eMSP NBSR
Emerging Ecosystem-based Maritime Spatial Planning Topics in the North and Baltic Sea Regions

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Strengthening the application of ecosystem-based approach in MSP

eMSP NBSR project

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Contents

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DISCLAIMER

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Introduction

An ecosystem-based approach (EBA) is a vital part of maritime spatial planning. It makes MSP a powerful instrument to achieve balance between the development of human activities at sea and healthy functioning of the marine ecosystem. Application of the ecosystem-based approach is stipulated by the EU MSP directive and integrated in many international policy agreements. It was also included in the Regional MSP principles developed by Baltic Sea countries, pursuing the overall target to keep collective environmental pressure of various human activities within the limits of ecosystem bearing capacity and thus, contributing to the joint effort to achieve good environmental status of the Baltic Sea.

The development of ecosystem-based approach (EBA) has been and remains in focus of HELCOM-VASAB MSP working group. Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area was adopted by HELCOM and VASAB in 2016. The document presents a first step towards a common understanding of the application of ecosystem-based approach drawing up national spatial plans.

The European Green Deal set new commitments for tackling climate and environment related challenges. Its actions targeting climate change resilience, biodiversity conservation and restoration, clean energy, sustainable blue economy and other sectors largely serve as a guidance for the development of framework for ecosystem-based approach in MSP. The Green Deal boosted the development of policies and actions specifically aimed to protect the environment and oceans. Maritime Spatial Planning, applying ecosystem-based approach is considered as a tool which effectively contributes to the achievement of the ultimate goal – reduction of cumulative environmental pressure on marine ecosystem, achieving and maintaining its good environmental status.

Since the ecosystem-based approach is one of the basic MSP principles driving the MSP process towards achieving sustainable use of ecosystem goods and services and maintaining of the ecosystem integrity, application of the ecosystem-based approach in MSP is a prerequisite for its contribution to the EU Green Deal. Thus, the main goal of this study is to enhance the ecosystem-based approach in MSP through the investigation of best practices, further development of international policy framework and distribution of relevant knowledge for the North and Baltic Sea regions.

New Baltic Sea Regional MSP Roadmap 2030 was adopted in 2021. The Roadmap set a goal to strengthen the joint effort, and ensure coherence throughout the Baltic Sea Region, to implement Maritime Spatial Plans, aiming for sustainable development of the region and building a sound basis for an adaptive Maritime Spatial Planning process applying the ecosystem-based approach. To make MSP contributing to the progress towards good environmental status of the Baltic Sea is one of the Roadmap's objectives. The objective is to be achieved through applying an ecosystem-based approach with an aim to reduce environmental pressures of sea-based human activities on the Baltic Sea ecosystem and to strengthen protection and restoration of marine species and habitats. The Roadmap considers revision of the regional Guideline on application of EBA in MSP as one of the major practical measures to achieve the objective.

The results of this study are intended to contribute directly to the implementation of the above -mentioned regional task. Baltic Sea regional task force for the revision of the Guideline has

already been set and project outputs related to application of EBA in MSP are supposed to create a basis for the task force's work.

Acknowledging utter significance of ecosystem-based approach for future-proofing MSP, eMSP project formulated its ambitions. They included:

- A review of application of ecosystem-based approach in national MSPs to reveal challenges and compile best practices.
- Identification of gaps in the existing international legal and policy framework which can be filled in based on the practical application of EBA in maritime spatial plans.
- Development of concrete recommendations supporting international legal and policy framework for application of EBA in maritime spatial planning, e.g. EBA guidelines, common ground for Strategic Environmental Assessment-framework.
- Proposing a framework for continuous science and policy dialog and mutual knowledge exchange in the North Sea and Baltic Sea regions.

The project work related to application ecosystem-based approach in MSP foreseen at least three major outputs:

- a review of national MSPs regarding the application of ecosystem-based approach in national MSPs and compilation of good practices;
- a map of gaps in existing international policy framework related to practical application of EBA in maritime spatial plans; recommendations to fill gaps and advance international policy framework for application of EBA in maritime spatial planning (e.g. EBA guidelines, legislative recommendations, common ground for Strategic Environmental Assessment-framework etc);
- a policy brief targeting urgent needs for enhancement of EBA in MSP in the light of Green Deal with concrete illustrative examples;
- recommendations for a framework for continuous science and policy dialog and mutual knowledge exchange in the North Sea and Baltic Sea regions.

Study cases practically illustrating approaches and tools to strengthen ecosystem-based MSP were included in the project work. Particularly, the study cases were intended to demonstrate;

- how MSP can contribute to the achievement of Good Environmental Status (BSAP and MSFD targets);
- investigate and assess opportunities for closer integration between MSP and spatial conservation measure (e.g. coherent networks for MPAs, OECMs, EBSAs and green infrastructure).

The review of good practices of application of ecosystem-based approach in national MSPs included input from eMSP project partners and material about application of EBA in the development of Latvian MSP. It was intended not only describe good practices for EBA in MSP from the latest round of MSPs in the North Sea and Baltic Sea but reveal respective challenges, serving as a basis for further gap analysis and recommendations to bridge them. The review was published as a separate project document (A review of good EBA practices). Another separate

document is policy brief on EBA in MSP. The policy brief presents relevant key project findings in a condensed and focussed manner.

This report presents details of the work done in the two years of eMSP project implementation. It includes a glossary of terms, detailed overview of existing international EBA framework, analysis of gaps in this framework, two case studies, recommendations on application of EBA on MSP and proposals for long-lasting MSP dialog platform for the North Sea and Baltic Sea regions.

One of the major working methods of the Learning Strand on Ecosystem-based approach in MSP was community of practice. Communities of Practice (CoPs) is an organized group of people who have a common interest in a specific area. They collaborate regularly to share information, improve their skills, and actively work on advancing the general knowledge of the matter. CoP for Learning Strand on EBA in MSP consisted of two major components – a dialog platform lasted throughout the whole project implementation period and time-bound drafting groups focused on the development of concrete project deliverables.

The dialog platform consisted of unlimited number of stakeholders and functioned through the whole project implementation period. More than 50 CoP's participants represented all Baltic and North Sea countries as well as Spain, Portugal, Italy, and some other countries beyond project area. Majority of participants represented public authorities, intergovernmental organizations, scientific and non-governmental organizations. All participants were divided to three major groups according to the self-assessment of their involvement in the CoP's work:

- Core group – project partners and CoP member engaged in drafting project deliverables.
- Contributors – CoP members providing input to project deliverables (information, feedback, reviewing, discussion).
- Followers – CoP members interested to learn from the project and use project results.

In general CoP as a working instrument demonstrated its effectiveness for stakeholders' involvement enabling their contribution to the project work and ownership of the achieved results. All together 5 online meetings and one physical meetings of the CoP were arranged during the project's lifetime.

Glossary of terms related to EBA in MSP used in the report

1	Adaptive management	a systematic approach for improving management through learning by monitoring and evaluating management outcomes.
2	Baseline	normal baseline for measuring the breadth of the territorial sea is the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State
3	Baseline study	the study of the original status of the environment in the area before the development work of the plan is started. This study serves in addition to the Zero alternative the purpose of a base reference against which the changes due to implementation of the plan are measured.
4	Blue Economy	a sum of economic activities of ocean-based industries and the assets, goods and services of marine ecosystems
5	Coastal zone	an area at the interface between land and sea, where the sea influences the land and the land influences the sea
6	Contiguous zone	A zone contiguous to its territorial sea, where the coastal State may exercise the control necessary to prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea
7	Cumulative impact/cumulative effect	A combined outcome of numerous actions and stresses, where a group of relatively minor impacts may add up to severe habitat degradation or loss/ changes to the environment caused by the combined impact of past, present and future human activities and natural processes.
8	Ecological value	non-monetary assessment of ecosystem integrity, health, or resilience, all of which are important indicators to determine critical thresholds and minimum requirements for ecosystem service provision
9	Ecologically or biologically significant areas (EBSAs)	special areas in the ocean that serve important purposes, in one way or another, to support the healthy functioning of oceans and the many services that it provides.
10	Ecosystem	a biological community of interacting organisms and their physical environment.
11	Ecosystem Approach/ Ecosystem Based Approach	a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way
12	Ecosystem health	a state or condition of an ecosystem that expresses attributes of biodiversity within “normal” ranges, relative to its ecological stage of development.

13	Ecosystem services	benefits that humans derive from ecosystem functions, either directly or indirectly, including provisional, regulating, cultural and supporting services.
14	Ecosystem-based adaptation	a strategy for adapting to climate change that harnesses nature-based solutions and ecosystem services.
15	Ecosystem-Based Management	a process that integrates biological, social and economic factors into a comprehensive strategy aimed at protecting and enhancing sustainability, diversity and productivity of natural resources. EBM is an integrated approach that considers the entire ecosystem, including humans.
16	Environmental Impact/Environmental effects	any change to the environment, whether adverse or beneficial, resulting from a facility's activities, products, or services.
17	Environmental Impact Assessment	A process of evaluating the probable environmental impact from a proposed development, taking into account socio-economic, cultural and human health impacts.
18	Environmental pressure	Pressures resulting from human activities which bring about changes in the state of the environment/activities and factors that cause environmental change
19	Exclusive Economic Zone	zone where coastal nations have jurisdiction over natural resources.
20	Good Ecological Status	A state of water body with a slight variation from undisturbed conditions
21	Good Environmental Status	An environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable thus safeguarding the potential for uses and activities by current and future generations.
22	Green Infrastructure	Strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services
23	High Seas	All parts of the sea that are not included in the Exclusive Economic Zone (EEZ), in the territorial sea or in the internal waters of a State
24	Human activities	various actions for recreation, living, or necessity done by people/A set of human operations and actions that have real predicted goal.
25	Integrated coastal zone management	A dynamic, multi-disciplinary and iterative process to promote sustainable management of coastal zones.
26	Integrated management	an approach by which the many competing environmental and socioeconomic issues are considered together, with the aim of achieving an optimal solution from the viewpoint of the whole community and the whole ecosystem
27	Marine protected area	geographically distinct zones for which protection objectives are set

28	Maritime Spatial Planning	a public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process
29	Ocean Governance	the integrated conduct of the policy, actions and affairs regarding the world's oceans to protect ocean environment, sustainable use of coastal and marine resources as well as to conserve of its biodiversity.
30	Other Effective Conservation Measures (OECMs)	sites outside protected areas that deliver the effective and long-term in situ conservation of biodiversity, support associated ecosystem functions and services, and promote cultural, spiritual, socio-economic and other locally relevant values.
31	Precautionary principle	management principle stating that in cases “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”
32	Strategic Environmental Assessment	A process by which environmental considerations are required to be fully integrated into the preparation of Plans and Programmes and prior to their final adoption
33	Territorial sea	the belt of water not exceeding 12nm in width measured from the territorial sea baseline; the sovereignty of nations extends to the territorial sea, its seabed and subsoil, and to the air space above it.
34	Zero alternative	A description of the likely evolution of relevant aspects without the implementation of the plan or programme as an important frame of reference for the assessment of the plan or programme.

An overview of policy context for an ecosystem-based approach in MSP

International policy framework

United Nations Sustainable Development Goals 2030

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

Goal 14 – Life below water – calls to conserve and sustainably use the oceans, sea and marine resources for sustainable development. The Goal integrates 10 targets addressing such urgent needs as reduction of all kinds of marine pollution, sustainable management of marine and coastal ecosystem, nature conservation and prevention of overfishing, minimizing of ocean acidification impact, increase of scientific knowledge and other. Progress towards the targets should be achieved through the implementation of the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources.

The United Nations Convention on the Law of the Sea UNCLOS

The United Nations Convention on the Law of the Sea UNCLOS was adopted in 1982. It lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing uses of the oceans and their resources. UNCLOS primarily describes how sea-going vessels should interact with each other and with marine resources in regional waters and the high seas. UNCLOS defines everything from freedom of navigation to pollution and wildlife conservation. It also delineates maritime political and economic boundaries.

The Paris Agreement

Climate Change is one of the major crises of the modernity. The Paris Agreement is a legally binding international treaty on climate change, entered into force on 4 November 2016. Its overarching goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels." The Paris Agreement commits Parties to develop national climate action plans, known as nationally determined contributions (NDCs). In their NDCs, countries communicate actions they will take to reduce their greenhouse gas emissions and to build resilience to adapt to the impacts of climate change.

The Convention for Biological Diversity (CBD)

The ecosystem-based approach emerged in the policy dialog in the 90s, when the Convention for Biological Diversity (CBD) at its second meeting, held in Jakarta, November 1995, adopted the ecosystem approach as the primary framework for action under the Convention. The ecosystem approach was identified as a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Later in 1998 the twelve defining principles were adopted commonly known as the '*Malawi Principles'*:

- The objectives of management of land, water and living resources are a matter of societal choices.

- Management should be decentralized to the lowest appropriate level.
- Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
- Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context, considering e.g. mitigating market distortions, aligning incentives to promote sustainable use, and internalizing costs and benefits.
- Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
- Ecosystems must be managed within the limits of their functioning.
- The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
- Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
- Management must recognize that change is inevitable.
- The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
- The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
- The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

CBD - Global Biodiversity Framework

The Kunming-Montreal Global Biodiversity Framework (GBF, decision 15/4) represents the most ambitious global agreement on biodiversity in the history of environmental governance and will serve as the world's framework for actions taken at all levels to safeguard and restore biodiversity. The framework supports the achievement of the Sustainable Development Goals and sets out an ambitious pathway to reach the global vision of a world living in harmony with nature by 2050. The framework has four long-term goals for 2050 related to the 2050 Vision for biodiversity. Goals A and Goal B are especially important for the application of ecosystem-based approach in marine spatial planning:

> Goal A: The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050; Human induced extinction of known threatened species is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels; The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.
>
> Goal B: Biodiversity is sustainably used and managed and nature’s contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050.

The Framework includes 23 action-oriented global targets for urgent action over the decade to 2030 to enable progress towards long-term goals for 2050. The twenty-three targets to be achieved by 2030 include 30 per cent conservation of land, sea and inland waters, 30 per cent restoration of degraded

ecosystems, halving the introduction of invasive species, and $500 billion/year reduction in harmful subsidies. Target 1 specifically addresses spatial planning.

> Target 1: Ensure that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes addressing land- and sea use change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.

Regional (Baltic Sea) policy framework

The Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area aimed to promote the ecological restoration of the Baltic Sea Area and the preservation of its ecological balance. *The Baltic Sea Action Plan (BSAP)* is a strategic programme of measures and actions for achieving good environmental status of the sea, ultimately leading to a Baltic Sea in a healthy state.

The ultimate goal of the BSAP with respect to biodiversity and ecosystems is that the Baltic Sea ecosystem is healthy and resilient, which is supported by ecosystem-based management of human activities. The cumulative effects on marine ecosystem of existing and new activities need to be evaluated, and an ecosystem-based approach implemented, where the carrying capacity of the ecosystem, and the need to set limits for human activities, is acknowledged.

In the BSAP, Contracting Parties to the Helsinki Convention underscore the need to integrate environmental objectives with socio-economic goals in order to advance sustainable development and stress the need for coherent spatial planning of human activities at sea across the region, applying the ecosystem-based approach. The BSAP recognizes that maritime spatial planning is a key and increasingly important instrument in ecosystem-based management and in working towards good environmental status. Hence, the BSAP provides a general framework for the ecosystem-based approach in the Baltic Sea region.

Regional BSR framework for application of EBA in MSP is formulated in several regionally agreed policy documents which are closely related to the above-mentioned BSAP. The ecosystem-based approach is one of the ten *"Baltic Sea broad-scale MSP principles",* formulated by Baltic Sea countries in 2010 to guide maritime spatial planning and, thereby, to contribute to coherent MSP in the Baltic Sea. *The definition of ecosystem approach* was adopted by joint HELCOM and OSPAR Meeting in June 2003 as "the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity". The application of the precautionary principle is equally a central part of the ecosystem approach.

Further developing the broad-scale principles, Baltic Sea countries agreed on *the Regional MSP Roadmap 2013-2020* to draw up and apply maritime spatial plans throughout the Baltic Sea Region by 2020 which are coherent across borders and apply the ecosystem approach.

The new Regional Maritime Spatial Planning Roadmap 2021-2030 has set a goal to strengthen the joint effort, and ensure coherence throughout the Baltic Sea Region, to implement Maritime

Spatial Plans, aiming for sustainable development of the region and building a sound basis for an adaptive Maritime Spatial Planning process applying the ecosystem-based approach.

Regional (North Sea) policy framework

Alike in the Baltic Sea region, *The North-East Atlantic Environment Strategy (NEAES) 2030* identifies means by which Contracting Parties implement the OSPAR Convention in the period 2020-2030. The Strategy defines the ultimate goal as a clean, healthy and biologically diverse North-East Atlantic Ocean, which is productive, used sustainably and resilient to climate change and ocean acidification.

The document further identifies objectives of the Strategy. One of them addresses components of EBA in MSP requesting to ensure that uses of the marine environment are sustainable, through the integrated management of current and emerging human activities, including addressing their cumulative impacts. Indirectly, the Strategy also considers MSP requesting to consider relevant spatial and temporal information on human activities, pressures, sensitive receptors and habitats to establish measures and actions to prevent, reduce or otherwise manage impacts.

Overall, the work of the OSPAR Commission is guided by the ecosystem approach to an integrated management of human activities in the marine environment. The definition of the ecosystem approach was formulated in *the Joint Ministerial Meeting of the HELCOM and OSPAR Commissions* held in 2003 in Bremen (Germany).

Further guidance for application of the ecosystem approach in the North Sea region was given in *the Bergen Statement 2010*. In the Statement, the Ministers and the Member of the European Commission reaffirmed that the ecosystem approach is the overarching concept and basis for OSPAR's work. They emphasized that they would continue further development of tools that support the ecosystem approach, such as integrated assessments, socio-economic analysis and area-based management tools, including marine spatial planning. The document highlights crucial role of monitoring and assessment for EBA application recognizing large data and information gaps existing in the OSPAR area. Finally, the Statement stresses the role of cooperation with stakeholders and international organizations managing human activities.

EU policy framework

EU Maritime Spatial Planning Directive.

Objective - when establishing and implementing maritime spatial planning, Member States shall consider economic, social and environmental aspects to support sustainable development and growth in the maritime sector, applying an ecosystem-based approach, and to promote the coexistence of relevant activities and uses.

The application of an ecosystem-based approach will contribute to promoting the sustainable development and growth of the maritime and coastal economies and the sustainable use of marine and coastal resources.

The aim is to ensure that the collective pressure of all activities is kept within levels compatible with the achievement of good environmental status and that the capacity of marine ecosystems to respond to human-induced changes is not compromised.

An ecosystem-based approach should be applied in a way that is adapted to the specific ecosystems and other specificities of the different marine regions and that takes into consideration the ongoing work in the Regional Sea Conventions.
Maritime spatial planning is a tool to support the ecosystem-based approach to the management of human activities in order to achieve good environmental status of marine ecosystem.
In September 2021 CINEA published *Guidelines for implementing an Ecosystem-based Approach in Maritime Spatial Planning*. The document intends to describe a practical approach toward an Ecosystem-based Approach in Maritime Spatial Planning Including a method for the evaluation, monitoring and review of EBA in MSP. The guidance:

- presents an introduction to ecosystem-based concepts, principles and approaches.
- describes how work under the EU regulatory framework – including the MSF) – provides resources for EBA in MSP.
- presents a set of key actions to integrate EBA in the main steps of the MSP process.
- describes potential tools that can be applied as part of operationalizing EBA in MSP.
- provides an approach to monitor, evaluate and review progress in integrating EBA in MSP.

Finally, the guidance illustrates recommendations with examples derived from MSP case studies as well as references for users to further explore when integrating EBA into MSP.
The Marine Strategy Framework Directive aims to achieve Good Environmental Status (GES) of the EU's marine waters and to protect the resource base on which marine-related economic and social activities depend. In order to achieve this goal, the Directive establishes European marine regions and sub-regions on the basis of geographical and environmental criteria. Regional Sea Conventions (RSCs) set regional environmental targets and coordinate Member States' actions, including with those of third countries in the same region or sub-region.
The purpose of *the Water Framework Directive* is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater which contributes to the protection of territorial and marine waters and achieving the objectives of relevant international agreements. The knowledge provided by the WFD for land-based pressures on marine ecosystem is a part of the assessment of cumulative environmental pressure.
The Birds and Habitats Directives provide data on protected marine species as well as on protected areas, specifically those designated as Natura 2000 sites. The Natura 2000 site management plans, in particular, should provide detailed information on ecosystems within their boundaries, and potentially in a broader geographical context.
Monitoring and reporting obligations under *the Common Fisheries Policy* will deliver information on fish stocks and landings, as well as the spatial distribution of fishing vessels (through VMS) that can help in assessing current state and pressures imposed by fisheries.
Since MSP applying the ecosystem-based approach ultimately aims to achieve good environmental status of marine ecosystem, assessment of anticipated environmental effects of the plan is to be thoroughly considered. *The SEA Directive* establishes environmental assessment as an important tool for integrating environmental considerations into the preparation and adoption of plans and programmes. Since maritime spatial plans are likely to have significant effects on the environment, they are subject to Directive 2001/42/EC. The objective of this Directive is to provide for a high level of protection of the environment and to contribute to the

integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development. According to the Directive the environmental assessment shall be carried out during the preparation of a plan or programme and before its adoption or submission to the legislative procedure.

The EU Climate Low adopted in 2021 is primarily focused on the reduction of green-house emissions and achieving climate neutrality within the European Union (EU) by 2050. In this relation, the role of marine ecosystems, providing ecosystem services for carbon storage and renewable energy is of primary importance. EBA in marine special planning intends to ensure sustainable use of these services preventing deterioration of marine environment with subsequent ecosystem disfunction. The Law also aimed to enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change, ensuring coherency of adaptation policies and their mutual support.

Urgent needs for restauration of ecosystems to mitigate the global biodiversity crisis were formulated in the proposal for *the EU Nature Restoration Law*. The proposal combines an overarching restoration objective for the long-term recovery of nature in the EU's land and sea areas with binding restoration targets for specific habitats and species. These measures should cover at least 20% of the EU's land and sea areas by 2030, and ultimately all ecosystems in need of restoration by 2050.

The European Green Deal, approved in 2020, is a set of policy initiatives by the European Commission to improve the well-being and health of citizens and future generations. The Green Deal involves several environmental policies addressing climate change, pollution, biodiversity and ecosystem health and restoration. In the conclusions of the European Commission Report outlining the progress made in implementing Directive 2014/89/EU establishing a framework for maritime spatial planning (COM (2022) 185), MSP is considered as a powerful enabler for the European Green Deal. Furthermore, Member States will need to continue to reflect the ambitions of the European Green Deal in their maritime spatial plans, and to align their plans with these ambitions. The Report points out that future maritime spatial plans will have to cater for cumulative impacts of anthropogenic pressures by applying an ecosystem-based approach.

The European Union Strategy for the Baltic Sea Region (EUSBSR) is the first of the four Macro-regional Strategies in Europe. The Strategy is an agreement between the Member States of the EU and the European Commission to strengthen cooperation between the countries bordering the Baltic Sea. The Strategy is divided into three main objectives: saving the sea, connecting the region and increasing prosperity. Actions needed for the achieving of the Strategy's objectives are formulated an action plan, which is implemented by fourteen policy areas. Policy Area Spatial planning aims for territorial cohesion in the Baltic Sea Region by 2030, when the Region shall be better integrated and coherent macro-region. To achieve that, PA increases the knowledge on land-based spatial planning in the BSR and aims for coherent maritime spatial planning throughout the BSR, applying ecosystem-based approach.

Gap analysis of international framework for application of EBA in MSP

Good examples of the application of EBA in national MSP and respective difficulties which have been faced in the course of the national marine spatial planning process were compiled supplied by eMSP project partners and members of CoP on EBA in MSP to lay the basis for this gap analysis (A review of application of ecosystem-based approach in national MSPs to reveal challenges and compile good national practices). Further, documents and agreements related to the EBA application existing in the Baltic and North Sea areas were analysed to identify whether they properly address respective global, regional and EU policies and regulations. At the next step, the most comprehensive guiding document - the Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area (adopted in 2016) – was thoroughly investigated to identify its relevance to the modern knowledge base and policy landscape.

Two topics were considered separately in the gap analysis as they constitute the basis of the EBA in MSP. The first one is themes which are to be addressed when applying the EBA in maritime spatial planning. Another topic is existing guidance related to knowledge and data sufficient to develop ecosystem-based maritime spatial plan. These two themes together identify the thematical scope of national MSP process applying the EBA.

The European Green Deal, approved in 2020, was not considered in the past MSP cycle which in most countries had already been accomplished by that time. So, EBA related provisions of this key European policy document were in general not integrated in the previous national MSP cycles. This policy, including climate change as its intrinsic part, was considered in a separate section of this gap analysis.

Two additional documents were considered in addition to the above-mentioned policy framework. One of them is recommendations on the EBA application by the Pan Baltic Scope project published in 2018. The project developed recommendations to fill in gaps in the EBA related guiding documents. In this gap analysis their relevance to the current state of EBA framework was assessed. The other document used for the identification of gaps is the assessments of the application of EBA in MSP in the North and Baltic seas published by WWF. The document utilized a set of indicators to assess the application of the EBA. Indicators which scored zero points were of the highest interest for the gap analysis.

Finally, the document includes an evaluation of usefulness of various international documents for strengthening of the EBA framework. This evaluation is based on a survey carried out in the community of practice for the EBA in MSP consisting of about 50 representatives of public authorities, scientific organizations, non-governmental organizations and business community.

Major challenges in the application of EBA in MSP

Comparison of the North and Baltic Sea regional EBA frameworks

A majority of countries in the North and Baltic Sea regions are the EU member states, which in general identifies a commonality of the framework for the application of EBA in MSP. These countries are also contracting parties to the OSPAR and Helsinki Conventions respectively, which provide common ground for understanding of the ecosystem-based approach and to large extent goals which are supposed to be achieved in the marine spatial planning process.

However, the regional policy landscapes in these two regions have certain differences resulting from specificity of regional intergovernmental institutions. Primarily, this difference is caused by the establishing in the Baltic Sea region of a regional coordination platform jointly run by the Helsinki Commission (HELCOM) and the Vision and Strategies Around the Baltic Sea (VASAB). The goal of this platform called HELCOM-VASAB MSP Working Group is to ensure cooperation among the Baltic Sea Region countries for coherent regional Maritime Spatial Planning (MSP) processes in the Baltic Sea. Table 1 below illustrates commonalities and differences in the North Sea and Baltic Sea regional frameworks for the application of ecosystem-based approach in MSP.

Table 1. Commonalities and differences in regional EBA frameworks for the North and Baltic Seas.

North Sea	Baltic Sea
Commonalities	
CBD Definitions of the ecosystem-based approach	
The Malawi principles	
EU Policies (for the EU member states in NS and BS) and EU Guideline for EBA in MSP	
OSPAR Convention and Helsinki Convention	
Joint HELCOM and OSPAR definition of ecosystem-based approach (2003)	
Differences	
The North-East Atlantic Environment Strategy (NEAES) 2030 does not address MSP as a tool contributing to GES of the North Sea.	The HELCOM Baltic Sea Action Plan (BSAP) 2030 in the segment dedicated to cross-cutting issues specifically considers MSP as a tool contributing the effort to achieve GES.
-	Baltic Sea broad-scale MSP principles (2010)
-	The Regional Maritime Spatial Planning Roadmap 2030

-	Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area (2016)
	Guidelines on transboundary consultations, public participation and co-operation
-	Policy area Spatial Planning of the EU Strategy for the Baltic Sea Region

Gaps in the existing Baltic Sea EBA framework

Regional Baltic Sea policy framework for the application of ecosystem-based approach in marine spatial planning in addition to global and the EU documents includes several regional policy and guiding documents (see previous section). General guidance on how to apply EBA in MSP is given in Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area jointly adopted by HELCOM and VASAB in 2016. At that time the Guideline was the document synthesizing all valid policy documents related to the issue. However, as global and regional policy scape has been developed in the last 8 years, the document demonstrates gaps and requires revision. An analysis of gaps is given in table 2.

Table 2. Gaps in the Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area.

Addressed policies	Gaps
Global framework	No
Joint HELCOM and OSPAR definition of ecosystem-based approach (2003)	No
Helsinki Convention	No
Joint HELCOM–VASAB MSP Principles	No
Marine Strategy Framework Directive	No
HELCOM Baltic Sea Action Plan	Revision required, since new BSAP 2030 was adopted in 2021
EU Strategy for the Baltic Sea Region	Revision required, since new Action plan was adopted in 2021
	Regional MSP Roadmap 2030

	Water Framework Directive
	Birds and Habitats Directives
	SEA Directive
	Biodiversity strategy for 2030 -EU GD
	Proposal for a Nature Restoration Law – EU GD
	European Climate Law – EU GD
	Common Fisheries Policy

Key elements of ecosystem-based approach in MSP:

Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning identifies many elements of ecosystem-based approach in MSP originating from different sources and thus, belonging to different categories from basic theoretical principles to specific practical tools. Among such elements the Guideline mentions best available knowledge and practice, precaution, alternative development, identification of ecosystem services, mitigation and adaptation.

All these elements are of high relevance for the application of ecosystem-based approach in MSP, however, experience from the previous MSP cycles and compiled good MSP practices allow to systematically reconsider and regroup these elements for better coverage of the whole spectrum of aspects which ought to be accounted in ecosystem-based marine spatial planning. Proposed key EBA elements are:

- Inclusion of nature: nature conservation and cumulative impact within ecosystem carrying capacity.
- Ocean governance: aligning strategic policy goals with ecological objectives and targets.
- Social and economic considerations: utilization of ecosystem services and incorporating relevant human activities.
- Comprehensiveness and coherence: cross-border and cross-sectoral consideration.
- Adaptive management: forward looking approach and adaptation to emerging challenges.

These five elements are to be based on fundamental principles of ecosystem-based approach and MSP principles considering such cross-cutting issues as climate change.

MSP knowledge and data

Both the Malawi principles of the ecosystem-based approach and the joint HELCOM–VASAB MSP Principles for the Baltic Sea region identify the best available knowledge and practice as a vital basis for ecosystem-based MSP. It is recognized by the Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning. However, the document does not go further than declaration of these basic principles and giving an example derived from the assessment of the Baltic Sea environmental state.

Analysis of good practices of EBA application in MSP demonstrates a broad range of knowledge and data required for adequate planning the use of sea area. In general, required knowledge might be aggregated in three basic groups: state the environment and its components, human activities and environmental pressures caused by these activities. This approach is prominently demonstrated by the recently accomplished HELCOM HOLAS3 assessment with one significant remark. The assessment illustrates a snapshot of the state of the Baltic Sea marine environment, human activities and pressures for a certain period of time. It does not include a comprehensive projection for at least a decade. Nevertheless, the recommendations based on the HOLAS3 experience including methodological approach for cumulative impact assessment would be a valuable contribution to the international framework for EBA in MSP.

The best available knowledge is invariably based on the best available data. The data also serves for cross-border communication helping to ensure coherence of spatial planning cross borders throughout the entire sea basin. Significant progress has been achieved in standardization of MSP related data in the Baltic Sea region, which is reflected in respective documents prepared by HELCOM-VASAB MSP DATA Expert Group (e.g. HELCOM-VASAB Guidelines on transboundary MSP output data structure) and experience of utilizing HELCOM Basemaps portal as a regional MSP data hub. Good practices presented by eMSP project partners for the overview could be utilized as recommendations to improve MSP knowledge base and strengthen the ecosystem-based approach. Specific recommendations will be produced by study cases which are being developed in the same project. Following sources of information can be utilized to fill the identified gaps in:

- An indicative list of knowledge areas to be addressed. Recommendations based on knowledge compiled for (HOLAS III). Study case MSP for GES, MSP and MPAs
- Address recent developments of MSP data (results MSP DATA ECG and other).
- Provide recommendations on reference list of EBA data (eMSP LS on DATA).
- Exemplify good practices of obtaining scientific knowledge from national MSP processes (EBA overview).

EU Green Deal and ecosystem-based approach in MSP

The European Green Deal, approved in 2020, is a set of policy initiatives by the European Commission to improve the well-being and health of citizens and future generations. The Green Deal involves several environmental policies addressing climate change, pollution, biodiversity

and ecosystem health and restoration. Since the policy has been recently developed it has not been reflected in the international framework for EBA in MSP.

It has already been mentioned that three policies of the EU Green Deal are of high relevance for marine spatial planning and ought to be reflected in respective international framework. They are the Biodiversity strategy for 2030, the Proposal for a Nature Restoration Law and the European Climate Law. The latter requires specific consideration in the light of the ongoing discussion on the role of MSP in increasing climate change resilience.

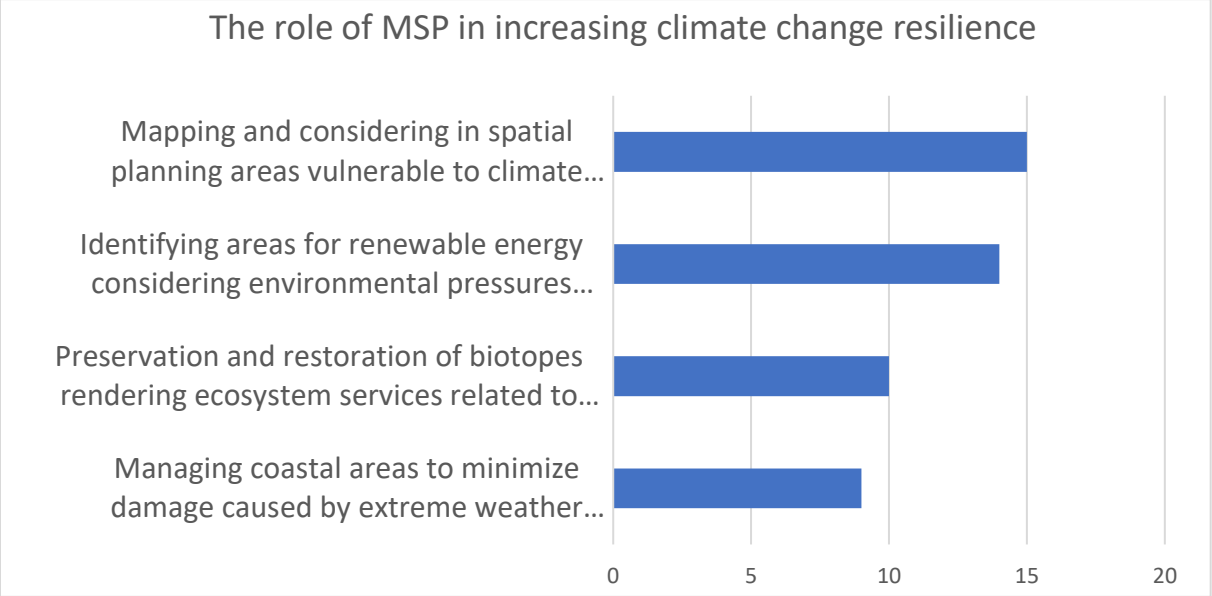
Particularly, addressing climate change requires to pay specific attention to adaptive management as one of the elements of EBA in MSP. Adaptive management, with regard to climate, is to make the MSP process capable to adapt to changing climate parameters; to consider changes of environmental pressures and ecosystem responses caused by climate change. At the same time, uncertainty of knowledge based on the environmental changes caused by climate change manyfold increases the importance of the precautionary principle as one of the basic principles of EBA in MSP.

The role of MSP in increasing climate change resilience

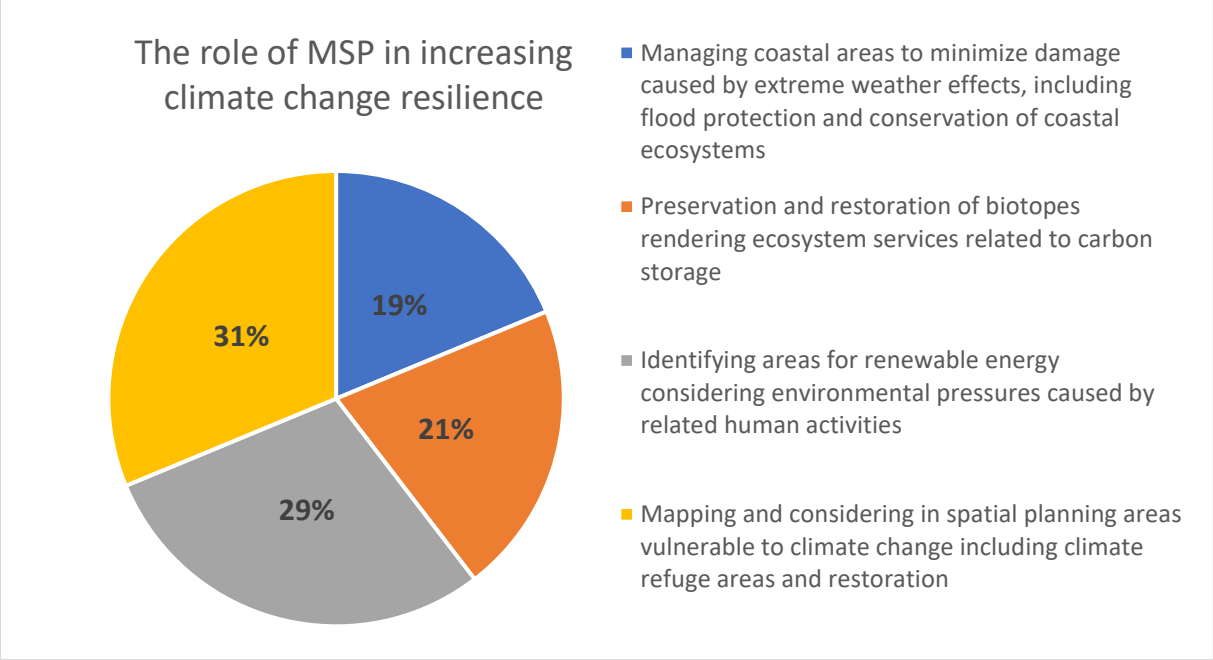
The role of MSP in joint effort to increase climate change resilience is one of the cornerstone questions of eMSP project. The overview of good practices of EBA application in MSP revealed four major ways how MSP is capable to address climate change:

- Mapping and considering in spatial planning areas vulnerable to climate change including climate refuge areas and restoration.
- Managing coastal areas to minimize damage caused by extreme weather effects, including flood protection and conservation of coastal ecosystems.
- Identifying areas for renewable energy considering environmental pressures caused by related human activities;
- Preservation and restoration of biotopes rendering ecosystem services related to carbon storage.

Figure 2. Identification of major role of MSP in increasing climate change resilience MSP (A-absolute number of responses, B-percentage).



A.



B.

Participants of the 4th meeting of CoP on EBA in MSP were invited to express their views on the priority role of MSP in climate change choosing three out of four roles or making their own proposal choosing "other" option. 48 answers to questions were received and one additional proposal was made. One of the participants pointed out that MSP should consider carbon capture storage in marine areas, and not just looking at blue carbon sequestration in terms of seagrasses, algae, and mud bottoms. Results of prioritization are shown in figure 2. In general, the study

demonstrates that all four identified tasks are of high relevance for marine spatial planning process.

PanBalticScope project recommendations for EBA in MSP

The Pan Baltic Scope project identified a number of areas needing further attention in order to strengthen EBA in MSP. These were highlighted in the project recommendations and addressed to specific target groups (see table 3).

Table 3. Relevance of PanBalticScope project recommendations on strengthening EBA in MSP for current gap analysis.

	EBA-recommendation from Pan Baltic Scope	Target groups	Still a GAP in 2023?
1	Develop tools and mechanisms for enhancing cooperation between different national administrative levels in marine planning and marine management to implement the ecosystem-based approach.	Planning authorities, Local and regional authorities, Sector authorities, Sector representatives, NGOs	Yes. Vertical national cooperation linking planning at different levels may be developed.
2	Integrate the ecosystem-based approach into sectoral planning initiatives to facilitate its implementation in MSP	Planning authorities, Local authorities, Sector authorities, Sector representatives, NGO	Yes. EBA in MSP may be strengthened through the integration of EBA in the sectoral planning taking place before or parallel to MSP.
3	Link MSP closer to the implementation of the Marine Strategy Framework Directive at national, transnational and HELCOM levels. Develop spatially related Good Environmental Status objectives that can be supported by MSP and used in Strategic Environmental Assessments.	Planning authorities, Policy makers, Sector authorities, HELCOM-VASAB MSP Working Group, Researchers	Yes. Spatializing MSFD-targets for GES is still a potential
4	Integrate cumulative impact assessment as a key component of the Strategic Environmental Assessment of maritime spatial plans.	Planning authorities, Sector authorities, Researchers	Yes. There is a need to harmonize application of cumulative assessments as part of SEA.
5	Develop a common understanding of the precautionary principle as part of adaptive management, as a part of	HELCOM, National governments, Planning authorities, Licensing authorities	Yes. Active management of uncertainty including adaptive management and

	handling uncertainties in planning in a similar way.		clear application of the precautionary principle still needs attention to strengthen EBA.
6	Evaluate cumulative impacts on green infrastructure, including foreseen future alterations of key habitats as a result of climate change.	Planning authorities	Yes.
7	Apply the green infrastructure concept in the MSP process to support implementation of the ecosystem-based approach, in steps such as stocktaking, development of spatial solutions and Strategic Environmental Assessment. This would increase relational understanding on marine ecosystem functioning and connectivity, as well as its contribution to societal benefits. The information on marine green infrastructure should be considered to guide away the potentially harmful developments from ecologically valuable or sensitive areas.	Planning authorities	Yes.
8	Use the most recent version of essential fish habitat maps, produced in Pan Baltic Scope, available at HELCOM.	Planning authorities	Yes
9	Further develop Essential Fish Habitats maps, by including more species and assessing changes under climate change, to support adaptive MSP.	Fishery agencies, Researchers, HELCOM	Yes
10	Produce up to date pan-Baltic maps on key components of the ecosystem – birds, mammals, fish, benthos – using the same approach applied in mapping Essential Fish Habitats in the Pan Baltic Scope project.	Environmental authorities, Researchers, HELCOM	Yes

11	Develop further the marine green infrastructure concept and mapping methods to increase the knowledge on functioning of marine ecosystem and relational understanding of socio-ecological systems. This should include the connectivity analysis as part of the ecological value mapping as well as more elaborated approach to ecosystem service mapping.	Researchers, HELCOM, HELCOM-VASAB MSP Working Group	Yes
12	Further develop pan-Baltic green infrastructure mapping approach to support cross-border coordination of planning solutions, in respect to ecological values, thereby improving the connectivity of the functionally interrelated parts of the ecosystems.	HELCOM, Researchers	Yes

In addition to the above mentioned gaps the Pan Baltic Scope project included a specific evaluation of the current HELCOM-VASAB EBA Guideline by the University of Gothenburg. The results were presented in a synthesis report (http://www.panbalticscope.eu/wp-content/uploads/2019/12/PBS-Synthesis-Report.pdf) based on a review of scientific literature, selected reports and pertinent guidance documents. The Guideline was assessed in the light of these sources. It was found to be fairly well aligned with the Malawi Principles for the Ecosystem Approach endorsed by the parties to the Convention on Biological Diversity. It was however noted that since both documents and in particular the Guideline are short on substance, limited guidance for the actual application of an ecosystem approach is achieved. The assessment of the Guideline in relation to the scientific literature on the ecosystem approach revealed significant room for improvement. This includes potential amendments aimed at dealing with uncertainty and precaution in a more systematic fashion, ensuring that public participation processes enable genuine two-way communication and avoid capture by particularly resourceful or articulated interests, as well as increasing transparency concerning trade-offs among users and interest. These are gaps in the international EBA-policy framework which eMSP should address.

What can be concluded from “zero” (WWF) assessment

An analysis has been carried out to see which WWF EBA-evaluation indicators have received the most zeros in the assessments for the North and Baltic seas. A high amount of zero values are considered to indicate that there is a gap in the implementation of the respective indicators.

Highest number of zeros for the North Sea countries were on the indicators “Areas for nature restoration included” and “Temporal and spatial uncertainties in the era of climate change addressed” both with five zeros out of six total. The assessment for the Baltic Sea countries also

gathered most zeros (nine of nine in total) for “Areas for nature restoration included”. The results are clear in showing that both restoration and climate change are gaps in EBA-implementation. Further results for the Baltic and North Sea assessment respectively are shown in tables 4 A and B.

Table 4. WWF’s EBA evaluation indicators which scored zero points (A-Baltic Sea and B-Norht Sea).

WWF indicator nr.	WWF indicator name	Number of zeros in Baltic Sea assessment (9 max)
8	Areas for nature restoration included.	9
19	Aligns with EU policies for reduction of noise pollution	6
6.C	Are there measures to connect and manage MPAs in a coherent network within the planning area, across countries and in regional sea basins?	5
	Blue Carbon ecosystems protected	5
13	Industry employment and income generation forecasted	4
29	Adaptive management framework applied	4
32	Tools for monitoring progress and aligning with key policies included	4
3	When data is missing/ insufficient, Precautionary Principle applied	3
6a	Are MPA management provisions included as priorities in the maritime spatial plan?	3
12	Sustainable blue economy objectives and finance principles defined	3
18	Aligns with EU policies for seafloor and habitat protection	3
1	Strategic environmental assessments (SEA) conducted	2
2	Consideration for Ecologically sensitive areas	2
5	Land-sea interactions identified and analysed	2
7	Essential marine habitats connected via blue corridors/green infrastructure	2
31	Essential marine habitats connected via blue corridors/green infrastructure	2

A.

WWF indicator nr.	WWF indicator name	Number of zeros in North Sea Assessment (6 max)

8	Areas for nature restoration included	5
17	Temporal and spatial uncertainties in the era of climate change addressed	5
5	Land-sea interactions identified and analysed	4
7	Essential marine habitats connected via blue corridors/ green infrastructure	4
10	Marine ecosystem services assessed and included	4
13	Industry employment and income generation forecasted	4
3	When data is missing/insufficient, Precautionary Principle applied	3
9	Blue Carbon ecosystems protected	3
11	Risk in conflicts among users addressed	3
14	Sea use by fisheries assessed and included	3
31	Sustainable multipurpose use through time and space included	3
2	Consideration for ecologically sensitive areas	2

B.

Which documents are the most useful for strengthening the international EBA framework

Identification of documents which are, from stakeholders' point of view, useful to strengthen the application of ecosystem-based approach in MSP was one of the tasks of this gap analysis. Four documents which eMSP project can contribute to were considered as tools for strengthening the international EBA framework. Though, there is clear understanding that these documents or tools cannot be developed and approved in the project's lifetime, this assessment helps to tailor deliverables of the Learning Strand on Ecosystem-based approach in MSP to support the development of prioritized documents.

Participants of the CoP were invited to prioritize documents/tools which can be used to strengthen the EBA framework choosing among the proposed options:

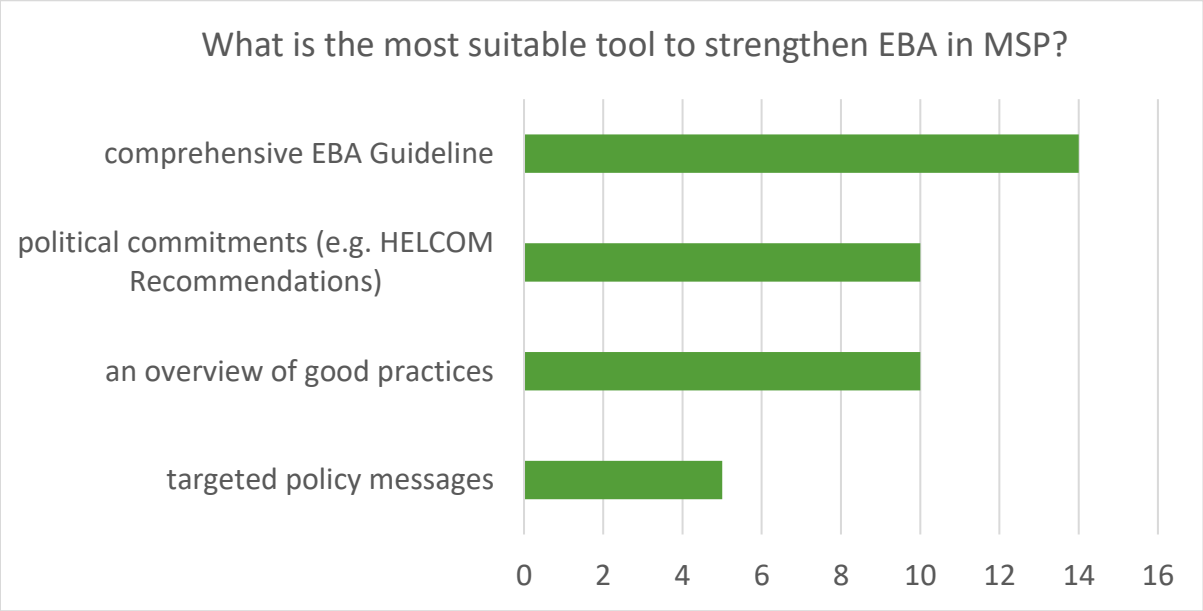
- an overview of good practices
- a comprehensive EBA Guideline
- political commitments (e.g. HELCOM Recommendations)
- targeted policy messages
- other

An alternative "other" option was included in the survey. Those who selected this option were invited to describe an alternative document/tool.

39 responses prioritizing of the proposed tool were received. The survey demonstrated that a comprehensive EBA guideline was considered as the most efficient tool supporting the application of EBA in MSP. An overview of good practices was equally valued as international

policy commitments. Targeted policy messages were considered as the least efficient tool. As an alternative tool, an agreed methodology to assess and implement EBA and concrete instruments to facilitate the application of EBA for stakeholders/policymakers were proposed. The results of prioritization are summarized in Figure 3.

Figure 3. Prioritization of tools to strengthen the application of EBA in MSP.



Case study – MSP for spatial protection

Summary

The case study “MSP for Spatial Protection” is a part of the eMSP NBSR project’s learning strand “Ecosystem-based approach in MSP”. The aim of the case study is to enhance connections and foster a better understanding between the maritime spatial planning (MSP) community and the nature conservation community.

To do this, we launched a survey to investigate the national approaches to coordinate MSP and nature conservation within the eMSP NBSR countries. The results indicate that MSP has a role in nature conservation planning, but this could be improved. Moreover, the administrations are separate, and in some countries, weakly coordinated, stressing the need for policy integration and coordination.

Building on the results from the survey, a workshop was organized to collect additional ideas on how to strengthen the linkages between the MSP and nature conservation authorities. The outcome of the workshop resulted in ten key points offering a comprehensive structure to bolster collaboration between MSP and nature conservation authorities. They underscore the significance of ongoing dialogue, trust-building, forward-thinking approaches, financial backing, shared goals, legal coherence, educational initiatives, inclusiveness, and integration with current networks. Implementation of these principles can result in more impactful and sustainable collaboration, ultimately fostering mutual benefits for maritime spatial planning and nature conservation activities.

Aim of the case study

The administrative bodies responsible for maritime spatial planning and marine nature conservation are generally not integrated. These tasks are often delegated to different branches of administration (B. Trouillet and S. Jay, 2021) (J. Reimer, at al, 2023). An increased collaboration could strengthen the ties between these activities. This case study aims to improve the linkages and develop the understanding between the maritime spatial planning (MSP) community and the nature conservation community on the relationship between MSP and marine spatial protection.

Objectives

The overall objectives of this case study are:

1. Survey: Conduct a comprehensive survey on national strategies for coordinating MSP and nature conservation efforts.

2. Workshop Coordination: Organize a physical workshop to unite the MSP and marine spatial protection communities, using the survey outcomes to address critical questions.

3. Reporting and Recommendations: Synthesize the results of the survey, and the workshop discussions, providing recommendations tailored for MSP and nature conservation authorities.

Background

Protected areas are often established to promote the conservation of marine biodiversity but can also be used to benefit other interests, such as fisheries and recreation, depending on the strictness of protection aimed at (N. Dudley, 2008). On the other hand, MSP has a broader scope, providing an overall framework for managing activities in the marine environment. Nature conservation policies are changing to combat the progressing loss of biodiversity. The contracting parties of the Convention on Biological Diversity (CBD) agreed in 2022 on the Global Biodiversity Framework 2030 (GBF) that will protect 30% of the land and sea areas (Kunming-Montreal Global Biodiversity Framework). The EU Biodiversity Strategy has the same goal of reaching a 30% coverage of protected areas, of which one third will be 'strictly' protected, by 2030. The EU, thus, has a more ambitious goal with its emphasis on the need for strict protection. Both in the CBD's agreement and in the EU Biodiversity Strategy, the 30% area may consist of protected areas or other effective (area-based) conservation measures (OECM). In 2022–2024, the national 'pledges' for implementing the Biodiversity Strategy will be introduced and coordinated between the member states.

This is a clear increase in the ambition to protect the marine environment. Still, its effect depends on how the protection is designed and if management and monitoring occur in accordance with current EU directives. The quality of protection is crucial, and we need to review what human activities are allowed in the area (K. Grorud-Colvert et al., 2021). Protecting 30% of the marine environment does not equal that the requirements and goals set in the EU's Birds and Habitats directives, Marine Strategy Framework Directive (MSFD), the Biodiversity Strategy, and the United Nation's GBF are automatically fulfilled. Nor does it guarantee the objective of marine protection: preserved biodiversity and continued sustainable exploitation of marine resources.

As the sea is an arena for various commercial interests, ensuring that activities within the blue economy are performed within an ecosystem-based approach right from the start is essential. Marine areas are less investigated than land areas. Better mapping of marine ecosystems and protected areas is required to make informed decisions. The MSP directive highlights the MSFD and its objectives of ensuring good environmental status in the European sea basins. MSP can be an important tool to contribute to preserving marine biodiversity through strategic planning.

Survey on coordination of marine spatial planning and nature conservation

In May 2022, a survey was distributed to the authorities responsible for national MSP planning and nature conservation in the eMSP NBSR project member countries. The purpose of the survey

was to understand, at the time, the current practices of coordinating/integrating MSP and marine nature conservation. The objective was to have each country's MSP authorities or respective experts complete a survey, collecting background information and viewpoints that would aid in planning an upcoming workshop on nature conservation and MSP.

In 2022, all participating countries had completed at least one round of MSP planning, with most of them having recently finalized/updated their MSP plans. Nature conservation had been addressed in the MSPs, with countries having adopted slightly different approaches. However, information hadn't been collected, nor had countries been compared yet using a common framework.

It was also recognized that nature conservation policies were undergoing changes, with ambitious objectives laid out in the EU Biodiversity Strategy. It is anticipated that a lot will change in a few years, and it will have implications for MSP. To comprehend the alterations concerning MSP, a description of the current situation was needed. In the survey, the term “MPA” (marine protected area) was used to address any type of a protected area at sea.

Questions for the survey

Questions were formulated under four themes:

- Responsibilities in marine nature conservation
- Relationships between MSP and MPA processes
- Inclusion of MPAs and high nature values into MSP plan
- Transboundary dimension

Responsibilities in marine nature conservation

The overall objective of this section was to gather comprehensive information and insights pertaining to how marine conservation and MSP decision-making and planning are organised in each country. This included identifying responsible authorities for marine nature conservation and MSP, understanding their roles and responsibilities in conservation efforts, assessing the involvement of MSP authorities in the implementation of the EU Biodiversity Strategy, determining the current proportion and status of protected areas in both the territorial sea area and Exclusive Economic Zone (EEZ), and exploring the existence and definition of Other Effective Area-based Conservation Measures (OECM) in each country.

Relationships between MSP and MPA processes

This section aimed to elucidate whether the conservation objectives are encompassed within the country's MSP objectives. Moreover, it sought to assess the extent to which MSP planning serves as the process and mechanism for planning and executing nature conservation initiatives at sea within the country. This involved examining whether MSP plays a central role or merely aligns with predetermined strategies and designations derived from nature conservation processes.

This section delved into the temporal dimension, to determine the maturity or readiness of the MPA network at the point when MSP planning was started, since MSP has typically been started

much later than MPA planning (J. Reimer, at all., 2023). The questions in this section also explored potential linkages between MSP and OECMs. Furthermore, it aimed to examine possibilities for further integration of MSP and MPAs in future planning and management, while identifying and delineating the bottlenecks that may hinder such integration.

Inclusion of MPAs and high nature values into MSP plan

This section evaluated how MSP accounts for various aspects of nature conservation within the designated plans of each country. This encompassed assessing the incorporation of MPAs, OECMs, and other conservation strategies within the MSP plans. This section thus advanced from MSP planning or the MSP system to the level of MSP plans and related documents.

The survey examined whether the MSP plan visually represents areas of high nature value that aren't designated as protected areas or conservation measures and investigated the inclusion of blue corridors or green infrastructure areas in the MSP plan's mapping, indicating consideration of ecological connectivity between MPAs on a larger scale.

Transboundary dimension

The primary objective of this section was to examine the collaborative efforts and potential strategies for enhancing international cooperation in addressing nature conservation aspects within the scope of MSP. The survey explored the avenues for further strengthening transboundary cooperation, specifically concerning MPA networks, and understanding the potential roles of MSP authorities in facilitating this cooperation.

Moreover, this section assessed the contributions of HELCOM and OSPAR in the Baltic and North-East Atlantic regions, respectively, to strengthen the link between MSP and MPAs, alongside exploring how the broader scope and policies of the European Union (EU) could enhance this connection.

Results of the survey

Responses were submitted from France, Denmark, Germany, Poland, the Netherlands, Sweden, Finland, and Åland (an autonomous region of Finland), and provided insightful findings on the integration and roles of authorities in MSP and spatial protection.

Responsibilities in marine nature conservation

The analysis reveals a varying degree of integration within authorities handling MSP and spatial protection. Countries such as France, Poland, Sweden, the Netherlands, and Åland exhibit a higher level of integration compared to Denmark, Germany, and Finland. In France and the Netherlands, the authorities responsible for both MSP and nature conservation are the most closely integrated also in relation to implementation of the EU Marine Strategy Framework Directive, which is further strengthening the environmental dimension of MSP.

We asked as a concrete example about the integration, what roles the MSP authorities might have in the then on-going preparation of national ‘pledges’ to implement the EU Biodiversity Strategy. Germany, the Netherlands, and France stand out for the direct involvement of MSP

authorities in the process. Contrarily, most countries solely consult MSP authorities. In Poland, due to legislative reasons, the MSP authorities were not involved in preparing the biodiversity pledges. The MSP authorities were limited out of the scope of consultation.

Relationships between MSP and MPA processes

The survey further delved into the role of MSP in nature conservation planning. France demonstrates a clear role for MSP in establishing new MPAs, while the Netherlands incorporates conservation objectives into the MSP program to support ecosystem-based MSP. For other countries, MSP plays a complementary role or simply incorporates the existing plans for nature conservation. Germany provides a promising example of how MSP is an adaptive process. Notably, Germany's latest MSP process (2021), based on an Ecosystem-Based Approach (EBA), extends beyond this, encompassing nature conservation perspectives to larger extent than the previous MSP plans.

Regarding the establishment of OECM areas, France, Sweden, and Finland have made notable progress in linking MSP to OECM areas. Other countries are still in the process of defining national OECM areas and exploring their integration with MSP.

Inclusion of MPAs and high nature values into MSP plan

	Inclusion of MPAs and high nature values into MSP plan													
		Types of protected areas												
	MPAs included in the MSP plan	Natura 2000 areas	Ramsar	Nature reserve	MSFD MPAs	HELCOM MPAs	OSPAR MPAs	Porposed MPAs	National MPAs	EBSA areas	International Bird Areas	Other types	High nature value areas included in MSP plan	MSP includes areas for ecological connectivity
Finland	no	yes	yes			yes	no	no	yes	yes	yes	yes	yes	yes
Åland	yes	yes	yes	yes		yes	no	no	yes	no	yes	no	yes	no
Sweden	yes	yes		yes	yes	yes	yes		yes			yes	yes	yes
Poland	yes	yes				yes							yes	no
Germany	yes	yes							yes				yes	no
Denmark	yes	yes	yes	yes	yes	yes	yes	yes					no	no
France	yes	yes	yes	yes			yes					yes	yes	no
The Netherlands	yes	yes			yes								no	no

Nature conservation consideration outside protected areas

The responses from various countries highlight commonalities in the integration of nature conservation considerations outside of MPAs within the context of MSP.

- Finland emphasizes the alignment of hunting areas for invasive mammals with the goals of the Marine Strategy Framework Directive (MSFD). Additionally, the identification of migratory routes for fish is highlighted as a conservation measure.
- Åland indicates an inclusion of nature conservation aspects outside of MPAs in the MSP-maps under the category of "valuable nature, culture, and environment."
- Sweden employs small n-area designations to signify the need for particular consideration of high nature values outside of MPAs.
- Poland designates specific areas within MSP with the primary function of protecting the environment and nature, enabling the implementation of nature conservation provisions even in areas with other primary functions.
- Germany's MSP includes measures such as Priority areas for species protection (divers), Reservation areas for species protection (covering diverse species including divers, harbor porpoise, and bird migration corridors), and a coherence measure involving the temporary exclusion of installations. These measures extend beyond traditional MPAs.
- The Danish Maritime Authority (DMA) plays a role in coordinating between MSP and spatial protection measures. Political agreements, such as establishing a trawl-free area, are included in the negotiation process within the MSP framework.
- France's MSP, both inside and outside MPAs, involves a comprehensive survey of ecological stakes in the marine region. Prioritization in different sectors based on conservation importance is done, with specified vocations aligned with environmental and socioeconomic stakes.
- The Netherlands highlights the role of the Nature Conservation Act in guaranteeing the conservation of species and habitat types falling under the Birds and Habitats Directives. Strict requirements for permits or exemptions are imposed for activities affecting protected species or Natura 2000 areas.

In conclusion, the common denominators among the surveyed countries include a commitment to integrating nature conservation considerations into MSP, employing designated areas, implementing specific conservation measures, and coordinating efforts across various directives and frameworks to achieve and maintain Good Environmental Status (GES). These findings underscore the importance of a holistic and collaborative approach to safeguarding marine ecosystems. The survey underscores the diverse approaches and levels of integration in MSP and spatial protection across European nations, shedding light on the multifaceted roles of MSP in conservation planning and the ongoing efforts to establish OECM areas in alignment with MSP.

Collaboration with neighbouring countries in handling the nature conservation dimension of MSP

Multiple countries mention the involvement of neighboring countries during consultation phases, such as Finland, Denmark, Germany and France. Several countries actively participate in

regional sea organizations (e.g., HELCOM-VASAB MSP WG and VASAB), indicating a shared commitment to regional collaboration (Poland and Germany).

Finland notes varying approaches as a challenge, and Germany mentions differences in national legal frameworks affecting MSP plans, although the plans can still be functional coherent. This suggests common difficulties related to diverse approaches. Both Sweden and Poland highlight joint expert workshops and projects, indicating a shared interest in addressing common environmental challenges.

Multiple countries emphasize the importance of continuous dialogue with neighboring countries, reinforcing the idea that ongoing communication is a key aspect of successful collaboration. While there are differences in the extent and nature of collaboration, these commonalities suggest a shared recognition of the need for cooperation in handling the nature conservation dimension of MSP.

The role of HELCOM and OSPAR in strengthening the MSP-MPAs linkage

HELCOM and OSPAR can strengthen the linkage between MSP and MPAs by:

1. Utilizing their rich knowledge, including maps, to a higher degree and playing a vital role in transboundary cooperation on MPA-networks.

2. Continuing to support MPA and MSP networking and collaboration among partner countries.

3. Participating in MSP consultation processes through expert groups to propose information and solutions.

4. Clarifying competencies, recognizing that, at least in Germany's EEZ, MSP supports nature conservation planning without designating MPAs.

5. Learning from other countries about the division of tasks between MSP and nature conservation and coordinating nature conservation efforts among countries.

6. Focusing discussions within existing groups, like HELCOM-VASAB, on how nature conservation is integrated into MSP.

7. Leveraging protocols developed under the OSPAR Convention for monitoring and assessing the environmental status in MSP, such as evaluating the efficiency of measures in the French MSP Action Plan.

The role of EU in strengthening the linkages between MSP and MPAs

To enhance the linkage between MSP and MPAs, suggestions for EU contributions include:

1. Avoiding additional regulations, promoting national approaches, and welcoming informal guidance.

2. Continued EU support for collaboration projects and emphasizing nature protection through the EU Biodiversity Strategy.

3. Sharing experiences, developing guidance, and strengthening the interlocking of MSP and MSFD.

4. Facilitating an exchange of ideas on nature protection in MSP.

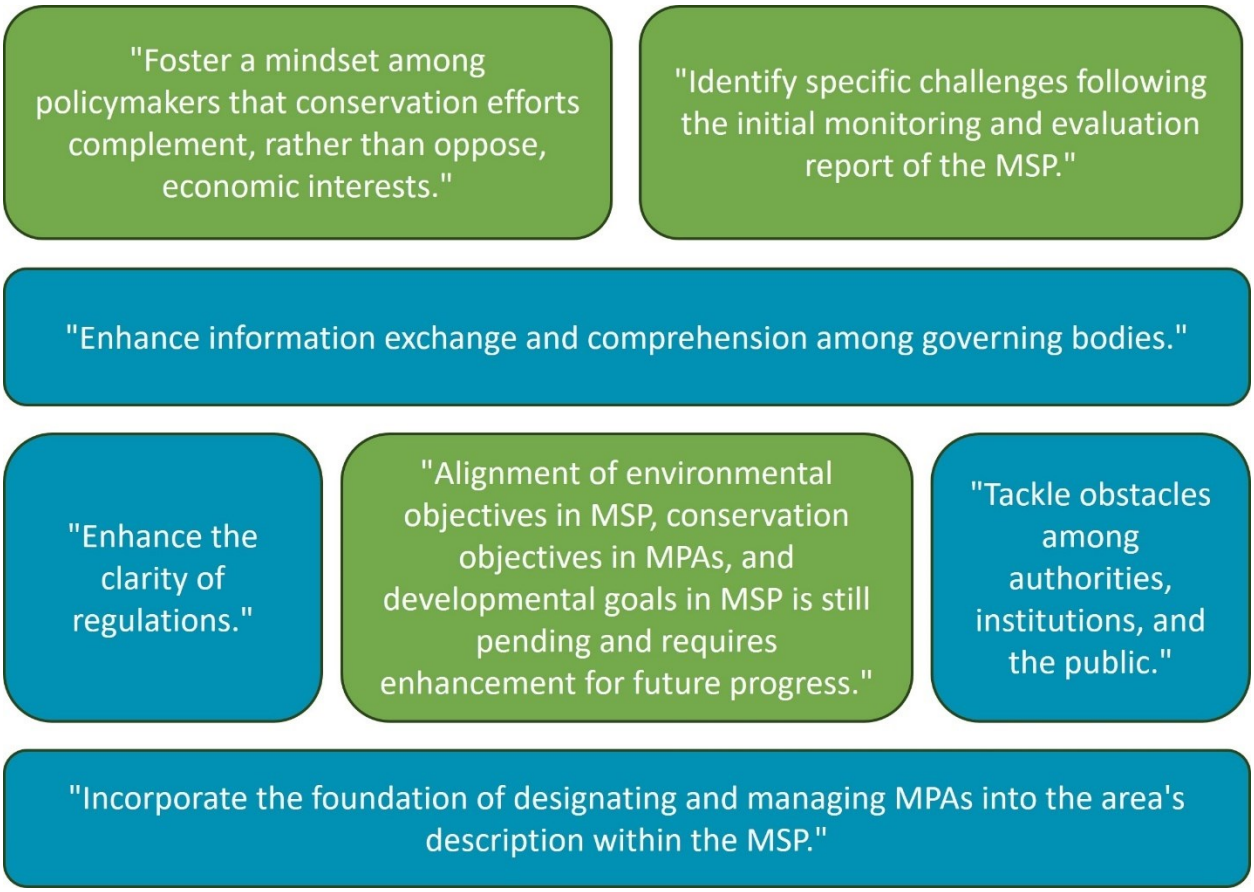
5. Promoting policy coherence and coordination among member states, including guidance, stakeholder engagement, research support, and common standards.

6. Engaging in a targeted dialogue for a coherent MPA network

Proposals for improvement

Among the survey responses, some proposals for improving the linkages between the MSP community and the nature conservation community were collected. These are displayed in figure 1.

Figure 1. Proposals for improving the linkages between the MSP community and the nature conservation community.



Refining the survey results in a workshop

A workshop to elaborate on key recommendations on integration of MSP and spatial protection was organised in June 2023 as part of a two-day workshop on the ecosystem-based approach to MSP. The contents for a workshop were planned based on the proposals for improvement identifies from the survey responses. The survey results were summarised as four messages:

- Increase awareness about MSP among nature conservation authorities – and vice versa.
- Develop stronger political will for the integration to include biodiversity consideration in MSP.
- Organise interaction between the authorities to address and solve institutional barriers.
- Clarify regulations to strengthen the coordination.

These four categories gave a starting point for discussions at the workshop. The participants were divided into three physical groups and two online groups. The groupworks generated 149 comments which were synthesized to yield the overall recommendations from the case study.

Conclusions/Recommendations

In the endeavour to strengthen the collaboration between MSP and nature conservation authorities, the workshop yielded a consensus on the top ten major points that are instrumental in enhancing the effectiveness of these two vital sectors working together:

1. Regular meetings: A foundational element in promoting synergy between MSP and nature conservation authorities is the establishment of regular mandatory meetings. These meetings serve as a structured platform for constant dialogue, ensuring that collaboration becomes a continuous process rather than a sporadic effort.

2. Awareness and trust: Building and sustaining awareness and trust between the two sectors is essential. The interplay between MSP and nature conservation often involves complex and interdependent issues, making trust and understanding a linchpin for successful collaboration.

3. Long-term responsibilities: Encouraging authorities to embrace responsibilities that transcend their current mandates is crucial. Addressing maritime and conservation challenges often necessitates a long-term perspective, and authorities need to consider the broader implications of their actions.

4. Funding and budgeting: Adequate budget allocation is essential to sustain collaboration. Financial support ensures that people and connections remain active, and resources are available to drive collaborative initiatives effectively.

5. Shared planning: Emphasizing shared topics and management planning fosters the alignment of goals. When MSP and nature conservation authorities collaborate on common objectives, the impact is more significant and synergistic.

6. Legislation and gap analysis: Regularly assessing legislation and conducting gap analysis is a proactive approach to identifying barriers to collaboration. This ongoing evaluation helps pinpoint areas that may require legal or policy adjustments to enable seamless cooperation.

7. Communication and education: Effective communication is vital at all levels, ranging from educating children about MSP and conservation to providing planners with the tools and knowledge to make informed decisions. Informed stakeholders are better equipped to support collaborative efforts.

8. Synchronize timelines: Aligning the timelines of MSP, the Water Framework Directive (WFD), and the Marine Strategy Framework Directive (MSFD) is imperative. A harmonized schedule ensures that the strategies and objectives of these interconnected processes complement each other.

9. Inclusivity: Maintaining an informed and inclusive forum that involves all stakeholders is fundamental. Collaboration should not be exclusive; it should encompass various voices and perspectives to produce well-rounded solutions.

10. Integration and networking: Strengthening collaboration involves seamlessly integrating with established local networks and organizing region-specific seminars and public engagement initiatives. This geographically grounded approach ensures that the benefits of collaboration are felt directly within the community, fostering a sense of ownership and enthusiasm, especially among local stakeholders and children.

To summarize, these ten major points provide a comprehensive framework for enhancing the collaboration between MSP and nature conservation authorities. They emphasize the need for continuous dialogue, trust-building, long-term thinking, financial support, shared objectives, legal alignment, education, inclusivity, and integration with existing networks. When put into practice, these principles can lead to more effective and sustainable collaboration, ultimately benefiting both maritime spatial planning and nature conservation efforts.

Case study – MSP for good environmental status

Aim and objectives of the case study

The aim of this case study is to investigate the ways Marine Spatial Planning (MSP) can contribute to the Good Ecological Status (GES) of the sea as defined by the Marine Strategy Framework Directive (MSFD). The case study will look at marine indicators used in MSFD reporting to:

- Investigate which indicators are related to pressures that MSP can influence.
- Review the current sets of indicators by collecting and distilling background information on them, issues affecting the indicators and assessing whether MSP can affect those issues.
- Examine whether the current indicators can be used in evaluating MSP contribution to GES.

The working hypothesis of the case study is “An indicator measuring a pressure or describing a state affected by an activity within the scope of MSP can be used in evaluating MSP effects on GES, if sufficient data in both spatial and temporal scales exist.”, and to accept or refute it, we will examine factors affecting the indicators and their possible use from the point of view of the human pressures within MSP scope.

Background

The EU Marine Strategy Framework Directive (MSFD) defines Good Environmental Status (GES) as the condition where marine waters "*provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive*." This aims to ensure that Europe's seas maintain a balance of health, productivity, and ecological diversity. The MSFD outlines 11 qualitative descriptors, providing a general framework and allowing flexibility for the member states to define more detailed criteria and methodological standards (Table 1).

Table 1. Qualitative descriptors for determining good environmental status in the MSFD (EU, 2008). The right column classifies the descriptors according to presence of corresponding pressure or state criteria/attributes within the descriptor (following the DPSIR framework). (Berg et al 2015.)

MSFD descriptor	*Short name*	*Classification*
Biological diversity	D1	State
Non-indigenous species	D2	Pressure/state
Commercially exploited fish and shellfish	D3	Pressure/state
Marine food webs	D4	State
Human-induced eutrophication	D5	Pressure/state
Sea floor integrity	D6	Pressure/state
Hydrographical conditions	D7	Pressure/state
Concentrations of contaminants	D8	Pressure
Contaminants in fish and other seafood	D9	Pressure
Marine litter	D10	Pressure
Energy, including underwater noise	D11	Pressure

The EU Maritime Spatial Planning Directive (MSPD) focuses on managing and coordinating spatial uses of the seas and oceans among EU member states to ensure compatibility and sustainability of human activities at sea. The directive allows for a degree of interpretation, enabling member states to adopt varied approaches in its implementation. This flexibility means that the resulting Marine Spatial Plans across the member states can hold diverse legal standings. While this provides countries with room to tailor their plans to specific national or regional contexts, it also means that some of these plans might not have a legally binding status. Consequently, the weight and enforceability of each MSP can vary, leading to a wide variety in how MSP guidelines are applied and upheld across different regions. In addition, many of the human activities within MSP are governed by other EU sectoral policies such as the common fisheries policy or are regulated through other regional or international treaties as in the case of maritime traffic.

MSP and environmental indicators

Indicators in the MSFD context

In the Finnish national reporting for the MSFD, the state of the marine environment and pressures affecting the sea are assessed through indicators that describe the achievement of GES and how far away it is.

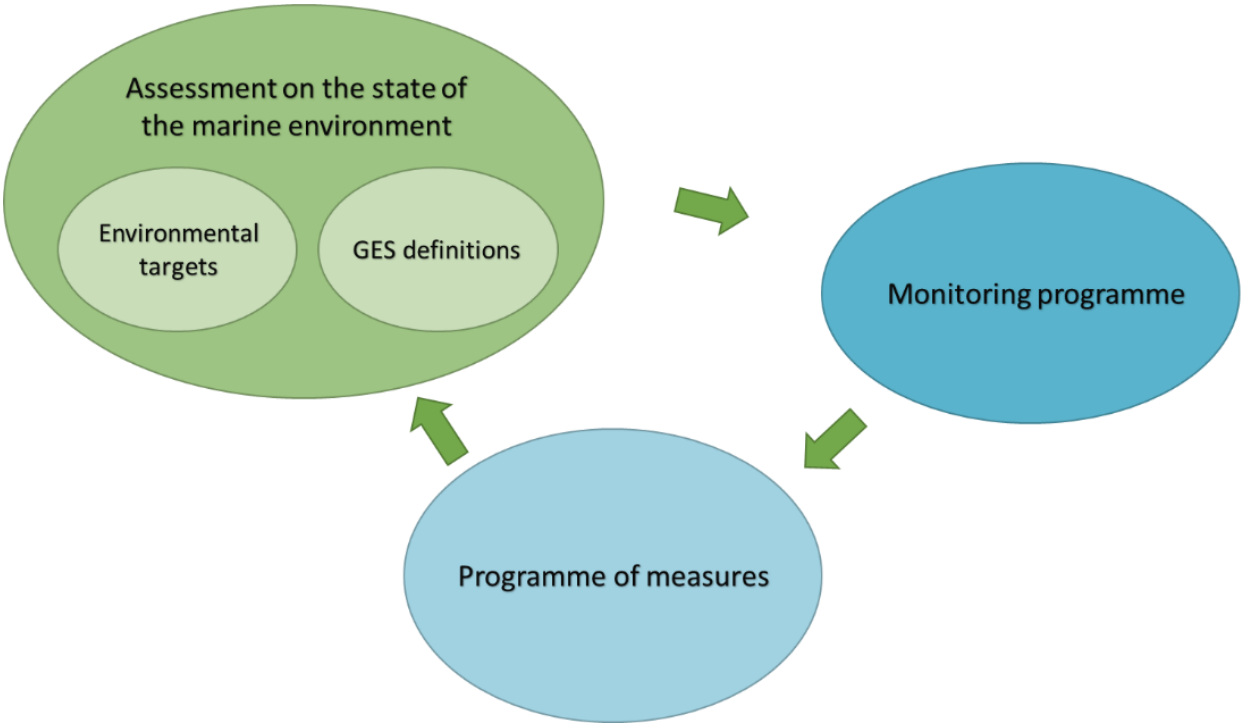
The indicators have either been set specific threshold values, or a written description or a trend-based definition has been created to describe how the achievement of GES is achieved. The number of indicators varies between the descriptors. Indicator information is supplemented with other monitored data to e.g. illuminate cause-and-effect relationships or impacts on species and habitats, or to strengthen the main message of the indicators. In the Baltic Sea the member states have developed indicators for marine status in the in collaboration with HELCOM and harmonized the gathering of requisite monitoring data.

The indicators used in Finland's MSFD reporting mainly follow common HELCOM indicators for the Baltic Sea with national indicators being used to complement the information in some marine areas. The primary objective of the marine indicators is to determine whether the status of the marine environment is "good" and secondarily the amount of the deficit if "good" status is not reached. The term "poor" is used for a status that is worse than "good". Because the status information provided by dozens of variables is complex, the assessment of larger entities has been implemented with assessment tools developed by HELCOM. These tools integrate indicator information and provide an overall picture of eutrophication, biodiversity, and the status of harmful substances. On coastal water areas, good status estimates have been integrated with the EU Water Framework Directive (WFD) classification. This applies especially to the status assessments of eutrophication, harmful and dangerous substances, and hydrographic changes. Status assessments of marine habitat types and species mentioned in the EU's Habitats Directive (HD) follow, as applicable, the favorable conservation status assessments of the Habitats Directive.

In general, the MSFD does not seek to replicate existing legislation and rather brings together many different sources of data and indicators, which are used in e.g., the reporting of other EU directives such as the WFD, HD and Birds Directive (BD).

Most indicators used in the Finnish MSFD reporting can either be classified as pressure or state indicators, and while this also applies to some of the 11 qualitative descriptors in the MSFD, many of the descriptors fall into both categories (Table 1). In the Finnish MSFD reporting (Figure 1) a third type of indicators are the environmental target indicators which aim to measure whether the environmental targets set in the assessment of the marine environment have been achieved.

Figure 1. MSFD management cycle. Adapted from Korpinen et al 2018 (p.39).



An example of these three types of indicators is shown in Table 6. Essentially, indicators can be seen as tools used to transform data into meaningful information, aiding in the interpretation of environmental conditions. In this example, data on nutrients details the amount entering the sea and their concentrations within seawater. To make this data applicable for analysis and decision-making, it is processed into indicators. This involves taking the data and assigning threshold values to determine nutrient levels in relation to established standards. If nutrient levels exceed these thresholds, the indicators signal potential concerns. In this way, indicators are derived from data combined with decisions on its representation, facilitating a clearer understanding of environmental conditions.

Indicator type	*Pressure*	*State*	*Environmental target*
Number of indicators	23	96	29
Example	Nutrient loads into the Baltic Sea	Nutrient concentrations in sea water	Trend of nutrient loads into the Baltic Sea

Table 2. Indicator types used in the Finnish MSFD reporting.

Relevance of environmental indicators for MSP

While considering what kind of a framework the existing MSFD indicators should be evaluated in to assess their utility for MSP, four main criteria surfaced (Figure 2) from scientific literature.

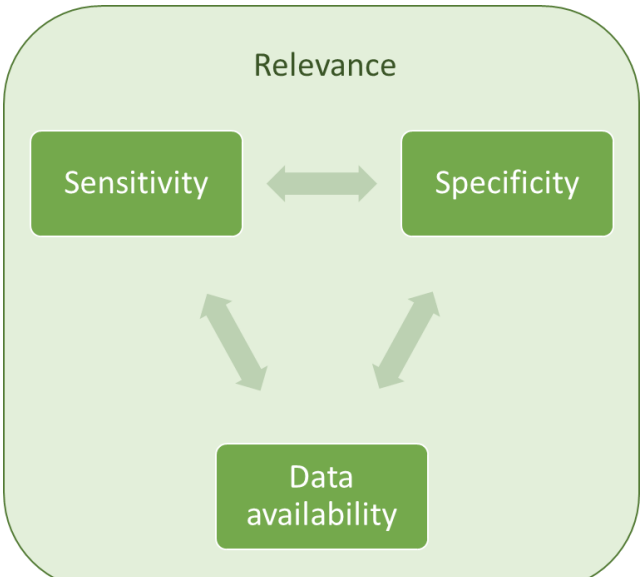


Figure 2. Indicator assessment framework

The first, overarching element is *relevance*, which determines whether the indicator is relevant for MSP by describing an aspect of GES that can be influenced by MSP.

The three other properties to consider are *sensitivity*, *specificity* and *data availability*. Sensitivity defines whether the indicator can detect changed in the parameter that may be caused by MSP activities and both sensitivity and specificity affect its ability to differentiate between sources of changes to the parameter, such as anthropogenic activities or natural changes. Data availability affects both, defining whether long-term and high-quality data is available on relevant spatial scales.

The focus of this assessment will be on the relevance of the MSFD indicators for MSP. Assessing the sensitivity, specificity and data availability of indicators will be discussed briefly.

As mentioned earlier, the wording of the MSPD allows for a variety of approaches in the legal standing of a member state's plan, making it challenging to gauge what are the human activities that MSP can affect. For the purposes of this exercise, in the first phase of assessing indicator relevance we shall assume that if a human activity is mentioned in the marine spatial plan, the indicators related to it are relevant as per our assessment framework.

The HELCOM-VASAB Baltic Sea Region MSP Data Expert Group has produced The Guidelines on transboundary MSP output data structure, a recommendation on the types of sea uses a Marine Spatial Plan in the Baltic Sea should contain. To link these sea uses to indicators the sea uses were first assigned to the activities listed in TAPAS Human Activities – Pressures Matrix. To simplify the process, all professional fishing activities were assigned to the category industrial fishing. If the effects of fishing are to be studied in-depth, this needs to be reconsidered as in reality there are large differences in the pressures and effects caused by benthic and pelagic fishing methods, and some methods are not in use in all areas – e.g. bottom trawling is not used in the Northern Baltic Sea. Extraction of metal ores was added as a sea use and marine plant & algae harvesting were added to include harvesting of Maerl and *Furcellaria* sp. as well as reed harvesting.

Figure 3 visualizes the connections of sea uses to human pressures, with the sea uses divided into two groups, those in MSP and those outside it. This shows that, using our broad definition of

relevance, all besides one pressure are within the scope of MSP but many of them are caused by both activities in and outside it. The single pressure outside MSP is input of heat which is caused by e.g., cooling waters of power plants. The pressures only within MSP scope include both pressures specific to certain species-related activities (aquaculture, fishing, hunting) as well as electromagnetic input by undersea cables, and impulsive noise caused by e.g., dredging activities and construction of wind farms.

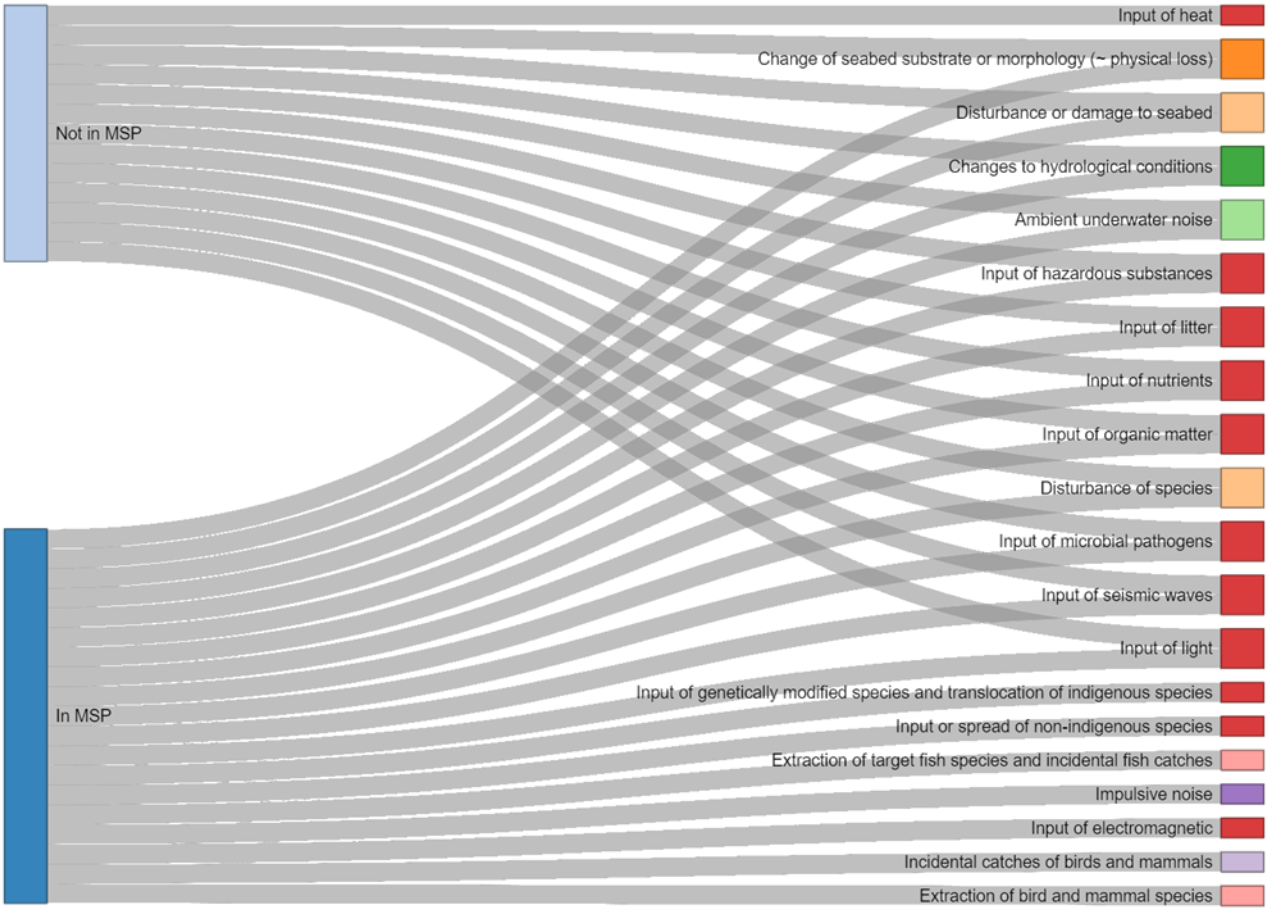


Figure 3. MSP and non-MSP sea uses' linkages to human pressure

Pressure indicators

Pressure indicators target quantifiable environmental pressures including nutrient and contaminant inputs, resource extraction activities such as fishing, impulsive noise, and seabed disturbances. As such they offer clear, measurable insights into environmental impacts.

After linking the sea uses to pressures, the pressures were linked to MSFD pressure indicators. Figure 4 shows the connections from the sea uses that are in MSP (left) to their human pressures (center) and to the corresponding pressure indicators.

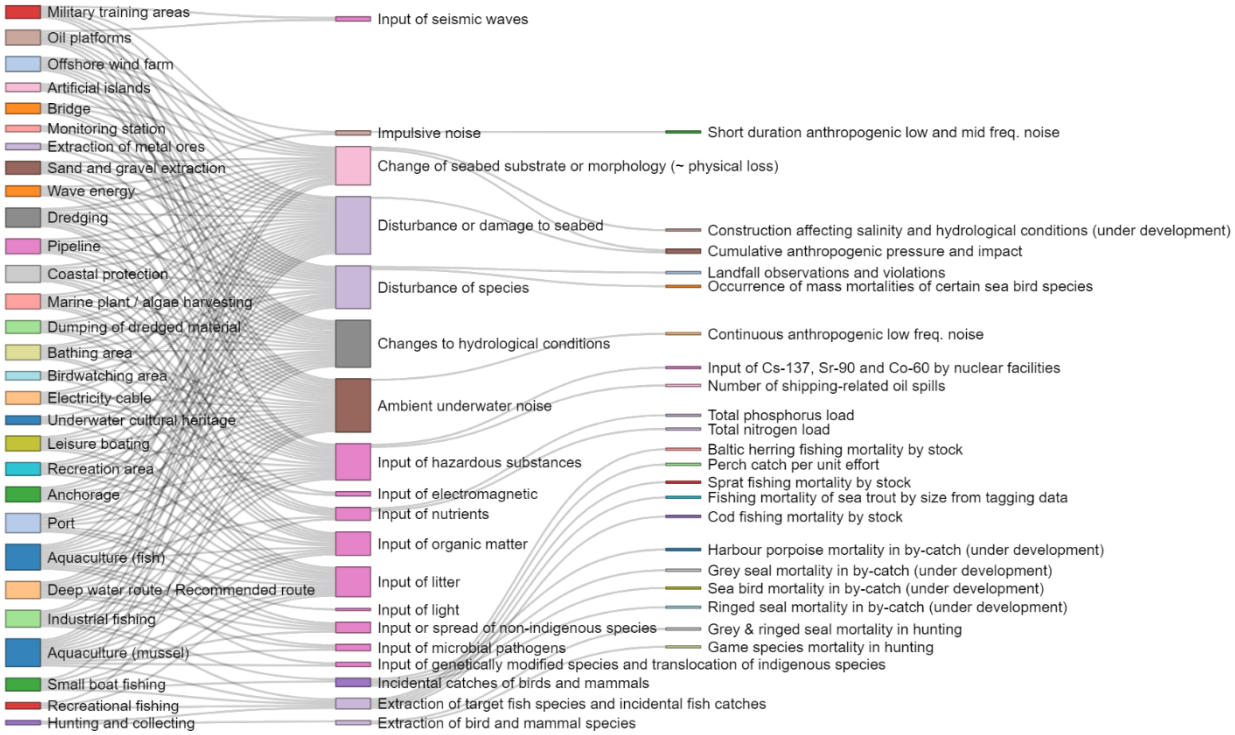


Figure 4. MSP sea use linkages to pressures and pressure indicators

State indicators

State indicators reflect the current condition of the marine environment, showing the real-time impacts of various pressures. They help in understanding the actual health of marine ecosystems and the effectiveness of actions taken against environmental pressures.

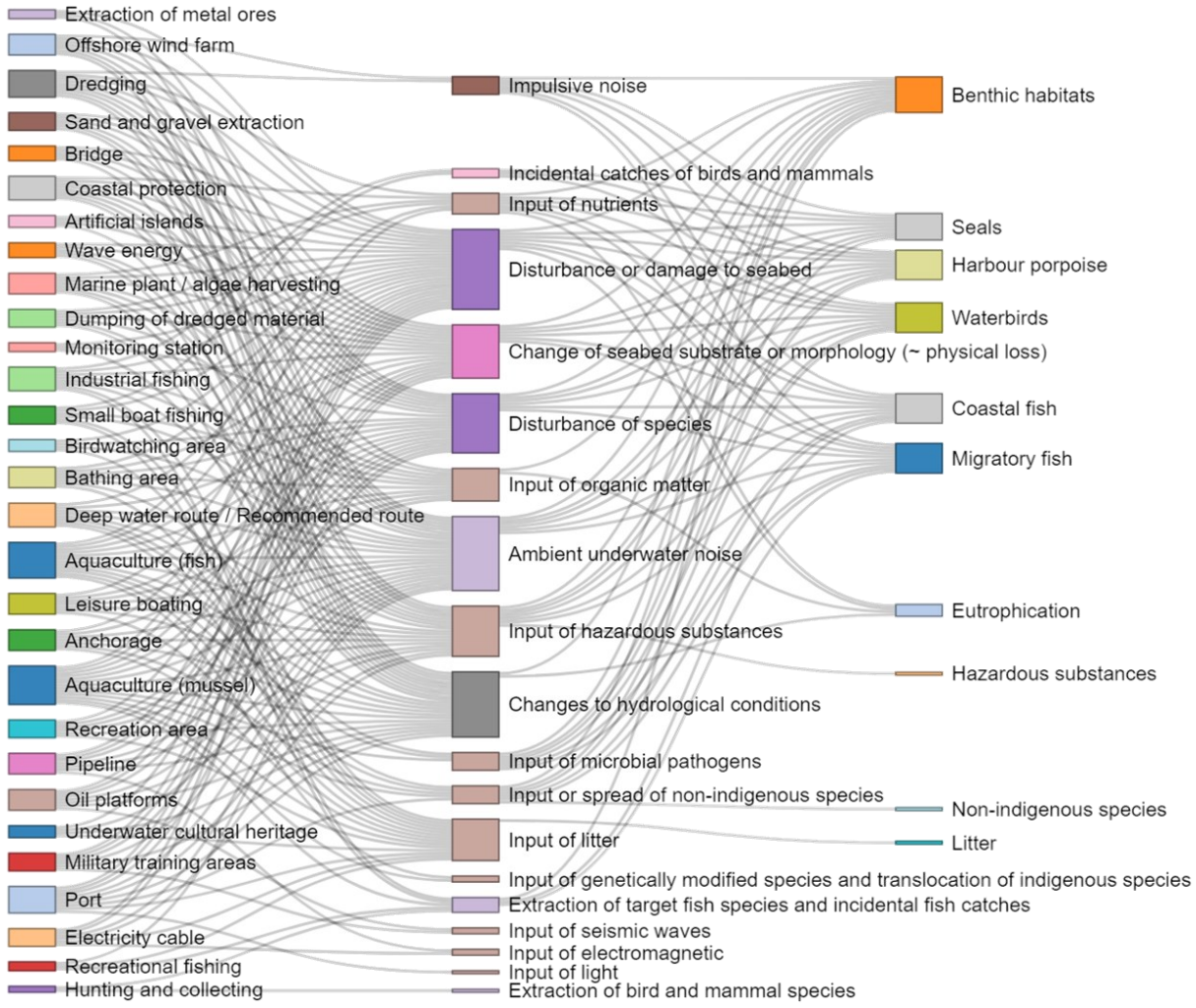


Figure 5. MSP sea use linkages to pressures and state indicators by topic

For some state indicators linking them to pressures is rather straightforward – eutrophication indicators generally relate to input of nutrients and hazardous substance indicator to input of hazardous substances. For others it may be more complicated as an obvious link might not be present. In these cases, a sensitivity matrix utilized in cumulative impact assessments has been used to link the pressures to ecosystem components. For example, an indicator measuring status of *Fucus* sp. would correspond to infralittoral rock and biogenic reef, connecting it to pressures listed for ecosystem component in the matrix. This approach provides a rudimentary link between the pressures and state indicators; however, it should be noted that a major part of the information is lost as the sensitivity scores, with values 0–5, are ignored and only the linkage is presented (Figure 5).

Target indicators

The environmental target indicators aim to measure whether the environmental targets set in the assessment of the marine environment have been achieved, and often provide information on trends. This is exemplified by the indicators on nutrients loads (Figure 6), or the amount of types of marine litter found in chosen areas within a defined period.

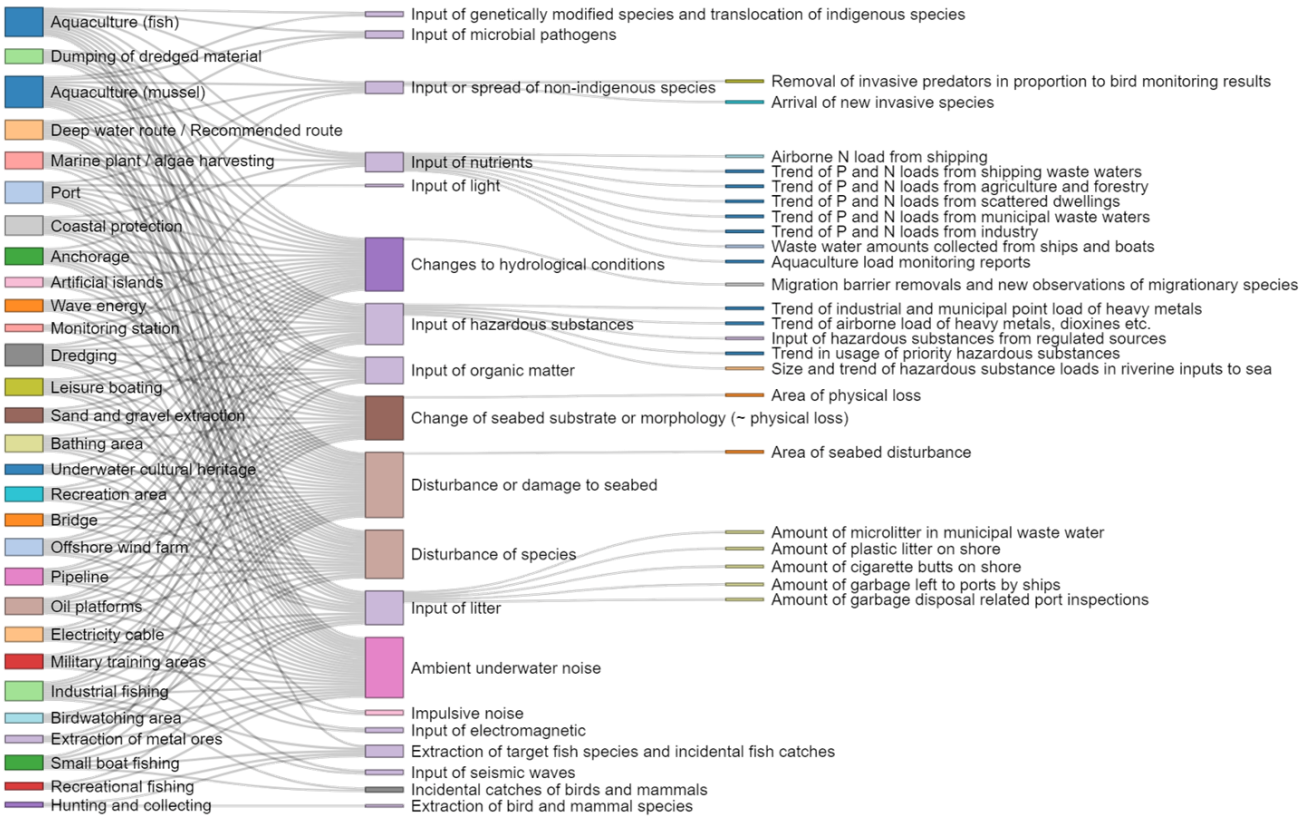


Figure 6. MSP sea use linkages to pressures and environmental target indicatorsssss

Possible gaps in indicators measuring activities in MSP

Links of human activities both in an outside of MSP to pressures and indicators are described in Figure 7. Most pressures have one or more indicators measuring them, with the exceptions of input of genetically modified species and translocation of indigenous species, input of electromagnetic, input of seismic waves and input of light. The human activities that mainly cause these pressures are (in order) aquaculture, undersea cables, prospecting for oil and gas resources and for the input of light, any human activity that produces light – from fishing and shipping to near-shore streetlights. For benthic habitats no indicators directly measuring the structure and function of the habitats currently exist, and while this is not required by the MSFD, it makes evaluating the state of marine habitats challenging.

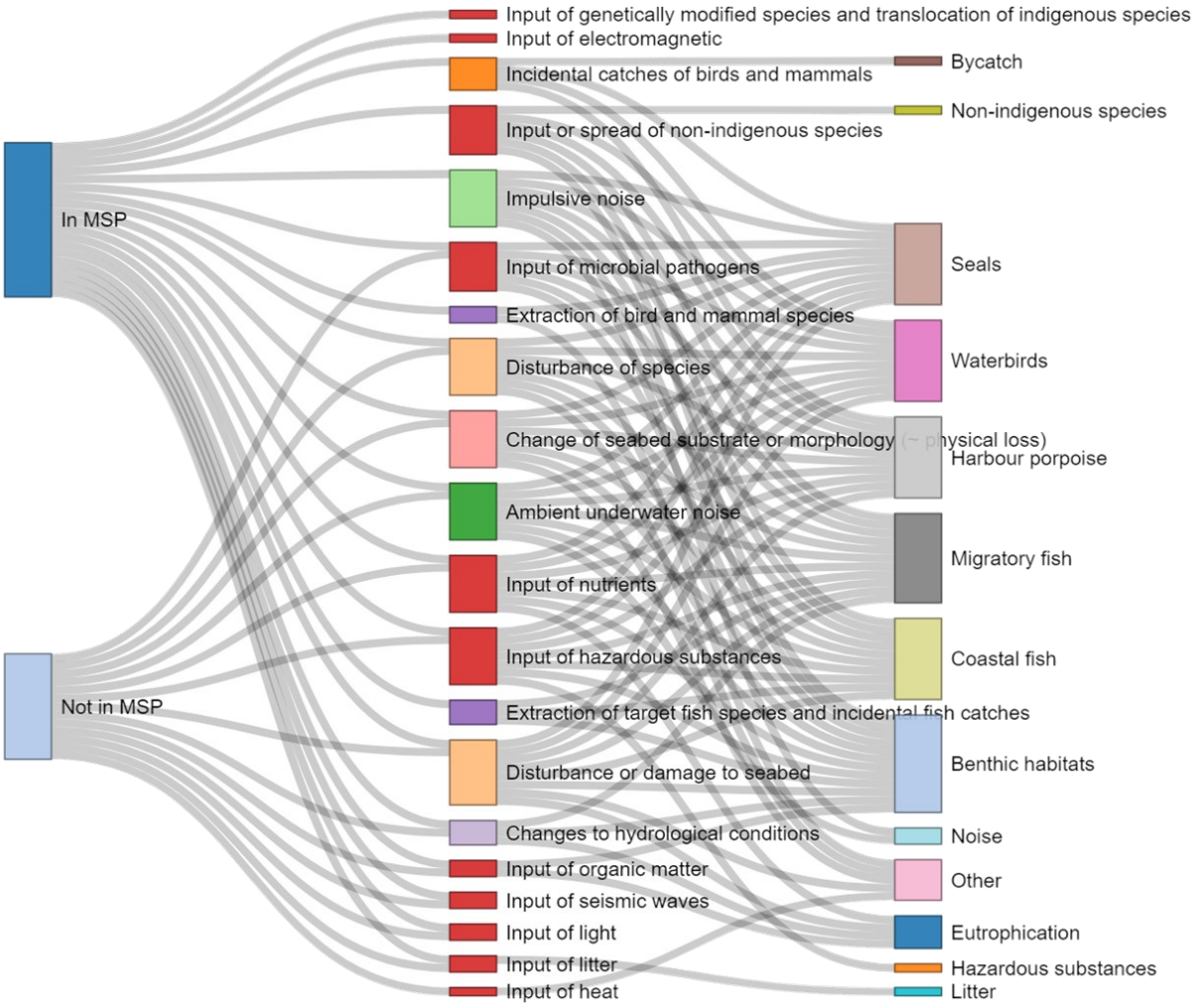


Figure 7. MSP and non-MSP sea use linkages to pressures and indicator topics

On sensitivity and specificity

In scientific literature the sensitivity and specificity of marine environmental indicators have been assessed using e.g. signal detection theory and gradient forest algorithms. Signal detection theory has been used on sensitivity to assess the indicator's ability to detect bad environmental conditions when the actual environmental condition is bad (the statistical true positive rate), and for specificity to assess the indicator's ability to detect good environmental conditions when the actual condition is good (the statistical true negative rate). The method chosen would depend on the type of indicators and the assumed interference of external factors.

Due to time constraints the scope of this case study could not include modelling activities but if MSFD indicators are to be used in MSP evaluation, the issues of sensitivity and specificity need to be further investigated to make sure the effects of an MSP can be separated from the effects of other drivers behind an observed environmental change. As seen in the relevance assessment, the pressures caused by human activities in an MSP are often same as from activities outside the scope of MSD (e.g. land-based sources), which further complicates the assessment.

Spatial scales and data availability in the Finnish MSFD reporting & MSP

In the Finnish MSP the country's territorial waters and Exclusive Economic Zone (EEZ) are divided into three planning areas, for which eight coastal regions have planning responsibility. The three planning areas are the Gulf of Finland, Archipelago Sea and Southern Bothnian Sea, and Northern Bothnian Sea, Quark and Bothnian Bay. As an autonomous region, the Åland Islands produces its own MSP (Figure 8).

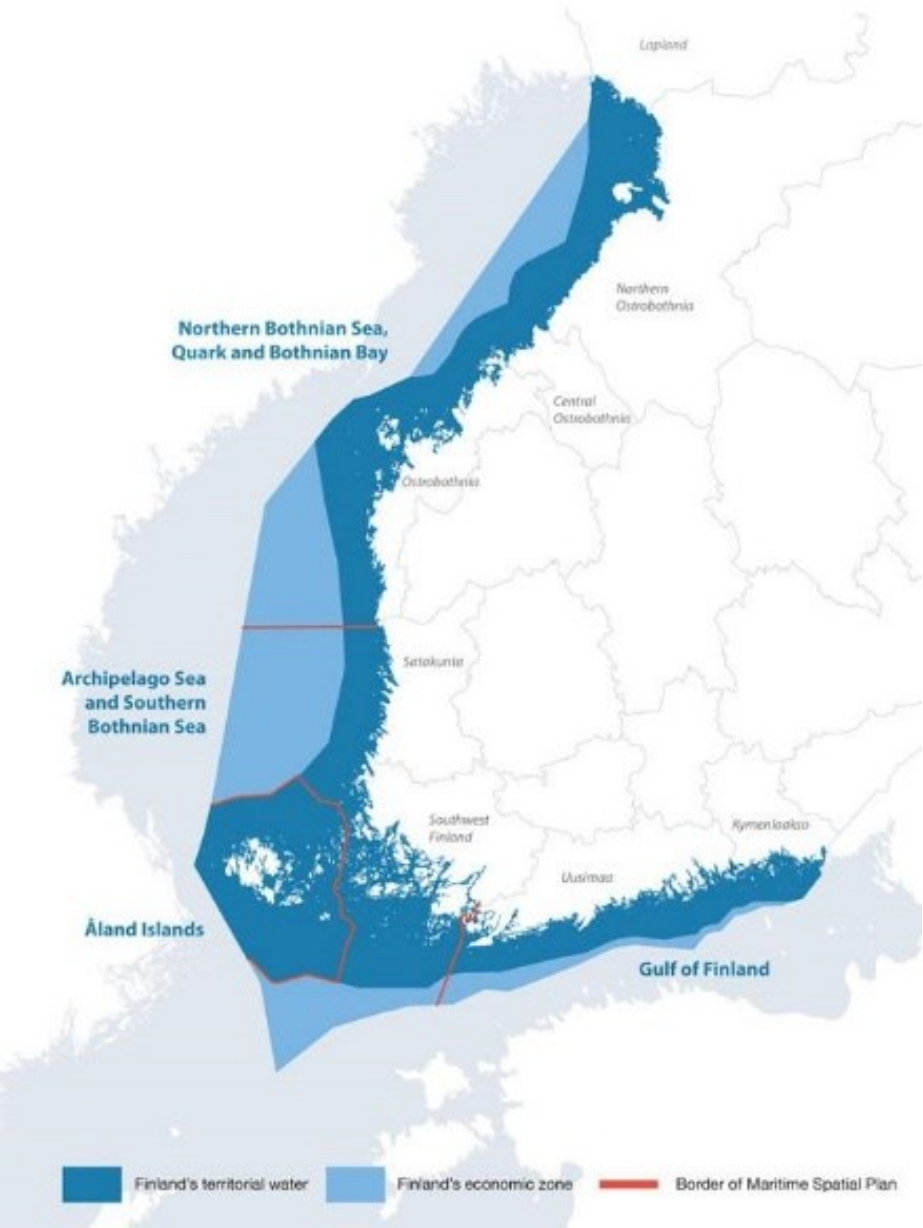


Figure 8. The MSP areas of Finland and Åland Islands (merialuesuunnittelu.fi)

The Finnish MSFD assessment covers the entire Finnish marine area (Figure 9.), from coastal waters to the outer edge of the EEZ. The marine area is divided into six sea areas: Bothnian Bay, the Quark, Bothnian Sea, Åland Islands - Archipelago Sea, Northern Baltic Proper, and the Gulf of Finland. The coastal water area, which falls under the scope of WFD, is divided based on natural characteristics (depth, openness) into 14 different types, three of which are in the coastal waters of the Åland Islands. These coastal water types are further divided into water bodies, the basic units of management in the WFD, of which there are a total of 276 in the coastal waters of Finland and the Åland Islands. The MSFD assessment has been conducted at different scales for different indicators, due to the mobility of species and the precision required by the indicator. For instance, a single assessment has been made for grey seals and sea birds across the entire marine area, zooplankton has been assessed according to the four sea areas, and water quality has been evaluated in coastal waters both by water body and by type, and in the open sea by sea area.

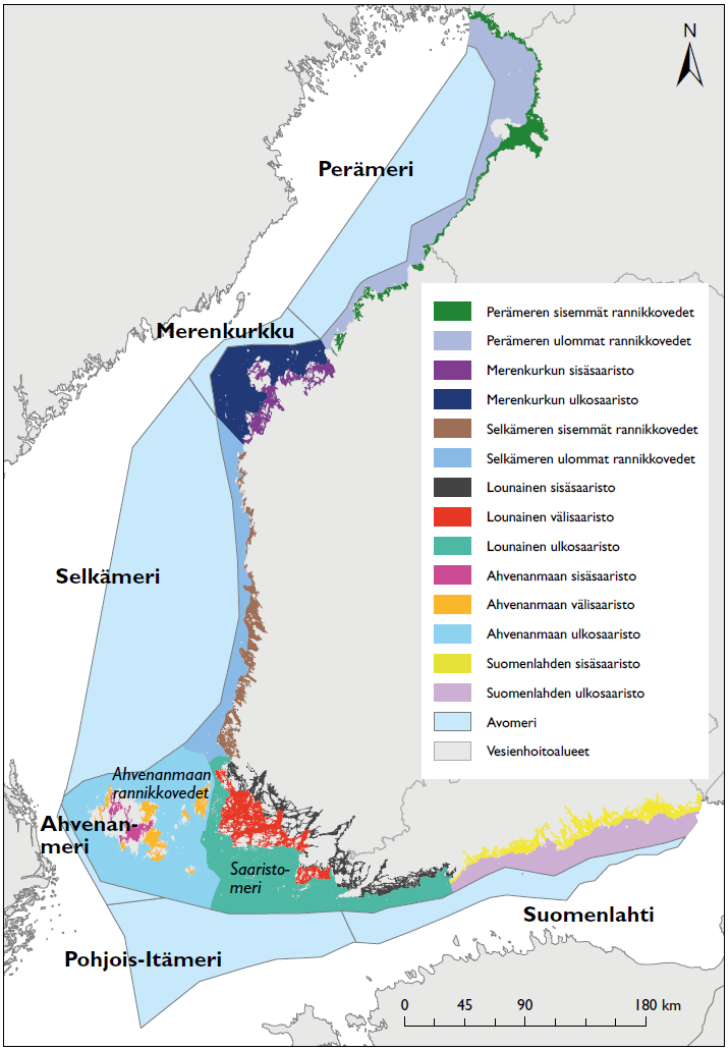


Figure 9. Finnish MSFD assessment areas

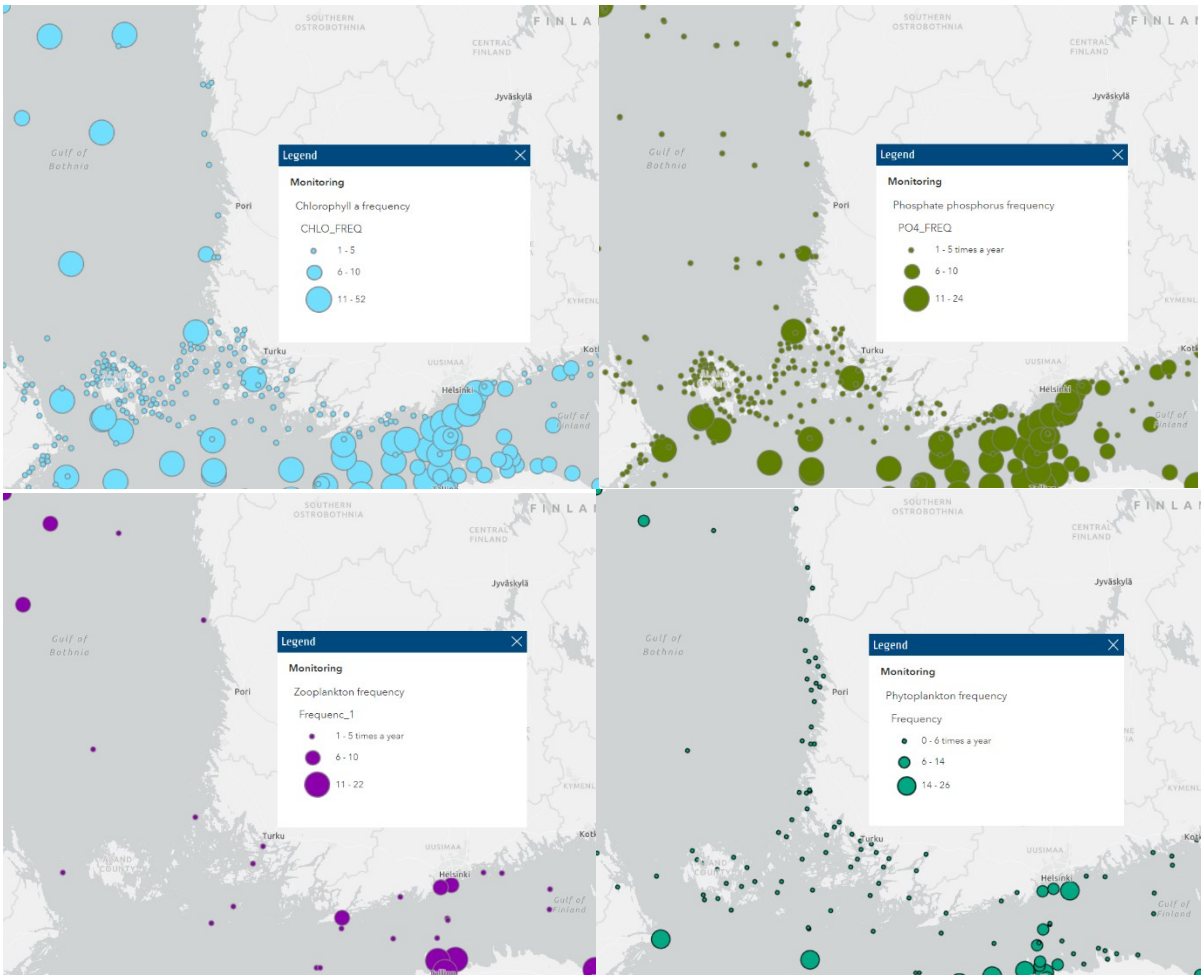


Figure 10. Example of Chl-a, Phosphate-P and plankton monitoring sites and frequency (HELCOM MADS)

The indicators' data collection methods are as varied as the issues the indicators are measuring. In general, indicators utilizing data from monitoring programmes, such as those considered HELCOM CORE Indicators (Figure 10), have the longest time series of data and the widest spatial coverage in their sampling stations. Other types of data utilized by indicators include the data provided by fishing reports, marine litter counts from shore areas, marine mammal and bird observations from aerial surveys and noise measurements by acoustic recording devices.

The Finnish MariPark case and GES

A MariPark is a nature-inclusive business area at sea, designed to support economic activities within a framework of environmental sustainability and safety. It aligns with the European Green Deal and sustainable blue economy strategies, emphasizing controlled development, security, and minimal environmental impact. The concept focuses on marine multi-use, facilitating cross-sectoral synergies and enhancing spatial use at sea, while prioritizing the good environmental status of marine ecosystems. This approach aims to balance economic use and conservation of marine resources, drawing parallels to business parks on land.

In Finland the national MSP coordination group has arranged for a series of workshops and meetings to involve stakeholders in conceptualizing a localized version of MariPark, considering the existing marine uses and their possible collaboration within a MariPark while exploring the possibilities to include new sustainable activities. The current national concept could include e.g. wind power, aquaculture and cultivation of macroalgae.

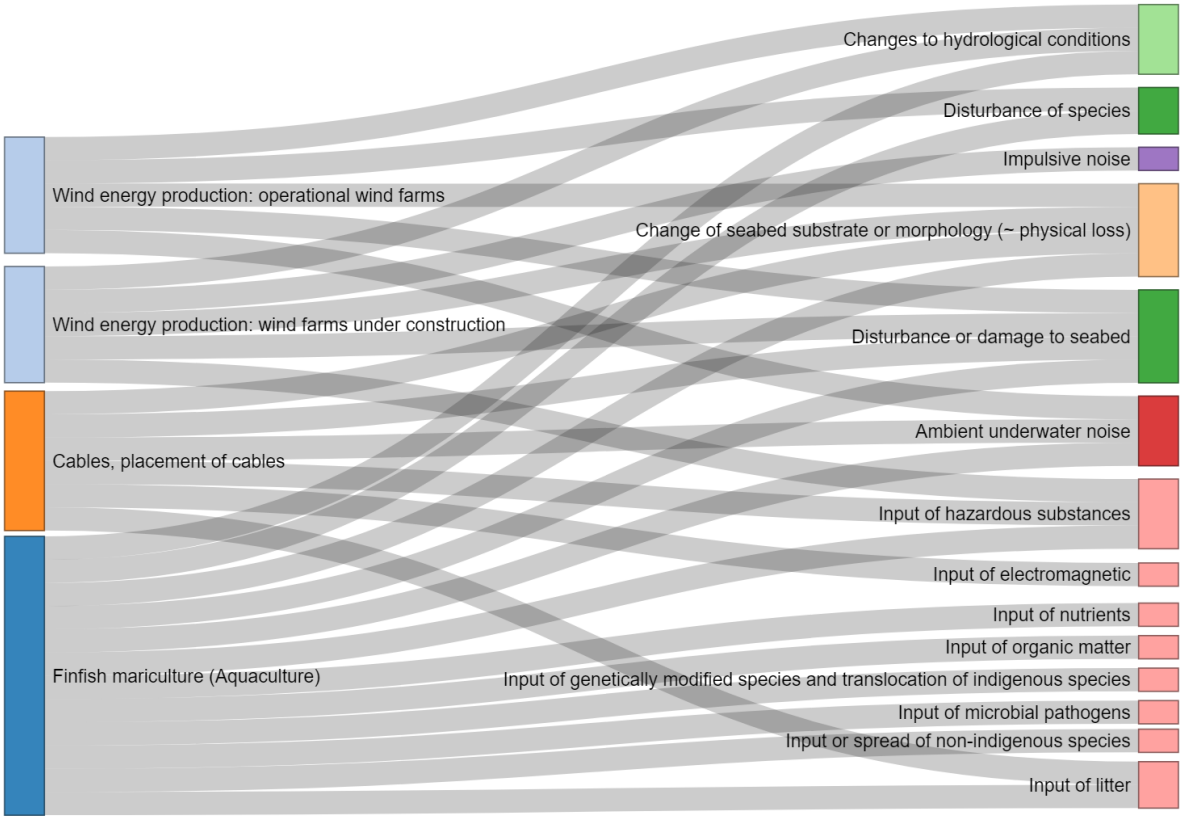


Figure 11. Sea uses – pressures connections for wind power and aquaculture.

Pressures caused by wind power and aquaculture are shown in Figure 11. The TAPAS framework to link activities and pressures does not include macroalgae farming in a suspended rope set up, but the pressures related to the day-to-day management of macroalgae farming can be assumed to be somewhat similar to pressures caused by aquaculture, with the exception of nutrient uptake instead of nutrient input. The presence of the pressures “Input of genetically modified

species [...], Input of microbial pathogens and Input or spread of non-indigenous species" are also dependent on the practises used and can't be assessed at this stage Therefore, it can be said that Figure 11 contains most, if not all the pressures of a MariPark.

Eutrophication is one of the most important pressures affecting the Baltic Sea, but assessing the effects of a single fish farm using measurements and nutrient indicators is usually not feasible, as the sampling effort would be great, and it would be challenging to distinguish the effects from the background eutrophication. In net pen facilities, where the nutrient emissions cannot be measured with water analyses as with operations on land, the load is calculated based on the additional growth of fish, the amount of feed, and the phosphorus and nitrogen contained in the feed. The Environmental Protection Act allows for the use of emission-based permits also in net pen facilities but permits based solely on emissions have not been granted for net pen facilities located in marine areas, as the challenge in an emission-based permit has been the verification of the additional growth amount. For these reasons the nutrient input, as well as possible output by macroalgae growing operations, would have to be calculated based on the mass of the feed input and mass of algae extracted.

The situation with indicators related to other pressures appears most likely very similar, with effects being hard to distinguish without an overly complicated sampling or measurement effort before and after. As such, it could be said that the MSFD indicators rarely offer a clear utility to measure the effects of a single project such as a MariPark.

However, it should be noted that as with any project, the potential environmental effects should be carefully assessed in an EIA to follow the precautionary principle.

Discussion and conclusions

Role of MSP in achieving GES

Marine Spatial Planning has the potential to facilitate the achievement of Good Environmental Status (GES) by mitigating human pressures on the marine environment. This can be done by redirecting or minimizing human activities within planning areas or marine regions. However, evidencing such contributions remains complex, e.g., when pressures shaping the indicator outcomes are beyond the reach of MSP, either because their sources are fundamentally governed by other marine policies or the sources are otherwise outside MSP scope, as with pressures originating from land.

MSP also has the potential to advance GES through the promotion of the multi-use concept of marine areas. Multi-use scenarios like the MariPark not only aim to redistribute pressures but also harbor the potential to increase biodiversity by establishing new habitats or re-establishing lost ones and support nutrient removal or carbon sequestration. However, it is important to approach this with caution and consider possible adverse effects in their Environmental Impact Assessments, as would be done for any other project.

Utility of MSFD Indicators for MSP and GES

In theory the Marine Strategy Framework Directive indicators can be used in evaluating MSP's contribution towards GES, but there are certain limitations.

- Many pressures from human activities included in MSP are often also caused by activities outside MSP scope, making differentiating between the sources and attributing measured environmental changes to MSP challenging.

- The spatial scales of the indicators and the monitoring data collected for them might not align with the scales of MSP planning areas and while in certain instances extrapolation or interpolation might be feasible, in many others it isn't.

- Assessing effects of a single project can be difficult, for example with eutrophication separating the effect of a single source such as a fish farm from the background eutrophication development might not be possible.

There are no silver bullets - it would not be feasible to look at MSFD assessment results pre- and post-MSP and attribute the measured change to MSP. Many sea uses affecting the marine environment are either governed through other marine policies or share the same pathways of effect to the environment with activities outside MSP, resulting in challenges in separating the sources of effects on the indicator results.

However, it is important to emphasize that the indicators are data-driven. While they might not always be directly applicable, their underlying data is valuable and can be used in cumulative impact assessment processes and tools such as HELCOM HOLAS and SYMPHONY. These tools can leverage the data to assess pressures and impacts, even if GES indicators themselves aren't utilized directly.

Recommendations on the application of ecosystem-based approach in MSP

Recommendations on the application of ecosystem-based approach in MSP is one of the main goals of Learning Strand on EBA in MSP. They originate from analysis of existing international framework for EBA in MSP, respective good practices derived from the past MSP cycle, analysis of gaps in the existing policy framework and study cases. These recommendations also reflect the most recent policy commitments of the European Green, WWF assessment of maritime spatial planning in the Baltic and North Seas and recommendations of Pan Baltic Scope project.

Key elements of ecosystem-based approach in MSP process.

Good practices of the ecosystem-based maritime spatial plans, compiled by eMSP NSBSR project, demonstrate that in general all national MSPs involved four major procedures recurrently repeated at different steps of national maritime spatial planning: Goals setting and revision, Defining the plan's content, Evaluation and impact assessment, monitoring and evaluation. In addition planning includes continuous participation and interaction process. However, it's difficult to distinguish steps from each other completely since they constitute a coherent maritime spatial planning process where all components are interdependent. These recommendations, structured according to above-mentioned MSP procedures. However, they do not include recommendations for monitoring and evaluations, since a separate Learning Strand of eMSP project was specifically dedicated to this theme. These recommendations also fully reflect five key components of ecosystem-based approach in MSP: inclusion of nature, social and economic consideration, comprehensiveness and coherence, integrated governance and adaptive management. The structure of MSP process and key EBA components is illustrated by figure 1.

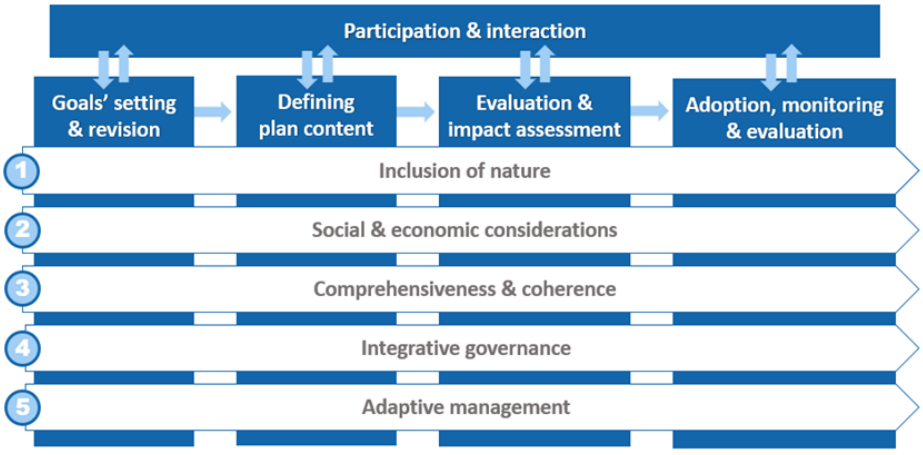


Figure 1. The structure of EBA MSP process and key EBA components.

Recommendations for goals' setting and revision.

Planning goals are set at the initial stage of the planning process. They are defined primarily by national legal base, national strategic marine policy documents and nature protection objectives specified in international agreements. In most cases planning goals don't undergo a substantial revision during the planning process.

EU MSFD. National MSPs, applying an ecosystem-based approach, are intended to deliver and maintain Good Environmental Status (GES) of marine ecosystem. That's why close connection of planning goals with objectives set under the Marine Strategy Framework Directive is one of the key elements of the goal setting process. This requires the development of spatially related Good Environmental Status objectives that can be supported by MSP.

International policy agreements. Regional Sea Conventions coordinate the effort of Contracting Parties to protect the marine environment, identifying specific environmental goals for respective basins. It serves for coordination of the implementation of the EU MSFD within the basins tailoring its goals for specific geographic and socio-economic conditions. In the Baltic Sea region regional GES objectives are set under regionally harmonized policies - the Baltic Sea Action Plan 2030 and related documents (e.g. Regional Action Plan on Marine Litter RAP ML or Regional Action Plan on Underwater Noise RAP NOISE). Strategy of the OSPAR Commission for the Protection of the Marine Environment of the North-East Atlantic 2030 largely identifies environmental goals for the North Sea region with respective specification in sectorial action plans (e.g. RAP ML) and other acquis. These spatially referenced environmental goals should be considered at the goal setting stage of spatial planning applying the ecosystem-based approach.

Biodiversity. Planning goals should be set striving to deliver nature conservation targets set under the EU GD Biodiversity Strategy which requires 30% of the EU marine area to be designated for nature conservation purposes. Planning goals setting should consider marine areas for the implementation of other effective spatial conservation measures aimed to protect species identified under EU Birds and Habitats Directives and the goals should be tailored for individual sea basins accounting for specificity of their habitats and species.

Restoration. Assuming that 81% of European habitats are in poor status, planning goals should deliver to the target set by recently adopted proposal for Nature Restoration law and foresee that 20% of sea area is designated for restoration measures.

Ecosystem capacity limits. The definition of ecosystem-based approach implies conservation and sustainable use of marine resources in an equitable way. It considers the human community as an intrinsic part of the ecosystem, inevitably influencing its state and functioning. The basic boundary conditions to be met to ensure the societal well-being today and in the future are to be set with respect to the social and economic goals. The basic boundary conditions take into account the value of provisioning, cultural, regulating and supporting ecosystem services, but also allow for the preservation, restoration and enhancement of the intrinsic value of nature. The desired quality of the marine environment is defined as a function of the ecosystem services, including the intrinsic value.

Land-sea interaction. Planning goals should reflect primary objectives of national social and economic policies safeguarding national interests in relation to human activities at sea and those which depend on marine ecosystem services and influence it. Important to acknowledge that the marine environment is not only affected by human activities at sea, but also by activities on land. It substantiates great importance of land-sea interaction as inseparable part of the planning process, and that the goal setting process should ensure a holistic view of relevant land-sea interactions and connect the marine policies with the ones for inland and (water)areas. In this context the EU Water Framework Directive contributes to the protection of territorial and marine waters and achieving respective objectives.

The Precautionary approach. Baltic Sea broad-scale MSP principles consider the precautionary principle as a central part of the ecosystem-based approach. This is also one of the key elements introduced by the Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area. Importance of the application of this principle already at the goal setting stage is provided by high uncertainty of knowledge on true impact of current human activities at sea which are many and even higher uncertainty of knowledge on it changes in future. In line with the precautionary principle, planning goals should be set avoiding any human activities in areas where they can threaten biodiversity or ecosystem services.

Climate change. Climate change further raises the importance of the precautionary principle due to high uncertainty of existing knowledge of future effect of climate change on both ecosystem and human activities. However, planning goals should aim to strengthen the resilience to climate change but not increase vulnerability of the region. Considering climate change scenarios at the goal setting stage of the planning process enables introduction of respective mitigation and adaptation measures during the following stages when planning solutions are developed. The planning goals addressing climate change should account for the need of climate refuge areas, coastal protection, development of renewable energy and respective infrastructure as well as ecosystem and other services related to carbon storage.

Comprehensive knowledge. The best available scientific knowledge is one of the pillars supporting ecosystem-based marine spatial planning. This cornerstone MSP principle runs through various components of the EBA framework. This knowledge should be fully applied in the development of planning solutions and evaluating their effect on marine ecosystems. However, already at the goal setting stage knowledge generated under various policy is to be synthesized. Comprehensive spatial data showing nature values, marine green infrastructure, ecosystem services should be synthesized with knowledge on land-sea interactions land-based pressures provided by the WFD as well as with data on social and economic values. Such comprehensive analysis leads to identification of gaps and setting specific goals to improve the knowledge base.

Adaptive management. Planning goals should be set assuming that adaptive management is inbuilt into the planning architecture. It implies that at later planning stages their adjustment is to be possible as a result of strategic environmental assessment of planning solutions. Adaptive management also involves recurrent evaluation and revision of plans which scope is to be set at the earliest planning stages. The role of adaptive management drastically grows in the light of

climate change to make the MSP process capable of adapting to changing climate parameters and to consider changes of environmental pressures and ecosystem responses caused by climate change.

Transparency. Marine spatial planning is a participatory process. The Guideline for the implementation of ecosystem-based approach in MSP in the Baltic Sea area identifies participation and communication as one of the key elements for the ecosystem-based approach. It requires that all relevant authorities and stakeholders as well as a wider public are to be involved in the planning process at an early stage. Authorities and stakeholders in the consideration and communication procedures are identified by national legislation or can be identified in a specific roadmap for the planning process. Being involved in the goal setting process, authorities and other stakeholders bring their sectorial goals into the consideration of respective working groups. Sector specific visions should be formulated at the initial stage of planning to identify and account for sectoral policy goals. A Public Participation Strategy is one of the possible tools to outline communication principles and activities as well as to enlist stakeholder groups to be involved.

Recommendations for defining plan's content

The content of the maritime spatial plan is largely defined by planning goals set at the initial stage of the planning process but depends on the available knowledge. This stage involves compilation of extensive data on the marine environment components and their state, human activities and environmental pressures originating from human activities both at sea and on land. Planning scenarios and solutions, including alternative solutions are developed at this stage utilizing the best available knowledge and following the precautionary principle to prevent any activities causing harmful effect on the marine environment. Recommendations based on the good practices supplied by project partners and members of community of practice for EBA-based MSP are compiled in this document.

Comprehensive knowledge. The best available scientific knowledge is one of the pillars supporting ecosystem-based maritime spatial planning. This knowledge has to be compiled in the process of defining the content of maritime spatial plan. The knowledge should in general cover three major areas: state of the ecosystem and its components, human activities, and the impact of the human activities on the ecosystem including cumulative impacts.

A comprehensive national study of marine areas including hydrological and geological data, data on distribution of birds, fish, marine mammals, pelagic and bottom habitats should be compiled in cartographic material called "marine green infrastructure" (Green Map). Generated spatial data should be utilized to produce maps demonstrating aggregated nature values.

Ecologically significant marine underwater areas, including potentially productive areas for ecosystem services are to be identified. Ecologically significant marine underwater areas should account for biodiversity, vulnerability and uniqueness of biotopes, geological diversity and areas in natural state. Scientific Criteria for identifying ecologically or biologically significant marine

areas (EBSAs) developed by the Convention on Biological Diversity might be applied to select valuable areas.

A coherent network of marine protected areas (MPAs) is one of the vital components of the marine nature conservation system. Spatial data on MPAs as well as information on targeted protection species and biotopes should be thoroughly compiled and considered in the planning process. However, since MPAs are already legally regulated at national or even international level they are not necessarily be reflected on plans but used as background information for planning human activities, even outside MPAs, and considering their potential impact on protected species and biotopes.

Information on human activities at sea, especially those which cause environmental pressure on the ecosystem, should be compiled involving stakeholders possessing respective competence. This information should be georeferenced demonstrating the spatial distribution of respective activities and their current intensity. Since maritime spatial planning is a forward-looking process, information on temporal variations of human activities is of high relevance and should be compiled wherever possible. Data on human activities should in general include shipping, construction including dredging and depositing of dredged material, extraction of mineral resources, defense, extraction of living species (e.g. fisheries), aquaculture and recreational activities. Each category can be further specified, being tailored for specific geographic and social-economic conditions. A future projection based on observed temporal and spatial variations of human activities could be utilized as “zero alternative” in the assessment of plan’s environmental and economic impact.

Information on environmental pressures is preferably to be derived directly from monitored or modelled pressure data. However, in cases when no direct data is available, the spatial distributions of these pressures can be estimated indirectly based on human activities associated with them. Some human activities cause multiple environmental pressures, so a careful mapping of human activities and pressures should be performed. A matrix could be utilized as a basis for mapping human activities and related pressures. Then environmental pressures originating from associated human activities are to be aggregated at basin scale and respective cartographic materials illustrating spatial distribution and intensity are produced. In general, environmental pressures under consideration should include input of substances, input of energy, biological and physical disturbance with further specification for respective sea area or basin. Environmental pressures originating from land-based activities are to be accounted for and thoroughly mapped.

Targeted studies are to be launched to obtain missing data and scientific evidence to underpin the maritime spatial plans and allow for specific activities at sea to take place. Monitoring programmes should be established to identify pressures and impacts caused by specific human activities for which the development is prioritized.

Spatial distribution of potential cumulative pressure can be computed summarizing individual environmental pressures. The results will provide information about the location of areas with the highest potential cumulative pressures, without assessing their specific interactions with species or habitats. However, each pressure is to be weighed against its average sensitivity score

for all ecosystem components, to provide a more realistic result. The distribution of potential cumulative environmental pressure provides a baseline for integrated management of human activities at sea; however, it might not correspond to the areas with high impact on species and habitats.

Land-sea interaction. Environmental pressures originating from land-based sources constitute a significant part of cumulative pressure on marine environment and though they lay beyond of the MSP powers they should be accounted for the assessment in cumulative pressure. Among the most significant pressures primarily originating from land-based sources are input of substances and input of energy. These pressures are to be specified for each marine area or sea basin. Coastal protection and development of coastal infrastructure as well as recreational activities in coastal areas are the human activities significantly contributing to the pattern of pressures on the marine environment. In combination with the high ecological value of coastal biotopes human activities related to the interaction between land and sea and related environmental pressures are to be thoroughly considered in maritime spatial planning process.

Ecosystem services. As an essential part of maritime spatial plan, ecosystem services have to be mapped and assessed when compiling the plan's content. Mapping and assessment of ecosystem services (MAES) is preferably to be based on the Common International Classification of Ecosystem Services (CICES) however, other classification can be considered. The identification and assessment is to be based on the best available data and expert knowledge on ecosystem components and biophysical mapping of the ecosystem's potential to deliver services. Social and economic values of the services are to be assessed wherever knowledge and resources are available. Potential production areas of ecosystem services can be integrated in the plan as 'significant underwater nature values'.

Ecosystem capacity limits. Since delivering good environmental status of marine waters is one of the MSP primary goals, the content of the plan is to be assessed to contribute to the planning objective of controlling environmental pressures within the ecosystem capacity limits at the same time facilitating social and economic development. Zonation analysis is one of the approaches which can be applied to identify potential location of prioritized human activity (e.g. offshore wind farm) comparing cumulative pressure in different areas and accounting for biodiversity, restrictions, social impact, economic feasibility and other parameters. Mitigation measures are to be foreseen to compensate for the growth of environmental pressures and ensure that cumulative pressure remains within the ecosystem capacity limits. All these aspects should be reflected in the environmental report developed at the early stages of the plan's content defining.

International policy agreements. International policy agreements such as Regional Sea Conventions serve to coordinate the effort to protect marine environment and ensure progress towards good environmental status of marine waters. They also provide (or could provide) a platform for cross-border consultations to ensure coherence of national maritime spatial plans across respective sea basins. International agreements also identify environmental goals, specific thresholds for good environmental status and sets of indicators demonstrating the state of marine environment at sea or basin level. This information should be considered when

identifying plan's content to ensure that cumulative environmental pressure remains within the ecosystem capacity limits and the plan contributes to overall effort to achieve good environmental status of marine waters.

Biodiversity and restoration. Identification of the plan's content should consider environmental targets established under EU GD Biodiversity Strategy which requires 30% of the EU marine area to be designated for nature conservation purposes and 10% strictly protected. In case that the existing MPA network within planning area does not meet the requirements, all compiled knowledge on ecologically significant marine underwater areas and areas with significant underwater natural values is to be utilized to identify areas with high potential for the use for nature conservation purposes.

In accordance with the European Nature Restoration law the content of the plan should foresee 20% of sea area designated for restoration measures. A passive or active restoration of lost natural habitats (e.g. reefs of European oyster) can be considered as it has added value as ecosystem services which have been lost or diminished. Assuming that returning to conditions without human impact in most cases is not feasible, restoration measures can co-exist with other human activities if their compatibility is scientifically proved. However, the plan's content should delineate areas to allow for the natural evolution of existing processes. In addition to their conservation value, such natural areas are also of high importance for scientific research and as reference areas for the estimating the impact of human activities at sea.

Biodiversity conservation goals and goals for restoration of lost or damaged natural habitats can be achieved through passive or active restoration measures (e.g. reefs of European oyster), however, it should be accepted that a return to the days when there was no human impact is obviously not always feasible.

Establishing dynamic natural areas in space and time can be considered to respond to the interaction between conservation objectives and possible shared use maximally and optimally. For instance, areas can be closed for a certain time be closed to human disturbance in function of temporally priority breeding, spawning, resting and foraging areas of mobile species such as fish, birds and marine mammals.

Areas for scientific monitoring of the natural evolution of existing processes are of vital importance and should be delineated where feasible. Natural areas, in addition to their conservation value, are also important for scientific research and as reference areas for estimating the impact of human activities at sea.

The Precautionary principle. Due to limited knowledge and data on ecologically significant underwater areas and areas of significant underwater natural values the precautionary principle is to be applied in planning to ensure that no marine activities that threaten biodiversity are placed in those areas. The importance of the precautionary principles increases due to uncertainties in the assessments of the state of the marine environment caused by climate change and limited knowledge on future development of human activities and related environmental pressures.

Integrated governance. All authorities responsible for the implementation of sectoral policies should be involved in the reviewing of the plan's content. Their main task is to evaluate whether the allocated space is sufficient to meet sectoral targets. Practically, establishing a working group consisting of representatives of respective public authorities may serve for the purpose. In case the working group grows large a steering group consisting of key implementers can be set up to coordinate the reviewing process. Key planning decisions are made by the steering group including practical aspects of the implementation of an ecosystem-based approach. The sectoral authorities included in the working group maintain a dialogue with sectoral businesses and organizations ensuring that MSP process is considerate of developments and needs within the sectors, as well as allowing for national sectoral targets to be met. The working group and steering group thus ensure the coordination and integration of targets, plans and legislation, which the MSP needs to conform with.

Social and economic considerations. An ecosystem-based MSP considers humans as an inseparable part of the ecosystem and assumes that human activities do not pose a threat for habitats and cumulative environmental pressure does not exceed the ecosystem's capacity limits. These preconditions make social and economic consideration a substantial part of the ecosystem-based approach in maritime spatial planning. Practically, planning solutions have to be analyzed from social and economic perspectives and balanced against environmental and nature conservation targets. Collaboration with stakeholders as a part of the planning process helps to weigh various political views on the plan's content. A conflict and synergy matrix could be an efficient tool to display the positive, neutral and negative interactions between interests.

Creation and maintaining of a comprehensive maritime information system containing the latest data on the state of the marine ecosystem and sea uses (economic activities of maritime sectors) is a tool facilitating compilation of the plan's content and it's reviewing, ensuring effective and timely data exchange between all involved parties. Social-economic studies providing quantitative assessments of ecosystem services including marine ecosystem accounting should be supported. Establishing of a permanent platform (e.g. virtual portal) for regular communication, discussion with relevant stakeholders is recommended to facilitate communication.

Adaptive management. The Malawi principles declare that ecosystem-based management must recognize inevitability of changes. It concerns changes of the state of ecosystem, including climate change, changes of societal and economic demands as well as continuously growing scientific evidence base. Accounting for these changes in the MSP process and its consequent cycles is considered as adaptive management. To identify the plan's content and develop planning options, scenarios for the future of the maritime area under consideration are to be developed. The scenarios consider the changes in planned maritime areas' operating environment in a long-term perspective (example from Finland -until 2050). Ecosystem and climate change indicators in combination with economic perspective and views of different societal groups are to be used to assess the impacts of the scenarios.

Establishing dynamic nature conservation areas in space and time could be considered to optimize the response to the interaction between conservation objectives and possible shared

use. For instance, restrictions for certain human activities might be imposed on certain areas to minimize human disturbance in periods of breeding, spawning, resting and foraging of mobile species such as fish, birds and marine mammals. Additionally, changes of boundaries for nature conservation areas or areas with priorities human activities could be foreseen for various climate change scenarios.

The challenge of lacking knowledge or data on the space required for specific activities to ensure the achievement of respective targets (e.g. renewable energy) an excessive area can be designated with subsequent specification of the requirements in the cause of the development of particular project. In case, when the implementation of the plan demonstrates that an activity has insufficient space to meet national targets, the plan can be adaptable through an addendum to the plan, which in its turn should be a subject for environmental impact assessment.

Mitigation measures. Mitigation is the combination of (in descending order of desirability) preventing/avoiding (addressing at the source), reducing, and offsetting the impact of human activities. In this context, avoiding impacts is regarded as an ultimate solution assuming that human activities at sea are designed in a way that they have 'zero negative impact' or even a positive effect. Since most human activities involve environmental pressures, mitigation is to be factored in at the planning stage. Mitigation measures can be included in the plan's content both with regard to options for changing the content (e.g. relocation of offshore wind areas) and proposed measures to implement at project level as to prevent, offset and reduce negative impacts on the marine environment.

Practical measures to mitigate the environmental impact of maritime spatial plans should be tailored for and targeted on the areas with high risk that environmental pressure might cause significant environmental effects. It may include the division of the planning area into zones defined by surface water classification (WFD) and also reflect the ratio of coastal land and sea surface areas. Zone use planning of mitigation measures should consider, among other things, the marine and water protection objectives that are typical of the areas, cultural values, open seascape, landscape values, development needs for tourism and recreational use, securing the operating conditions of maritime transport, and international infrastructure and transport connections.

Alternative planning solutions. Reasonable alternatives shall be developed to find solutions to avoid or reduce negative environmental and other impacts as well as impacts on the ecosystem services. Alternative planning strives to compare proposed solutions, including current status and "zero" alternative and demonstrate the impact of the plan. The impact assessment shows the difference in impacts of applying the maritime spatial plans and not applying them. Practically, specific national assessment tools can be applied for the analysis of interacting between different human activities and their cumulative environmental effects (e.g. Symphony in Sweden). The alternative planning solutions should be also analyzed from societal perspectives, in the context of the good environmental status of marine waters.

Climate change. The European Law on climate change sets ambitions goals related to climate neutrality and adaptation to climate change. Ecosystem based MSP is considered as a tool

contributing to the overall increase of climate changes resilience which is to be realized in the plan's content and planning solutions. Practically, it means strengthening adaptive management to make the MSP process capable to adapt to changing climate parameters and to consider changes of environmental pressures and respective ecosystem responses caused by climate change. The precautionary principle as one of the fundamental MSP principles is to be applied assuming uncertainty of knowledge on the climate change consequences for ecosystem and human activities.

Accounting for the uncertainty of existing knowledge, climate change scenarios are to be considered developing the plan's content. Adaptation to climate change should be addressed through considering in spatial planning the areas vulnerable to climate change including, climate refuge areas and restauration. Planning solutions for coastal areas, if they are included in national MSPs, should strive to minimize damage caused by extreme weather events, including flood protection and conservation of coastal ecosystems. Planning solutions to mitigating climate change should identify areas for renewable energy (e.g. offshore wind farms) taking into consideration environmental pressures caused by related human activities, and preservation and restauration of biotopes rendering ecosystem services related to carbon storage. The effectiveness of planning solution increases applying decentralized management when the solution can be tailored to address local issues.

Transparency. Cross-sectorial and transboundary consultations are an essential part of the plan's content development. It guarantees availability of the best knowledge, accounting for sectorial and national interest, acceptance of planning solutions by the public and resolving potential conflicts. Practical recommendations which could be derived from the past MSP cycle include the development of a roadmap for MSP process which among other issues outlines relevant stakeholders' groups and sets a communication plan. Sectorial visions can be developed to outline sectorial goals and identify respective content of the plans. National coordination in the form of cross-sectorial working groups or coordination committees may provide a platform for stakeholder's dialog. Establishing of online platform facilitates such cross-sectorial communication. However, formal consultation procedures, which might consist of several iterations including ESPOO-consultation, are an essential part of the plan's content development.

Regional Sea Conventions might serve as a platform for transboundary dialog in regional scale assuring coherence of the plan's content throughout respective sea regions. However, formal cross-border consultation rounds are to be arranged. Guidelines for transboundary consultation can be developed under the umbrella of respective regional working groups (e.g. HELCOM-VASAB Guidelines on transboundary consultations, public participation and co-operation). Bilateral or trilateral meetings between neighboring countries addressing specific environmental impacts of MSP as well as cumulative impacts in the neighboring areas is a useful instrument for the development of related plan's content ensuring MSPs cross-border coherence.

Recommendations for the assessment of plan's impact

Strategic environmental assessment (SEA) is a vital component for implementing the ecosystem-based approach in maritime spatial planning as it identifies, describes, and assesses the likely significant effects on the ecosystem. The EU Directive 2001/42/EC requires that a SEA is carried out before the approval of MSP by the responsible authority and in accordance with the criteria set out in the Directive and as required by the MSP Directive. This includes the preparation of an environmental report, public consultations and the revision of a draft MSP accounting for the consultations' results. In addition, an assessment of MSP's impact on habitats and species (Art. 6 of the Habitats Directive 92/43/EEC) and of bird sanctuaries (Birds Directive 2009/147/EC) are obligatory. The Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area recommends integrating assessment of environmental effects in several steps of the maritime spatial planning process. Practical recommendations based on the good practices supplied by project partners and members of community of practice for EBA-based MSP are compiled in this document.

Impact assessment at early planning stages. A roadmap for maritime spatial planning process is considered as a good instrument for coordination of national planning process since its very early stages. In addition to planning goals and environmental objectives the roadmap can identify the scope of the strategic environmental assessment, stakeholders' involvement and timeline for the assessment process. A guide or tutorial to environmental assessments in marine spatial planning can be developed ahead of the consultation phase, as working material designed to facilitate the integration of environmental considerations into the marine spatial plans. Assessment criteria or SEA objectives and the scope of the assessment are to be defined at early planning stages as a crucial part of evaluation and impact assessment. The stage of the MSP-process in which planning solutions are evaluated and their impacts assessed is essential for an iterative planning approach. This stage links back to the goal setting stage as the determined planning goals including environmental, can be part of the assessment criteria.

This is in general done in a specific document which will be shared with stakeholders in a consultation procedure. The aim is to gather broad feedback on the proposed scope of the assessment.

Sources of relevance for assessment criteria:

- Marine Strategy Framework Directive criteria and indicators
- Water Framework Directive criteria and indicators
- National environmental objectives
- Other planning objectives (economic and social)

Different activities on the coastal and marine environment need to be defined as they might affect the good environmental status (GES) of the marine environment and be critical for a

sustainable blue economy, and especially for fishing, ORE, Aquaculture, Cables, Tourism, Extraction areas, Dredging, Lapping, Harbors and connectivity.

Holistic approach. The holistic impact assessment involves all three components: strategic environmental assessment, sustainability assessment and to some extent socio-economic impact analysis. Since ecosystem-based approach in MSP implies promotion of conservation and sustainable use in an equitable way and intends to make marine spatial plans contributing to the achievement of good environmental status of the sea the assessment should involve identification of environmental objectives; consideration of areas of nature values and marine green infrastructure; analyze of conditions for ecosystem-services; evaluate individual and cumulative environmental pressures and their impacts accounting for ecosystem capacity limits.

The assessment of environmental and other impacts has to be integrated in the planning process at each consultation stage.

Holistic environmental assessment requires comprehensive knowledge. The best available scientific knowledge is one of the pillars supporting ecosystem-based marine spatial planning. This knowledge has to be fully utilized for the assessment of the plan's impact. The knowledge should cover the state of the ecosystem and its components, human activities, and their environmental impacts, including cumulative impact, as well as social and economic consequences of the plan's implementation.

Harmonization of data between MSP-authorities and across borders enables harmonized assessments and transboundary cooperation. A data reference list might serve as a shortcut towards harmonized assessments.

Targeted monitoring programmes is an instrument for ensure scientific underpinning for specific human activities of high political priority for planning areas (e.g. roll-out of offshore wind). Tailored research programmes should be also launched to ensure the use of the best available knowledge in relation to specific environmental pressures and their impacts (e.g. the study of pile driving underwater noise impact on fish larvae) as well as vulnerable biotopes or maritime areas.

A planning support tool (e.g. Symphony tool developed in Sweden), which allows for analysis of interacting, cumulative environmental effects can be developed and used to assess cumulative impacts of the current status, the zero alternative and the plans as well as for comparisons between the plans and the zero alternative.

Good Environmental Status. The Marine Strategy Framework Directive (MSFD) and the Water Framework Directive (WFD) lay the basis for marine environmental targets in the EU member states. The overall marine environmental objective is to reach Good Environmental Status (GES) for all eleven qualitative descriptors in the MSFD: (i) biologic diversity, (ii) non-indigenous species, (iii) commercial fish and shellfish, (iv) marine food web, (v) eutrophication, (vi) sea-floor integrity, (vii) hydrographical conditions, (viii) contaminants, (ix) contaminants in seafood, (x) marine litter and (xi) energy including underwater noise. Each descriptor is elaborated through criteria and indicators, and in many cases also with threshold values on GES.

Assessment of plan's impact has to fully utilize knowledge and methodological basis at regional level (e.g. Regional Sea Conventions) to assure cross-border components of the assessment. Regional sea conventions also develop regionally tailored thresholds and indicators identifying good environmental status of respective marine ecosystems in line with MSFD requirements. This information is to be considered in the assessment of the plan's impact. For example, HELCOM holistic assessment provides a methodological approach for the assessment of distribution of potential cumulative environmental pressures as a baseline for integrated management of human activities at sea.

Land-sea interaction. Environmental pressures originating from land-based sources constitute a significant part of cumulative pressure on marine environment and though they lay beyond the MSP powers they should be accounted for the assessment in cumulative pressure. Among the most significant pressures primarily originating from land-based sources are input of substances and input of energy. These pressures are to be specified for each marine area or sea basin. Coastal protection and development of coastal infrastructure as well as recreational activities in coastal areas are the human activities significantly contributing to the pattern of pressures on the marine environment. In combination with the high ecological value of coastal biotopes human activities related to the interaction between land and sea and related environmental pressures are to be thoroughly considered in marine spatial planning process.

Ecosystem services. Knowledge of marine ecosystem services is essential to avoid short-sighted overexploitation of marine resources. Information on the quantity, quality, location and value to humans of marine ecosystem services and the development of mapping, scenario and valuation methods of ecosystem services support a more robust MSP. All this allows ecosystem services' economic and long-term benefits to humans to be taken into account and the value of ecosystem services to be transferred to national accounting alongside other marine commodities.

An analysis of how conditions for ecosystem services may be changed by the marine spatial plans should be included as part of the impact assessment. Mapping and assessment of ecosystem services can be done utilizing the Common International Classification of Ecosystem Services (CICES) or alternative classifications. The assessment of the ecosystem potential to deliver services is to be based on available data in combination with expert knowledge.

Social and economic aspects. Potential changes of social and economic parameters should be assessed in the holistic assessment of marine spatial plans. The assessment should be based on scenarios considering not only environmental, economic and social impacts but also climate change and transboundary effects.

Indicators for the assessment of the impact of planning solutions should be developed to analyze socio-economic changes. These indicators should be tailored for specific features of geographical areas and in general such parameters as the intensity of tourist traffic, traffic in ports, the well-being of coastal communities, fish stocks and catches, needs for climate change mitigation and other.

The developed indicators should be applicable for the assessment of the plan's impact on the progress towards the set political objective, which can in its turn be helpful for assessing implementation of MSP. The analysis of indicators will serve as a basis for weighing of the proposed solutions in political groups, supporting political important social and economic issues. The result of the analysis is a plan where social and economic needs and impacts are balanced against nature protection targets. It can be visualized as a conflict and synergy matrix displaying the positive, neutral and negative interactions between interests.

Adaptive management. The development of scenarios reflecting changes in the planning areas resulting from the implementation of planning solution is one of the good practices of adaptive management in MSP. The impact of realization of these scenarios on ecosystem and regional climate change resilience should be assessed utilizing respective indicators. The result of the assessment should be considered when selecting a scenario demonstrating the balance between environmental and socio-economic goals. Additional scenarios focused on prioritized human activities at sea can be built and assessed.

The principle of adaptive management should be incorporated in national MSP frameworks through procedures for recurrent evaluation and revision of plans. Periodic analysis of the state of the environment with the use of data from environmental monitoring (e.g. water quality, state of the key species and biotopes, monitoring of seacoasts) is to lay basis for the revision. Though, MSPs do not necessarily include respective environmental indicators, indicators developed for the implementation of the EU MSFD or regionally agreed ones (e.g. in the frame of Regional Sea Conventions) should be applied. The results are to be used for periodic assessment of the environmental impact of the accepted planning solutions and revision of plans in case any deterioration of the state of the environment is revealed. As part of the assessment, competent authorities, responsible for maritime spatial planning, should enquire all stakeholders (authorities and institutions) involved in the planning process, about changes in spatial development. Compiled information is to be summarized in a report, which forms the basis for plan's revision. EU policies for sustainability and regional requirements are accounted in the revision process.

Alternative planning solutions. The consultation version of the marine spatial plans (draft version) is used to include alternative planning options in the form of different planning solutions for planning areas. The impact assessment of the draft plan is intended to demonstrate the difference in environmental impacts when applying proposed planning options and not applying them (zero alternative). The impact assessment should consider preservation of ecosystem services and ecosystem carrying capacity as well as planetary boundaries in general. At the national level it is recommended to arrange sectoral stakeholder workshops validating the existing knowledge base. It helps to overview sectoral interests and challenges considered in proposed alternative planning options (traditional uses, climate protection, nature protection).

Transparency. The MSP process should be transparent, and dialogue based. Good examples from previous MSP cycle involve a three step MSP-consultation procedure including ESPOO consultation. A good example of bilateral environmental consultations is the Polish-Swedish meeting on environmental impact of MSP on birds, harbor porpoises and bats including

cumulative impacts around in specific areas. Planners from both countries were engaged in discussion with environmental experts to develop a joint understanding of the current status and the potential impact of offshore wind development in both Polish and Swedish waters.

Special coordination sessions should be arranged to convey and discuss the results of the impact assessments in relation to planning proposals. Options to mitigate potential negative environmental impacts should be communicated with planners.

Recommendations for participation and interaction

Maritime spatial planning is a participatory process. The quality of planning, political adoption and public acceptance of the plan is guaranteed by accounting for the views of various stakeholder groups and resolving potential clashes of sea users' interests. Interaction and communication are to be arranged throughout the entire planning process starting from goal setting and plans' content compilation, continuing at the evaluation and assessment stage, and following up the plan's implementation and revision. In many countries interaction and communication process in MSP is regulated by national legislation, which identifies bodies and institutions to be involved in the planning process. A framework for consultation procedures is also to a large extent given in national or international legal and policy documents. This document compiles good practices provided by project partners and members of community of practice for EBA-based MSP, which can be useful for the next maritime spatial planning cycle.

Comprehensiveness and coherence. Comprehensive involvement of stakeholders and coherence of interaction and communication activities throughout the whole planning process is one of the key factors of success. Systematic preparation for interaction and communication is to be started at the earliest stages of spatial planning.

A roadmap for maritime spatial planning process, produced together with the maritime stakeholders can serve as a strong basis for the organization of effective, comprehensive and coherent communication. Key stakeholders representing competent local and national authorities, marine environment experts, NGOs and economically and socially important stakeholders can be identified in the roadmap and involved in its development. The roadmap can also include a consultation plan identifying main principles for stakeholders' involvement and timeframe for respective consultation campaigns.

A public participation strategy is one of the tools which can be drawn up at the initial stage of the planning process to outline communication (information and consultation) and involvement activities. The strategy contains principles as well as a detailed list of activities for stakeholders and the public. A stakeholder analysis can be carried out to identify all relevant and interested parties for the development of MSP.

Comprehensiveness and coherence of participation and interaction activities can be ensured by establishing respective thematic working groups and networks for the whole planning process. Neighbouring countries and regional international community are notified about the initiation of maritime spatial planning work and communication is maintained throughout entire planning

process, including formal consultations and informal communications. However, coordination of communication activities is to be provided by an MSP WG, composed of relevant ministries and public bodies, planning regions and coastal municipalities, as well as non-governmental organizations.

Best available knowledge. Utilizing the best available knowledge and practice for the development of maritime spatial plans is one of the elements highlighted in the Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area. This is also one of the EU MSPD requirements.

Availability of the best knowledge is to be guaranteed already at the goal setting stage, which requires organization of a dialogue with all relevant stakeholders. This dialogue is organized through co-developed of a common vision with stakeholders at the early stage of the planning process. This vision syntheses sectorial visions, developed by respective working groups. Strategic objectives and tasks are developed because of the dialogue ensuring the use of the best available sectorial knowledge. These objectives and tasks can be fine-tuned throughout the development of the MSP.

Establishing a scientific advisory board at the early stage of the planning process ensures comprehensive consideration of scientific background for planning solutions and guidance throughout the MSP process.

Thematic scientific working groups working with key themes such as «Working with nature» or «Living with climate change» can be established to ensure proper communication of scientific knowledge and data with other stakeholders. These working groups come up with recommendations and core principles that stakeholders can already consider in the planning process to guarantee the achievement of environmental goals and sustainable social and economic development of respective regions.

Communication of the best available scientific data. Data availability is one of the key challenges encountered by Baltic Sea and North Sea countries in the past MSP round. Another important aspect is data processing and their translation to serve policy and communication needs. Maps well visualize spatial distribution of various ecosystem components, human activities and related environmental pressures. Diagrams and graphs serve for illustration of temporal aspects of environmental, social and economic processes visualizing achieved or expected changes. The development of harmonized terminology and transparent methodological approaches to data processing which enhance understanding and alignment of MSPs in cross-border context, also strengthen the impact on stakeholders. Well defined methodological background in combination with end-user-oriented visualization tools help to communicate scientific evidence to broad public in a concise and nicely illustrated way.

A reference list for data required for application of ecosystem-based approach in MSP is beneficial to develop at regional scale. Such harmonized input and output data facilitates transboundary communication and interaction and supports transboundary aspects of strategic

environmental assessment (SEA). The use of harmonized data also increases the coherence of spatial plans across sea basins.

Data sharing is a substantial element of communication and interaction which also helps to involve respective stakeholders. Regional sea conventions (RSCs) provide platforms for sharing MSP related data across respective marine regions. Using RSCs' information resources as data sharing platforms helps to account for regional geographic and economic specificity in shared datasets. Establishing regional MSP data groups helps to harmonize both input and output data and develop common terminologies and visualization methods translating the data for planners.

Evaluation and impact assessment. Evaluation of alternative planning solutions, including strategic environmental assessment (SEA) and environmental impact assessment (EIA) is one of the mandatory procedures for maritime spatial planning. It also involves consultations related to transboundary impacts in the Espoo Convention framework. Participation of stakeholders in the communication of the assessment results is a key to the selection of the most adequate planning solution acceptable for groups pursuing various interests.

The goal of the environmental assessment is the integration of environmental considerations into the preparation and adoption of plans. Thus, the assessment of ecosystem based MSPs is to start at the very early stage of planning, ensuring just consideration of environmental objectives, and continued through all iterations including the final plan. Such iterative development involves several stages of interactions. Most of the reported good practices involved a three-step consultation procedure and the results of environmental assessment are considered at each stage. National MSP working group and/or steering group coordinates consultation process including communication of the environmental assessment results. Sectoral authorities ensure an ongoing dialogue with sectoral businesses. Engagement of local authorities in the consideration of the assessment results ensures participation of local communities. Continuous dialog with environmental NGOs is to be arranged.

Consideration of the environmental assessment of plans with potential cross-border impact is arranged in the whole basin scale. Regional Sea Conventions may provide a platform for informal interaction and the assessment results are to be included in the formal consultation process (e.g. in line with the Guidelines on transboundary consultations, public participation and co-operation). However, some specific aspects of MSP's environmental impact can be considered in small targeted regional or bilateral working groups.

Interaction procedure is to include a mechanism ensuring that comments and inputs received during communication/consultation process are addressed in the next plan's iteration and transparently reflected in the following draft of the plan.

Ecosystem services and land-sea interaction. Systematic interaction and communication with various stakeholders are intended to evolve thinking and raise the understanding of negative and positive effects on the marine environment. This is a co-creation process which serves for a more systematic comprehension of the multiple values provided by coastal and marine ecosystems (ecosystem services), as well as of the role of humans therein. The data on ecosystem services

and land-sea interactions collected and utilized in the planning process are to be made available and properly visualized.

Social and economic considerations. The balancing of interests of various stakeholder' groups is one of the main MSP functions. Thus, application of ecosystem-based approach in MSP naturally integrates interests of multiple stakeholders including social and economic considerations.

Vision(s) co-developed with stakeholders during the initial stage of the planning process lays a basis for further cooperation. Co-development can be organized in the format of a workshop. Strategic objectives and tasks identified in the vision can be further specified and fine-tuned during the development of the MSP.

Early establishing of a transdisciplinary national-level MSP cooperation group including ministries, agencies and experts ensures systematic collaboration between stakeholders and maritime spatial planners aimed to build shared knowledge on socio-ecological systems. Participation of stakeholders, including public authorities, economic sectors, researchers, and NGOs, throughout the entire MSP process can be organized as a series of regional and national workshops, sectoral meetings or individual consultations. However, the number of events has to be balanced with practical feasibility.

A conflict and synergy matrix displaying and communicating the positive, neutral and negative interactions between interests can be utilized as a tool to map and resolve potential conflicts between various sea user' groups. It ensures that sufficient space is allocated for achieving sectoral specific goals. More detailed studies including impact assessment should be undertaken at later stages to demonstrate opportunities for co-use/co-existence of various activities.

Ecosystem capacity limits. The ecosystem-based approach in MSP strives to manage human activities at sea in a way that the environmental load does not exceed ecosystem capacity limits. The good status of the ecosystem as well as trends of the status's changes, which proves its health and functionality, are illustrated by a set of indicators. This scientific information requires proper communication with stakeholders to forge a clear understanding of the responsibility of these stakeholders for the state of the marine environment.

A concept of "naturalness", which was reported as one of the good EBA practices in MSP, can be a good communication tool integrating the consideration of ecosystem capacity limits in the MSP interaction process. Naturalness is the basic boundary condition that must be met to ensure societal well-being today and in the future. Within the concept "basic boundary condition" takes into account the value of regulating and supporting ecosystem services, but also allows for the preservation, restoration and enhancement of the intrinsic value of nature. The desired quality of the marine environment is defined as a function of the ecosystem services, including the intrinsic value. Consequently, naturalness in the future assumes a level that allows healthy economic development, without compromising present and future ecosystem services. This does not aim for an ecosystem without human influence, but rather sustainable management of the ecosystem. Important to take into account is that naturalness is not only affected by activities from the sea, but also by activities from land (e.g. beach tourism, nutrient and pollutants)

Integrated governance. Ocean governance can be seen as the entirety of formal and informal institutions (organizations, rules, responsibilities, instruments, processes) used by human societies to plan and manage our seas in terms of human uses and maintenance of their good environmental status. Decentralization to the lowest appropriate level is mentioned in Malawi principles of ecosystem-based approach, which assumes multi-level governance as a basic approach for the EBA based ocean governance.

For multi-level governance to succeed, the right groups of stakeholders need to be involved, and they should be used properly in effective work groups. To ensure effective multi-level governance, the different levels need to cooperate, communicate, and ensure participation and strategic planning, while monitoring the results and being cost effective. Regional intergovernmental organizations (e.g. RSCs) play essential role being focused on mid- and long-term planning horizons, delivering policy coherence, linking local planning to national policies, and providing adequate information and guides to stakeholders.

Climate change. Climate change is a global process covering a long-term perspective and its effects are not always visible at local level in a short period of time. MSP is a national or local process which may involve specific measures aimed at mitigating climate change and adapting to its consequences. In this context MSP becomes a tool to communicate the need to allocate space from a global perspective, including MPAs, refuge areas, wind-energy farms, etc. with local stakeholders.

Planning solutions contain scenarios which account among other parameters the effect of climate change. Such scenarios demonstrate to stakeholders the cost of not implementation of climate change adaptation and mitigation measures and help to promote respective policies and solutions in local communities.

Climate change related interaction started at early planning stages helps to collect sectoral information on the climate change impact on these sectors, including the environment, and propose respective solutions.

Coastal areas are particularly vulnerable in relation to climate change. It involves flood risks and coastal erosion affecting both coastal biotopes and infrastructure. Cooperation with local communities and scientists helps to identify required measures related to land-sea interaction and make them accepted by the concerned stakeholders.

Adaptive management - follow up and revision. Adaptiveness of the MSP process is one of the key EBA components included in the Baltic Sea broad-scale MSP principles. The EU MSP Directive also indicates that EBA enables adaptive management which ensures refinement and further development as experience and knowledge increase. Adaptive management is an iterative process including monitoring, reviewing and evaluation of both the MSP process and the outcome. Interaction and communication of the monitoring results as well as involvement of stakeholders in the reviewing process is an essential part of the adaptive management in MSP.

Adaptive management, being inbuilt in the MSP architecture, assumes active participation and interaction during the development of the planning solutions as well as a component of the

follow up of the plans' implementation. Good EBA practices reported by eMSP project partners demonstrate the effectiveness of outlining stakeholder groups and a communication plan at early stages of MSP process e.g. as a part of national MSP roadmap. The same concerns the national monitoring and evaluation programme which provides up-to-date information on the plan's impact on the marine environment and reveals the need for its adjustment.

National legal frameworks in many countries stipulate monitoring of the plan's impact and periodic assessment of its validity. However, adaptive management implies adjustment of the monitoring and assessment as well as interaction with respective stakeholders on particular marine areas and specific circumstances. These peculiarities are to be reflected in a roadmap or in the descriptive part of the plan. Also, an opportunity for the revision of plans, based on the results of assessment and interaction is to be foreseen to ensure the adaptiveness of the process. Compiled good EBA practices include an example that a follow up report regularly prepared by a competent national authority might serve as a basis for changing the adjustment of planning solutions.

Community of Practice as an interaction platform. Community of Practice (CoPs) is an organized group of people who have a common interest in a specific area. They collaborate regularly to share information, improve their skills, and actively work on advancing the general knowledge of the matter. CoP is an effective tool ensuring participation of broad stakeholder's pull in MSP process. The structure of CoP includes two major components – a dialog platform planning and follow up period and time-bound drafting groups focused on the development of planning solutions or proposals for plan's adjustment.

The dialog platform is opened of unlimited number of stakeholders willing to participate in the planning and follow-up processes. Experience of the dialog platform will lay basis of the framework for continuous science and policy dialog and mutual knowledge exchange between planners and stakeholders. Time-bound drafting groups to be established for the development of concrete planning solutions, resolving conflicts and assessing plan's impact with subsequent development of proposals for plan's adjustments. However, these drafting groups should fully utilize experience gained during discussions within the dialog platform and submit developed proposals to the CoP for verification. Drafting groups are established on a voluntary basis. Coordination and facilitation of CoP are conducted by national competent authority. representatives of project partners leading the LS on EBA in accordance with project description.

A combination of various working methods is applied to assure equally active involvement of all stakeholders in the CoP activities. The dialog platform is mainly based on virtual networking including WEB seminars and meetings intercalating with discussions in the frame of large-scale events (e.g. MSP Forum). Dedicated workshops or round tables are considered as an instrument for drafting groups co-creating concrete planning solutions and policy recommendations.

North/Baltic Sea MSP dialogue platform

Sharing Experiences – Solidifying Collaboration - Strengthening Governance

Background

The North Sea and the Baltic Sea are two northern European sea basins which are geographically connected by narrow Danish straights. Pulses of salty waters from the North Sea play a significant role in the functioning of the Baltic Sea ecosystem, while the outflow of Baltic Sea waters can be observed far in the North Sea and even beyond.

Despite significant differences in their physical, chemical, and biological parameters, both sea basins share common history and socio-economic foundations. For centuries, these sea basins were connected by common trade ways which are growing and expending in the modernity.

These sea basins are also united by the fact that most of the countries located on their shores are members of the European Union and thus, are bound by common legal and policy frameworks for the marine management (e.g. MSFD, MSPD, European Green Deal etc). Both seas are also facing common challenges related to growing pressure on marine ecosystems (e.g. eutrophication, extraction of biological resources, seafloor damage, underwater noise, etc) and the growing impacts of climate change, which also escalates the other pressures (such as eutrophication in BS and acidification in the NS). These challenges identify common action needs such as reducing input of nutrients, developing of offshore renewable energy, strengthening nature conservation, sustainable food production, coastal protection and others.

From a governance perspective, the North Sea and Baltic Sea basins share some common components. Several countries have their territorial waters in both sea basins. Two sister conventions - the Helsinki Convention in the Baltic Sea (HELCOM) and the Oslo Paris Convention (OSPAR) in the North Sea, were signed by all riparian countries in the respective sea basins. Both Conventions are aimed at protection of the marine environment and achieving its good environmental status. Contracting parties to these conventions further have developed strategic agreements – The latest ones being the Baltic Sea Action Plan 2030 and the Strategy of the OSPAR Commission 2030 – identifying environmental and management objectives and actions to be undertaken to achieve them by 2030. These objectives demonstrate a high level of problem awareness and knowledge of the needs to be solved. Countries in both regions demonstrate strong commitments and motivation to jointly achieve ambitious goals contributing to the SDGs and the EU Green Deal.

Despite of all commonalities of political and legal frameworks, marine governance structures in the North Sea and Baltic Sea regions demonstrate practical differences. Particularly, it concerns such important marine management tool as Maritime Spatial Planning (MSP). The Baltic Sea region has several regional coordination platforms for MSP, with strong leadership of the HELCOM-VASAB MSP Work Group. This group, jointly coordinated by HELCOM and VASAB, serves as a platform for regional policy dialogue in MSP. Representatives of all Baltic Sea riparian

countries, as well as multiple observers, use the platform for identification of basic principles of marine spatial planning in the region, key priorities, and approaches to ensure regionally coherent national MSPs serving for both the development of a growing sustainable blue economy and protection of the marine environment. As a result of this cooperation, a regional MSP framework was developed, including broad-scale regional MSP principles, a regional MSP roadmap and several documents guiding application of the ecosystem-based approach, transboundary consultations, and MSP data sharing.

Policy Area Spatial Planning as an element of the EU Macroregional Strategy for the Baltic Sea became another significant actor in the overall development of maritime spatial planning in the Baltic Sea region. The Policy Area focuses on encouraging the use of maritime spatial planning in all the EU Member States around the Baltic Sea and developing a common approach for cross-border cooperation. It steers implementation of related regional project to encourage them contributing to the progress towards the EU MSPD policy objectives and supports a regional science-policy interface. In order to translate scientific findings into regional policy documents, the Policy Area maintains a regional Planners' Forum and a MSP DATA Expert Group.

The North Sea region does not possess such an advanced governance structure. However, recently, nine North Sea countries - Belgium, Denmark, France, Germany, Ireland, the Netherlands, Norway, Sweden, and the United Kingdom - have started the Greater North Sea Basin Initiative (GNSBI). The Initiative is launched to enhance intra-national cooperation in the region to ensure viability of space for the development of a sustainable blue economy and conservation of nature.

The eMSP NBSR project revealed certain differences in the level of progress achieved in the respective sea regions in the development of different MSP components. The Baltic Sea region has developed a solid knowledge base for the application of the ecosystem-based approach, which embraces such conceptual elements as cumulative impact assessment, sustainable use of ecosystem services, precautionary principle, alternative development, mitigation measures, adaptive management and some other. In the North Sea region, the focus remains on how to work better towards a more sustainable blue economy and the development of concepts such as multi-use of marine space, co-existence of various sea uses and nature-inclusive sea-use design. Encouragingly, MSP data sharing, as a basis for cross-border and cross-sectoral cooperation and dialogue, is an area which has been significantly advanced in both regions.

This brief description of the commonalities and differences of the ways of MSP development in the North Sea and Baltic Sea regions demonstrates that both regions would greatly benefit from establishing a continuous long-term MSP dialogue platform. Such a platform would serve for knowledge transfer, exchange of experience, development of coherent and compatible methodological approaches and data sharing. In a broader perspective, this dialogue would also serve as a platform for transfer of innovative technological solutions and economic development in both regions.

Organization of the Baltic/North Sea MSP dialogue platform

The objective of the proposed cross-basin platform is to strengthen the design and implementation of Maritime Spatial Plans to achieve the goals of the EU MSPD Directive, aiming for sustainable development of the Baltic Sea and North Sea regions and building a sound basis for an adaptive Maritime Spatial Planning process applying the ecosystem-based approach and promoting sustainable blue economy.

The long-term dialogue platform will create most value by being future-oriented, proactive, and pursuing objectives which are fair and implementable, meaning that they are ambitious, but also achievable.

The dialogue platform should not be formal; a formal group is needed for decision-making. An informal planners' forum is felt, among the MSP policymakers and practitioners engaged in the eMSP NSBR project, as the most suitable format for the platform; informal groups can start as knowledge sharing, potentially developing into more formal groups, as and if needed. Cost and administrative needs, however, must be carefully considered.

To whit, even an informal planners' forum requires an organisational structure, such as an organizing committee, which would need fewer resources compared to a formal planners' forum, but would, nonetheless, still require some. Potentially such an informal Baltic Sea-North Sea planners' forum might be supported jointly by the HELCOM-VASAB MSP WG from the Baltic Sea region and the Greater North Sea Basin Initiative from the North Sea region.

Additional funding of the dialogue platform could be secured through application for a targeted project or including this kind of activity in a broader project proposal.

Dialogue themes and results

Proposals for the major themes for the initial stage of the dialogue are formulated based on the outputs of discussions in the communities of practice (CoP) formed in the frame of the eMSP NBSR project. These CoPs included representatives of both the Baltic and the North Sea regions, as well as participants from other European marine regions and even beyond. These themes also correspond to the objectives of the Baltic Sea Regional MSP Roadmap 2030 and priorities of the Greater North Sea Basin Initiative.

An ecosystem-based approach delivers future-proof maritime spatial planning. The theme will embrace various aspects of the application of the ecosystem-based approach in MSP, with particular focus on the cumulative pressures and marine ecosystem capacity limits, biodiversity conservation and restoration policy priorities, application of a precautionary principle and climate change resilience. The result of the dialogue would be mutual learning from the experience gained in both regions and knowledge transfer, common understanding of methodological approaches in MSP, MSP capacity building and strengthening the EBA framework for MSP.

Maritime spatial planning for sustainable blue economy. In the frame of this theme, practical solutions for sustainable development of the maritime sector will be discussed. Specifically, the discussion will be focussed on multi-use of marine space and co-existence of various sea uses, nature-inclusive design of installations at sea, sustainable use of ecosystem services and cumulative environmental effects of intensively developed marine areas. The result of this dialogue would be transfer of knowledge on co-existence of different human activities at sea, harmonized methodological approaches to the assessment of cumulative environmental effects of multi-use, practical recommendations on nature-inclusive design, and guidance for establishing of intensively used marine areas (MariPark). The idea of a MariPark is in line with the European and national strategies to promote sustainable blue economy and contribute to the Green Deal. Bert It can act as a tool to stimulate SBE by offering zone(s) at sea for marine activities, in analogy with business parks on land.

Monitoring of maritime spatial plans implementation as basis for adaptive management. Environmental, social and economic effects of MSPs and identification of needs for their adjustment have become key issues after adoption of national maritime spatial plans by all riparian countries in the Baltic and North Sea regions. Discussion on this theme includes basic principles for organization of monitoring and evaluation of national MSPs, national monitoring practices, procedures for updating of national MSPs and consideration of the monitoring results in these procedures as well as criteria for evaluation of MSPs' effects. As a result of the thematic proposed cross-basin dialogue, practical recommendations for the development of national MSP monitoring and assessment programs will be developed. The dialogue has the potential to strengthen managerial capacity of national MSP authorities and integration of adaptive management in their practices.

Data as a driving force for scientifically justified MSP. MSP is data-driven process, which means that data availability and quality largely identify the quality of national MSPs, especially in the period declared as digital transformation. Within this theme, participants will discuss data needs and processes providing required information, analytical instruments for better integration of data in MSPs, data transformation for communication and creation of new knowledge as well as data sharing to facilitate cross-border and cross-sectoral communication. The dialogue can result in the increasing of data availability and usability for MSP, strengthening the use of the data and their sharing based on FAIR principles. FAIR data are data which meet principles of findability, accessibility, interoperability, and reusability. Practical solutions on data presentation and visualization catering for the needs of various MSP stakeholders will be devised.

Participants

Since the proposed dialogue platform is aimed to enhance the implementation of Maritime Spatial Plans (under the EU MSPD Directive) in light of shared growing needs and challenges in the two sea basins, the key target group of the dialogue platform is representatives of respective competent authorities, policymakers and MSP practitioners. However, application of the ecosystem-based approach requires close cooperation and involvement within MSP and sectoral authorities, respective of NGOs and the scientific community. Dialog on sustainable blue

economy is impossible without involvement of respective sectoral authorities and the business community. The same concerns monitoring of the plans and data management. Thus, the dialogue platform implies involvement of multiple MSP stakeholders and actors. It is paramount that policymakers know exactly which issues the MSP actors are dealing with. Ecosystem-based MSP needs to be an integrated part of their decision making when it comes to offshore renewable energy, nature conservation, and fishing, otherwise it will change nothing. Thus, policymakers need to listen and to work together with the broad range of MSP actors.

Integration with the EU MSP Platform

Planning and coordinating systems for MSP in the NBSR and beyond could be strengthened by broader and more active use of the European MSP Assistance Mechanism and its European MSP Platform. It is a service to member states to share relevant knowledge and experiences on MSP, operated via a dedicated team with presence in all European sea-basins. Experts continuously draw together information on MSP experience, funding and training opportunities as well as relevant events from across Europe. The information is then made available in various interactive, easy-to-use formats readily accessible through the website. This platform could be enhanced to become more interactive, e.g. including a chat and question function for experts and practitioners to share experiences amongst each other.

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eMSP NBSR
Emerging Ecosystem-based Maritime Spatial Planning Topics in the North and Baltic Sea Regions

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Thank you for reading!

This document is a result of a joint work of the eMSP NBSR project partners and invited contributors.

It is the very last page of the document, but not the end of the eMSP NBSR project - the whole scope of project results is coming gradually and to be complete in the beginning of 2024.

Meanwhile, real-time progress and more information on all activities and events can be found at www.eMSPproject.eu

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