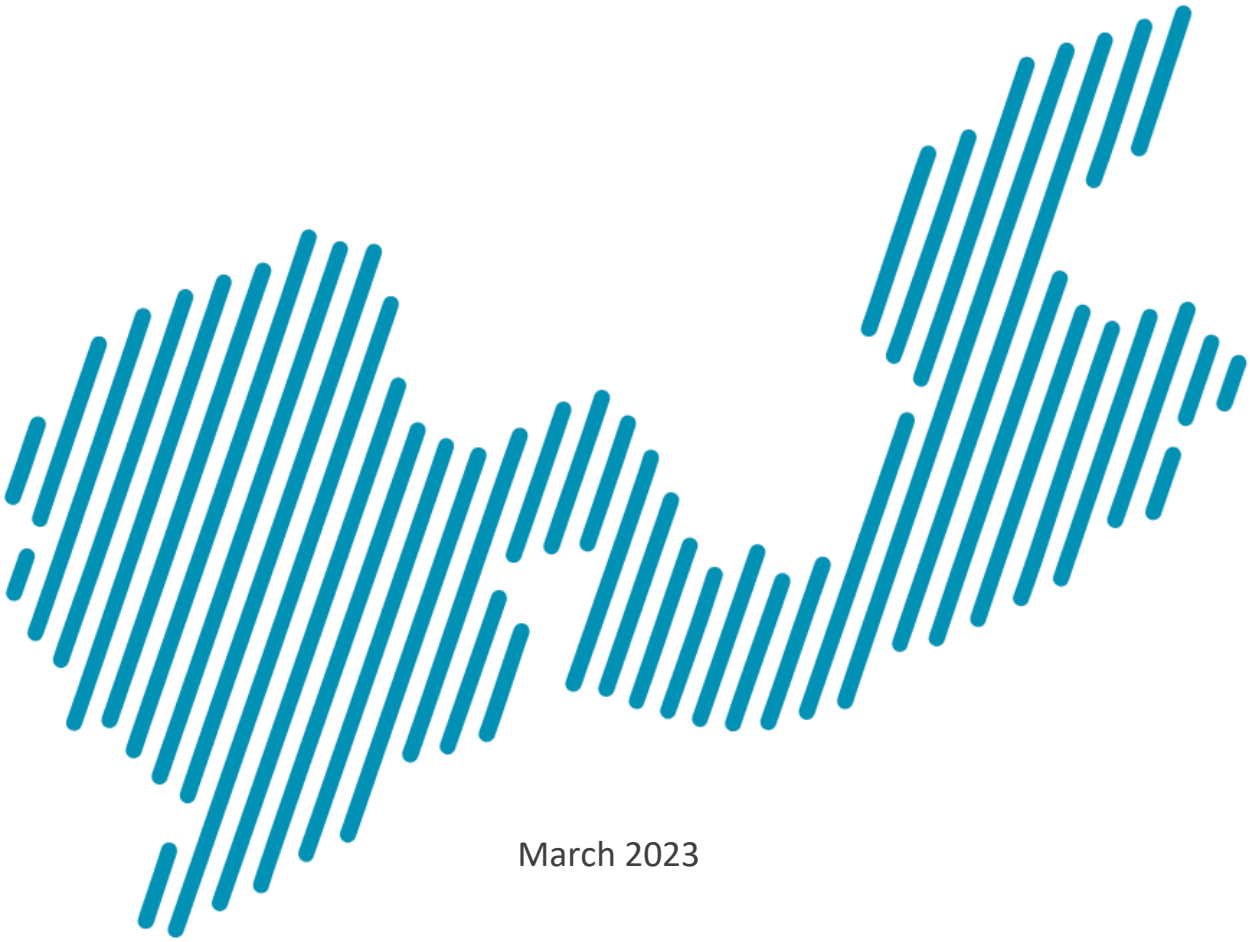
eMSP NBSR
Emerging Ecosystem-based Maritime Spatial Planning Topics in the North and Baltic Sea Regions

Co-funded by the European Union

A review of application of ecosystem-based approach in national MSPs to reveal challenges and compile good national practices



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Authors and editors: The overview is compiled by Dmitry Frank-Kamenetsky (HELCOM) and Jan Schmidtbauer Crona (The Swedish Agency for Marine and Water Management).

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DISCLAIMER

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Contents

Abstract

This overview aims to demystifies how Maritime Spatial Planning (MSP) can apply the ecosystem-based approach (EBA). It compiles the current practice of EBA in MSP in Baltic and North Sea countries and structures it based on a set of themes. The purpose is to uncover how the practical processes of planning have considered the ecosystem-based approach. The aim is to learn from the good practices which have been found. The next step is to identify gaps in EBA-implementation in MSP and based on those gaps develop recommendations on how to strengthen EBA in the next planning round.

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It recognizes that health and restoration of ecosystem must be regarded alongside with social and economic well-bring.

The structure of the overview includes such elements as Inclusion of nature, social and economic consideration, comprehensiveness and coherence, adaptive management and finally ocean governance. Since MSP is a participatory process stakeholders' involvement is not considered as a separate component but as a cross-cutting issue relevant for all five elements. The framework for the overview was chosen as it represents EBA as outlined in the so-called Malawi principles under the Convention of Biological Diversity (CBD).

This overview is to be utilized as basis for proposals to strengthen the international framework for the implementation of EBA in maritime spatial planning. Hence, the document includes a description of the existing EBA-framework, embracing its global aspects, regional (HELCOM and OSPAR) and the EU.

Seven countries from the Baltic Sea region and three from the North Sea region supplied information for the overview. National experts did not cover all five distinguished components of EBA but focussed on specific issues which were identified as examples of national good practices. Identifying good examples assessment report by WWF on Maritime spatial planning in the Baltic Sea (2022) has been considered among other reasons. Summary of reasons to select good practices is annexed to the overview.

In addition to description of good practices, contributors were invited to identify key challenges of EBA application in MSP and, where possible, suggestions to overcome these challenges. Among major challenges insufficiency of data and scientific knowledge, lack of harmonized methodologies, communication difficulties, cross-sectoral barriers and land sea interaction were specifically underscored. Challenges related to climate change and accounting for its effect in maritime spatial plans were specifically highlighted by many reporters. A summary of identified challenges is given in the end of the overview.

The overview presents information on good practices as it was provided by national experts. Thus, the form of presentation differs from case to case. A certain system was introduced to reports provided by Baltic Sea countries. They were invited to evaluate national practices against

the Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area (HELCOM-VASAB 2016). Contributors from the North Sea region provided input based on their view on EBA-implementation. The overview is to be considered as a working material of the eMSP NBSR project (Emerging Ecosystem-based Maritime Spatial Planning Topics in the North and Baltic Sea Regions).

Rationale and purpose of the overview

An ecosystem-based approach (EBA) is one of the main pillars of maritime spatial planning, formulated in the EU MSP Directive. It was also included in the Regional MSP principles developed by Baltic Sea countries, pursuing the overall target to keep the collective environmental pressure of various human activities within the limits of ecosystem carrying capacity and thus, contributing to the joint effort to achieve good environmental status of the Baltic Sea.

The European Green Deal sets new goals for tackling climate and environmental challenges. Its actions targeting climate change resilience, biodiversity conservation and restoration, clean energy, production of food, transport and other sectors largely serve as a guidance for the development of the international framework for the ecosystem-based approach in MSP. This development does not mean reconsidering of the existing framework, but its advancement accounting for the experience obtained so far and specification and adjustment to address new political targets.

Almost all EU countries in the Baltic Sea and North Sea regions have already adopted national MSPs. Revision is foreseen within the next 10-year period – in some countries already within the next 2-3 years. This time should be effectively utilized to analyse good practices applied in the first MSP round, particularly, in relation to implementation of EBA. The analysis will create basis for further advancement of the international EBA framework, providing good examples and identifying gaps, which are to be filled in to facilitate application of EBA in MSP and harmonize it between European sea regions.

The eMSP NBSR project (Emerging Ecosystem-based Maritime Spatial Planning Topics in the North and Baltic Sea Regions) addresses various MSP aspects through studies arranged within respective Learning Strands (LS). Among them such closely related themes as sustainable blue economy (SBE), ocean governance and ecosystem-based approach (EBA). Despite all these topics consider sustainable use of marine resources keeping environmental pressure within the limits of marine ecosystem bearing capacity, focus of these themes slightly differs. For example, Learning Strand on sustainable blue economy is focused on food and energy production with central learning questions dealing with cross-border collaboration, decarbonization, multi-use of space and environmental impact. The main goal of Learning Strand on EBA in MSP is to enhance the ecosystem-based approach in MSP in the context of the EU Green Deal through the investigation of good practices, further development of the international policy framework and distribution of relevant knowledge for the North and Baltic Sea regions.

This overview is intended to compile good practices for EBA in MSP from the latest round of MSPs in the North Sea and Baltic Sea and reveal respective challenges, serving as a basis for further advancement of the international EBA framework. Recommendations which supposed to be developed will also take into account the latest studies of the European Commission and the Word Wide Foundation (WWF).

Policy framework for an ecosystem-based approach in MSP

International policy framework

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.

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.

Since the ecosystem-based approach became one of the basic MSP principles in the Baltic Sea region, *a Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area* was issued jointly by HELCOM and VASAB. The document identifies key elements for applying the ecosystem-based approach in MSP, largely derived from the Malawi Principles and the Baltic Sea broad-scale MSP principles. These key elements are:

- Best available Knowledge and Practice: The allocation and development of human uses shall be based on the latest state of knowledge of the ecosystems as such and the practice of safeguarding the components of the marine ecosystem in the best possible way.

- Precaution: A far-sighted, anticipatory and preventive planning shall promote sustainable use in marine areas and shall exclude risks and hazards of human activities on the marine ecosystem. Those activities that according to current scientific knowledge may lead to significant or irreversible impacts on the marine ecosystem and whose impacts may not be in total or in parts sufficiently predictable at present require a specific careful survey and weighting of the risks.
- Alternative development: Reasonable alternatives shall be developed to find solutions to avoid or reduce negative environmental and other impacts as well as impacts on the ecosystem goods and services.
- Identification of ecosystem services: In order to ensure a socio-economic evaluation of effects and potentials, the ecosystem services provided need to be identified.
- Mitigation: The measures are envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan.
- Relational understanding: It is necessary to consider various effects on the ecosystem caused by human activities and interactions between human activities and the ecosystem, as well as among various human activities such as: direct/indirect, cumulative, short/long-term, permanent/temporary and positive/negative effects, as well as interrelations including sea-land interaction.
- Participation and communication: All relevant authorities and stakeholders as well as a wider public shall be involved in the planning process at an early stage. The results shall be communicated. Integrated Coastal Management (also known as ICM), as an informal and flexible instrument, can support the process of participation and communication.
- Subsidiarity and coherence: Maritime spatial planning with an ecosystem-based approach as an overarching principle shall be carried out at the most appropriate level and shall seek coherence between the different levels.
- Adaptation: The sustainable use of the ecosystem should apply an iterative process including monitoring, reviewing and evaluation of both the process and the outcome.

The document also provides detailed step by step guidance on the application of ecosystem-based approach in maritime spatial planning process through an integrated strategic environmental assessment process, highlighting aspects which should be accounted for in MSPs.

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 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 European Green Deal

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.

Methodology to select good practices and identify challenges in application of EBA in MSPs

The selection of good practices is mainly based on information from two major sources. One of them is the assessment report by WWF on Maritime spatial planning in the Baltic Sea, published in 2022. The report evaluates the balance between nature and people needs which is supposed to be maintained applying ecosystem-based approach in MSP. The assessment is based on more than 30 indicators reflecting four aspects of marine spatial plans: inclusion of nature, socio-economic considerations, good ocean governance and comprehensiveness of the complete MSP process. However, some conclusions in the assessment seems to be based on misunderstandings of national plans, national responsibilities or corresponding legal frameworks. Nevertheless, the indicators and evaluation provide a helpful structure for the methodology presented here.

Another source of information is the report prepared by works package 2 (WP2) of eMSP NBSR project and titled “Who can learn from whom” MSP analysis and cross reference. The report presents an overview of the maritime spatial planning (MSP) processes in the countries participating in the eMSP NBSR project. This information was utilized to propose good EBA practices for countries which had not been included in the WWF report by the time of preparation of the reporting template. The report by WP2 was also a source of information to identify challenges encountered by countries developing national MSPs. Countries’ leading roles in the development of respective practices on regional level or leadership of respective Learning Strands in eMSP NBSR project have been used as additional arguments for selection of examples. Another argument was mentioning of respective practices as good example in EC COM (2022) 195. A summary of reasons for the proposed case is given in Annex 1.

Since the main aim of the overview is to lay basis for further development of proposals **to enhance the international framework for the application of EBA in MSP**, selected good practices are to be evaluated against existing international Guidelines to assess the implementation of

these Guidelines and identify needs for their improvement accounting for the experience gained in the latest MSP cycle and illustrated by good practices. Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area has been used as baseline for the description of selected good practices. Also, questions for the review and evaluation of EBA in MSP listed in annex to Guidelines for implementing an Ecosystem-based Approach in Maritime Spatial Planning published by CINEA in September 2021 have been taken into consideration. Main criteria to select good practices can be formulated as following:

a. Inclusion of nature: nature conservation and cumulative impact within ecosystem bearing capacity.
b. Ocean governance: aligning strategic policy goals with ecological objectives and targets.
c. Social and economic considerations: utilization of ecosystem services and incorporating relevant human activities.
d. Comprehensiveness and coherence: cross-border and cross-sectoral consideration.
e. Adaptive management: forward looking approach.

Finally, this overview considers only good practices from national MSPs of eMSP NBSR project partners. Since CoP for EBA in MSP learning strand involves representatives of other countries, which MSPs were highly ranked in the WWF's report, these CoP members have been kindly welcomed to provide information on respective good practices utilizing the proposed formats. For example, WWF's report highly ranks social-economic aspects and ocean governance in Estonian and Latvian MSPs.

Sweden. Inclusion of nature in MSP – nature conservation and cumulative impact within ecosystem bearing capacity

In the WWF's assessment, Swedish MSP got the highest score in the category – "inclusion of nature", which illustrates how the plan accounts for cumulative effects of human activities on marine ecosystems, integrating marine protection and considerate expansion of at-sea activities as essential components of a sustainable blue economy. Swedish MSP received the highest score (ranks from 0 to 1) for indicators illustrating assessment of the environmental effect of MSP and accounting for ecosystem services, which is considered as one of the pillars for ecosystem-based approach in MSP. Description of these indicators and score received by Swedish MSP according to the WWF evaluation are given in Table 1.

Table 1. Indicators reflecting the account for nature value in Swedish MSP and assessment of its environmental effect (according to WWF report on Maritime spatial planning in the Baltic Sea). Numbers of indicators are given according to the numbering in WWF report.

N	Indicator Name	Indicator Question	Score
1	Strategic environmental assessments (SEA) conducted	Where appropriate Strategic Environmental Assessments (SEA) conducted in line with measures based on the mitigation hierarchy (avoid, compensate, restore)?	1
2	Consideration for ecologically- sensitive areas	Was appropriate mapping of ecologically sensitive areas conducted and were these included as "sensitive area" layers in the draft plan?	1
4	Planned activities fall within environmentally-sustainable limits	Were cumulative impact assessments of all maritime activities conducted to ensure that combined impacts do not exceed the sea's carrying capacity?	1
6	Network of well-managed Marine Protected Areas included	Are MPAs included in the plan's priorities? Are these areas in line with the EU Biodiversity Strategy targets? Are MPAs coherently connected nationally, as well as across countries and regional seas?	0.8
7	Essential marine habitats connected via blue corridors/ green infrastructure	Are blue corridors and green infrastructure connecting essential wildlife habitats, migratory routes and populations adequately addressed in the plan and part of the spatial mapping?	1
10	Marine ecosystem services assessed and included	Are marine ecosystem services properly addressed and translated into spatial designations?	1

According to the "Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area", strategic environmental assessment (SEA) is an

important tool 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 recommends integrating assessment of environmental effects in several steps of the maritime spatial planning process. In general, these steps are given in table 2 including a description of how the steps were addressed in Swedish MSP.

Table 2. Strategic environmental assessment as a tool for inclusion of nature in MSP example from Sweden.

SEA in MSP PROCEDURE— general steps according to the Guideline	SEA in Swedish MSP
STARTING	
Identification of issues and impact assessment	
Scoping of the environmental assessment, i.e. identify potential significant environmental parameters and human activities, determining the SEA process	A report on the current status including information regarding the utilisation of marine resources, current conditions, including the first description of the status of the marine environment as a basis for planning was developed. https://www.havochvatten.se/en/our-organization/publications/swam-publications/2014-06-16-marine-spatial-planning---current-status-2014.html The scope of the SEA was described in the MSP-roadmap.
Participation and interaction	
Establish the participation and interaction procedures Identify authorities, NGOs and other interested parties whom the plan may concern	A roadmap for marine spatial planning was produced. Thematic working group on nature conservation and marine ecology were established. Sweden's neighbouring countries were informed about the Swedish marine spatial planning and work on strategic environmental assessment in connection with consultations on the roadmap.

SETTING GOALS	
Defining goals	
Take into account relevant legislation and strategies concerning ecosystems, environmental and environmentally relevant programs, plans and agreements as well as CBD, EU, HELCOM and national targets	The scope of the strategic environmental assessment and environmental objectives were, among other things, identified in the roadmap.
Identification of issues, investigations and impact assessment	
Identify and define existing problems in the marine ecosystems, threats to the ecosystems and potential uses of ecosystems and their services Ensure the identification and valuation of ecosystem services Update the existing knowledge of the marine ecosystems and natural values and related databases	A guide or tutorial to environmental assessments in marine spatial planning was developed ahead of the consultation phase, as working material designed to facilitate the integration of environmental considerations into the marine spatial plans. A comprehensive cartographic material showing nature values, marine green infrastructure (green maps), was produced and used in the planning process.
Participation and interaction	
Communicate and promote goals concerning the marine ecosystem: biodiversity, natural values and the sustainable use and preservation of ecosystem goods and services	An informal dialogue on the first drafts of marine spatial plans in 2017.
PREPARATION	
Revision of the goals	
Revise the goals of the plan with regard to the assessed impacts on marine ecosystems and the sustainable use of the ecosystem services	The results of the impact assessments from dialogue and consultation phases were fed back into the planning process. The feedback enabled to consideration and changes of draft plans, based on the results of the impact assessments.
Evaluation and impact assessment	
More precise investigations of planning options if needed Identify and assess the impacts of the planning options and compare the planning alternatives	Map material, known as the Green map, was gradually developed throughout the process in order to make use of the best available data. The maps show aggregated nature values representing birds, fish, marine mammals and bottom substrates. The impact assessments show the difference in impacts of applying the marine spatial plans and not

	applying them. the latter called the zero alternative. The reference year for the zero alternative was 2030.
Participation and interaction	
Authorities responsible for ecosystems and nature protection as well as other authorities responsible for applying the ecosystem-based approach in the planning process, as well as stakeholders take part	A three step MSP-consultation procedure including ESPOO-consultation took place during 2016-2019. Bilateral Polish-Swedish meeting on environmental impact of MSP on birds, harbour porpoises and bats including cumulative impacts in the area of the Southern Middle Bank was arranged in Gdynia Poland in 2019.
PROPOSAL	
Revision of the goals and/or the planning options	
Goals and planning options are revised taking in to account the results of consultations with authorities responsible for ecosystems and nature protection as well as for applying the ecosystem-based approach in the planning process and stakeholders take part	Special coordination sessions were held in the autumn of 2018 to convey and discuss the results of the impact assessments in relation to planning proposals. Options to mitigated potential negative environmental impacts were communicated with planners.
Investigations and impact assessment	
Prepare the Environmental Report, according to Article 5 of the SEA Directive, when applicable, including in particular the following aspects: Potential impacts of the plan, including cumulative impacts under consideration of the precautionary approach Options and alternatives (including clarification of their compatibility with the ecosystem-based approach) Achievement of strategic goals and environmental objectives Mitigation measures	Symphony planning support tool, which allows for analysis of interacting, cumulative environmental effects was 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. The consultation version of the marine spatial plans included alternative planning options in the form of different planning solutions for sub-areas. The review version and the version delivered to Government included cumulative assessments displaying results per potential offshore wind area, both areas included in the plans and other. A qualitative analysis of how conditions for ecosystem services may be changed by the marine spatial plans was also part of the impact assessment The content of the plans is in general assessed to contribute to the planning objective of good environmental status. Risks of content not being compatible with good environmental status is highlighted in the Environmental Report and solutions proposed (see mitigation measures). Mitigation measures are included in the Environmental Report both with regard to options to change content of the plan (eg relocation of offshore wind areas etc especially in the early consultation stages including comparisons of sums of cumulative impacts from different areas for offshore wind) and proposed measures to implement at project level as to

	prevent, offset and reduce negative impacts in the marine environment.
Participation and interaction	
Present the submitted opinions on the planning options Authorities responsible for ecosystems and nature protection take part in the formal consultation process	National Environmental Protection Agency took part in consultations as well as in other dialogue including ESPOO-consultation. County Administrative Boards responsible for regional environmental protection were engaged in contributing with environmental data as well as comments during consultations. Continuous dialogue was held with environmental NGOs throughout the MSP-process, eg WWF.
APPROVAL	
Evaluation of the plan and the planning process and impact assessment is finalised	An environmental report published in December 2019. The marine spatial plans are in general assessed to contribute positively to the objective of good environmental status through guidance on nature use and particular consideration of high nature values. The southern Middlebank area for offshore wind may have negative effects on the long tailed duck due to its localization in shallow water. Wind extraction investigation areas is designated in some Natura2000-areas and requires Natura2000-permits for plans to be realized.
Plan is finalized	Swedish national marine spatial plan was adopted in February 2022

Description of inclusion of nature in MSP and related recommendations for the international EBA framework.

Swedish national marine spatial plan was adopted in February 2022. It consists of marine spatial plans for the Gulf of Bothnia, the Baltic Sea and Skagerrak/Kattegat and does not include coastal waters which are planned by the coastal municipalities. The Swedish MSP is intended to contribute to long term sustainable development. It provides guidance on what is the most suitable use of the sea but does not stipulate any regulations prohibiting or restricting activities or measures within planned areas. In addition to thirteen specified sea uses, the plan specifies areas where particular consideration has to be made to high nature values, to high culture values, or to the interests of Sweden's total defence.

Since Swedish marine spatial plans strive to contribute to sustainable development, they shall reconcile economic, social and environmental objectives. The latter was ensured applying a holistic impact assessment procedure as one of the key components of ecosystem-based approach. The holistic impact assessment involved 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, current overview will be focussed on the assessment of environmental effect of Swedish MSPs. The assessment involved identification of environmental objectives; considered areas of nature values and marine green infrastructure; analysed conditions for ecosystem-services and accounted cumulative environmental effects. It demonstrates in general a comprehensive approach towards EBA-implementation and thus can be included in the overview of good practices related to application of ecosystem-based approach in MSP. However, inclusion of nature in Swedish MSP could be further strengthened in the next MSP cycle through better integration of SEA results in the final plan.

Integrated approach to the assessment of environmental effects

The assessment of environmental and other impacts has been integrated in the planning process at each consultation stage. Further integration and interaction between planning and impact assessment procedures will be developed in the new planning round.

Assessment of the contribution of the plans

The impact assessments show the difference in impacts of applying the marine spatial plans and not applying them. It involves assessing one future scenario with marine spatial plans and one without the plans, the latter called the zero alternative. The reference year for the zero alternative was 2030. Both the environmental report and sustainability report contain descriptions of the assumptions made regarding the development of different sectors until 2030.

Applying a holistic perspective

A holistic systems perspective has been a basis in the development of Symphony as a cumulative assessment tool. Input data in Symphony cover coastal areas even though they are not included in Swedish national MSP. There is however a need to strengthen the data cross borders to enable cumulative assessments based on a sea basin scope.

Contribution to good environmental status.

The environmental assessment includes a qualitative analysis of the contribution of the marine spatial plans to achieving good environmental status in Swedish waters for relevant assessment criteria under the Marine Strategy Framework Directive and the criteria of the Water Framework Directive that are related to the marine environment, as well as environmental quality standards for the North Sea and the Baltic. The overall assessment indicates small effects, negative as well as positive. Sand and energy extraction are assessed to primarily have local negative effects, because the affected bottom environments are geographically limited and small in relation to the plan areas as a whole. For wintering sea birds and Baltic Sea harbour porpoises, offshore wind generation can have a moderate negative impact, but with potential cross-border relevance. Based on the current state of knowledge and the plurality of other pressures, it is not possible to predict effects of the changes brought about by the plans at population level for all species. More detailed investigations will be required in licensing examinations for offshore wind power operations. The marine spatial plans are assessed to contribute positively to the objective of good

environmental status through guidance on nature use and particular consideration of high nature values supporting green infrastructure outside of current marine protected areas.

Environmental quality objectives

The marine spatial plans are considered to have certain direct impacts in relation to some of the environmental quality objectives; reduced climate impact, clean air, a non-toxic environment, a balanced marine environment, flourishing coastal areas and archipelagos and a rich diversity of plant and animal life. The most affected are reduced climate impact and, a balanced marine environment, flourishing coastal areas and archipelagos. The plans are through inclusion of a number of areas for energy extraction promoting establishment of offshore wind energy. The planning guidance is expected to facilitate the granting of authorisation processes, thus increasing the rate of renewable energy extraction. Guidance on the establishment of offshore wind and sand extraction risks disturbing valuable species and habitats, At the same time, the marine spatial plan opens up the possibility for increased protection of species and habitats in far more and larger areas through the guidance on consideration of high nature values. High Nature Value Assessments have been included in the trade-offs for the most appropriate use, with the result that interfering activities are avoided in the most valuable natural areas. Guidance on the consideration of high nature values also signals to the need for operators and regulators to apply in particular sustainability principles in future activities. Attention is drawn to the importance of these areas for biodiversity, the integrity of ecosystems and resilience in a changing climate. In addition, the use nature in the plans confirms the existing and planned protected areas, fish spawning grounds and areas of national interest in nature conservation. Criteria for the designation of “small n-areas” for particular consideration of high nature values have included if they area is likely to function as a climate refuge area.

Global Goals

The plan proposals are evaluated positively in all three plan areas for the global sustainable development goals number 7 and 13 related to sustainable energy and reduced climate change and climate impact. The positive contributions increase with the scale of increased energy extraction and is therefore highest in the Gulf of Bothnia. Energy extraction can give rise to local negative environmental impacts on goal 14 Life below water, for example through the impact on the marine bottom environment, which affects target 14.2 on protecting and restoring ecosystems, and 24 (24) potentially some impact on cultural environments too, of target 11.4 on protecting the world’s cultural and natural heritage. The plans guidance on particular consideration of high nature values, as well as cultural values, are considered to be a positive contribution to goal 14 and goal 15 Life on land through expected environmental measures within commercial fishing and other sectors. This impact is likely to be greatest in Skagerrak/Kattegat, where the guidance on particular consideration is assessed to give an overall positive contribution to target 14.4 on sustainable fishing.

Challenges

1. To minimize uncertainty in assessments of environmental effects, in particular effects on species with transboundary populations like the harbour porpoise and birds like the Long Tailed duck.

2. To understand the potential role of MSP in marine management. eg through green infrastructure, including connectivity, how it can be communicated and or integrated in MSP.
3. To develop the linkage between sea and land including planning at national and local scale.

Ideas and proposals to address the challenges:

To strengthen the basis for Strategic Environmental Assessment of marine spatial plans by developing knowledge on ecosystem components/nature values and their sensitivity towards plan related impacts.

Development of the linkage between MSP and the Marine Strategy Framework directives criteria and indicators as to clarify how MSP can contribute to GES as well as avoid negative impacts.

To strengthen the international EBA framework in particular on the two above mentioned topics and assessment of cumulative transboundary effects.

Finland. Inclusion of nature in MSP - nature conservation and cumulative impact within ecosystem bearing capacity

According to WWF assessment report the approach applied by Finland to account for nature value in national MSP slightly differed from one demonstrated in Swedish example. Finland reported that a SEA was not needed since national MSP was not intended to exert environmental impact from sectoral activities. Finland, however, presented an environmental report and an assessment of potential impacts from sea uses delineated as suitable in the plan document. Moreover, COM (2022) 185 considers Finnish MSP as a good practical example of EBA in MSP, where authorities used scenarios for the future of the maritime area and assessed their impact.

Finland is running an extensive Inventory Programme for Underwater Marine Diversity – VELMU. VELMU collects data on the occurrence of underwater marine biotopes, species and communities in Finland's marine waters. Environmental variables collected in the VELMU Programme are available through regularly updated VELMU Map Service.

According to the "Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area" environmental assessment has to be considered at several steps of the maritime spatial planning process. In general, these steps are given in table 3. The approach applied in Finnish MSP could be considered as a good example in the light of the Guideline and utilized for further advancement of international framework for EBA in MSP.

Table 3. Environmental assessment in MSP example from Finland.

Inclusion of nature in MSP PROCEDURE— general steps according to the Guideline	Inclusion of nature in Finnish MSP
STARTING	
Identification of issues and impact assessment	
Scoping of the environmental assessment, i.e. identify potential significant environmental parameters and human activities, determining the SEA process	A current status report was done for each of the planning areas. The reports included information of the status of the marine environment, blue economy sectors, and geo-biological characteristics of the area. The reports are available in Finnish. The regional summaries of the current status is provided in Storymaps https://www.merialuesuunnittelu.fi/en/situational-picture-material-and-reports/ or as a part of the Digital Maritime Spatial Plan 2030 for Finland, e.g. the situational picture for the Gulf of Finland: https://meriskenaariot.info/merialuesuunnitelma/en/suunnitelma-sl-tilannekuva-eng/ When scoping of the environmental assessment the Status of Finland's Marine Environment 2018 (PDF), which has been prepared as part of Finland's Marine Strategy, was a key document. As part of the Scenario Phase, the 'key change agents' of the operating environment were identified https://meriskenaariot.info/merialuesuunnitelma/en/scenario-introduction/
Participation and interaction	
Establish the participation and interaction procedures Identify authorities, NGOs and other interested parties whom the plan may concern	Stakeholder salience analysis was performed. Internal (Who to 1) inform, 2) consult, 3) engage, and 4) collaborate with? And how?) and external (public) interaction plans were prepared. The public one: https://www.merialuesuunnittelu.fi/wp-content/uploads/2020/10/vuorovaikutussuunnitelma-27.9..2018_EN.pdf A national-level MSP cooperation group including ministries, agencies and experts was established. MSP Cooperation Network open to anyone was established (approx. 400 participants in a very early phase of the planning). A roadmap for maritime spatial planning process was produced together with the maritime stakeholders. The key stakeholders represented environmental authorities, marine environment experts and other ecologists. The planning process was decided to carry out together with the maritime stakeholders. This included the

	Scenario Phase and Vision Phase of the planning. Environmental experts were well represented in these planning phases. Neighbouring countries were informed about the Finnish MSP.
SETTING GOALS	
Defining goals	
Take into account relevant legislation and strategies concerning ecosystems, environmental and environmentally relevant programs, plans and agreements as well as CBD, EU, HELCOM and national targets	The MSP in Finland considers all relevant environmental legislation, strategies and programmes. Finnish MSP has adopted an ecosystem-based approach in planning and these connections are shown in the report Application of the Ecosystem-based approach in MSP: https://www.merialuesuunnittelu.fi/wp-content/uploads/2020/11/Ecosystem-based-approach-in-Finnish-MSP.pdf The connections are shown in the written part of the Digital Plan, part 'Maritime Spatial Planning' (one of the five parts of the written part of the Digital Plan).
Identification of issues, investigations and impact assessment	
Identify and define existing problems in the marine ecosystems, threats to the ecosystems and potential uses of ecosystems and their services Ensure the identification and valuation of ecosystem services Update the existing knowledge of the marine ecosystems and natural values and related databases	The Finnish ecologically significant marine underwater areas (EMMA), which are potential production areas of ecosystem services, were identified. The valuable areas are significant especially in terms of the biodiversity, vulnerability and uniqueness of biotopes. Geologically diverse and natural state areas are also included. Valuable areas were selected on the basis of the criteria relating to the descriptions of ecologically or biologically significant marine areas (EBSAs) under the Convention on Biological Diversity. The EMMA survey is based on extensive materials, literature and marine nature knowledge of more than 50 professionals. The area definitions rely mainly on the data collected during the VELMU programme: The Finnish Inventory Programme for the Underwater Marine Environment. EMMA-report (in Finnish): https://www.merialuesuunnittelu.fi/wp-content/uploads/2020/03/SYKEra_8_2020-2.pdf VELMU inventory data (https://www.ymparisto.fi/en-US/VELMU/The_Finnish_Inventory_Programme_for_Unde(59607)) These EMMA-areas were used in the Plan Map as areas with significant underwater natural values. It is possible to examine the EMMAs together with the Natura 2000 areas, private and State conservation areas, national parks and internationally important bird areas (IBAs), as

	well as Finnish Important Bird Areas (FINIBAs). The Scenario phase was the very first phase when the environmental impact assessment was carried out. All three future scenarios' effects on the state of the environment (and blue economy and people's well-being and participation) were assessed in a rough level
Participation and interaction	
Communicate and promote goals concerning themarine ecosystem: biodiversity, natural values and the sustainable use and preservation of ecosystem goods and services	An intensive collaboration phase with 380 maritime stakeholders was carried out during the 10-month-long Vision Phase. The work included a large set of national and regional level workshops, thematic meetings, and a consultation phase. During the collaboration phase, maritime stakeholders and maritime spatial planners built shared knowledge on socio-ecological systems (SES). Systematic thinking evolved and raised the understanding of each one's negative and positive effects on the marine environment. Thus, this co-creation process developed a more systematic comprehension of the multiple values provided by coastal and marine ecosystems, as well as of the role of humans therein. The data on ecosystem services and land-sea interactions utilized by blue sectors was collected during this phase. See the roadmap to achieve the shared vision for nature conservation and environment: https://meriskenaariot.info/merialuesuunnitelma/en/nature-conservation-and-management/. To note, the visions and roadmaps of all blue economy sectors included visions for supporting the status of the marine environment. These visions and roadmaps were included in an environmental impact assessment.
PREPARATION	
Revision of the goals	
Revise the goals of the plan with regard to the assessed impacts on marine ecosystems and the sustainable use of the ecosystem services	The sector specific Visions and Roadmaps were considered during the environmental impact assessment. The impact assessment showed the impact paths of the MSPlan, and the results were considered before finalizing the plan. The consultation phase included also the Vision Phase material (visions for 2030 and roadmaps to achieve the set visions) fed back into the draft plan.
Evaluation and impact assessment	
More precise investigations of planning	The Scenario Phase environmental impact assessment

options if needed Identify and assess the impacts of the planning options and compare the planning alternatives	provided information on what should be considered in MSP, regardless of the possible future. The impact assessment of the Draft Plan showed the difference in environmental impacts when applying the maritime spatial plans and not applying them (zero alternative). The assessment was done for each of the three planning areas and for the whole marine sea area of Finland. The impact assessment covered preservation of ecosystem services, Baltic Sea's carrying capacity, and planetary boundaries. Impact assessment report: https://meriskenaariot.info/merialuesuunnitelma/wp-content/uploads/2020/11/EN_Mersu_vaikutukset_loppuraportti_2020.pdf
Participation and interaction	
Authorities responsible for ecosystems and nature protection as well as other authorities responsible for applying the ecosystem-based approach in the planning process, as well as stakeholders take part	A formal consultation phase included the draft plan and the impact assessment of the draft plan. Neighboring countries as well as other countries in the Baltic Sea were informed and consulted.
PROPOSAL	
Revision of the goals and/or the planning options	
Goals and planning options are revised taking in to account the results of consultations with authorities responsible for ecosystems and nature protection as well as for applying the ecosystem-based approach in the planning process and stakeholders take part	Thematic meetings with environmental experts and authorities were arranged during the draft plan phase to discuss the planning decisions. The application of the Ecosystem-based Approach into MSP was facilitated by the environmental experts. Maritime spatial planners pondered planning solutions that contribute to achieving the marine status targets.
Investigations and impact assessment	
Prepare the Environmental Report, according to Article 5 of the SEA Directive, when applicable, including in particular the following aspects: • Potential impacts of the plan, including cumulative impacts under consideration of the precautionary approach • Options and alternatives (including clarification of their compatibility with the ecosystem-based approach) • Achievement of strategic goals and	The Finnish MSP focuses on controlling the pressure on sea areas so that the activities take note of the operational environment and support the good status of the marine environment. For example, when modelling potential places for offshore wind power the Zonation analysis with some 140 data layers covering biodiversity, restrictions, social impacts, profitability and enablers, was used. The precautionary principle was used in planning; the EMMA areas (altogether 87 areas) reflect the occurrence of biodiversity and ecosystem services in

environmental objectives • Mitigation measures	Finnish marine areas and no marine activities that threaten those bd-values were placed in those areas. No specific alternative planning solutions were provided. Options were instead produced and examined by means of future scenarios in collaboration with stakeholders as part of the planning process itself. The alternative future scenarios were especially analysed from societal and policy perspectives, in the context of the environment and marine status. Practical measures to mitigate the environmental impact of maritime spatial plans include the division of the planning area into three zones: the inner archipelago and inner coastal waters, the outer archipelago and outer coastal waters, and the open sea. The zones are defined by surface water classification (WFD) and also reflect the ratio of coastal land and sea surface areas. Zone use planning takes into consideration, 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.
Participation and interaction	
Present the submitted opinions on the planning options Authorities responsible for ecosystems and nature protection take part in the formal consultation process	The summary of submitted opinions of the planning options and their effect on the final Plan was provided after the second consultation phase. Summary of the feedback on the Maritime Spatial Plan and its consideration: https://www.merialuesuunnittelu.fi/wp-content/uploads/2020/11/Maritime-Spatial-Plan-draft-for-Finland-2030-Summary-of-the-feedback-and-its-consideration.pdf All environmental authorities, experts and NGOs had a right to take part in the consultation and give feedback. Informal feedback was collected during the whole MSP process 2016-2021.
APPROVAL	
Evaluation of the plan and the planning process and impact assessment is finalised	The finalized Impact Assessment of the Finnish Maritime Spatial Plan was published in October 2020. Maritime spatial planning strives for consistency with other programmes, strategies and sector-specific plans related to the Baltic Sea. International and national obligations related to the marine environment set the basis for identifying sea areas with the greatest

	potential for the development of maritime sectors while supporting a good status of the marine environment.
Plan is finalized	The councils of coastal regions prepared the maritime spatial plan in three different parts, and the administrative authorities of coastal regional councils approved the three plans between November and December 2020. The three plans form together the *Maritime Spatial Plan 2030 for Finland*, and it was adopted in December 2020.

Description of inclusion of nature in MSP and related recommendations for the international EBA framework.

Maritime spatial plan 2030 for Finland covers the whole sea area starting from the shoreline. MSP promotes the achievement of good status of the marine environment, and sustainable blue economy including the sustainable use of natural resources. The Plan is a strategic development document, formed together with stakeholder groups, which identifies in general terms the areas' opportunities for multipurpose use and supports the harmonisation of maritime operations. In addition to marine nature and environment, and traditional sea uses, the Plan considers also cultural values, leisure and tourism activities.

Finnish MSP has adopted Ecosystem-based Approach as a holistic method of planning use and management, with a core principle of humans as an integral part of nature with an impact on its functions. The cornerstone of ecosystem-based maritime spatial planning is to support the achievement and maintenance of good marine environmental status. Since the administration responsibility of MSP and MSFD are separated in Finland, there has been a challenge to find direct and effective ways for MSP to support the good status of the marine environment. MSP, as well as marine and terrestrial spatial planning at all levels in Finland, can contribute to descriptors of a good marine environmental status, such as biodiversity loss, the status of commercial fish stocks, seabed destruction and disturbance, changes in the seabed's hydrographical characteristics, underwater noise, changes in marine food webs, contaminants in the marine environment, and increase in marine litter.

Not only MSFD or WFD, but also nature protection objectives specified in international agreements and EU and national legislation, such as Habitats Directive and Birds Directive, are considered in MSP. The impact of the strategic maritime spatial plan as regards the nature conservation arises from its link with national, regional and sectoral policy guidelines and strategies, and regional programmes and their realisation, and from supporting the goals of regional land use planning, regional development projects and natural resource plans and other maritime management plans.

The Maritime Spatial Plan 2030 for Finland does not indicate existing areas of the Natura 2000 network, national parks or other nature reserves whose protection and implementation is guided by other legislation. The conservation areas cover 20,7 % of the territorial sea, while the percentage does not include world heritage sites (UNESCO) or EBSAs. The conservation network

has been considered as background material of MSP and planning solutions take note of all conservation areas. Instead of protection areas, altogether 87 'EMMA areas' are included in the Plan as 'Significant underwater natural values', which are potential production areas of ecosystem services. In addition, knowledge of ecosystem services and land-sea interactions utilized by blue sectors were gathered and mapped, and considered when making planning solutions. Further ecosystem service mapping including also leisure and cultural values has been done nationally in MAREA project (https://www.syke.fi/projects/marea) and these values will be included in the revised MSPlan. 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.

Challenges

- to find direct and effective ways for MSP to support the good status of the marine environment for all MSFD descriptors.
- Identify and optimize co-use of areas important for the marine ecosystems, without jeopardizing natural protection, including cross-sectoral considerations and socio-economics aspects.
- Environmental accounting
- Assessing cumulative pressures
- EBA as a tool to support European Green Deal: review of EBA principles.

Åland. Social and economic considerations: utilization of ecosystem services and incorporating relevant human activities

The Malawi principles declare that ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity. It should consider all forms of relevant information and involve all relevant sectors of society and scientific disciplines. Thus, social and economic consideration is vital aspect of ecosystem-based approach in MSP. WWF assessment of maritime spatial planning in the Baltic specifically addressed the balance between nature and people in European Sea. According to the Assessment report Åland scored the second highest points for socio-economic indicators after Sweden among eMSP NBSR project partners (50%). But since Sweden has already been included in the consideration of SEA procedure in MSP, Åland's MSP is proposed as a good example of social and economic considerations in MSP. Some indicators related to social and economic considerations applied in the WWF assessment report are given in table 4.

Table 4. Indicators reflecting social and economic considerations in Åland's MSP (according to WWF report on Maritime spatial planning in the Baltic Sea). Numbers of indicators are given according to the numbering in WWF report.

N	Indicator Name	Indicator Question	Score
10	Marine ecosystem services assessed and included	Are marine ecosystem services properly addressed and translated into spatial designations?	0
11	Risk in conflicts among users addressed	Does the plan analyse interactions of maritime stakeholders and propose measures to reduce conflicts that could lead to social tensions, accidents and/or pollution? E.g. conflicts between maritime sectors and area-based conservation management measures?	0.5
12	Sustainable blue economy objectives and finance principles defined	Are clear economic objectives defined, with a focus on sustainable development and sustainable blue economy?	0.5
13	Industry employment and income generation forecasted	Does the MSP include multiple spatial evaluations of different job and income generation scenarios, and their assessment against environmental criteria?	1
14	Sea use by fisheries assessed and included	Are the spatial designations based on a thorough assessment of areas accessed by fisheries, incorporating requirements of the CFP and MSFD?	0.5
16	Results from cross-sectoral public consultation incorporated	Did stakeholder consultations involve all actors and take place across the entirety of the MSP process with sufficient time for individuals to access documents?	0.5

With references to the EU Strategy for the Baltic Sea Region and MSP Directive, the "Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area" considers social, cultural and economic aspects as integral parts of ecosystem-based approach in MSP.

The Guideline recommends identification of ecosystem services at early stages of planning process. It also recommends ensuring socio-economic evaluation of effects and potentials, the ecosystem services provide throughout entirety of the planning. Concrete recommendations on consideration of social and economic aspects in several steps of the maritime spatial planning process are given in table 5.

Table 5. Social and economic considerations in MSP example from Åland.

Social and economic considerations in MSP PROCEDURE— general steps according to the Guideline	Social and economic considerations in Åland's MSP process
STARTING	
Identification of issues and impact assessment	
Identify and analyze the current and potential resources, activities and uses, in the planning area: — recognize economic and social objectives Define preliminary planning options: — accounting for in the development of preliminary planning options/strategies ecosystem services, economic and social objectives	Current and potential resources, activities and uses were identified and described. Economic and social objectives were taken into account in the overall objective of the MSP process
Participation and interaction	
Establish the participation and interaction procedures Identify authorities, NGOs and other interested parties whom the plan may concern	A roadmap/a plan of the MSP process was produced. Authorities, NGOs and economically and socially important stakeholders were identified.
SETTING GOALS	
Defining goals	
Take into account existing legislation, general and sectoral strategies, programmes and plans. Identify and decide on short- ausesnd long-term goals	The overarching goal of the MSP process was to propose future uses of the marine areas in Åland and, in that, consider **economic, social and environmental aspects** to support sustainable development and growth in the maritime sector. Part of that work was to take into account legislation, general and sectoral strategies, programmes and plans. ***No division in short- and long-term goals was made.***
Identification of issues, investigations and impact assessment	
Consider interactions between interests — Identify and define potential uses ecosystems and their services — Ensure the identification and valuation of ecosystem services	When current resources, activities and uses were identified and described, we tried to describe **future co-use** and also **potential future uses and needs**, such as wind-power and areas with high nature value.

Participation and interaction	
Clarify the goals of other authorities and NGOs — Communicate and promote goals concerning the sustainable use and preservation of ecosystem goods and services	**A consultation plan** including authorities, NGOs and **economically and socially important stakeholders** was made and included in the roadmap. Surveys and questionnaires were hold on the Internet.
PREPARATION	
Revision of the goals	
Revise the goals of the plan with regard to the assessed impacts on marine ecosystems and the sustainable use of the ecosystem services	The first draft version of the plan was revised with regard to the sustainable use, including impacts on marine ecosystems but also with regard to comments from economic and social stakeholders.
Content of the plan	
Draw up planning options in line with previously considered goals and the precautionary principle Prepare the plan taking identified limited carrying capacity of the marine ecosystems into account	**The first consultation version** was drawn up after taking account of comments and proposals in the above-mentioned surveys and questionnaires.
Evaluation and impact assessment	
More precise investigations of planning options if needed Identify and assess the impacts (social and economic) of the planning options and compare the planning alternatives	During that process, the social and economic needs and impacts were balanced against nature protections needs.
PROPOSAL	
Revision of the goals and/or the planning options	
Goals and planning options are revised taking in to account the results of consultations with nature protection, authorities responsible for various aspects of social and economic development, as well as stakeholders	After the first consultation / referral period the responses was analyzed and the **social and economic needs and impacts were balanced against nature protections needs.** At this stage, political views were also weighed in, mainly in a **political reference group**. This supported political important social and economic issues.

Content of the plan	
Prepare the planning proposal, which is selected as a result of the evaluation process of the planning options	**A second consultation version**/ proposal was drawn up.
Investigations and impact assessment	
Assess the feasibility of the plan — Assess social and economic impacts of the planning proposal — Assess how the goals are likely to be achieved — Mitigation measures	Social and economic needs were taken into account and assessed, as well as needs for nature protection.
Participation and interaction	
Present planning options Public display of the planning proposal	Meetings was mainly held with main stakeholders, trying to balance nature protection VS social and economic issues. At this stage, political views were taken into account to a high degree.
APPROVAL	
Evaluation of the plan and the planning process and impact assessment is finalized	After the second referral period the responses were analyzed and the social and economic needs and impacts was balanced against nature protections needs.
Plan is finalized	The plan was finalized.

Challenges

- Identify and optimize co-use of areas important for the marine ecosystems, without jeopardizing nature protection, including cross-sectoral considerations and socio-economics aspects.
- Mapping of ecosystem service, socio-cultural and recreational values. Identification and valuation of ecosystem services in a more systematic way could have been done.

Ideas and proposals to address the challenges:

At national level

Describe nature protection objectives and try to **define the limits and bearing capacity of the ecosystem**, for example in connection with EU directives and, perhaps, ecosystem services.

Describe and define socio-economic objectives and try to define socio-economic limits. What are the social and economic needs for your society?

Discuss and describe how to optimize co-use taking into account a) nature protection and socio-economic objectives and b) limits.

Strengthening the international EBA framework.

Propose guidance for mapping ecosystem service, socio-cultural and recreational values.

Propose guidance for describing socio-economics limits and needs.

Provide opportunities to discuss and evolve cooperation to enhance the possibilities to balance nature protection and socio-economic needs.

Latvia. Social and economic considerations: utilization of ecosystem services and incorporating relevant human activities

Latvia developed its first draft MSP by early 2016, yet due to intensive dialogues with stakeholders adoption of the plan was completed in May 2019. During the development of the MSP, existing international, EU and Baltic Sea regional MSP principles were followed. According to the WWF Assessment report Latvia scored the highest points for socio-economic indicators (92.9%). Some indicators related to social and economic considerations applied in the WWF assessment report are given in table 6.

Table 6. Indicators reflecting social and economic considerations in Latvian MSP (according to WWF report on Maritime spatial planning in the Baltic Sea). Numbers of indicators are given according to the numbering in WWF report.

N	Indicator Name	Indicator Question	Score
10	Marine ecosystem services assessed and included	Are marine ecosystem services properly addressed and translated into spatial designations?	1
11	Risk in conflicts among users addressed	Does the plan analyse interactions of maritime stakeholders and propose measures to reduce conflicts that could lead to social tensions, accidents and/or pollution? E.g. conflicts between maritime sectors and area-based conservation management measures?	1
12	Sustainable blue economy objectives and finance principles defined	Are clear economic objectives defined, with a focus on sustainable development and sustainable blue economy?	1

13	Industry employment and income generation forecasted	Does the MSP include multiple spatial evaluations of different job and income generation scenarios, and their assessment against environmental criteria?	0.5
14	Sea use by fisheries assessed and included	Are the spatial designations based on a thorough assessment of areas accessed by fisheries, incorporating requirements of the CFP and MSFD?	1
15	Offshore renewable energy targets included - CO2 neutrality respects biodiversity	Were the national offshore renewable energy targets for carbon neutrality translated into spatial designations while respecting biodiversity	1
16	Results from cross-sectoral public consultation incorporated	Did stakeholder consultations involve all actors and take place across the entirety of the MSP process with sufficient time for individuals to access documents?	1

With references to the EU Strategy for the Baltic Sea Region and MSP Directive, the "Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area" considers social, cultural and economic aspects as integral parts of ecosystem-based approach in MSP.

The Guideline recommends identification of ecosystem services at early stages of planning process. It also recommends ensuring socio-economic evaluation of effects and potentials, the ecosystem services provide throughout entirety of the planning. Concrete recommendations on consideration of social and economic aspects in several steps of the maritime spatial planning process are given in table 7.

Table 7. Social and economic considerations in MSP example from Latvia.

Social and economic considerations in MSP PROCEDURE— general steps according to the Guideline	Social and economic considerations in Latvian MSP process
STARTING	
Identification of issues and impact assessment	
Identify and analyze the current and potential resources, activities and uses, in the planning area: — recognize economic and social objectives Define preliminary planning options: — accounting for in the development of preliminary planning options/strategies ecosystem services, economic and social objectives	The regulations of Cabinet of Ministers (No 740 of 30.10.2012) "Procedures for the Development, Implementation and Monitoring of the Maritime Spatial Plan" contains the general requirements for development of MSP. It states that MSP shall be developed for the part of the Baltic Sea under the jurisdiction of the Republic of Latvia, taking into account the terrestrial part that is functionally interlinked with the sea. MSP shall be developed in accordance with the Marine Strategy (link to MSFD) and taking into

	account the international policy documents and legal acts, as well as development planning documents and legal acts of national level. A working group was established; the first task was to draft terms of reference for consultants who would be in charge of the preparing MSP. The terms of reference were drafted in 2014, considering all available approaches, principles, international conventions, EU directives, national legislation, etc. A topic of ecosystem services was listed to be covered by the content of the plan for which characterisation, mapping and assessment to be carried out.
Participation and interaction	
Establish the participation and interaction procedures Identify authorities, NGOs and other interested parties whom the plan may concern	In order to ensure regular involvement and participation of state institutions, planning regions, coastal local governments and public representatives in the development process of a maritime spatial plan, the responsible minister for MSP established a national MSP working group (MSP WG). The MSP WG consisted of more than 30 members and a chairperson - Head of spatial planning department). The MSP WG was composed of relevant ministries and public bodies, planning regions and coastal municipalities, as well as non-governmental organizations. During the preparation phase, a Public Participation Strategy was drawn up to outline communication (information and consultation) and involvement activities. The strategy contained principles as well as a detailed list of activities for stakeholders and the general public. A stakeholder analysis was carried out to identify all relevant and interested parties for development of MSP.
SETTING GOALS	
Defining goals	
Take into account existing legislation, general and sectoral strategies, programmes and plans. Identify sectoral goals for the planned area (in addition to the overall goals) at different geographical levels: EU, Baltic Sea, national, regional	Development of the MSP started with assessment of current status and trends of marine and coastal ecosystems and all related sea use sectors. Indicator based approach was applied, including nature, environmental and socio-economic

and local Identify and decide on short- and long-term goals	indicators. Maps of distribution of marine ecosystem features and services as well as existing sea uses were produced. The long-term vision on the use of the sea (the desired situation in 2030) and goals (priorities and objectives) of the plan were built upon objectives and priorities set in the relevant EU and national policy documents. The vision was co-developed with stakeholders during the first regional workshops at the early stage of the planning process. Strategic objectives and tasks were developed and fine-tuned throughout the development of the MSP. As the Latvian MSP is a long-term planning document, short term goals (objectives) were not developed. Tasks aiming to achieve the goals and objectives have different deadlines.
Identification of issues, investigations and impact assessment	
- Consider interactions between interests — Identify and define potential uses ecosystems and their services — Ensure the identification and valuation of ecosystem services	Development interests, conditions and strategic targets/objectives of each sector were clarified. It was important to understand existing long-term objectives, as the plan was drafted with the perspective of 2030 (~12 years). A conflict and synergy matrix was elaborated to display the positive, neutral and negative interactions between interests. Mapping and assessment of ecosystem services (MAES) was initiated based on CICES classification and the EU MAES process. The identification and assessment was determined by the data availability and expert knowledge, therefore the biophysical mapping of the ecosystem potential to deliver services was feasible. Social and economic values were not assessed due to lack of knowledge and resources at that time. For the first time a national sea basin benthic habitat map was created which served as a basis for MAES. In total 9 ES classes were mapped spatially: 2 provisioning, 5 regulating and 1 cultural ecosystem.
Participation and interaction	
Clarify the goals of other authorities and NGOs — Communicate and promote goals concerning the sustainable use and preservation of ecosystem	The vision was co-developed with stakeholders during the first regional workshops at the early stage of the planning process. Strategic objectives and tasks were developed and fine-tuned

goods and services	throughout the development of the MSP. In general, stakeholders, including public authorities, economic sectors, researchers and NGOs, played an essential role throughout the entire process of MSP through a series of regional and national workshops, sectoral meetings, individual consultations etc. Systematic coordination and cooperation was ensured by the early establishment of a transdisciplinary MSP working group, with representatives from relevant ministries, regional and local authorities and NGOs.
PREPARATION	
Revision of the goals	
Revise the goals of the plan with regard to the assessed impacts on marine ecosystems and the sustainable use of the ecosystem services	Latvians MSP defined the following sectoral priorities for the planned area: 2 cross- cutting priorities - a healthy marine environment and a stable ecosystem, national defence; and 4 sectoral priorities: maritime development and safe shipping, sustainable fisheries and tourism, as well as the use of renewable energy sources.
Content of the plan	
Draw up planning options in line with previously considered goals and the precautionary principle Prepare the plan taking identified limited carrying capacity of the marine ecosystems into account	In order to develop to identify planning options the 4 strategically different scenarios were built and assessed for drafting the 1st version. Ecosystem and climate change indicators were used to assess the impacts of the scenarios. For the 2nd version of MSP, additional scenarios focused on shipping and energy (wind energy) were elaborated and assessed.
Evaluation and impact assessment	
More precise investigations of planning options if needed Identify and assess the impacts (social and economic) of the planning options and compare the planning alternatives	The developed scenarios for the 1st draft were assessed using also economic, social, environmental, climate and transboundary criteria. Indicators were selected to assess each objective and task. These can be also helpful for assessing

	implementation of MSP. Yet, the drafting of MSP was also in close collaboration with SEA; developing of the Environment report.
Participation and interaction	
Present planning options and their impacts Involve authorities responsible for nature protection, authorities responsible for various aspects of social and economic development, as well as stakeholders	Stakeholders were involved in assessing each of 4 scenarios for the first draft MSP by implementing SWOT analysis. The events were organized at regional and national level. The prepared 1st draft was also available for full scale public consultation process, including SEA. Involvement of stakeholders was according to the developed Public Participation Strategy. As a result, local and regional governments (important social partners) had the largest representation in organized events. From the economy sectors, shipping including ports were the most active stakeholder in the process, followed by fishery and energy. Environmental and nature conservation sector has the same activity level as local and regional governments.
PROPOSAL	
Revision of the goals and/or the planning options	
Goals and planning options are revised taking in to account the results of consultations with nature protection, authorities responsible for various aspects of social and economic development, as well as stakeholders	The goals (vision, priorities and objectives) were revised at the stage when the 2nd draft of MSP was developed. The “economic growth” was replaced by “economic existence”, 6 priorities got the same importance from a strategic point of view. The revisions were undertaken due stakeholder opinions and not based on thorough assessment exercises.
Content of the plan	
Prepare the planning proposal, which is selected as a result of the evaluation process of the planning options	Based on the 1st draft and additional dialogues among key stakeholders on alternative scenarios and some additional data layers, the 2nd draft proposal was developed. This proposal was assessed more thoroughly for SEA (impact on different environmental components, including ecosystem services), however, not from socio-economic perspective.
Investigations and impact assessment	

Assess the feasibility of the plan — Assess social and economic impacts of the planning proposal — Assess how the goals are likely to be achieved — Mitigation measures	The in-depth socio-economic assessment was carried out for the 1st version of the MSP, but socioeconomic aspects were taken into account while drafting the 2nd draft of the MSP.
Participation and interaction	
Present planning options Public display of the planning proposal	MSP and its planning proposals were presented and displayed twice: for each of the versions, a full-scale public participation process was organized. Regional events were organized additionally when the 1st version was for public consultation in January 2016. After that for consultations with public were carried out mainly in electronic communication and within MSP WG meetings and MSP related project events that helped to have a general agreement on MSP contents. The formal public consultation process for 2nd draft version of MSP was carried in July and August 2018. On 15 November 2018 the formal harmonisation process of MSP final version was started and continued until the MSP was harmonised and approved by the government in 2019.
APPROVAL	
Evaluation of the plan and the planning process and impact assessment is finalized	SEA for the MSP was completed on 03.04.2019 by issued statement of the State Environmental Bureau.
Plan is finalized	Plan was adopted by the Latvian government on 14 May 2019.

Challenges

- Availability of spatially explicit and timely up-dated socio-economic and environmental data to be used in trade-off analysis.
- Encouraging wider and more active engagement of all stakeholders in the development of MSP.
- Identify and optimize co-use of areas important for the marine ecosystems, without jeopardizing natural protection, including cross-sectoral considerations and socio-economics aspects.
- Mapping of ecosystem service, socio-cultural and recreational values.

Ideas and proposals to address the challenges:

At national level

In accordance with the principle of the adaptive approach, MSP solutions must be adjusted to the latest knowledge and data on economic activities in the sea, the state of the marine ecosystem, the distribution of species and habitats, as well as the multiple impacts caused by economic activities and the ability of the ecosystem to adapt to the pressures of the economic activities and the changes caused. For that, the following tasks to be implemented:

- to create and maintain a comprehensive maritime information system so that the latest data on the state of the marine ecosystem, sea uses (economic activities of maritime sectors) are available for the decision-making/licensing process, for updating the MSP,
- to ensure effective and timely data exchange between all involved parties.
- to create permanent platform for facilitating regular communication, discussion with relevant stakeholders (both in working group meetings and electronically in virtual space, e.g. using national geoportal or other available digital tools)
- to support implementation of social-economic studies, quantitative assessments of ecosystem services incl. marine ecosystem accounting;
- consider all sustainability criteria in the MSP approval stage.

Strengthening the international EBA framework.

- collect and share economic and social data from the countries around the Baltic Sea.
- support in development of sea basin specific and national scenarios, including sector specific scenarios
- support in methodologies for socio-economic impact assessment studies to be replicated in development of the next generation of MSP.

Denmark. Ocean governance - aligning strategic policy goals with ecological objectives and targets

International ocean governance strives to address the many challenges stemming from the ocean's multidimensional and interconnected role. In practice, ocean governance is a process which aligns goals and objectives of various domestic, regional and global policies so that the world's oceans and their resources together are healthy and productive, for the benefit of current and future generations. The ecosystem approach was initially identified as a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the ocean governance is a vital part of this strategy.

WWF assessment of maritime spatial planning in the Baltic considers good ocean governance as aligning the plan with other EU policies enforcing a high-standard EBA-MSP. According to the Assessment report Denmark scored almost 40% in this category, which in combination with Danish leadership in the Ocean Governance Learning Strand of the eMSP NBSR project leads to a proposal to consider Danish MSP as a good example of ocean governance component of EBA. Some indicators related to good ocean governance applied in the WWF assessment report are given in table 8.

Table 8. Indicators reflecting ocean governance aspects in Danish MSP (according to WWF report on Maritime spatial planning in the Baltic Sea). Numbers of indicators are given according to the numbering in WWF report.

N	Indicator Name	Indicator Question	Score
18	Aligns with EU policies for seafloor and habitat protection	Have healthy biological diversity, seafloor integrity and essential fish habitats been adequately addressed to comply with the MSFD primary objective?	0
19	Aligns with EU policies for reduction of noise pollution	Has the impact of noise pollution been properly addressed in the maritime spatial plan in line with the MSFD objective?	0
20	Aligns with EU Habitats Directive and Birds Directive	Have spatial measures in the plan underpinned the Birds Directive and the Habitats Directive?	0.5
22	Legally binding plan	Are the measures included in the maritime spatial plan legally binding, at minimum for public authorities?	0.5
23	Cross-sectoral policies and timelines harmonised	Does the plan identify and align with other interconnected policies, and does the plan's timeline harmonise with those of other policies?	0.5
24	Competent authority for delivering EBA-MSP in place	Is a competent authority with the mandate and capacity required to deliver and maintain a high-standard EBA-MSP in place?	1

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 Baltic Sea broad-scale MSP principles adopted by in 2010 further specify the ecosystem-based approach, highlighting that good ocean governance should involve harmonized implementation of multidimensional marine policies and creation of respective administrative mechanisms.

The "Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area" considers various components of ocean governance at different stages of implementation of the ecosystem-based approach in the maritime spatial planning process. It includes: accounting for relevant legislation and strategies, identifying

strategic goals and ecological objectives, preparation of future scenarios, identification of competent authorities and involvement them into planning process etc. Concrete recommendations on consideration of ocean governance in several steps of the maritime spatial planning process are given in table 9.

Table 9. Ocean governance in MSP, example from Denmark.

Ocean governance in MSP PROCEDURE— general steps according to the Guideline	Ocean governance in Danish MSP process
STARTING	
Decisions taken when starting the preparatory process for a maritime spatial plan	
Planning authorities are in charge of drafting plans in accordance with the national legislation. — Identify all relevant environmental and other authorities and stakeholders that should be involved in applying the ecosystem-based approach	Initial steps of the Danish planning process were to establish a working group and a steering group with representatives from 17 authorities with activities and responsibilities pertaining to the ocean.
Identification of issues and impact assessment	
Identify the starting point and goals on a general level — Identify strategic goals and ecological objectives	National targets for i.a. nature conservation and energy construction have been leading in the allocation of space for these purposes.
Participation and interaction	
Establish the participation and interaction procedures	To start of the planning process, two workshops were held with stakeholders from different sectors including academia. These workshops had the intention of establishing the expectations for a Danish MSP.
SETTING GOALS	
Defining goals	
Take into account existing legislation, general and sectoral strategies, programmes and plans. — Take into account relevant legislation and strategies concerning ecosystems, environmental and environmentally relevant programs, plans and agreements as well as CBD, EU, HELCOM and national targets.	The ecosystem-based approach for the Danish MSP was guided by the HELCOM-VASAB principles. All relevant legislation was accounted for when allocating areas in the plan. Sectoral authorities of the working and steering group are concerned with sectoral legislation, targets and plans and ensure that these can be met through the Danish MSP.
Content of the plan	
Consider interactions between interests	The MSP working group discussed possibilities for how different activities can co-exist in time and space. Dialogue takes place on a continuous basis in order to

	establish possibilities for two or more activities to co-exist.
Identification of issues, investigations and impact assessment	
Consider interactions between interests	Ibid. Through the administration of the MSP, much is learned in terms of when two or more activities can co-exist and when this is not possible. Thanks to the adaptable design of the MSP, it will be possible to adjust the plan based on new knowledge.
Participation and interaction	
Clarify the goals of other authorities and NGOs	While other authorities are part of the MSP working and steering group, they bring forth sector specific goals. As mentioned above, these have been essential to the allocation of space.
PREPARATION	
Revision of the goals	
Revise the goals of the plan with regard to the assessed impacts on marine ecosystems and the sustainable use of the ecosystem services	As part of the environmental assessment, it was decided to revise the initial area allocation for activities in order to keep as many Natura 2000 areas free from potentially damaging activities such as mineral resource extraction.
Content of the plan	
Draw up planning options in line with previously considered scenarios and the precautionary principle Prepare the plan taking identified existing legislation, general and sectoral strategies, programmes and plans.	Scenarios of sectoral activities were drawn up before the initial allocation of zones. The precautious approach described above were then applied.
Evaluation and impact assessment	
More precise investigations of planning options if needed Identify and assess the impacts (on various strategic goals) of the planning options and compare the planning alternatives	After adjusting the area allocation as described above, the revised plan draft was then environmentally assessed.
Participation and interaction	
Cooperation with authorities and stakeholders	The MSP working group and steering group were central in the development and revision of the plan draft as well as the environmental assessment.

	Sectoral authorities ensure an ongoing dialogue with sectoral businesses.
PROPOSAL	
Revision of the goals and/or the planning options	
Goals and planning options are revised in cooperation with authorities and stakeholders	The coordination of goals and planning drafts took place through cooperation in the MSP working and steering group.
Content of the plan	
Prepare the planning proposal, which is selected as a result of the evaluation process of the planning options	The plan proposal was published on March 31st 2021 with immediate legal effect.
Investigations and impact assessment	
Assess the feasibility of the plan — Assess how the goals are likely to be achieved — Mitigation measures	All authorities reviewed the plan draft before it was sent into consultation. They were then responsible for evaluating if the allocated space was sufficient in order to meet sectoral targets.
Participation and interaction	
Present planning options Public display of the planning proposal	The plan was in consultation from March 31st 2021 to September 30th 2021. The plan was presented on an international meeting and national public meetings.
APPROVAL	
Evaluation of the plan and the planning process and impact assessment is finalized	The Danish MSP has since the end of consultation awaited a political negotiation, which will consider consultation responses and recent updates to national targets.
Plan is finalized	Awaiting the ongoing political negotiation.
Opinions and statements are integrated into the proposal	

Description of good ocean governance in MSP and related recommendations for the international EBA framework.

The Danish MSP was developed by an MSP working group and steering group which both consist of representatives from seventeen authorities (The Ministry of Industry, Business and Financial Affairs, the Ministry of Finance, the Ministry of Defence, the Ministry of Climate and Energy, the Ministry of Environment, the Ministry of Food, Agriculture and Fisheries, the Ministry of Transport, the Ministry of the Interior and Housing, the Danish Energy Agency, the Danish Business Authority, the Danish Fisheries Agency, the Danish Geodata Agency, the Coastal Authority, the Danish Environmental Protection Agency, the Danish Housing and Planning Authority, the Agency for Culture and Palaces and the Danish Civil Aviation and Railway Authority). Key decisions of the MSP were made by the steering group including how to implement an ecosystem-based approach. The sectoral authorities of these groups keep a

dialogue with sectoral businesses and organisations and ensure 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.

Challenges

- Increasing interest in activities at sea and as a result potential synergies and co-existence between nature protection and activities, such as sustainable energy.
- Challenging to know how much space is required to ensure that certain targets for e.g. renewable energy or aquaculture can be achieved.

Ideas and proposals to address the challenges:

At national level

Regarding the challenge of not knowing the amount of space to allocate to ensure the achievement of targets, the Danish MSP has addressed this challenge by two measures. 1) For some activities, e.g. renewable energy, space has been allocated for an area much larger than what is expected to be used. 2) If it turns out that one activity has insufficient space in order to meet national targets, the plan is adaptable and additional space can therefore be added through an addendum to the plan.

Strengthening the international EBA framework.

Germany. Comprehensiveness and coherence - cross-border and cross-sectoral consideration

Definition of ecosystem-based approach adopted by both HELCOM and OSPAR commissions in 2003 identifies it as “the comprehensive integrated management of human activities based on the best available scientific knowledge…”. Further developed the Baltic Sea broad-scale MSP Principles point out that maritime spatial planning with an ecosystem-based approach shall seek coherence between different planning levels. The EU MSP directive also stipulates coherence of MSPs across marine regions and with coastal zone management plans. All that demonstrates that comprehensiveness and coherence of MSPs are vital components of ecosystem-based approach in planning.

WWF assessment report, which is utilized here as an information source for selection of good EBA practices, paid significant attention to comprehensiveness and coherence of MSPs in the Baltic Sea region. The assessment considers comprehensiveness of national MSPs a complex criterium integrating the use of best available scientific knowledge, cross-sectoral and cross-border cooperation as well as coverage of the entire sea area. According to the assessment report Germany scored 68.8% in this category, which is one of the highest results among project

partners, which suggests that German MSP could be considered as a good example of comprehensiveness and coherence of MSP as component of EBA. Some indicators evaluating comprehensiveness and coherence of MSPs applied in the WWF assessment report are given in table 10.

Table 10. Indicators reflecting comprehensiveness and coherence in German MSP (according to WWF report on Maritime spatial planning in the Baltic Sea). Numbers of indicators are given according to the numbering in WWF report.

N	Indicator Name	Indicator Question	Score
26	Planning based on best-available scientific evidence	Is the plan based on the best available data? In the face of data gaps, have new data collection processes been set up to support future plans?	0.5
27	Industrial, ecological, cultural and societal functions included	Were all socio-economic, ecological and cultural uses of the sea thoroughly assessed at the same level of detail and translated into spatial designations to guarantee GES and ocean resilience?	0.5
28	Cross-border cooperation for good planning, monitoring and enforcement	Is cross-border cooperation in place to harmonise MSP procedures (planning, monitoring and EBA standards) solve transboundary conflict?	1
30	Interdisciplinary science supported decisions	Was the plan developed based on a broad knowledge base involving interdisciplinary science and a comprehensive set of decision support tools?	0.5
31	Sustainable multipurpose use through time and space included	Are areas identifying spatial and temporal multi-purpose maritime activities included?	1
33	Entire sea area covered	Has the entire sea area been covered?	1

Existing international framework for EBA in MSP pays large attention to comprehensiveness and coherence of MSPs. It is reflected in the Baltic Sea Action Plan (BSAP), Baltic Sea broad-scale MSP principles, Regional Maritime Spatial Planning Roadmap 2021-2030 and Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area. Coherence between maritime spatial planning and other processes is highlighted in several articles of the EU MSP Directive. Concrete recommendations by the Guideline for ensuring comprehensiveness and coherence of MSP are integrated at different stages of the maritime spatial planning process are listed in table 11.

Table 11. Comprehensiveness and coherence in MSP, example from Germany.

Comprehensiveness and coherence in MSP PROCEDURE— general steps according to the Guideline	Comprehensiveness and coherence in German MSP process
STARTING	
Decisions taken when starting the preparatory process for a maritime spatial plan	
Identify all relevant environmental and other authorities and stakeholders that should be involved	In the German MSP EBA concept, the EBA is applied in the combination of the spatial plan and the SEA, i.e.

in applying the ecosystem-based approach For a cross-border planning process, a public authority or authorities have to be determined	an integrative planning process. German spatial law defines the public authorities responsible for MSP.
Identification of issues and impact assessment	
Define the planning area. Identify the functions of the marine ecosystems and ecosystem goods and services in the planning area and surroundings and their links to ongoing and future maritime activities Identify the existing knowledge base and also gaps in knowledge	The planning area is defined by law, also the MSP 2021 was the second German plan for the EEZ. The knowledge base, including ecological functions, was described within the status report, the scoping report and the SEA report.
Participation and interaction	
Establish the participation and interaction procedures	National and international stakeholders were identified and approached very early. German Spatial Planning law sets the framework for consultation and participation. In 2018 the BSH established the Scientific Advisory Board for guidance throughout the MSP process.
SETTING GOALS - Concept for the revision of the German Maritime Spatial Plans & Scoping report	
Defining goals	
Take into account existing legislation, general and sectoral strategies, programmes and plans.	Existing legislation, general and sectoral strategies, programmes and plans were taken into account as a basis for the vision and the guiding principles.
Content of the plan	
Clarify the feasibility of the preliminary planning options; clarify how to integrate various goals Prepare future scenarios for the planning process	The planning options were displayed and described in the Concept for the revision of the German Maritime Spatial Plans (March 2020). This step was the first consultation round nationally and internationally, also through ESPOO notification.
Identification of issues, investigations and impact assessment	
Consider interactions between interests Update the existing knowledge	On the national level sectoral stakeholder workshops in 2019 validated the existing knowledge base. The interactions led to an overview of sectoral interests and challenges, which were condensed into three

	planning options (traditional uses, climate protection, nature protection).
Participation and interaction	
Clarify the goals of other authorities and NGOs	During the processes described above, stakeholders including authorities defined their goals and ambitions. National and international comments of the consultation process were used to sharpen the revision concept.
PREPARATION – 1st Draft MSP & SEA	
Revision of the goals	
Revise the goals ensuring cross-sectoral coherence	See above
Content of the plan	
Draw up planning options in line with previously considered scenarios and the precautionary principle Prepare the plan taking identified existing legislation, general and sectoral strategies, programmes and plans.	Out of the three planning options of the revision concept, a single draft plan was prepared that aimed to balance maritime uses and protection requirements. This took into account existing legislation (e.g. renewable energy, nature conservation, shipping).
Evaluation and impact assessment	
More precise investigations of planning options if needed Identify and assess the impacts (on various sectorial policies and cross-border) of the planning options and compare the planning alternatives	The 1st draft MSP was assessed through an SEA with two environmental reports, one for the Baltic Sea and one for the North Sea. Sectoral impact assessment and cross border assessment was carried out.
Participation and interaction	
Cooperation with authorities and stakeholders, including cross-border consultations)	A second consultation round was held with national and international stakeholders, on both the draft MSP and the SEA. Critical and supportive comments and suggestions were received on the proposed designations. BSH and BMI evaluated the statements received and published the evaluation. Further input was given on new information, e.g. scientific environmental studies, updated information on sector activities, contributing to the best available knowledge.

PROPOSAL – 2nd Draft MSP & SEA	
Revision of the goals and/or the planning options	
Goals and planning options are revised in cooperation with authorities and stakeholders, including cross-border consultations	As in 1st consultation round: based on the comments received a 2nd draft was prepared.
Content of the plan	
Prepare the planning proposal, which is selected as a result of the evaluation process of the planning options	As in 1st consultation round: based on the comments received a 2nd draft was prepared.
Investigations and impact assessment	
Assess the feasibility of the plan — Assess how the goals are likely to be achieved Negotiate content proposals with sectoral interests/actors, if necessary	As in 1st consultation round: based on the comments received a 2nd draft was prepared.
Participation and interaction	
Present planning options Public display of the planning proposal	As in 1st consultation round: based on the comments received a 2nd draft was prepared.
APPROVAL – MSP 2021	
Evaluation of the plan and the planning process and impact assessment is finalized Plan is finalized Opinions and statements are integrated into the proposal - the plan or programme as adopted - a statement on how environmental considerations have been integrated into the plan and the reasons for choosing the plan in the light of the other reasonable alternatives	Final plan developed based on 2nd stakeholder consultation round and approval process by relevant federal ministries. . The impact assessment / SEA was completed. The plan came into force on 1st of September 2021 as an ordinance. The plan includes a summary statement on: the way in which environmental concerns were considered in the update procedure, the way in which the results of public and authority participation were considered in the update procedure, giving the reasons why the plan was chosen after consideration of the alternative planning options that were examined, the measures to be taken as part of the monitoring of the impacts on the environment.

Description of cross-sectorial and cross-border consideration in MSP to ensure its comprehensiveness and coherence and related recommendations for the international EBA framework.

Challenges

- Growing range of uses results in the increase of spatial conflicts and competition. Further application of multi-use.
- Assessing cumulative pressures (cumulative impact assessment etc.): Method, interpreting and communicating results
- Further development of concepts (EBA…) and collection and interpretation of environmental data
- Reconciling specific examples of multi-use / co-use with EBA
- Combining the EBA with consideration of climate change
- Turning the EBA into an instrument that can help reconcile the EU Green Deal and biodiversity goals
- Strengthening exchange on MSP: planning forum, German-Polish MSP working group.

Ideas and proposals to address the challenges:

At national level

Strengthening the international EBA framework.

Poland. Adaptive management - forward looking approach

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 MSP process and its consequent cycles is considered as adaptive management. The Baltic Sea broad-scale MSP principles include adaptiveness as a component of sustainable use of the ecosystem where an iterative process including monitoring, reviewing and evaluation of both the process and the outcome should be applied. The goal set by new Regional Maritime Spatial Planning Roadmap 2021-2030 includes building a sound basis for an adaptive Maritime Spatial Planning process applying the ecosystem-based approach. Thus, adaptiveness is one of key characteristics of EBA in MSP.

WWF assessment of maritime spatial planning in the Baltic considers adaptive management as one of evaluation criteria and suggests a number of related indicators. However, adaptive

management is not considered as a separate assessment category and respective indicators are scattered over other categories. In this assessment these indicators are compiled and listed in the table 12. Despite Polish MSP did not score the highest percentage for indicators related to MSP adaptiveness, it is suggested that Poland, as co-leader of Monitoring and Evaluation learning strand in eMSP NBSR project would provide ideas on integration of adaptiveness in MSP process applying ecosystem-based approach.

Table 12. Indicators reflecting adaptiveness of Polish MSP (according to WWF report on Maritime spatial planning in the Baltic Sea). Numbers of indicators are given according to the numbering in WWF report.

N	Indicator Name	Indicator Question	Score
9	Blue Carbon ecosystems protected	Does the maritime spatial plan consider protection of blue carbon and coastal zones, ensuring sustainable utilisation and manipulation of resources in light of climate change?	0.5
17	Temporal and spatial uncertainties in the era of climate change addressed	In light of the climate and biodiversity crises, does the plan include spatial and temporal uncertainty aspects in its regulatory framework?	0.5
21	Vision for sustainable development in next 20 years included	Was a long-term vision for sustainable development of maritime activities formulated (with clear objectives and a timeline), and does it delineate principles for developing the sea area across the next 20 years?	0
25	Various scenarios of sustainable sea uses considered	Does the plan explore the full range of instruments available for steering multiple at-sea activities toward sustainability?	0.5
29	Adaptive management framework applied	Is adaptive management built into the planning architecture?	0.5
32	Tools for monitoring progress and aligning with key policies included	Does the plan's framework include procedures and indicators to measure progress against the baseline, status quo of the current MSP, EU policies for sustainability (i.e. MSPD, MSFD, Biodiversity Strategy, WFD, SEA) and regional sea requirements?	0

EU MSP directive stipulates that 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, building on existing knowledge and experience. The approach will also allow for an adaptive management which ensures refinement and further development as experience and knowledge increase, taking into account the availability of data and information at sea basin level to implement that approach. EU EBA Guideline in its turn identifies adaptive management of marine ecosystems as fundamental principle of EBA in MSP. It addresses unexpected changes in ecosystems (e.g. due to climate change) and socio-economic systems as well as takes on board new policy goals that may be developed.

Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area, with reference to the EU MSP Directive, recommends integration of adaptive management at different stages of MSP process. Concrete recommendations are given in table 13.

Table 13. Adaptive management in MSP, example from Poland.

Social and economic considerations in MSP PROCEDURE— general steps according to the Guideline	Adaptive management in Polish MSP process
STARTING	
Content of the plan	
Define preliminary planning options concerning the content of the plan	The planning process was initiated by gathering ideas and motions – also from the public. On that basis the first version was prepared and respective consultation took place.
Identification of issues and impact assessment	
Identify the existing knowledge base and also gaps in knowledge - Identify knowledge and knowledge gaps related to the marine ecosystem, natural values and their relation to human activities based on available sources such as HELCOM assessments - Identify the most probable future changes in ecosystems and human activities	It is mandatory according to the regulation on the required scope of the plans
Participation and interaction	
Establish the participation and interaction procedures Identify authorities, NGOs and other interested parties whom the plan may concern	The Act of March 21, 1991 on the maritime areas of the Republic of Poland and the maritime administration established a catalog of bodies and institutions with which draft plans are agreed and discussed. The Act also provides for the procedure of subsequent sending of the plan for consultation or opinion, and public presentation to collect comments and suggestions.
SETTING GOALS	
Defining goals	
Identify and decide on short- and long-term goals	The goals are defined in national and international policies and strategies. The plan should be adaptive.
Content of the plan	
Prepare future scenarios for the planning process	The planning process is regulated by the act and regulation.
Identification of issues, investigations and impact assessment	

Consider interactions between interests Identify existing problems Identify existing and potential threats Add to the existing knowledge and update databases Take into account the precautionary principle	Interactions were considered in detail in the "synergies and conflicts charts". Existing problems and existing and potential threats were identified in the planning and consultation process. The database was being updated in every round of the consultation process.
Participation and interaction	
Clarify the goals of other authorities and NGOs	The Act of March 21, 1991 on the maritime areas of the Republic of Poland and the maritime administration established a catalog of bodies and institutions with which draft plans are agreed and discussed. The Act also provides for the procedure of subsequent sending of the plan for consultation or opinion, and public presentation in order to collect comments and suggestions.
PREPARATION	
Revision of the goals	
Revise the goals of the plan with regard to the assessed impacts on marine ecosystems and the sustainable use of the ecosystem services	The revision has been performed at previous stage (see text above).
Content of the plan	
Draw up planning options in line with previously considered goals and the precautionary principle	There was "v. 0" of the plan which was then broadly consulted.
Evaluation and impact assessment	
More precise investigations of planning options if needed	There were four versions of the plan, each was subject to impact assessment and broadly consulted
Participation and interaction	
Present planning options and their impacts	There were four versions of the plan, each was subject to impact assessment and broadly consulted
PROPOSAL	
Revision of the goals and/or the planning options	
Goals and planning options are revised taking in to account the results of consultations with nature protection, authorities responsible for various aspects	There were several rounds of consultations.

of social and economic development, as well as stakeholders	
Content of the plan	
Prepare the planning proposal, which is selected as a result of the evaluation process of the planning options	There were four (4) subsequent versions of the plan.
Investigations and impact assessment	
Elaborate a monitoring programme according to the expected impacts and the planning procedure Set up a system for monitoring the interactions between human activities and marine ecosystems, including impacts on the marine ecosystems in order to ensure an adaptive management approach	Along with Polish MSP, the Environmental Impact Prediction (Environmental Report) was also prepared (the prediction was prepared for each version of the plan and was being updated subsequently). The report includes a chapter on the methods of analyzing the impact of Polish MSP and the frequency of this analysis. The analysis of the impact of Polish MSP will allow to assess how its provisions are implemented, whether mitigation measures are applied, whether the changes in the environment are the same as provided for in the report, and whether and what changes to the provisions of Polish MSP should be done. In order to fulfill the objectives of the analysis, it is going to, according to the report, cover: 1. Control of the implementation of the principles of Polish MSP by keeping a register of violations of the provisions of the plan regarding the way of using the space. This register should be kept by the Directors of Maritime Offices and updated every 2 years. 2. An analysis of socio-economic changes (carried out in the first, fifth and tenth years of the implementation of Polish MSP) based on the following indicators: a) the intensity of tourist traffic, b) traffic in ports, c) the well-being of coastal communities; d) fish stocks and catches. 3. Periodic (carried out in the first, fifth and tenth years of the implementation of Polish MSP) analysis of the state of the environment with the use of data from environmental monitoring: a) water quality monitoring, b) nature monitoring, c) monitoring of seacoasts.

	Based on the results of the above analyzes, an assessment will be made whether the provisions of Polish MSP do not contribute to the deterioration of the environment. In the event of a significant deterioration in the condition of the environment, procedures will be initiated to minimize the negative impact.
Participation and interaction	
Present planning options Public display of the planning proposal	Polish maritime spatial development plans are presented to the public several times at various stages of work. Pursuant to the Act of March 21, 1991 on the maritime areas of the Republic of Poland and maritime administration, which is the basis for the development and adoption of plans, the procedure begins with publishing information about commencing the preparation of the draft plan and about the possibility of submitting comments and applications regarding draft plan.
APPROVAL	
Evaluation of the plan and the planning process and impact assessment is finalized	Plan was approved by the Council of Ministers. At the final stage all ministries has checked once again if the plan was consistent with other relevant documents, strategies and policies.
Revision of the plan: — Plans shall be reviewed on a regular basis in order to implement adaptive management.	The act of 21 March 1991 on maritime areas of the Republic of Poland and maritime administration contains provisions on periodic assessment of the plan's validity. This assessment must be carried out at least every 10 years. As part of the evaluation, the authors of the plan (competent directors of maritime offices) are to ask all authorities and institutions with which the plan has been reviewed and agreed upon to provide information on changes in spatial development. On the basis of the information provided, the director must prepare a report, which is the basis for the change of the plan.
MONITORING	
Evaluate the time period of the plan Plan is taken into account in other plans and projects	The authorities responsible for permitting process in marine areas apply the plan. It is mandatory as the plan is a binding regulation.
Monitor and audit the impacts on the marine ecosystems according to the monitoring programme, in order to ensure an adaptive management	We are at the beginning of this process.
REVISION OF THE PLAN	

Plans shall be reviewed on a regular basis in order to implement adaptive management.	The act of 21 March 1991 on maritime areas of the Republic of Poland and maritime administration contains provisions on periodic assessment of the plan's validity. This assessment must be carried out at least every 10 years. As part of the evaluation, the authors of the plan (competent directors of maritime offices) are to ask all authorities and institutions with which the plan has been reviewed and agreed upon to provide information on changes in spatial development. On the basis of the information provided, the director must prepare a report, which is the basis for the change of the plan.

Some aspects of adaptive management in Polish MSP process and related recommendations for the international EBA framework.

In light of the climate and biodiversity crises, regulatory framework of Polish maritime spatial planning addresses spatial and temporal uncertainty aspects applying the following mechanisms. 1) the concept of main and allowed functions is applied, where allowed functions may not harm the main function or sustainable development, 2) priority is given to environmental protection regardless of plan's provisions (§ 3 attach. 1 of the regulation), 3) plan gives directions, but each concrete project has to be evaluated – plan does not substitute permitting procedure (even though investors claim the plan should replace that obligation). These rules are tools to address uncertainties.

A long-term vision for sustainable development of maritime activities formulated delineating principles for developing the sea area is a substantial part of Polish MSP. Polish Maritime Policy with the perspective to 2030 adopted by the Council of Ministers in combination with sectoral strategies and policies connected with maritime development create the vision, which is adopted in the plan.

The principle of adaptive management is accounted in the Polish MSP framework which includes procedures for recurrent evaluation and revision of plans. Despite, plans themselves do not include indicators and procedures to measure progress against the baseline, the Act on maritime areas of the Republic of Poland and maritime administration (adopted 21 March 1991) which creates the basis for maritime spatial planning stipulates regular assessment of the plan's validity. This assessment must be carried out at least every 10 years. As part of the evaluation, competent authorities, responsible for maritime spatial planning, are obliged to 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.

In Polish case activities foreseen in "Preparation" section of the EBA Guideline are carried out at previous stages "starting" and "setting goal". During these two stages ideas and notions from the

public were collected and, at the same time, relevant documents were analysed. That was the basis for the first version of the plan.

Challenges

- Identification of MSP's role to make changes in the ecosystem ensuring its GES and tackling climate changes.
- Scarcity of legal and methodological framework for monitoring and evaluation of MSPs which provide information to build evidence base for adaptive management throughout the MSP's lifespan.

Ideas and proposals to address the challenges:

At national level

Strengthening the international EBA framework.

Belgium. Social and economic considerations: balancing between social-economic and nature conservation goals.

MSP work by North Sea partners is not guided by respective regional guideline and has not been evaluated in the WWF report, identification of good practices for Belgium can be done solely on information compiled for "Who can learn from whom" report produced by WP2. According to the WP2 report Belgian MSP was primarily focused on balancing different sectoral interests and establishing a sustainable use of marine resources. In this respect, good EBA practices which could be learned from Belgian MSP are related to integration of solutions related to accounting for sectorial interests when planning human activities especially in relation to balancing between social-economic and nature conservation goals. WP2 report identifies an example of good practice in Belgian MSP in line with this notion as - the good EBA practice proposed by the Designation of the habitat's Directive area 'de Vlaamse Banken' and formal obligation for an appropriate assessment for activities within this area. This example falls under category "Social and economic considerations: utilization of ecosystem services and incorporating relevant human activities".

<u>Legal system and policy approach for Belgium:</u>

- a legal basis for MSP and its procedure of adoption in 2012, embedded in the Law on the protection of the **marine environment** of 1999 (LPME)[1], and the first legal enforceable MSP

[1] The law has been renamed as the Law on the protection of the marine environment and on the organization of marine spatial planning in the sea areas under Belgian jurisdiction (LPME). The LPME provides the environmental principles that Belgian authorities and users of Belgian marine waters must respect, such as the precautionary principle, the principle of prevention

2014-2020 in 2014 (Peccue et al, 2016), followed by the development of a long term MSP vision 2050 in 2017 and a new MSP 2020-2026 in 2019. [2]

- The precautionary approach is a leading principle in the Marine Environmental And MSP Act, and following international and EU obligations and ambitions like (N2000/BHD, MSFD, SEA and EIA directives);
- Focus is on the one hand on Natura2000 with 30% designated as habitats directive area ('special area for conservation, SAC) and bird directive areas (special protection area, SPA). On the other hand there is a strong focus on delivering and maintaining Good Environmental Status according to EU MSFD[3],[4] [MSFD incl programme of measures is an integral part of the Belgian MSP]
- To ensure scientific underpinning for the roll-out of offshore wind a very extensive monitoring programme has been established since 2006, with a continuous follow up, allowing for a unique long-term monitoring programme. Reports are published every year (https://odnature.naturalsciences.be/downloads/mumm/windfarms/winmon_report_2021_final.pdf) The cost of the monitoring is for the wind farm exploitations (included as one of the conditions upon licencing).

Focus of Belgium's North Sea MSP Programme 2020-2026

- The Belgian MSP explicitly mentions (in Annex I) that "an integrated marine spatial planning supports management with an **ecosystem-based approach**. It helps foster sustainable management of the sea, protection of the common good and growth in various marine sectors.
- **Naturalness** is a basic precondition for the development of the BNS in all its dimensions, and is specifically mentioned as one of the core principles of the Belgian MSP (Annex 2 to the MSP). Other core principles include social welfare and multi-use of space as the norm for all uses of space.
- The **desired quality of the marine environment** is defined on the basis of the ecosystem services to be supplied, including the intrinsic value.
- The aim is not to create an ecosystem without human impact, but to ensure the sustainable management of the ecosystem.

principle, the principle of sustainable management (human activities must be managed in such a way that the marine ecosystem remains in a condition which ensures the continued use of the sea), the polluter pays principle, the principle of restoration (if the marine environment is damaged or disrupted, it must be restored to its original condition, as far as possible). This law is also the legal basis to designate MPAs, such as marine reserves, a for licensing or authorizing activities at sea.

[2] MSP 2020-2026 at https://www.health.belgium.be/en/marinespatialplan.be.

[3] Recital 44 EU MSFD 2008/56 Programmes of measures and subsequent action by Member States should be based on an ecosystem-based approach to the management of human activities and on the principles referred to in Article 174 of the Treaty, in particular the precautionary principle. [art 174 TEC since 2016 now art 191 TFEU]

[4] Art 1.3. EU MSFD: Marine strategies shall apply an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such 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, while enabling the sustainable use of marine goods and services by present and future generations.

Naturalness in the Belgian MSP

The Think Tank North Sea is working on a widely supported long-term vision 2050 for the Belgian part of the North Sea. In 2018, two working groups worked on the themes « Working with nature » and « Living with climate change ». They are coming up with recommendations and core principles that stakeholders can already take into account in their operations today in order to guarantee a bright future for our part of the North Sea in 2050. The findings and recommendations of the working groups are presented in concise and nicely illustrated vision texts. Everyone can start applying them in his or her field now! Whether you are a citizen, a scientist, a policy maker or working in industry. **In 2017, three thematic working groups formed the basis of the North Sea Vision 2050 :** Naturalness, Blue Economy and Multiple Use of Space.

ThinktankNSV - reports (thinktanknorthsea.be)

The report of the working group on naturalness were used as a basis for the revisioning of the Belgian MSP. The basic principles and ambitions that were described in this report were adopted in Annex 2 of the MSP 2020 that describes naturalness as one of the leading principles in the new MRP.

Bijlage 2 Langetermijnvisie, doelstellingen en indicatoren, en ruimtelijke beleidskeuzes MRP 2020 | FOD Volksgezondheid (belgium.be)

Naturalness is defined as the scale and intensity with which biotic and abiotic processes take place and are expressed in the ecosystem. Naturalness is the basic boundary condition that must be met to ensure the societal well-being today and in the future. Naturalness is thus at the basis of various goods and services for our society today and in the future. Within the concept "basic boundary condition" takes into into account the value of regulating and supporting ecosystem services, but is 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 should assume a level that allows healthy economic development, without compromising present and future ecosystem services compromising. Further development of human activities at sea, therefore by definition pay maximum attention to naturalness. This does not aim for an ecosystem without human influence, but rather sustainable management of the ecosystem. Current human activities at sea are many and their true impact is not fully known at present. 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)

Meeting or contributing to the basic edge condition naturalness can be approached from the following perspectives:

1. Conservation and restoration of natural resources (including through management plans and measures for marine protected areas);

2. Avoidance and mitigation of negative impacts (so-called mitigating measures);

3. Creation of naturalness (e.g. placement of artificial reefs).

Step 1: determining the threshold values

Achieving and maintained, implies a resilient ecosystem, with the capacity to adapt while maintaining the inherent ecosystem services for each type of biotope in that ecosystem, so as to be more resilient to human and natural disturbance. Setting these targets and thresholds is and will remain a scientific challenge for which there addition, there must be public support be in place. What is the target? How much nature is enough? What is a healthy biodiversity threshold to be resistant to infections? What is the appropriate spatial scale level at which this should be determined? These are all questions that need to be answered in order to determine when an ecosystem can be considered healthy (= desired naturalness). Herein lies also the key to determining a feasible and sustainable ecological status as a function of future development, so that the baseline and/or threshold determination is no longer equated with 'back to the state of 1900'. The desired naturalness need also not be fixed at the same level for the four distinct dimensions . Spatial and/or time-based differentiation may be appropriate.

Determining threshold values requires:

- Use of scientific knowledge : it is of importance the desirable state, as already defined in the Marine Strategy Framework Directive and the Habitats Directive, of both soil, water column and air to be permanently qualified and to quantify it. Important here is the focus on the scientific underpinning, necessary for estimating which activity has, or could could have, on the marine environment. The improvement and expansion of this knowledge is primordial within the environmental impact assessment process (including how and to what extent mitigation), which forms the basis forms for the management of human activities at sea;
- Identification and elimination of knowledge gaps and uncertainties. In addition to in in-house expertise, use should also be made of experience from nature management on land and expertise from abroad. Accurate follow-up and intensive scientific monitoring of pilot projects or in situ test sites offer added value;
- Thorough follow-up or monitoring to determine whether the predefined objectives were achieved. This monitoring should be scientifically substantiated, objective and measurable indicators. All available resources should be optimally used for this purpose deployed;
- Investing in research development and innovation (RD&I) of alternative and innovative monitoring strategies, techniques and activities that contribute to the efficient collection of data relating to the state of the marine environment.

Step 2 : Mitigation of negative impacts of human activities at sea.

Mitigation is the combination of (in descending order of desirability) preventing/avoiding (addressing at the source), reducing, and offsetting the impact of human activities. As an ultimate goal can be stated that all activities should be in are consistent with the desired naturalness, so that no compensation is needed.

In itself, this means:

- Avoiding impacts, i.e. that human activities at sea are designed in such a way that they have 'zero impact' or even a positive impact. The basic attitude here is that the polluter avoids, mitigates and restores, which goes beyond the 'polluter pays' principle;
- A far-reaching empowerment of sectors, supported by international agreements and cooperation, in order to promote economic developments in the Belgian waters;
- Striving for low-impact activities, whereby mitigation is already factored in before the activity takes place. If there is impact, it must certainly be reversible. In other words, in the design of all (new) activities should naturalness be central. Activities may only be permitted if it is demonstrated (on the basis of the available scientific knowledge) that the desired naturalness in all (scientific) probability will not be compromised. The EIA tool should be evaluated and, if necessary, be transformed into (1) a assessment framework that should allow to objectively distinguish between these activities for which a significant impact is expected (= macro-impact) and activities with expected minimal impact (= micro-impact), (2) a tool that focuses on the search for opportunities for positive impacts.

Step 3 : Creating naturalness in the BNZ

Actions related to maintaining and restoring of the desired naturalness in the BNZ can take many forms, but obviously there is an important role for the marine protected areas.

Important here is:

- The already widely tested and science-based delineation and definition of the objectives of the marine protected areas also remain remain paramount in the future. Only on basis of this can a meaningful choice with regarding location, size and possible possibility of multiple use of space be made. This justification serves immediately also to justify "no use" marine protected areas versus marine protected areas with adapted shared use;
- A passive or active restoration of lost natural habitats (e.g. reefs of European oyster), as this will result in ecosystem services have been lost, or minimised. A return to the days when there was no human impact was obviously not feasible;
- Consider establishing dynamic natural areas in space and time in order to maximally and optimally respond to the interaction between conservation objectives and possible shared use. 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;
- Delineate areas to allow for the natural evolution of existing processes follow up scientifically. Natural areas, in addition to their conservation value, they are also of important for scientific research and as reference areas for the estimating the impact of human activities at sea.

More specifically, within the MSFD context, MSP wants to make the passive or active restoration of lost natural habitats (e.g. European oyster reefs) happen, as this will result in the loss of or reduction in ecosystem services.

- Link to multi-use: Striving for the desired level of naturalness will result in healthy ecosystem services, at the service of social well-being. The current demand for space at sea, within which these ecosystem services develop, creates tensions but also opportunities that support the demand for multiple use of space (MUS).
- In all future developments in the Belgian North Sea and on beaches, a working with nature approach should be pursued, to render mitigation and restoration unnecessary afterwards.
- Example of EBA: aquaculture and decreasing eutrophication: the aquaculture must reduce the level of eutrophication within the concession zone

Applying the ecosystem based approach to planning, developing and protecting the sea often directs us to new science needed. Belgium commit to doing so and getting the best available knowledge, data and science to underpin the maritime spatial plans and allow for activities at sea to take place.

EBA-challenges for the near future

- Fisheries management measures for habitat protection within the SACs are not developed and depend and heavy Common Fisheries Policy agreement (Art. 11 and 18 of the CFP). There is *no* obligation for fisheries activities to perform an EIA, being the only sector exempted.
- Pressure for fast development of wind capacity might reduce the ambition to have all areas in multi-use;
- Building an artificial island for energy transformation in a sustainable way (using nature inclusive design);
- Assessment of cumulative impacts
- Integrating EBA and MU in new tendering procedure for wind farms
- Furthering other sources of energy from the sea (first focus on floating solar) and understanding the ecosystem effects of that activity before scaling up;
- Based on new evidence on suitable habitats for restoration of biogenic (oyster) reefs make that ambition a reality;
- Keeping up with the accelerated speed of implementing renewable energy targets;
- Understanding and mitigating changes in the marine environment caused by climate change, and take that evidence up in MSFD/MSP.

Forward looking thoughts for eMSP NBSR project to discuss and work on:

- International MSP cooperation on basin scale: North Sea MSP?;
- Pressure for fast and massive installation of wind farms versus other development in blue economy to be integrated (different stage and velocity of implementation);
- Inserting and anticipating climate change effects;
- Cumulative impacts framework;

France. Inclusion of nature – strategic approach to integrate MSFD and MSP

French MSP, according to WP2 report, is focused on specification of the conditions for implementing the National Strategy for the Coastline and the Sea taking account of local specificities. It reflects one of the crucial EBA components – land-sea interaction included in great number of international guiding documents. Assessment of impact and pressures of different human activities on the coastal and marine environment to identify their potential effect on the good ecological state (GES) of the marine environment was reportedly one of the key EBA components. France decided to merge MSFD and MSP processes into a unique process, strengthening coherence between environmental and economic policies. In this context, the designation of EB-MSP, the creation of MPAs and the mapping of impacts on the marine ecosystems to define the most vulnerable and critical ecological areas sounds like well-defined example of good EBA practices in French MSP. This case clearly falls under category – "Inclusion of nature: nature conservation and cumulative impact within ecosystem bearing capacity" and reflects specific aspects of that related also to land-sea interaction.

Description of inclusion of nature in MSP.

Present in all oceans except the Arctic, France has the second largest maritime area in the world, with more than 10 million km². France's maritime policy aims to protect biodiversity and resources, but also to develop a sustainable economic activity.

In order to guarantee good ecological status and better economic and social development of the sea and coastline, the National Strategy for the Coastline and the Sea (Stratégie nationale du littoral et de la mer - SNLM) was adopted in February 2017 in France. This document states that for each of the four Sea Basins in metropolitan France (Eastern Channel -North Sea, North Atlantic Sea -Western Channel, South Atlantic Sea and Mediterranean Sea) and the 4 Sea Regions of France Outermost territories (Guyana, Antilles, St Pierre et Miquelon and South Indian Ocean), a planning document, the Sea Basin Strategy Document (Document stratégique de façade - DSF), must specify the conditions for implementing the national strategy, taking account of local specificities.

Integrated approach to the assessment of environmental effects

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.

Contribution to good environmental status

The French maritime spatial planning process has considered since the beginning the ecosystems. Indeed, France has decided to include in its National strategy for sea and coast and its Sea Basin

Strategies (1 per Sea Basin –4 in metropolitan France and 4 in outermost regions) the 2 EU framework directives:

•MSFD (2008/56) which targets to achieve or sustain the good ecological states of the marine environment toward a clean, productive and healthy sea;

•MSPD (2014/89) which provide a frame for marine spatial planning and request member states to coordinate their activities at sea.

A ministerial decree states that DSF should include indicators defining the good health state of the environment, based on the 11 descriptors of 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.

Ecological issues

The table below is an example of the strategic environmental goals related to its indicator taken into account for the ecological issues of MSP, for the Eastern Channel - North Sea DSF :

Descriptors	Strategic environmental goals
Benthic environments (HB)	Limit or avoid physical disturbance of anthropic origin impacting the good ecological state of benthic coastline environments, benthic environments of continental shelf and seafloor environment especially specific environments
Marine mammals and marine turtles (MT)	Limit or avoid pressures generating direct mortalities and trouble of mammals and marine turtles
Seabirds (OM)	Limit or avoid disturbance generating direct mortalities, disruption and the waste of important functional environments for seabirds' life cycle and of foreshore, especially for vulnerable and endangered species
Fishes (PC)	Limit disturbance on vulnerable fish species or in danger to favour their restoration and Limit the disturbance level on importance of halieutic functional area
trophic system and pelagic environments	Favour the upholding in the trophic resources' environment necessary for large predators
non-native species	Limit the risks of introduction and spread of non-native species through human activities
commercial species	Favour fish stocks exploitation, shellfish and crustacean at productivity level of better sustainable
Eutrophication	Reduce nutrient excessive supply and them transfer in sea environment
Sea floor integrity	Avoid the wastes and the marine environments physical disturbances linked with maritime and coastline activities

Hydrographic conditions	Limit the modifications of hydrographic conditions through human activities who are being negative for ecosystem effective operation
Contaminants	Reduce or remove chemical contaminants supply in the marine environment, of terrestrial and maritime origin, chronic or accidental
Contaminants – health aspect	Reduce microbiological contaminations, chemical and phycotoxic degrading the health quality of seafood, aquaculture an halieutic production area and bathing area
Marine litter	Reduce supplies and the rubbish in the sea and coastline of terrestrial and maritime origin
Noise	Restrict emitted noise in the sea environment at no impacting level for marine mammals

Vulnerable maritime areas

Vulnerable maritime areas have been integrated from the initial assessment to the measures. Indeed, the Sea Basin Documents making process are made via an integrated process allowing to take into account vulnerable maritime areas and their interactions with other activities all along the process.

Some examples of good practices

Before the EU MSP Directive in 2014, the MPA network was already well-implemented in France. The first natural marine parc was implemented in 2007, and their number have doubled between 2012 and 2016. Overall in 2022, 33% of French EEZ is defined as an MPA: 56% of those are located in New Caledonia, 27% are in Sub Antartic, 6% in the French West Indies, 4% in Mainland France and 5% in other French maritime areas as of June 2022.

Challenges

Measuring the cross-impact of activities on the environment and their costs will be key for the next round, with some identified challenges:

•Lack of spatialised data, difficulties in quantification and localisation of human impacts, even more concerning the cumulative impacts.
•Cross-cutting data are from different scale, standards and grids.
•Evaluation of the cost of the degraded environment is difficult. Assessment of the cost of public policies implemented to cope with degradation have been performed but not yet in terms of cost for economic sectors
•A lot of very good scientific insights have been provided by the community but it is difficult to reach practical conclusions for decision making and to have an overall assessment.
•Communicating with stakeholders and the public the results, in a simple and clear way: the initial assessment part of the DSF provides too much information for non-professional and is not easy to handle for non-specialist,

Ideas and proposals to address the challenges:

•In the short term: synthesis map, ecological zoning, quality of the synthesis pointing out the main issues.

•Longer term:

- Refine the ecological zoning,
- Rebuild the ecosystem,
- Make an effort on inventories and monitoring of human activities (e.g. nautical sports and leisure) and marine ecosystem,
- Develop tools and models for specialization and evaluation of impacts
- Decline/refine evaluations (environmental stakes, human activities, impacts, ecosystem services...) at local scales (vocation zone)
- Point at stakes/issues that can be addressed through local management (complementary to basin/national actions)

Netherlands. Ocean governance: aligning strategic policy goals with ecological objectives and targets

Ultimate goal of Dutch MSP reported to the WP2 review is integrating all relevant policies for the Sea and links with land for a six-year period, with a view of achieving long term targets. The Netherlands ecosystem based Maritime Spatial Plan (MSP) "The North Sea programme 2022-2027" builds on the Marine Strategy for achieving and maintaining Good Environmental Status (chapter 3) and includes the Programme of Measures. The Dutch MSP itself is an integral part of a six-annual National Water Programme, which ensures a holistic view of relevant land-sea interactions and connects the marine areas with the inland and (water)areas, activities and ecological policies. In this respect, the philosophy of national MSP process - to strike a balance between national priorities, taking into account land-sea interactions - embraces various national and international policies in forward looking context and, thus, demands their goals in a holistic approach to ocean governance.

According to the report, Dutch national MSP accounts for such EU policies as MSFD and European Biodiversity Strategy, energy transition, food transition, coastal protection and safe shipping in combination with international protection schemes and agreements: OSPAR, ASCOBAN, AWEA (migratory birds Africa-Europe). It gives a good example of "Ocean governance: aligning strategic policy goals with ecological objectives and targets" as one of the key components of EBA in MSP.

Challenges:

Finding the right spots for nature restoration targets e.g. flat oyster reefs), underpinning ecosystem impact of new activities (e.g. floating solar), come to a joint (international) framework for assessing cumulative impacts, and in particular the work needed to scientifically underpin the roll out of offshore wind, while staying within the ecological carrying capacity.

Good EBA-practices

Legal system and policy approach for The Netherlands:

- The ecosystem is at the basis of planning starting with the precautionary approach (TFEU 191), and following international and EU obligations and ambitions like (N2000/BHD, MSFD, SEA and EIA directives);
- Focus is on delivering and maintaining Good Environmental Status according to EU MSFD[5],[6] [MSFD including programme of measures is an integral part of the Dutch MSP]

[5] Recital 44 EU MSFD 2008/56 Programmes of measures and subsequent action by Member States should be based on an ecosystem-based approach to the management of human activities and on the principles referred to in Article 174 of the Treaty, in particular the precautionary principle. [art 174 TEC since 2016 now art 191 TFEU]

[6] Art 1.3. EU MSFD: Marine strategies shall apply an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status and that the capacity

- To ensure scientific underpinning for the roll-out of offshore wind a Cumulative Effects Assessment Framework for offshore wind has been developed and is used (CEAF currently 4.0 version)
- Various decrees and legislative procedures are guiding the site selection for offshore wind, including the considerations in the context of the Nature Conservation Act.
- A further mitigation hierarchy for activities which need a permit is included in MSP programme [assessment framework ref chapter 10.5 of the MSP]

Focus of the Netherlands North Sea MSP Programme 2022-2027

- Delivering the Dutch North Sea Agreement (NSA) from 2019/2020;
- Nature, energy & food transition (with a view and safeguarding other national interests as [safety/smoothness of shipping, sand availability NBS, military);
- Focus on strengthening the ecosystem (components) and restoration and nature inclusive design for offshore wind farms, with a tender clause to secure nature enhancement measures in these farms;
- Anticipating the EU GD Biodiversity Strategy targets (e.g. 30% MPA, excluding bottom impact fisheries towards 15% and nature restoration objectives – a.o. oyster reefs);
- A knowledge and monitoring programme is linked to priorities from the NSA [see box 1.]:

Box 1. The Netherlands' North Sea Agreement (NSA) wants to confront the challenges in response to changing use and find a new equilibrium. The NSA outlines the real need for an integrated and systematic research and monitoring programme that forms the basis for knowledge about how the North Sea functions. The 'Nature Strengthening and Species Protection Monitoring Survey' (MONS) aims to answer the central question of whether and, if so, how the changing use of the North Sea can adapt to its ecological capacity. The aim of the MONS programme is to give the parties to the North Sea Consultation (NSC) and, in the wider sense, society, an understanding of the changes that may and/or will, in future, arise as a result of the transitions that are already under way (energy, food supply and nature), combined with factors such as climate change, acidification and autonomous changes.

Steps foreseen in the near future implementing 2030 targets in national (maritime spatial) plans

- Q1 – 2023 Nature Restoration pledges EU MS;
- Follow up to the Quality Status Report from OSPAR 2023 to guide the next MSFD cycle (Part I and II) – which is supporting the adaptive management approach in the Netherlands MSP policy.

Applying the EBA in MSP often results in the need for building up scientific knowledge.

- Applying the ecosystem-based approach to planning, developing and protecting the sea often directs us to new science needed. The Netherlands commits to doing so and getting the best available knowledge, data and science to underpin the maritime spatial plans and allow for activities at sea to take place. The example of fish larvae studies in relation to underwater

of marine ecosystems to respond to human-induced changes is not compromised, while enabling the sustainable use of marine goods and services by present and future generations.

noise from pile driving illustrates this in a compelling way (see box 2.), but many more examples from the recent past are available for those interested: such as the case of (1) Nature Based Solutions and coastal protection with the Sand Engine and for constructing the Rotterdam port extension Maasvlakte II: including monitoring and evaluation or leaving sand extraction pits in the best way possible for kicking back environment, (2) the story of bats migrating to the UK (and back), (3) recent updates on behaviour patterns for a variety of gulls.

Box 2. EBA Case: Fish larvae and under water noise due to installation of offshore wind turbines (NL).

In 2008 concern was raised on the potential negative impact of driving piles in the seabed floor for the installation of wind turbines. The underwater noise was estimated between 180 and 200 decibels close to the activity – with an impact in low and high frequency affecting marine life (mammals, fish, fish larvae). In particular for fish larvae impacts were not well understood. For mammals (in particular harbour porpoises) a moratorium for construction was put in place for 4 months during the pregnancy time and other mitigating measures have been taken. Fish larvae however cannot swim away from noise. Fear was that fish larvae's' swimming bladders could be damaged (implode / explode).

Netherlands raised the topic at the start of a Strategic Environmental Assessment to gather opinions from other North Sea member states, stakeholders and others concerned. It was deemed necessary to conduct research with controlled test on shore in an aquarium. For this a special permit had to be obtained (testing on animals). If fish larvae are taken out from the sea for fisheries research (estimating reproduction for stock assessment and quota) non such permits are required.

Testing was conducted on larvae from plaice, sole and herring. The tests were repeated to confirm first findings. This confirmation was completed for plaice and sole but were not successful for herring. Those tests needed to be repeated completely.

The results showed no statistically significant differences in mortality between exposure and control groups at sound exposure levels which were well above the US interim criteria for non-auditory tissue damage in fish.

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0033052

EBA-challenges for the near future

- Getting the required data and information on ecosystem (components) timely, with a view to the needed roll-out of offshore wind/renewables, and also to assess the qualification of various Marine Protected Areas as Bird-areas [the Dutch North Sea MSP programme will be partially revised to allow for meeting renewable energy targets to make the country Fit-for-55 in 2030;
- Achieving an internationally agreed framework for assessing cumulative effects timely (OSPAR/NSEC work);
- Furthering other sources of energy from the sea (first focus on floating solar) and understanding the ecosystem effects of that activity before scaling up;
- Based on new evidence on suitable habitats for restoration of biogenic (oyster) reefs make that ambition a reality far offshore near the Frisian Front/Doggerbank;
- Keeping up with the accelerated speed of implementing renewable energy targets;
- Making a national nature restoration plan within a two year time frame following the EU Nature Restoration Law as proposed by the European Commission (COM 304 2022 final);
- Understanding and mitigating changes in the marine environment caused by climate change, and take that evidence up in MSFD/MSP.

Forward looking thoughts for eMSP NBSR project to discuss and work on:

- Setting the timeline on MSP revisions of the partners and the way the countries will take the European Biodiversity Strategy in;
- Ability to restore specific species specific and habitats following the EU Nature Restoration Law;
- Inserting and anticipating climate change effects;
- Cumulative impacts framework for all activities prior to next full planning cycle (OSPAR agreement prior to 2028) – our next full planning cycle will start mid 2026;
- Following work in North Seas Energy Cooperation (NSEC) Dublin & Esbjerg declaration – regional master plan SEA for hotspots 2030 and 2050 planning – joint scoping SEA.

A summary of major challenges to apply EBA in MSP

What was challenging in the past MSP cycles:

- Absence of harmonized international methodological framework for cumulative impact assessment.
- Insufficiency of information (data) related to various EBA aspects, including ecosystem components, distribution of human activities and their impacts.
- Lack of evidence base on the role of MSP in the support of good environmental status in terms of MSFD(WFD).
- Insufficient cross-sectorial knowledge base for identification and optimization of co-use/multi-use of areas without exceeding ecosystem carrying capacity and accounting for socio-economic aspects.
- Difficulties to communicate scientific evidence base with general public and broad stakeholders' community.
- Accounting for linkages between sea and land in MSP solutions at national and local scale.

What is anticipated in future:

- Understanding changes in the marine environment caused by climate change, and the development of MSP solutions/practices to increase climate change resilience.
- Keeping up with the accelerated implementation of renewable energy targets, understanding of environmental pressures caused by related activities at sea and the development of solutions to keep the pressure within ecosystems carrying capacity.
- Integration of the EU Green Deal and other recent environmental initiatives in MSP which might require reviewing EBA principles.

References

EU Maritime Spatial Planning Directive

EU Marine Strategy Framework Directive

EU Water Framework Directive

EU Birds and Habitats Directives

EU Common Fisheries Policy

EU SEA Directive

European Commission (2021). Study on Integrating an Ecosystem-based Approach into Maritime Spatial Planning

European Commission (2021). Guidelines for implementing an Ecosystem-based Approach in Maritime Spatial Planning

European Commission (2022). Outlining the progress made in implementing Directive 2014/89/EU establishing a framework for maritime spatial planning

HELCOM-VASAB (2010). Baltic Sea broad-scale MSP principles

HELCOM-VASAB (2016). Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area

HELCOM (2021). The Baltic Sea Action Plan (BSAP)

HELCOM (2021). Regional Maritime Spatial Planning Roadmap 2021-2030

WWF (2022). Maritime spatial planning in the Baltic – assessment report

WWF (2022). Technical Annex. Assessing the Balance Between Nature and People in European Seas: Maritime Spatial Planning in the Baltic

“Who can learn from whom” MSP analysis and cross reference. eMSP-NBSR project report.

Annex 1. Summary of reasons for selection of good practices

	Nature value	Ocean governance	Social and economic	Comprehensiveness and coherence	Adaptive management
Åland			High score in WWF report		
Belgium			WP2 report: solutions to account for sectorial interests; balancing between social-economic and nature conservation goals		
Denmark		Leadership in Ocean Governance Learning Strand of eMSP NBSR project			
Finland	Specific approach to account for nature value; extensive Inventory Programme for Underwater Marine Diversity; Good practice mentioned in COM(2022) 195.				
France	WP2 report: land-sea interaction; merging MSFD and MSP processes; mapping of impacts on the marine ecosystems				
Germany				High score in WWF report; Involvement in BS regional work on MSPs cross-border coherence.	
Latvia			The highest score in WWF report		
Netherland		WP2 report: integrating all relevant policies; embracing various national and international policies in forward looking context			
Poland					co-leadership of Monitoring and Evaluation learning strand in eMSP NBSR project
Sweden	High score in WWF report; leadership of the development of Green Infrastructure concept				

eMSP NBSR
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Co-funded by the European Union

Know more about the eMSP NBSR project Learning Strand and the Community of Practice on Ecosystem-Based Approach in MSP **here**.

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/**