bathing water directive EU Birds Directive (BD)
urism	
ihertes	EU Common Fisheries Policy (CFP) AEWA Agreemen
uacutture	Ramsar Convention
	ASCOBANS Jastarnia Plan
se carbon storage capacity	EU Regulation on Invasive allen species EU Renewable Energy Directive
	EU Strategy to harness the potential of offshore renewable energy
arine and coastal ecosystem services	EU Recommendation on Integrated Coastal Zone Management

Baltic Sea Protection and Climate Change - facing the future

Credit: Juuso Haapaniemi

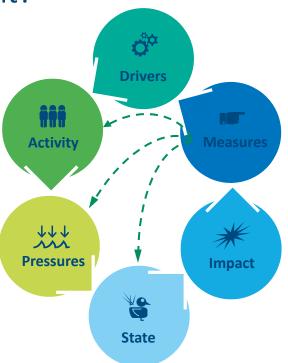
Marine protection, why do we need it?

- Nature and biodiversity **make life possible**, provide **health** and **social benefits** and **drive our economy**. Nature is also our best ally in **tackling the climate crisis**, and the marine environment is an integral part of the larger land-sea ecosystem.

- Several of the **sectors** utilising the Baltic Sea **depend on the quality of the environment** (including e.g. fishing, aquaculture, tourism, leisure activities etc.).

- The practice of protecting, i.e **leaving space for** the natural environment from negative impacts.

- This is done by **limiting activites and pressures**, or **improving the status**, thus limiting the negative impact..

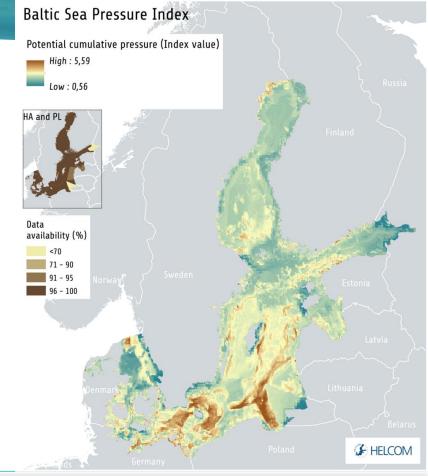






Current situation – the not so good

- Incomplete knowledge base for decision making and designation.
- Gaps in governance.
- Insufficient use of adaptive management.
- It took 30 years to get where we are, now we need to double it in 6 years.
- But it isn't about getting to 30%, it's about getting there in a way that actually provides biodiversity benefits, also under a changing climate.









How can MPAs play a role in supporting adaptation to climate-related change?

What do we want to achieve?

Rationale for theory of change...

If sufficient and effective spatial protection is ensured across the ecoregion...

Enabling

sufficient

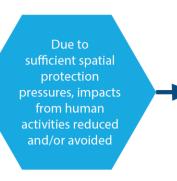
spatial

protection

measures for

the marine

environment



INTERMEDIATE OUTCOME

positive marine biodiversity outcomes

Secure

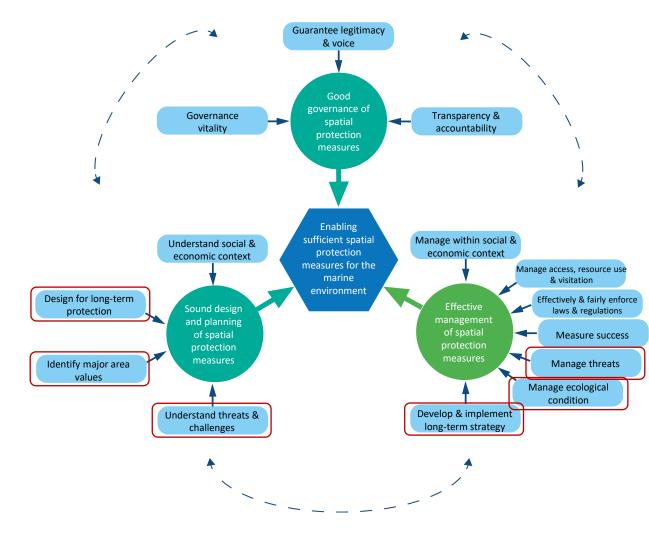
ULTIMATE IMPACT

... there will be a reduction in the negative impact from human activities, and...the goals of maintaining or restoring the status of marine biodiversity can be reached.









How MPAs can be designed to be resilient to future climate impacts? Exploring how can MPAs play a role in supporting adaptation to climate-related change in the Baltic Sea

- **Examples:**
 - Blue carbon

 - directly protect coastal blue carbon habitat, such as coastal wetlands. protect healthy ecosystems and food webs that store carbon in marine life, and transport it to the deep seabed for long term storage. can prevent bottom disturbance to the carbon stored in sediments. can help address other factors that affect carbon storage, such as the presence of investive corecise and collutation.

 - invasive species and pollutants. provide focal points for restoring blue carbon habitats.

Spatial and adaptive climate refugia

- spatial refugia are areas that are changing more slowly than elsewhere. adaptive refugia are areas that already represent "future" conditions, and contain individuals who are adapted to those conditions.
- **Ecosystem restoration**
 - MPAs provide long-term protection and active management, providing opportunities for research, restoration and community engagement. Ecosystem restoration is an important climate adaptation strategy. By making restoration decisions that take future conditions into account, restoration can help to restore ecosystem services lost to climate and non-climate impacts and ensure that they are resilient to future change
- Expanding on what we protect, and why.











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