Pan Baltic Scope

Co-funded by the European Maritime and Fisheries Fund of the European Union

EBA in MSP – a SEA inclusive handbook

EBA in MSP – a SEA inclusive handbook

Editors:
Philipp Arndt – Federal Maritime and Hydrographic Agency (BSH)
Jan Schmidtbauer Crona – Swedish Agency for Marine and Water Management (SwAM)

Authors:
Susanne Altvater – s.Pro – sustainable projects GmbH
Ivana Lukic – s.Pro – sustainable projects GmbH
Silke Eilers – AquaEcology

Layout and Print:
Federal Maritime and Hydrographic Agency (BSH), Rostock

ISBN: 978-3-86987-990-1

This handbook was developed within the framework of the Pan Baltic Scope project.

www.panbalticscope.eu

Co-funded by the
European Maritime and
Fisheries Fund of the
European Union

EBA in MSP – a SEA inclusive handbook

Table of Contents

Foreword

In the Pan Baltic Scope project, Maritime Spatial Planning (MSP) authorities and Regional Sea Organizations in the Baltic Sea Area took up the work of former projects, such as Baltic Scope, focussing on cross-border collaboration. A number of activities were carried out under three work packages during 2018–2019. One activity was focused on Ecosystem-Based Approach in sub-basin SEA. This handbook „EBA in MSP – a SEA inclusive handbook“ is a deliverable from that activity.

The handbook aims to be a practical tool for the planners' daily work in a transboundary environment – in the Baltic Sea and beyond. Addressing the implementation of an Ecosystem-based Approach (EBA), guiding through the comparison of different Strategic Environmental Assessments (SEA) and linking MSP to other key policies like the EU Marine Strategy Framework Directive (MSFD).

In close collaboration with the Activity “Ecosystem-based Toolbox” a set of four products was developed to meet different demands and developments for the EBA implementation:

- This handbook for the practical approach.
- The Background Report of the handbook – containing more detailed information on the relevant topics.
- The Synthesis Report on the Ecosystem Approach to Maritime Spatial Planning, focussing on the scientific analyses of EBA concepts.
- Recommendations for the revision of the HELCOM/VASAB Guideline for the implementation of an ecosystem-based approach in MSP.

In addition, it should be mentioned that the collaboration with the projects’ activities on cumulative impact assessments, Green Infrastructure, and Socio-economic modelling, was supporting this development – highlighting the framing character of the EBA concept.

We would like to thank all project partners for their caring constructive support.
May EBA be with you in MSP always!

Introduction

To implement the Ecosystem-based Approach in Maritime Spatial Planning (MSP) in a cross-border setting is a challenge as it involves administrative, planning and other institutional differences. This handbook aims to contribute to a better understanding of such differences context and to provide tools for a more harmonised implementation of EBA in MSP.

Experiences from completed cross-border cooperation projects in the Baltic Sea, such as Baltic LINES and Baltic SCOPE, indicate that joint actions can benefit both physical (e. g. siting decisions) and institutional issues (e. g. knowledge transfer of good practices). Cross-border cooperation and collaboration provides an opportunity to improve the efficiency of planning and management of coastal and marine resources and activities, facilitating decision-making in the Baltic Sea.

The Ecosystem-based Approach

In recent years, the importance of applying an **Ecosystem-based Approach (EBA)** in MSP has been increasingly highlighted. The approach allows a holistic consideration of the marine environment, while acknowledging that humans are an integral part of the natural system. When applied, it can show the trade-off and interactions between the goods and services provided by natural ecosystems and the different management goals[1]. This includes an approach to allow a management of ecosystems "within the limits of their functioning[2]".

Functional ecosystems are indispensable for the survival of human beings and future generations; the consideration of ecosystem aspects allows effective sustainable use of resources. Therefore, it is important to apply an EBA during planning and management.

Application of EBA implicates a holistic perspective, continual development of knowledge of the seas and their usage, application of the precautionary principle, and adaptive management. In all MSP contexts one of the main challenges, related to this topic, is the understanding of cumulative effects that may occur from the combination of different projects and activities and the potential lack of a continuous series of data and related assessment tools. Therefore the Strategic Environmental Assessment (SEA) is essential for the implementation of an EBA in MSP.

Individual countries in the Baltic Sea Region are at different stages of MSP development, and take different approaches to EBA integration. For example, implementation of EBA in MSP in Latvia follows a three-step approach: a) analysing best knowledge and practice and identification of ecosystem services, b) finding alternative developments to assess impacts on marine ecosystems and c) applying precaution and mitigation when using an impact matrix[3]. These different approaches indicate a need for comparable concepts and tools of actually implementing EBA while drawing up maritime spatial plans. This is a particularly pertinent issue given that various EU regulations and guidance documents

1 Levin, P. S., Fogarty, M.J., Murawski, S. A. and Fluharty, D. (2009) Integrated Ecosystem Assessments: Developing the Scientific Basis for Ecosystem-Based Management of the Ocean. PLOS Biology. https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.1000014.

2 See Malawi Principle 6 (CBD Decision V/6, Ecosystem approach UN Doc UNEP/CBD/COP/5/23 (22 June 2000)

3 Veidemane, K. et al (2016). Development of a Maritime Spatial Plan: the Latvian Recipe. Report from Baltic SCOPE. Retrieved from: http://www.balticscope.eu/content/uploads/2015/07/LV-recipe_EN_web.pdf

relating to MSP, including the **EU MSP-Directive** (MSPD 2014/89/EU) and The European Marine Strategy Framework Directive (MSFD 2008/56/EC), require the application of an EBA. Transnational initiatives can provide guidance in this regard. The HELCOM-VASAB MSP Working Group's Guideline for the Implementation of ecosystem-based approach in MSP in the Baltic Sea area[4], elaborates on the key elements to consider when applying EBA, such as deploying best available knowledge and practice, following the precautionary principle and identifying ecosystem services.

Multiple national administrative processes are producing a knowledge- and evidence-base concerning the marine environment in the framework of **relevant EU Directives** (e. g. Marine Strategy Framework Directive[5], Strategic Environmental Assessment Directive[6], the Environmental Impact Assessment Directive[7] or the Water Framework Directive[8]). Nevertheless, there is a need to clarify how these existing administrative processes can support the implementation of EBA in MSP across EU Member States.

The Marine Strategy Framework Directive (MSFD) and Strategic Environmental Assessment (SEA) can contribute to the implementation of EBA in MSP. However, the extent to which the administrative processes of MSP, MSFD and SEA are integrated varies according to their implementation within each country. Nevertheless, these processes are mutually informing, and pre-determined connection points can support effective transfer of information.

Against this background, the handbook aims to clarify, how implementation of the aforementioned EU Directives interrelate in the context of the Baltic Sea and defined case study region. Specifically, the handbook **provides a practical approach to integrate an EBA into planning processes and to give planners a modular approach, which guides through the many possibilities. Consequently, cross-border coherence of EBA, SEAs and MSP is of key interest:**

- **Strategic Environmental Assessments (SEAs)** have been identified as potentially important tools to implement the EBA;
- The assessment of cumulative impacts and effects is seen as a priority and condition for implementing EBA, as embedded in the MSFD, in particular through the implementation of the **latest GES Decision of 17th May 2017**[9].

While multiple EU and non-EU projects have focused on developing ecosystem services approaches, cumulative impact assessment tools and area-based management tools, there is still a need for clear guidance and a practical method on how to integrate concepts, processes and evidence bases in the context of EBA in MSP.

4 Available at: http://www.helcom.fi/Documents/Action%20areas/Maritime%20spatial%20planning/Guideline%20for%20the%20implementation%20of%20ecosystem-based%20approach%20in%20MSP%20in%20the%20Baltic%20Sea%20area_June%202016.pdf
5 MSFD, 2008/89/EU
6 SEA-D, 2001/42/EC: Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment
7 EIA-D, 85/337/EEC
8 WFD, 2000/60/EC
9 European Commission Decision (EU) 2017/848 of 17 May 2017, Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017D0848

Geographic scope of the handbook

The Southwest Baltic is regarded as a vital area for MSP activities in the Baltic Sea region as it covers the territorial waters and Exclusive Economic Zones (EEZ) of and between Germany, Denmark, Sweden and Poland. Furthermore, the area also includes internal waters, such as Stettiner Haff/Szczecin Lagoon, whose jurisdiction is divided between Poland and Germany and is an important strategic access route to the ports of Świnoujście and Szczecin. The Southwest Baltic is a highly complex sea area from all perspectives: geographical, political, social, environmental and economic. Shipping traffic travelling to the Baltic from all corners of the world crosses through the narrow straits of the western part of this case study area, distances between landmasses are considerably short, and there are disputed border issues yet to be solved. Defence and commercial fisheries are presented as the most suitable uses in large parts of the marine area. In several cases, the areas have a high nature value and are attractive for outdoor recreation. Consequently, the allocation of space for determined uses and sectoral interests is particularly challenging in the Southwest Baltic[10].

Nevertheless, the methods applied and in particular the concepts developed, are transferable to other sea basin regions and individual needs of maritime spatial planners.

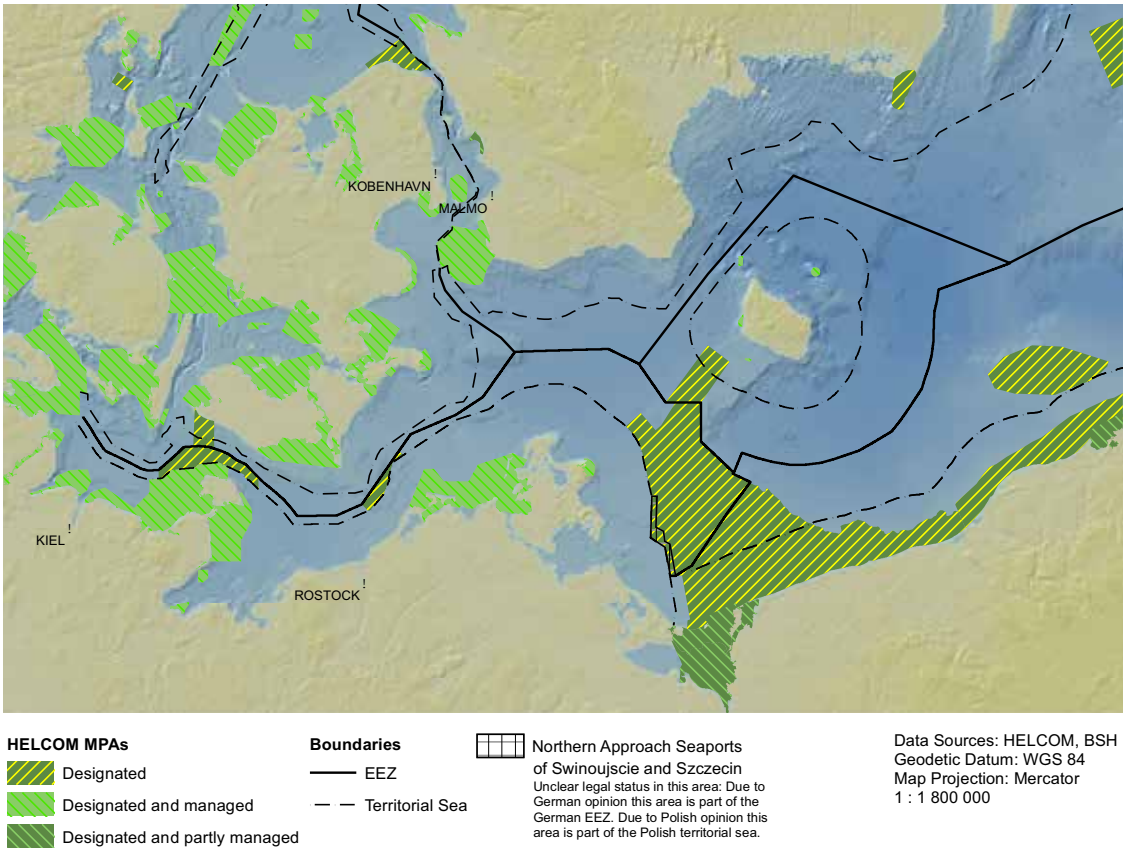


Figure 1: Southwest Baltic case study area for detailed cross-border and cross-sectoral discussions.

10 Baltic SCOPE (2017). Coherent Cross-border Maritime Spatial Planning for the Southwest Baltic Sea – Results from Baltic SCOPE. Retrieved from http://www.balticscope.eu/content/uploads/2015/07/BalticScope_SWB_report_WWW.pdf

1. Overview and linkages

1.1. Definition of the Ecosystem-based Approach

The Ecosystem Approach was first defined in the context of the Convention of Biological Diversity (CBD) as "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way, with the aim to ensure that human use of ecosystems is kept within the limits of the ecosystems' capacity to regenerate with regard to their structure, dynamics and function" (CBD 2000; Ansong et al., 2017; Urtāne et al., 2017).

The EBA has been integrated in marine policy such as the Marine Strategy Framework Directive (2008/56/EC) and the Maritime Spatial Planning Directive (2014/89/EC).

The Marine Strategy Framework Directive defines EBA as follows; "An Ecosystem-based Approach, whereby human activities affecting the marine environment will be managed in an integrated manner promoting conservation and sustainable use in an equitable way of oceans and seas." The Marine Spatial Planning Directive states: "The application of an Ecosystem-based Approach will contribute to promoting sustainable development and growth of the maritime and coastal economies and the sustainable use of marine and coastal resources."

The term 'Ecosystem Approach' was first coined at the Rio Summit in 1992, followed by the 12 "Malawi Principles".[11] These principles explicitly take into account social and socio-political aspects (Table 1).

1	Management objectives are a matter of societal choice.
2	Management should be decentralized to the lowest appropriate level.
3	Ecosystem managers should consider the effects of their activities on adjacent and other ecosystems.
4	Recognizing potential gains from management there is a need to understand the ecosystem in an economic context, considering e.g. mitigating market distortions, aligning incentives to promote sustainable use, and internalizing costs and benefits.
5	A key feature of the ecosystem approach includes conservation of ecosystem structure functioning.
6	Ecosystems must be managed within the limits to their functioning.
7	The ecosystem approach should be undertaken at the appropriate scale.
8	Recognizing the varying temporal scales and lag effects which characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
9	Management must recognize that change is inevitable.
10	The ecosystem approach should seek the appropriate balance between conservation and use of biodiversity.
11	The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
12	The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Table 1: The 12 Malawi principles of the Ecosystem-based Approach (CBD, 1998).

11 Malawi Principle 6 (2CBD 'Decision V/6, Ecosystem Approach' UN Doc UNEP/CBD/COP/5/23 (22 June 2000)

The concept has a number of different interpretations, although they all have in common that the limits of ecosystems demand for an integrated management approach. The IOC-UNESCO developed the first guidelines (Ehler & Douvere 2009) on implementing Ecosystem-based management on MSP. Various transnational initiatives have also provided guidance in this regard. The HELCOM-VASAB Guidelines[12] for the implementation of Ecosystem-based Approach in MSP in the Baltic Sea, elaborates on the key elements to consider when applying the approach, such as deploying best available knowledge and practice, following the precautionary principle and identifying ecosystem services.

1.2. The Ecosystem-based Approach in MSP

EBA in Maritime Spatial Planning has been defined as a "holistic approach with a focus on preserving/restoring marine ecosystems and maintaining ecosystem services to support human needs. It should provide spatial solutions for the management of human activities in a way that is compatible with the achievement of good environmental status (GES) and the capacity of marine ecosystems to respond to human-induced changes[13]."

The key elements of EBA that have been identified are the following;

- Best knowledge and practice
- Precaution
- Alternative development
- Identification of ecosystem services
- Mitigation
- Relational understanding
- Participation and communication
- Subsidiarity and coherence
- Adaptation

The following table identifies the planning phases for EBA within the MSP process:

Defining and analysing existing	1 Selection of plan area and boundary
Situation	2 Scoping, Data collection and Mapping
Assessment	3 Understanding structural and functional biodiversity
Relation between uses	4 Cumulative impacts and ecosystem service perspective
Stakeholder participation	5 Cross-sector integration
Planning Phase	6 Setting of Management Measures and trade-off analysis
Implementation and Evaluation and monitoring	7 Adaptive Management

Table 2: Seven core elements of an Ecosystem-based MSP process
Source: Ansong et al. (2017).

The basis for an Ecosystem-based Approach in the EU Maritime Spatial Planning-Directive (MSPD 2014/89/EU) (art. 5 and recital 14), takes root in the EU Marine Strategy Framework Directive MSFD (2008/56/EC) where Member States are required to establish marine strategies which shall apply an "ecosystem-based approach to the management of human activities while enabling a sustainable use of marine goods and services." The assessment of cumulative

12 see fn. 4
13 Ansong et al. (2017), Schmidtbauer-Crona et al. (2017)

impacts and effects is also seen as a priority and condition for implementing an EBA, as embedded in the MSFD, in particular through the implementation of the revised GES Decision (Commission Decision 2017/848).

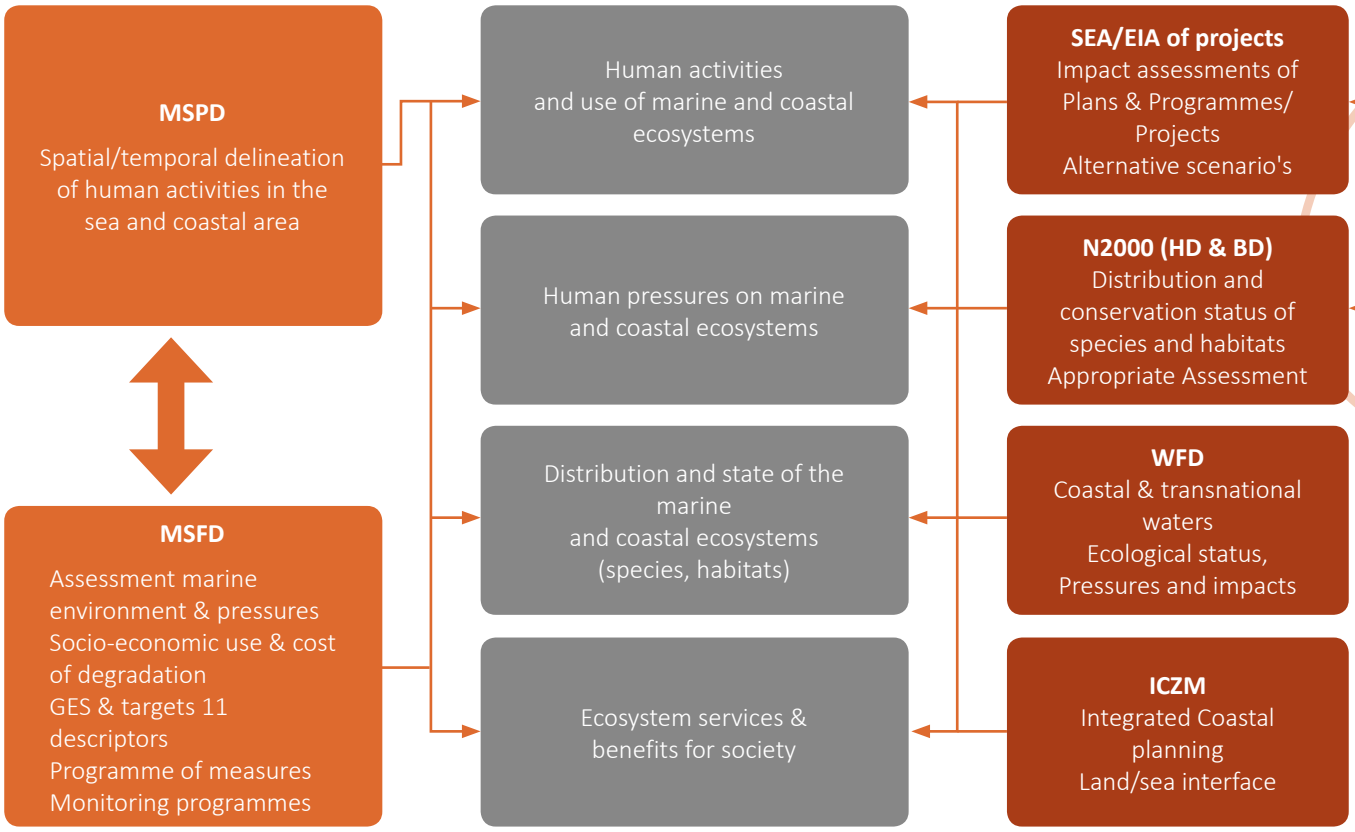


Figure 2: Link between key policies in the frame of Ecosystem-based Approaches.

For the handbook, a review of possible EBA principles has been conducted, including:

- Principles by Halpern S.B. et al. 2008,
- EBA elements & principles by Ansong J.K. et al. 2016,
- HELCOM/VASAB Guideline for the implementation of ecosystem-based approach in MSP,
- Malawi Principles for the Ecosystem Approach
- Baltic SCOPE Toolbox Checklist, and
- Those used in the context of MSPD, ICZM, WFD, Habitats Directive, and MSFD implementation.

This resulted in the collection of common principles classified according to the stages of MSP[14] and the requirements of the MSP Directive as presented in figure 3. Thus, the figure shows the linkage of the final selection of EBA principles with MSP steps and MSP Directive requirements.

14 Ehler, Charles, and Fanny Douvere. Marine Spatial Planning: a step-by-step approach toward ecosystem-based management. intergovernmental Oceanographic Commission and Man and the Biosphere Programme. iOC Manual and Guides no. 53, iCaM Dossier no. 6. Paris: UneSCO. 2009

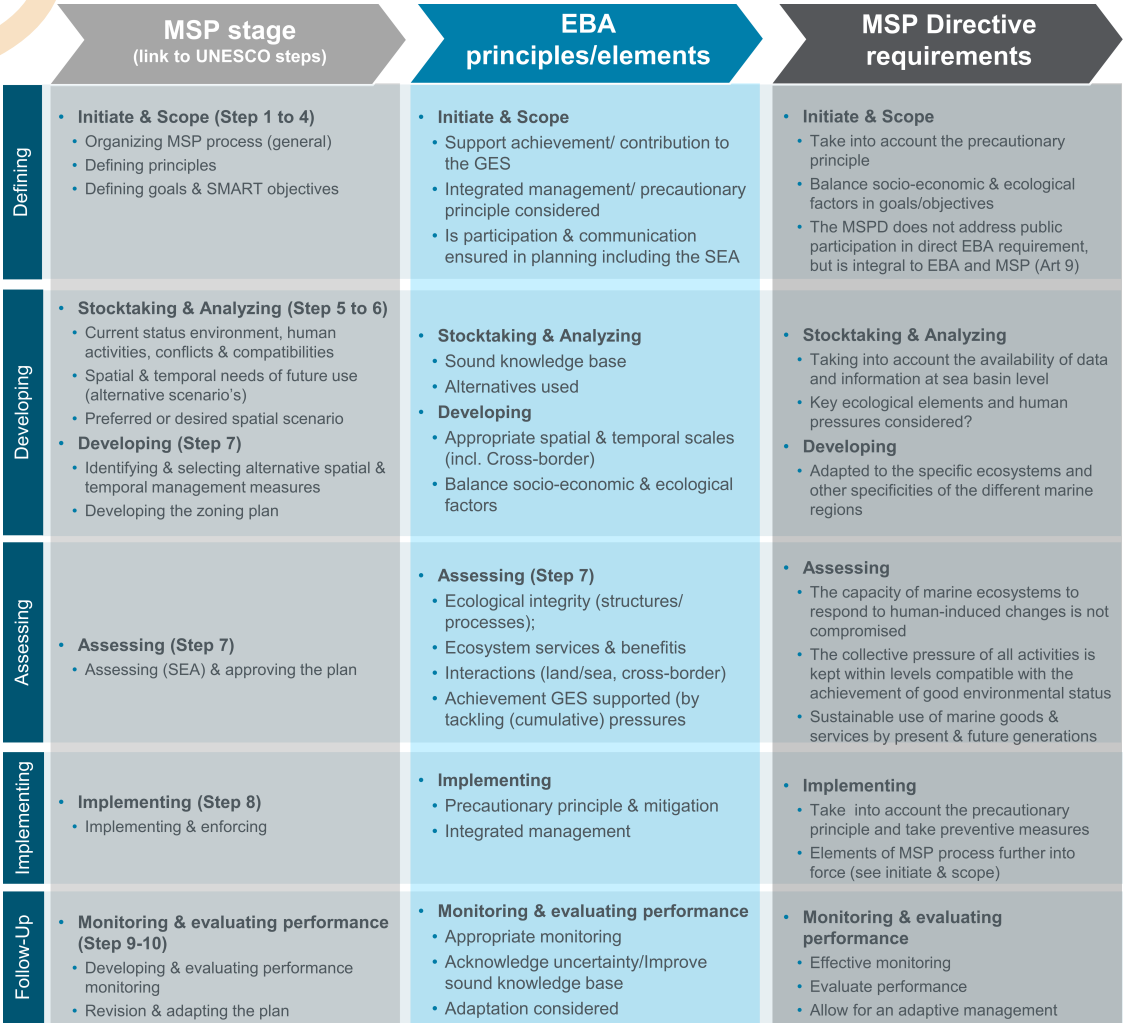


Figure 3: Various elements of EBA and their linkage with steps and requirements of MSP.

1.3. Challenges when implementing the EBA in MSP

Although the concept of EBA and its underlying principles are widely accepted, the implementation of EBA in MSP is still fragmentary understood in practise, and the principles are not implemented comprehensively.

In the EU, multiple national processes are producing knowledge and evidence base concerning the marine environment and ecosystem-based management in the framework of relevant EU Directives mentioned above. Nevertheless, there is a need to clarify how these processes can support the implementation of EBA in MSP. Clear guidance and practical tools on how to integrate all these concepts and link various processes, and evidence bases, in the context of the implementation of EBA in MSP, have been lacking to date.

According to the EU MSP Directive, member states shall apply the EBA when establishing and implementing MSP, which means – among other requirements – that MSP shall be based on the best available scientific knowledge about the ecosystem and its dynamics. In practice, the implementation of the Ecosystem-based Approach has a number of challenges as the scientific basis for MSP is in the early stages throughout the EU.

Main challenges, related to the aspiration of this holistic approach, are to ensure sufficient knowledge about the environmental systems, their economic and social aspects as well as thresholds for impacts. In particular the understanding of cumulative effects that may result from the combination of different activities, as well as the potential lack of a continuous series of data and related assessment tools. These aspects are linked to the need for evaluation and monitoring of conflicts among uses, in order to detect how conflicts may evolve in the course of implementation.

1.4. The current status of MSP in the case study region

All information is based on analysis of national documents and interviews with national experts.

1.4.1. Denmark

Currently there is no national MSP plan in Denmark. However, there is a range of sectoral plans for energy, fisheries, infrastructure, environmental protection, etc. and these will comprise key input to the coming maritime spatial plan. The Danish Parliament adopted the Act on Maritime Spatial Planning in 2016, which establishes the framework for spatial planning in the marine areas of Denmark.

1.4.2. Germany

Maritime Spatial Plans exist for the North Sea and Baltic Sea German EEZs (2) and for the territorial sea areas under the jurisdiction of the three coastal federal states (Lower Saxony, Schleswig-Holstein, and Mecklenburg-Vorpommern) (3). The legal basis is the General Spatial Planning Act which was made applicable to the EEZ in 2004. In order to coordinate the growing conflicts of maritime uses, in particular between space requiring offshore wind farms and marine environmental protection goals as well as traditional maritime uses such as shipping and fisheries, an integrative and sustainable approach was developed for the two German Exclusive Economic Zones (EEZ). Maritime Spatial Plans for the EEZ of the Baltic Sea and North Sea, set into force in 2009, contain designated (priority and restricted) areas for the above mentioned sectors – whereby for the North Sea priority areas are foreseen for shipping, cables/pipelines and offshore wind farms, and for the Baltic Sea for shipping and offshore wind farms. Currently preparatory steps are being taken to revise and update the plans.

1.4.3. Poland

The first legal basis for MSP in Poland was established in 2003. The regulation on maritime spatial planning in Polish sea areas was adopted in 2015. Three non-binding pilot MSP projects were completed under BaltSeaPlan project: for the Gulf of Gdansk, Middle Bank, and Pomeranian Bight. The national planning process was launched at the end of 2013 and it is divided into development of the following plans: MSP of Polish Sea Areas in scale of 1 : 200.000, MSPs separately for Szczeciński, Kamieński and Vistula Lagoons, MSPs for ports internal sea waters and potentially the detailed plans for selected sea areas indicated by the mentioned Plan in scale of 1 : 200.000.

The work on the Maritime Spatial Plan for the Polish Sea Areas in scale of 1 : 200.000 has been started with the data and planning proposals gathering round, followed by four national consultation meetings, 8 sectoral meetings, three international and several meetings at the ministerial level. The first version of the Plan (a preliminary division of sea-basins) was prepared in 2017. The next version (v. 1) has been a

subject of the official public consultations the period n May–July 2018, with the open public debate in June. Till the July 2019 the two subsequent versions were prepared taking into consideration comments and remarks received during the consultation and arrangement process. The final (v. 3) version was prepared with the beginning of August 2019. That version and its SEA would be now a subject to the transnational ESPOO consultations and then, to the national legislative process.

Director of Maritime Office in Szczecin has officially started to prepare plans for Szczeciński Lagoon and for Kamieński Lagoon in January 2017. Data inventory, study of spatial conditions and planning arrangement were prepared at the end of 2018, the draft plans for both lagoons were submitted for official national consultation process. Each stage of work was accompanied by activities related to public participation. The draft MSP for Szczeciński Lagoon was consulted with Germany in May 2019.

The work on the plans covering sea waters of the five largest ports under territorial jurisdiction of Director of Maritime Office in Szczecin (ports in Szczecin, Świnoujście, Police, Dziwnów and Trzebież) and ports under territorial jurisdiction of Director of Maritime Office in Słupsk (Łeba, Ustka, Rowy, Kołobrzeg, Darłowo and Dźwirzyno) are under elaboration.

1.4.4. Sweden

Proposals for Swedish maritime spatial plans will be submitted to the government in December 2019. The Swedish government will adopt the maritime spatial plans before the end of March 2021. Three plans covering the major part of the territorial sea and EEZ are under preparation: Skagerrak/Kattegat, Baltic Sea and Gulf of Bothnia.

The municipalities shall plan the entire Swedish territory, including coastal and marine areas. Over 80 municipalities have marine areas, of which 65 have areas overlapping with the national plans. Not all municipalities have so far engaged in active planning (including prioritisation between interests) in the entire territorial sea of their municipality.

On 1 December 2016 SwAM published early draft MSP-proposals (1st round) for all three national MSP areas. In January/February 2017 environmental impact assessments were published. The drafts and the EIA were the basis for a broad dialogue with trade organisations, NGOs, central government agencies, regional government bodies (County Administrative Boards), regions, municipalities, academia and neighbouring countries. On 15 February 2018 draft proposals (2nd round), environment impact assessments and sustainability appraisals were published for public consultation including ESPOO-consultation. On 14 March 2019 final proposals including impact assessment and appraisals were published (3rd round) for public review.

1.5. Detailed comparison of MSP and planning approaches

The table 3 builds on the BalticLINes final report to compare the state of MSP in the countries in the study area. Table 4 provides more specific aspects of the national MSPs.

	Germany	Poland	Sweden	Denmark
Competent Ministry	Ministry of the Interior, Building and Community	Ministry of Maritime Economy and Inland Navigation	Ministry of Environment and Energy	Ministry of Industry, Business and Financial Affairs
Competent planning authority	Federal Maritime and Hydrographic Agency & Coastal Federal States	Maritime Offices in Szczecin, Słupsk and Gdynia	Swedish Agency for Marine and Water Management	Danish Maritime Authority
Number of planning areas and governance	2+3 2 EEZ 3 Territorial Waters	1 national – covering Gulf of Gdańsk, territorial waters and EEZ Coordinated between three regions 3 for internal sea waters of the lagoons several for the internal sea waters of ports probably a few the detailed plans for selected sea areas	3 1 nm from the baseline seawards including the EEZ	1 National MSP
Expected progress in MSP (national plans)	2nd edition 1st draft: 09/2020 MSP: ~08/2021	1st edition 1st draft: ~05/2018 3rd draft ~ 08.2019 MSP: ~2021	1st edition Proposals to be submitted to the government 12/2019	1st edition 1st draft: ~ 04/2019, MSP: ~12/2020
Scale of MSP	1:400.000	National – 1:200.000 Lagoons – 1:25.000–1:10.000 Ports – 1:5.000–1:2.000	1:700.000–1:1.000.000	Not decided yet
Planning horizon	Not decided yet	~2030	2030	~2050
Binding/ non-binding MSP	Binding	Binding	Guidance	Binding Denmark started their maritime spatial planning processes in January 2017 and it is estimated to be completed and to enter into force by March 2021. Due to the initial stages of MSP, a governance framework has not been established yet.
National MSP objective	Promote sustainable spatial development, which brings social and economic demands regarding sea space in line with the sea's ecological functioning and leads to a permanent, large scale balanced order	Create preconditions for blue economy growth and to coordinate (functionally and spatially) the various maritime economic activities. Ensure the realization of maritime investment projects in a sustainable way.	The aim of marine spatial plans is to contribute to long-term sustainable development. They shall be drawn up in such a way that business policy objectives, social objectives and environmental objectives are reconciled. Marine spatial plans shall: • contribute to the achievement and maintenance of a good environmental status of the sea environment • contribute to the sustainable use of the sea's resources, so that industries associated with the sea can develop • promote coexistence of different activities and areas of use	Promote economic growth, the development of marine areas and the use of marine resources on a sustainable basis

Table 3: The state of national MSP.

The **spatial planning approach** taken in the four case study countries differs with regards to detail as well as spatial management approach used. For example, Germany uses a precise zoning approach, while a less restrictive and more strategic planning approach is taken in the development of the plan in Denmark. The table below provides a general overview of the spatial management approach taken in each of the countries.

In Denmark, the zoning/spatial planning approach has not been established yet; however it is being developed on a sector-by-sector basis. The sectors incorporated into the planning process are coastal land uses; marine conservation; mineral mining/aggregate extraction; offshore oil & gas; offshore renewable energy; marine transport; international commercial fishing; domestic commercial fishing. It is envisioned that the plan will promote economic growth, the development of marine areas, and the use of marine resources on a sustainable basis while taking account land-sea interaction and strengthening cross-border cooperation.

In Sweden, on the other hand, the plans are set to provide guidance to national authorities, municipalities and courts on the best use of the sea in order to inform future decisions, planning and permit reviews. Each of the three plans sets out specific uses for each area. The Baltic Sea plan for example, sets out eight uses in the Baltic Sea: recreation, energy extraction, defence, general use, nature, sand extraction, shipping and commercial fisheries. Guidance on most appropriate use gives priority, but there are also geographical areas with guidance on needs of particular consideration (high nature values, high cultural landscape values or defence). Thus, guidance means neither bans nor restrictions. This means that it is possible for other uses to be both tried and applied in areas where they are not featured on the planning maps.

Examples of this include the right of maritime shipping to proceed regardless of what the marine spatial plans specify, provided there are no restrictions in other shipping regulations, the possibility of applying for energy extraction licences in other areas than those specified in the marine spatial plans, consideration of nature and culture values even where they are not specified in the marine spatial plans, and that commercial fishing is practised in larger areas than those specified for that use in the marine spatial plans, with quotas regulated by the EU. However, the marine spatial plans have a guiding function in decisions, planning and licensing examinations. Coexistence is indicated on the planning maps by overlapping uses.

In Germany, the priority areas have been designated for shipping and wind energy development; other uses are prohibited in such areas unless they are compatible with the priority uses. Nevertheless, wind farm development was also possible in all other areas without specific restrictions, until the sectoral spatial plan (Site Development Plan) for windfarm development was introduced in 2017 and 2019. The designation of areas for shipping takes account of the principle of international law attributing priority to this use; recognised shipping routes that are indispensable for international shipping constitute the framework of the overall planning concept. Reservation areas have been designated for shipping, pipeline, and research uses that are considered particularly important when balancing with spatially significant competing uses. Consideration of other concerns such as defence, tourism and leisure and ferry crossings has been included in the plan.

In Poland, the whole planning area has been divided into the sea basins with different priority functions, where other functions are allowed provided they are not conflicting or permanently disturbing

the priority function. Several sub-basins have been designated to reserve space for allowed functions like technical infrastructure, coastal protection or tourism. For the purposes of this report, due to the large diversity of MSPs for Polish maritime areas, in particular due to different scales, the analysis focused on maritime spatial plan which covers the internal sea waters of Gdańsk Bay, territorial sea and the Exclusive Economic Zone and is prepared jointly by the three Maritime Offices (in Szczecin, Słupsk and Gdynia).

	DE	PL	SE	DK
Planning scale	Federal and national	National	National (but divided in three areas)	National
Zoning framework	Priority areas, Reservation areas and considered uses.	Areas with a basic function and bunch of allowed functions	Most appropriate use Particular considerations	No harsh restriction. Development zones and general use zones are defined. Definitions will be part of the legally binding plan. It will be available only when published.
Planning options	Seen as part of the SEA.	For some cases (e.g. hard infrastructure) different options for specific locations and specific cross sectoral conflicts	In the planning process certain aspects are analysed more in detail, including the possible future developments i.e. forecasts for energy needs and available space. SEA report includes measures – concrete proposals for alternative planning considerations in order to promote the achievement of good environmental status.	N/A

Table 4: Planning scales and zoning frameworks of the four national MSP processes.

1.6. Sectors in the maritime spatial plans of the case study region

While the international agreements such as within the International Maritime Organization (IMO) are widely respected, the countries in the case study region still take quite different approaches with regards to planning their sectoral uses. While Germany uses the detailed zoning scheme with restrictions defined for certain sectors, Denmark uses a more open approach with minimal restrictions at the MSP stage. In Denmark, possible impacts and decisions for development are made at the licensing and the EIA stage of each development project. The following table summarizes how the sectoral uses are considered in the plans in the case study countries. In Sweden, the developments are decided on a case-by-case basis. This way, combinations of different sectors are also discussed and the available data (or the lack of the same) is also taken into consideration in decision-making. Namely, where no data can support the restriction of a certain development, a learning-by-doing approach may be applied. The Background report contains a table of the approaches taken in each of the countries for 9 relevant sectors in the region.

2. Transboundary aspects of national MSP

The MSP processes across the Baltic Sea Region have been analysed to gain understanding of differences across MSP processes and develop a practical translation matrix for planners. The analysis shows that neighbouring countries extensively work together in EU transnational projects to coordinate planning issues that concern various sectors, such as shipping and fisheries, and to coordinate data and documentation. The Planning Forum of the Pan Baltic Scope project was initiated to platform where planners can meet and exchange on current MSP issues and strengthen communication. Cooperation is also taking place within the scope of the regional marine environment convention, the Baltic Sea Convention (HELCOM). Further, Vision and Strategies around the Baltic Sea (VASAB) is a special forum for cooperation between the ministers that have responsibility for spatial planning in the Baltic Sea region. The working group for maritime spatial planning has been formed by VASAB and HELCOM, drawing up guidelines for cross-border consultation and for the implementation of an ecosystem approach in maritime spatial planning.

Nevertheless, the terminology used in planning differs across the region and in some cases pose challenges in consultations or when the solutions are worked out jointly.

2.1. Transnational aspects overview

The following table provides a short overview of transnational aspects within each of the four national MSP processes.

	DE	PL	SE	DK
General questions				
Dimensions/ scales covered	Baltic Sea: Federal EEZ plan and the two State plans (up to 12nm).	National plan	Three plans covering the national waters and overlapping municipal waters (1 nautical mile from the baseline).	National plan
Activities and the environment of the neighbouring country considered during the planning process	Focus is on main transboundary relevant issues – shipping, linear infrastructure, fixed infrastructure (OWF) on both sides of the border (cumulative aspects). But dependent on availability of information on planning objectives and measures in neighbouring countries	The main activities of transnational character like shipping, fishery, have been taken into consideration as well as the available data and information on environmental features especially for the marine parks and species protection i.e. at the border with Germany. Thanks to the early transnational consultation process, the knowledge on important cross-border issues was gained.	For each sector the plan describes possible cross-border effects of a given development and cooperation mechanisms with the neighbouring countries. For example, the cross-border impact consists of negative impacts from sand extraction (Sandflyttan on the border with Denmark), wind power (South-eastern Baltic Sea bordering on Poland), and commercial fishing and shipping (South-western Baltic Sea together with Denmark and Germany, or in the Southern and South-eastern Baltic Sea with Denmark and Poland) and positive environmental impacts from areas with particular consideration to high nature values.	Even on the national level, the plan will contain the different rules for the North Sea and Baltic given the different environment. Environmental data in these two sea basins is shared between the countries esp. in the EU projects.
Consideration of lines/ borders/ polygones going along the border	This is not so much about cartographic/ spatial depiction, but about actual functional impact of planning, i.e. when it comes to decisions being made based on MSPs	E.g. the main shipping lines of transnational character were considered.	Data coherence is being worked out through the cooperation projects including the Pan Baltic Scope.	Currently only the national coherence is being worked out (i.e. standardised approach for maritime and land planning).
Sectors of relevance in cross-border planning	Offshore wind energy, shipping, environmental protection, defence (NATO training areas)	Offshore wind energy, shipping, environment, fishing and to a certain extent the underwater cultural heritage as discussed in the Baltic RIM project.	Mostly shipping as well as fishing to some extent. The lack of data on foreign vessels fishing in SE or SE vessels landing in foreign ports constraints the transboundary analysis on fishing. Offshore wind development in one country if close to ports in another country may also require cross-border planning. Environment is also relevant in this context – transboundary migratory components, shared Baltic wide species such as cod, dolphin, birds, etc.	

Process	DE	PL	SE	DK
At what stage the cross-border aspects come in to play	In informal and formal stages of planning: a) pre-drafts and status report, b) first full draft, c) second full draft etc.	Throughout the process, starting with the scoping step.	Second stage	Throughout the process, especially through the EU cooperation projects, as well as through the consultations
Dealing with cross-border cross sectoral conflicts	Thematical bi-/ trilateral meetings (for shipping currently linked to North-SEE project meetings).	Through international organized consultations and bi-lateral meetings. Border with Denmark was decided and agreed.	Depending on the sector different authorities are involved in the process. The cooperation projects are tool to cooperate and find solutions.	Potential future conflicts are jointly forecasted and analysed in the EU cooperation projects.
Consultations	International consultations have taken part as physical meetings in the course of public consultation of the first and second full drafts. In the revision process there will be international consultations from the scoping phase onwards.	Inviting the authorities from other countries to stakeholder meetings and attending the meetings from other countries	Cooperation takes place through projects where issues are identified and worked out. Moreover, the neighbouring countries have had the opportunity to submit comments on the drafts of the marine spatial plans at an early stage in 2017 during a dialogue that SwAM held with stakeholders. The specific comments received are described. Formal ESPOO-consultation in 2018.	Mainly relying on the cooperation through the SEANSE and Pan Baltic projects. Official hearing will take place during the 6 months period when the plan well as the SEA are made public. Comments will be considered in the plan.

Table 5: Transnational aspects of national MSP processes.

2.2. Translation matrix

The translation matrix presented in table 6, aims to support planners in providing an overview of terminology and steps of national MSP coherence.

Terminology	Countries where used	Definition	Differences in defining the term
Spatial management approaches			
Priority areas	DE, PL, SE	In these areas one use is given priority over other uses	In SE: Sea Uses;
Reservation areas	DE, SE, (PL)	Areas where special importance is attached to certain uses (other uses are not ruled out per se). Namely, in these areas one use is given special consideration in a comparative evaluation with other spatially significant planning tasks, measures and projects.	In SE: Particular considerations In PL: only sub areas for infrastructure, tourism etc. in the areas with other basic functions
Considered uses	DE, PL	Uses not regulated (no assigned zone) by the plan but considered in the process of establishment of priority and reservation areas.	In PL: even if there are no assigned zones, considered used can be regulated through planning provisions.
Development zones	DK	Zones for specific development goals with a focus on Blue Growth	
General use zones	DK	Description for all sea uses	In SE: Description of sea use in each area will be described per use; same in DE and PL
Most appropriate use area	SE	Uses judged in the MSP process to be the most appropriate, and as such have priority over other uses. Other uses within the area must be adapted to the conditions and needs of the specified uses in management, planning and licensing examinations	Not used in other countries
Area of particular considerations	SE	Within the area particular consideration must be made of the interests of the specified use in management, planning and licensing examinations	Not used in other countries
Environmental terminology			
Effect	SE	Change in the environment that the impact entails on an ecosystem component (ecosystems or individual flora and fauna). Effects can be direct or indirect, cumulative, positive or negative, or long or short term	
Impact	SE	Change in physical conditions that the plan's implementation entails (e.g. that an area is claimed, water clouding, noise).	
Pressure	N/A	The mechanism through which an activity has an effect on any part of the ecosystem. The nature of the pressure is determined by activity type, intensity and distribution.	
Ecosystem components	SE	Living environments, species, or groups of animals and plants that constitute a part of the marine ecosystems.	

Table 6: Comparing elements to facilitate MSP coherence.

3. Comparison of national SEAs

Since maritime spatial plans are likely to have significant effects and a minimum requirement of the MSPD is to take into account environmental aspects[15], the strategic environmental assessment (SEA) is as an instrument to incorporate environmental aspects in maritime spatial planning[16]. The SEA Directive also aims to promote sustainable development[17]. When consistently applied, SEA is a vital instrument to ensure that environmental matters are given due consideration. An important first step in the SEA process is the assessment of reasonable (planning) alternatives. Furthermore, the Ecosystem-based Approach can be a useful concept for the future application of SEA. Certain matters are more appropriately assessed within a detailed environmental impact assessment (EIA), which is often required for the licensing of individual projects and how they fit into the broader ecosystem-based management framework[18].

The EIA is one of the most common tools used worldwide in the implementation of the mitigation hierarchy, i. e. the avoidance, reduction and offset of environmental impacts of authorized development projects.

Strategic environmental assessment is a step-by-step procedure to analyse and communicate environmental and health considerations related to the development of strategies, plans and programmes prepared by the governments, and to allow participation of stakeholders.

The UNECE Protocol on SEA defines Strategic Environmental Assessment as, "... the evaluation of the likely environmental, including health, effects, which comprises the determination of the scope of an environmental report and its preparation, the carrying-out of public participation and consultations, and the taking into account of the environmental report and the results of the public participation and consultations in a plan or programme" (Article 2.6). As the countries in the scope of this handbook are signatories of this protocol, the methodological approach for SEAs in it should be used.

The SEA procedure can be summarized as follows: a scoping and environmental report is prepared in which the likely significant effects on the environment and the reasonable alternatives of the proposed plan or programme are identified. The public and the environmental authorities are informed and consulted on the draft plan or programme and the environmental report prepared. Member States on which plans and programmes of a neighbouring country are likely to have significant environmental effects have to be consulted according to the ESPOO Convention[19].

3.1. Overview of national SEAs

Current approaches to SEA differ greatly due to the different interpretation of requirements across member states and other context-specific factors.

15 Art. 6, 2b MSPD

16 As required by Art. 1 of the SEA Directive (2001/42/EC), environmental concerns have to be incorporated into plans and programmes

17 Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment

18 EIA is mandatory in relation to specific proposed activities, i. e. public and private projects, which are listed in Annexes I and II of the EIA Directive 85/337/EEC.

19 The Convention on Environmental Impact Assessment in a Transboundary Context (informally called the ESPOO Convention) was signed in Espoo, Finland, on 25th Feb. 1991.

For example, variation can be seen in terms of:

- The extent to which SEA is integrated into the MSP process. In some cases, the entire SEA process runs parallel to the MSP process, providing input on potential environmental impact continuously on the Maritime Spatial Planning process. In other cases, the SEA is a one-time assessment, conducted during a certain planning stage.

- The choice of the method is related to whether the MSP authority is responsible for the SEA. Whether it addresses ecological aspects only, or integrates social and economic factors.

- The extent of stakeholder involvement and consultation resources available, including institutional capacity for delivering SEA, particularly data gathering and analysis, and stakeholder engagement, which is particularly resource-intensive.

- Interpretation of 'alternatives to the plan' as required by the SEA directive and presented in the environmental report. In some processes, the alternative is defined as 'no plan', and the options are simply therefore the proposed plan, or considering the implications of not implementing the plan (e.g. German SEA for MSP 2009).

- Ambition to use requirements of the SEA to assess plan alternatives and consider different scenarios for a MSP, for example by varying the scale of development, location, etc. to explore the relative ecological effects.

Table 7 provides an overview of the SEA approaches in the four countries of the case study region.

General	DE	PL
Plan/ SEA documents/Responsible authority	Environmental reports on Maritime Spatial Plans for the German EEZ 2009 (Umweltberichte Raumordnungspläne für die deutsche AWZ 2009); Environmental Report on Site Development Plan 2019 (Umweltbericht Flächenentwicklungsplan 2019)/Responsible: Federal Maritime and Hydrographic Agency (BSH)	Prognoza oddziaływania na środowisko projektu planu zagospodarowania (The Strategic Environmental Assessement for the draft MSP) Work has been started in 2016 and the environmental assessement was performed parallelly starting from the first version of the Plan. The subsequent version of the SEA were publicly available and consulted. SEA is based on Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments (JoL of 2018, pos. 2081 consolidated text as amended) – Article 46. /Responsible: Maritime Offices in Gdynia, Słupsk and Szczecin are required to develop the draft plan. The SEA was prepared by an external expert team of the Maritime Institute in Gdańsk.
Scope and Scale	The SEA for the German EEZ in the Baltic Sea contains and assesses the likely significant impacts on the environment caused by the implementation of the spatial plan according to the criteria of Annex I of the SEA Directive. The assessment also analyses alternative planning solutions and the development of the area without a plan.	The draft plan together with the SEA covers the internal sea waters of Gdańsk Bay, territorial sea and the Exclusive Economic Zone
Objectives	The SEA is aiming to describe the current environmental status and assesses current and future uses and their impact on the environment, without and with an MSP. It provides measures to prevent and minimise likely significant effects on the environment caused by maritime planning, assesses potential alternatives and describes the implementation process of the environmental assessment.	The Strategic Environmental Assessment was to identify and to judge potential significant effects of implementation of the Plan's provisions on the environment, and subjects being under protection of the Natura 2000 areas, according to the criteria of Annex I of the SEA Directive. The following are information on the content of SEA, the main goals of the plan's design and its links with other documents: 1. Information on the methods used to prepare the SEA, 2. Proposals on anticipated methods of analysing the effects of implementing the provisions of the draft plan and the frequency of its implementation, 3. Information on possible transboundary environmental impacts, 4. Summary in a non-specialist language, 5. Information on valuable reservoirs in terms of nature, including protected areas under the Act of 16 April 2004 on nature protection (Journal of Laws of 2018, item 1614, as amended), 6. Presentation of spatial phenomena and the interaction of these phenomena on maps, 7. A statement by the head of the team of authors about meeting the requirements set out in art. 74 a of par. 2 of the Act on Environmental Protection, 8. Recommendations for individual versions of the draft plan, 9. Summary and conclusions

	SE	DK
	The early draft MSP-proposal published in December 2016; • Environmental impact assessments within the SEA process published in January 2017; • Consultation meeting with neighbouring countries held in June 2017; • Espoo consultations started in June 2018; • Final plan proposals and SEAs published in March 2019; • submission of final proposals to the Government on December 2019 /Responsible: According to the Planning and Building Act, municipalities have the planning responsibility for Sweden's territory which includes internal waters and territorial sea. 65 municipalities share the planning responsibility for the national marine spatial plan areas.	Denmark's National MSP is currently being developed and its corresponding SEA has not been completed yet. However, we identified the Environmental Impact Assessment for Krieger's Flak Offshore Wind Farm as an example. This EIA is of particular interest for the present study as it has transboundary considerations as the wind farm located in Denmark borders the EEZ of Sweden and Germany. The EIA investigation sought to identify the environmental impact of the construction project and was put out to public consultation for licensing approval.
	Sweden is preparing three marine spatial plans for its territorial sea and EEZ – one for the Gulf of Bothnia, one for the Baltic Sea and one for Skagerrak and Kattegat. With the Baltic Sea Plan being of particular relevance for the present study. The drafting of the plan was completed in February 2018 with a corresponding SEA, both of which are under consultation currently. The marine spatial plans border on nine neighbouring countries EU member countries, which through the MSP Directive require transboundary cooperation. It is within this context that the marine spatial plans and corresponding SEAs have been open to consultation to neighbouring countries.	Even on the national level, the plan will contain the different rules for the North Sea and Baltic given the different environment. Environmental data in these two sea basins is shared between the countries esp. in the EU projects.
	The following are information on the content of SEA, the main goals of the plan's design and its links with other documents: 1. Environmental assessment method Step 1: Identification of the connection between sectors and pressures Step 2: Description of the values, environmental impacts and environmental effects Step 3: Assessment of environmental consequences	Currently only the national coherence is being worked out (i.e. standardised approach for maritime and land planning).

	DE	PL
Methodology	Starting point for the assessment of possible impacts caused by the MSP is the **comprehensive description and assessment of the environmental status** (chapter 2). It takes all relevant environmental goods into account, like seabed, water, benthic species and their habitats, fishes, marine mammals, seabirds and migratory birds as well as human health. Chapter 3 describes the **possible development of the biotic and abiotic environmental goods without a plan**. These assessments are the first comprehensive ones due to the first EEZ-wide planning in the German Baltic Sea. The description and assessment of likely severe impacts of the MSP also focuses on these environmental goods (chapter 4). The impact assessment comprises also cumulative, secondary and synergistic effects. During the selection of areas for specific uses, FFH- and EU-protected areas for birds have been avoided as far as possible. In those cases where this was not possible, an impact assessment has been conducted according § 34 BNatSchG (German Nature Conservation Law). The assessments are complemented by the presentation of measures to prevent and minimise likely significant negative impacts caused by the MSP (chapter 6) and are examining alternatives for each of the impacting sector (chapter 7). Monitoring measures to supervise the impacts of an implemented MSP are also part of the assessment (chapter 8). The annex of the report provides a draft concept for a monitoring plan to assess possible severe impacts of offshore wind farms.	1. The analysis contained in the SEA was carried out according to the **content and level of detail of the materials included in the plan design document**. 2. **The information contained in the SEA is relevant to the state of modern knowledge about POM** (Polish maritime areas) and methods of their assessment (Article 52 (1) of the Act on the EIA). The POM environment, its mechanisms as well as the condition of some protected areas still needs (with few exception) more intensive research. This is important in the context of naturally valuable regions, which could be determined mainly on the basis of expert knowledge. 3. **No new environmental studies have been conducted. The SEA document was prepared on the basis of published and unpublished materials** of the specialists of the interdisciplinary team preparing the SEA, available research results of other research teams, research results from environmental impact reports (hereinafter referred to as EIA reports) and data of institutions performing the assessment of the state of the marine environment. 4. Various methods and techniques of study works were used, as well as a **heuristic forecasting method**, using the knowledge and experience of specialists of the interdisciplinary team of authors. The SEA or the forecast as directly translated from Polish language, was **based on rational, scientific premises, it has a definite time horizon and a qualitative character** (Kruk-Dowgiałło et al. 2011). 5. The applicable provisions of national law regarding the preparation of strategic environmental impact assessment as well as information contained in legal regulations relevant to environmental protection and protected areas located in the area of potential impact of the draft plan have been taken into account: • acts of international law, HELCOM recommendations • acts of EU law (Directives), • acts of national law, • acts of a planning nature: • environmental protection programs of coastal provinces, • studies of conditions and directions of spatial development of communes located by the area covered by the plan. 6. **The current available information and spatial data** from, inter alia, the Ministry of the Environment, the General Directorate for Environmental Protection (GDOŚ), the European Environment Agency (EEA), maritime offices and other institutions were used. The information from the website of the General Directorate for Environmental Protection (http://natura2000.gdos.gov.pl/) of Standard Data Forms (SDF) of Natura 2000 sites in POM and located in the coastal belt adjacent to the project area was used. In addition, the results of natural inventory (primarily cartographic materials) were used to develop draft plans for the protection of Natura 2000 areas in the area of the Vistula River Estuary, the Puck Bay, the Vistula Lagoon, the Baltic Coastal Waters, the Ostoja Słowińska and the Pomeranian Bay (Ławicki et al. 2012 , Michałek&Kruk-Dowgiałło 2014a, Michałek&Kruk-Dowgiałło 2014b). 7. **Impact assessment** covered the functions defined in the draft plan, including their activities. 8. Areas, species of plants, animals and habitats subject to legal protection based on national and international regulations have been taken into account. 9. The provisions of the existing protection plans and conservation task plans for Natura 2000 sites at sea and land have been taken into account. In the case of areas at sea that do not yet have approved management plans, the authors of the SEA based their analyses on draft plans. The SEA also includes protection plans (or projects of these plans) for national parks, landscape parks and nature reserves. 10. **It has been assumed that the basis for each strategic environmental impact assessment is the characterization of the state of the natural environment** (Kistowski 2001, 2002).

SE	DK
The purpose of the SEA was to identify and describe the MSP plans effects on human health, the environment and on the management of the physical environment and natural resources. The following assessments have been conducted: 1. **The current state of the marine environment** in the area covered by the draft plan, 2. **The zero-alternative scenario** in the state of the environment in the absence of implementation of the draft plan, 3. **The state of the environment with the implementation of the plan alternative**. In the SEA, the long-term sustainability and environmental effects are the main focus. The MSPs will be assessed according to Chapter 6 of the Environmental Code with regard to the following environmental aspects: 1. Population and people's health 2. Animal or plant species that are protected under the Environmental Code Chapter 8, and biological diversity otherwise 3. Land, soil, water, air, climate, landscape, built environment, and cultural environment 4. management of land, water, and the physical environment otherwise 5. other management of materials, raw materials, and energy 6. other parts of the environment The environmental assessment aims to identify and assess the MSPs overall environmental impact compared with the zero alternative in 2030, i.e. if the plan is not applied. The environmental assessment has been based on Symphony and expert investigations. Symphony is described in the following section. The effects of the plan have been assessed for the following themes defined in the MSP: • attractive living environments (cultural environment, tourism, outdoor recreation, angling) • energy • defence • storage and extraction of materials (carbon dioxide, sand) nature • transportation and communications (shipping, communication cables) • aquaculture and blue biotechnology • commercial fisheries	The EIA mapped out all environmental conditions in proposed project's construction and assessed all of the potential environmental impacts. The assessment mostly focused on the impact of the wind farms construction and operation on marine mammals in the area. The methodology applied is the following: 1. Satellite tagging of harbour porpoises 2. GPS tracking of harbour porpoises and grey seals 3. Modelling 4. Modelling porpoise distribution 5. Acoustical data from harbour porpoises 6. Modelling the distribution and habitat use of seals 7. Assessment of effects in the construction period 8. Assessment of effects in the operation period 9. Assessment of effects of the decommissioning

Process	DE	PL
Approach of the Planning	The spatial planning process of the German Baltic EEZ is a one-step approach, i.e. there exist no overarching plans or regulations for subordinate planning levels. Planning is directly followed by licensing, i.e. of infrastructure projects. However, other planning and assessment processes have to be taken into account. This is especially relevant for the determination of two particularly suitable areas for wind energy in the EEZ of the Baltic Sea for which Strategic Environmental Assessments have been performed and which have been included into the MSP as priority areas (according to § 18 para. 3 ROG).	Throughout the process (in parallel i.e. preparation of SEA in combination with the MSP process-SEA and MSP teams collaborated each with other) The plan and the SEA were conducted in parallel including the public consultation[20].
Relevance of transboundary issues?	Spatial planning processes in coastal areas of the federal states have to be coordinated as well as transboundary issues with Poland, Sweden and Denmark.	The assumptions of the Plan and the Prognosis of the impact on the environment (SEA) were presented to the stakeholders, also including transboundary aspects. Especially, during the 3 international consultation meetings, special bilateral discussions were held on the transnational issues, including environmental aspects.
Consultation When does SEA come into play?	In informal and formal stages of planning: a) pre-drafts and status report (initially in the on-going revision process), b) first full draft, c) second full draft etc.	Throughout the whole MSP process. Consecutive drafts of SEA influenced drafts of the maritime spatial plan

Table 7: Comparing elements to facilitate MSP coherence.

3.2. EBA elements in national Strategic Environmental Assessments

In a MSP context, the SEA provides a mechanism for strategic consideration of environmental effects and the assessment of plan-alternatives. It contributes to the implementation of the Ecosystem-based Approach, as it frames the evaluation of effects on protected species and habitats.[21]

The Baltic Sea has some of the pioneer maritime spatial plans and processes that have paved the way for the wider EU policy support for the MSP, and served as an inspiration for the Member States in other sea regions.[22]

20 Source: http://www.gospodarkamorska.pl/Administracja,Prawo/plan-zagospodarowania-przestrzennego-polskich-obszarow-morskich.html

21 Section 5.3 of the SEA Directive explains: when determining whether plans are likely to have significant environmental effects, one criterion is their "effects on areas or landscapes which have recognised national, Community or international protections status" (Annex II). Biodiversity, including fauna and flora, is also one aspect of the environment that must be considered. This is in accordance with Article 14 of the Convention on Biological Diversity: Impact assessment and minimizing adverse impacts

22 Starting in 2002, methodology was tested and practical planning experience was gained through cross-border pilot projects such as BaltCoast, PlanCoast, BaltSeaPlan, PlanBothnia and PartiSEApate. Lessons learnt were implemented in strategic documents at the political level. Within these projects, or using experience of them, formal maritime spatial plans were developed in Germany. Poland, Latvia, Lithuania and Estonia developed pilot maritime spatial plans with transnational elements, see https://www.msp-platform.eu/sea-basins/baltic-sea-0

SE	DK
Second stage	Throughout the process, followed by an EIA
Depending on the sector different authorities are involved in the process. The cooperation projects are tool to cooperate and find solutions.	Potential future conflicts are jointly forecasted and analysed in the EU cooperation projects.
Second stage	Mainly relying on the cooperation through the SEANSE and Pan Baltic projects. Official hearing will take place during the 6 months period when the plan well as the SEA are made public. Comments will be considered in the plan.

Nevertheless, the approaches taken in these plans and processes vary, as well as the extent to which EBA has been taken in to consideration or applied. Table 8 provides details related to the most important elements of the SEA necessary to ensure the sustainable development of the marine area. To facilitate the link to EBA, the table follows the main EBA elements.

EBA element	Germany	Poland
Best knowledge, practice	SEA is based on very detailed and comprehensive data on all relevant biological and physical aspects and conditions of the marine environment, esp. gathered from EIA studies and monitoring of offshore wind farm projects, from the site investigations, scientific research activities and from national and international monitoring programs.	The SEA was based on various existing sources, as well as the experts' judgement.
Precaution	Implementation of the EBA in German SEA & MSP and its relation to the precautionary principle is currently actively developed.	It is unclear how precaution was considered. The document does not refer to it directly. But the plan itself has many precautionary measures i. e. refraining from planning majority of the sea areas in Poland with the hard infrastructure.
Alternative development	In MSP 2009: only zero option. The following sectoral plans include alternatives, e.g. Site Development Plan includes spatial and technical alternatives. MSP 2021 will also develop and assess alternatives in more detail.	The SEA process is based on forecasting and it considers different options to suggest the one with the least negative impacts to the environment.
Identification of Ecosystem services	The SEA does not include identification of ES.	The SEA process does not conduct additional studies, but it does use past sources which have conducted the ES identification.
Mitigation	The SEA considers mitigation measures, for example application of best environmental practice, exclusion of Natura2000 areas for offshore wind energy, with regard to deconstruction of facilities or consideration of sensitive periods during construction phase.	The SEA indicates some mitigation measures in general level. The proposals from the SEA report were implemented to the Plan. It was assumed that detailed solutions are perceived under EIA for specific activities/investments.
Relational understanding	The SEA extensively looks at relations between different sectors and the environment, with an aim to identify conflicts and suggest solutions.	The SEA extensively looks at relations between different sectors and the environment, with an aim to identify conflicts and suggest solutions.
Participation and Communication	The SEA is an integrated part of the MSP. Consultation of SEA reports has been conducted together with consultation of draft MSPs.	The SEA is conducted in parallel with the MSP process and as such it includes multiple rounds of national and transnational consultations as well as separate meetings with sector representatives on specific topics.
Subsidiarity/ coherence	Due to the early MSP adoption coherence was not considered in detail. Coherence with plans in coastal waters and neighbouring areas will be a bigger topic in the update process.	The SEA followed the subsidiarity principle in that it looks at the different problematic areas and assesses multiple planning options. In regards to coherence, the same method is used but the criteria is different in the coastal waters vs. EEZ (according to the WFD and MSP respectively)
Adaptation	SEA does not specify adaptation.	Does not specify adaptation process. However the whole plan allowing production of renewable energy to meet the EU targets is a process for adaptation of Poland to the climate change.

Table 8: The EBA elements in national SEA of MSP.

Sweden	Denmark
As a starting point for the first phase of the national marine spatial planning the status description was compiled (Current Status 2014) with information and data from agencies involved in the marine sector and from county administrative boards regarding the utilisation of marine resources, current conditions, and possible future demands.	Existing knowledge is being used. Some new analysis but no studies no new data collection.
According to SwAM the plans should identify which areas are best suited for each activity. The benchmark should apply the precautionary principle and ensure that affected ecosystems properly function.	N/A
With the help of the Symphony tool, the cumulative environmental impact within the marine spatial planning area has been estimated and analysed with the aim of assessing the result of the MSP in relation to the zero alternative for 2030.	The process will consider different alternatives, but when published it will be one plan. Some alternatives are even considered in the translational context i.e. energy and shipping with Germany.
The SEA identified ecosystem services in relation to the sustainability assessment. In parallel with the SEA, a sustainability assessment was also done based on the Economy, Ecology, and Social dimensions. This expanded perspective was added to the SEA by also covering the plan's socio- economic and social impact.	Yes, it will be considered in the process.
The Symphony model was applied to estimate cumulative impacts and possible planning options.	N/A
The plan and associated studies have a strong focus on cross-sectoral relations. Specifically, the ambition of the Current Status 2014 report was to convey a cross-sectoral perspective as a starting point for the first phase of the MSP.	N/A
Comments submitted during the dialogue phase were worked into the SEA and MSP (in parallel) prior to the consultation phase.	There were stakeholder workshops and unofficial informal early involvement and consultations will be held again when the plan is published.
To capture regional differences, separate plans were prepared for the Gulf of Bothnia, the Baltic Sea, and Skagerrak and Kattegat. In the SEA for the Baltic Sea, the MSP's five marine sub-regions have been analysed – the Northern Baltic Sea and Södra Kvarken, the Central Baltic Sea, the South- eastern Baltic Sea, the Southern Baltic Sea, and the South-western Baltic Sea and Öresund.	N/A
Does not specify adaptation process.	Plan will be legally binding, so it can be changed only following the strict rules. The plan will also be digital, so it can be changed i.e. information can be added. The legislation will stay but the information and work around it can change.

3.3. Translation Matrix

The translation matrix aims to support planners in providing an overview of terminology and steps of national SEAs, which can support also countries outside the case study region.

Terminology	Countries where used	Definition	Difference effects (what the different effect for MSP, sectors, …
SEA process			
At which stage SEA comes into play	DE, PL, SE	In parallel with MSP development	–
Are consultation processes done in parallel/part of the SEA process?	DE, PL, SE	The plan and the SEA are conducted in parallel including the public consultation. Multiple national and international meetings have been held. In addition, there were a number of consultative meetings regarding specific sectors. Like technical infrastructure, offshore wind farms, fisheries, environmental protection.	–
Effects on MSP	DE, PL	Uses not regulated (no assigned zone) by the plan but considered in the process of establishment of priority and reservation areas.	–
Effects on sectors	DE	So far only for DE effects can be measured; SEA outlines alternatives; in practice no changes of original plan so far	–
Environmental terminology			
Alternative	DE, PL; SE	Change in the environment that the impact entails on an ecosystem component (ecosystems or individual flora and fauna). Effects can be direct or indirect, cumulative, positive or negative, or long or short term	PL: the alternative is defined as 'no plan', and the options are therefore the proposed plan; DE: the alternatives are considering the implications of not implementing the plan
Impact	SE	Change in physical conditions that the plan's implementation entails (e.g. that an area is claimed, water clouding, noise).	
Cumulative impacts	DE, PL, SE	Different levels of stressors related to the planned activity, other equal activities, other non-equal activities, other transboundary non-equal activities	DE: has taken into account all aspects of levels 1–3; PL: recognises some aspects of levels 1, 2 and 3; SE: takes all aspects into account, except gas storage under level 3
Ecosystem components	SE	Living environments, species, or groups of animals and plants that constitute a part of the marine ecosystems.	–

Table 9: Comparison of SEA terminology for an easier transnational collaboration on MSP.

4. The link between MSP and MSFD

4.1. How to integrate the MSFD into the process of MSP and SEA?

EU Member States must ensure that no significant risks or impacts on marine biodiversity, marine ecosystems or human health are posed by legitimate uses of the sea. A key unifying framework for the assessment of environmental status is the Marine Strategy Framework Directive (MSFD; 2008/56/EC) and its 11 Descriptors[23]. This is enshrined in the Marine Strategy Framework Directive (MSFD) which extends monitoring and assessment of EU marine areas up to 200 nm seaward of the baseline. The MSFD aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend.[24] Through the Directive's legislative framework, the ecosystem approach to the management of human activities having an impact on the marine environment, integrating the concepts of environmental protection and sustainable use, is enclosed.[25]

However, the MSFD does not provide the operational framework to manage these activities themselves[26]. Instead, member states need to develop programmes of measures to reach the targets.

In line with the programmes of measures and with regard to environmental targets, the MSP Directive comes into play: it focuses on activities at sea and how they could be balanced to maintain the sustainable use of marine and coastal resources. The SEA Directive, which is linked to the MSP Directive, provides a tool for analysing environmental components worth to protect and outlines how to minimize impacts on the environment.

Despite the fact that both these Directives have their specific objectives, many authors[27] have shown the importance of linking their efforts (along with others such as the Water Framework Directive (WFD, 2000/60/EC) or Habitats Directive (HD, 92/43/EEC)) in order to attain their objectives in a more coherent way, see Figure 4).

23 Qualitative Descriptors (QD) are: Biodiversity; Alien species; Fishing; Food-webs; Eutrophication; Sea-floor integrity; Hydrography; Pollution in the environment; Pollution in seafood; Litter; and Noise/energy.
24 Art. 9 of the MSFD
25 Preamble 8 of the MSFD
26 Frazão Santos et al. 2012
27 E.g. Boyes, S. J., and Elliott, M. (2014); Maccarrone, V. Filiciotto, F., de Vincenzi, G., Mazzola, S., Buscaino, G. (2015)

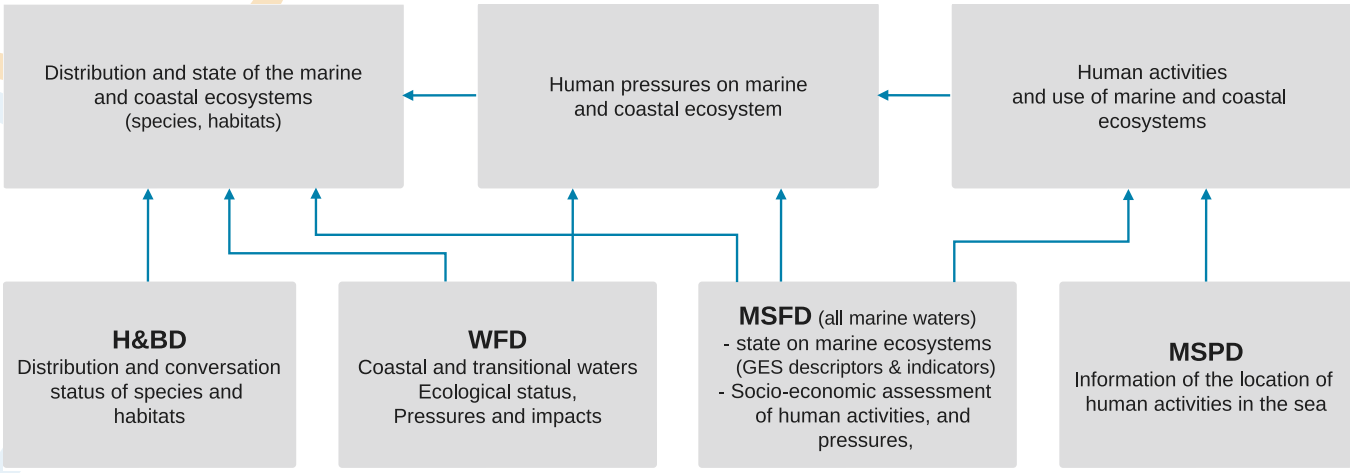


Figure 4: Overview of the linkages between the MSFD, WFD, the H&BD, and the MSPD illustrating how the assessments and data produced by these directives can feed into each other.

Linking, the MSFD and the MSPD, could be through the Ecosystem based Approach:

EBA is at the core of the MSFD and considered a necessary tool to achieve the Good Environmental Status and it is explicitly described in the Article 1 (3) of the Directive.[28]

As with the MSFD, the MSPD indicates that to promote sustainable development, blue growth[29], and sustainable use of the marine and coastal resources, maritime spatial planning should be based on EBA.[30] Compared to the MSFD, MSPD is not geared to the protection of marine ecosystems, although Art. 5 (1)[31] clearly sets the obligation to Member States to consider an EBA – as defined by the MSFD – when developing maritime spatial plans. Spatial plans have to ensure that good environmental status in marine waters can still be reached. The SEA Directive, which is linked to the MSP Directive, sets requirements and a tool kind of "step-by-step implementation guide" for analysing environmental components worth to protect and outlines how to minimize impacts on the environment.

The MSPD could interact with the MSFD by helping to gather data on human activities and uses in the marine space in order to build an information basis for the MSFD indicators. Pressure indicators are especially needed to verify the cause of a problem as it cannot be assumed that the pure presence of an activity in itself is that cause of an impact. Especially the investigations of such links would be beneficial both for MSPD and MSFD.

4.2. Relevant descriptors for MSP processes

The following table[32] provides an overview of the main pressures coming from maritime activities expected to affect

28 Article 1 (3) of the MSFD clearly states that 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" (MSFD, 2008/89/EU).

29 https://ec.europa.eu/maritimeaffairs/policy/blue_growth_en

30 Borja et al., 2013; Directive 2014/89/EU

31 of the MSPD

32 Adapted according to Gilbert et al, 2016: Marine spatial planning and GES: a perspective on spatial and temporal dimensions. Ecology and Society 20 (1): 64.

MSFD descriptors: The table focuses on those descriptors mainly relevant for spatial planning and the descriptors they are likely to influence. Other descriptors may be affected in specific areas depending on the present or planned sea uses.

Of the eleven GES descriptors, three are place-specific; they have a spatial character that can directly be affected by MSP:

- Hydrographical conditions, D7,
- Energy and underwater noise, D11,
- Seafloor integrity, D6.

Biodiversity, D1, with regards to benthic species and habitats, and commercial fish and shellfish, is partially place-specific because of the dependence on benthic habitats. Trends in state descriptors, D1, D4, and D6[33] representing aggregate properties of ecosystems will reflect cumulative effects, but not necessarily in a way that disentangles their causes. Marine litter, D10, lacks MSP-relevant attributes, although clearly litter production by planned activities requires regulation. The purpose is therefore to distinguish between drivers potentially subject to spatial planning and the descriptors they are likely to influence, and drivers beyond the remit of MSP but with pressures that might need explicit consideration when developing plans.

Qualitative descriptor [34]	Aspects relevant for MSP (most prominent examples)
D1 Biological diversity	Environmental protection, offshore renewable energy, cables and pipelines, oil and gas exploitation, sand and gravel extraction, benthic trawling
D4 Marine food webs	See biological diversity; important for cumulative impact assessments Dredging and dumping by their release of contaminants, which can accumulate in the food web and this way alter food web structure, shipping by introduction of contaminants, oil spills by direct mortality, fisheries (no take areas) because fishing alters the food web structure, any activity leading to habitat loss and population effects and disturbance as this could affect species distributions and this species composition at certain areas
D6 Seafloor integrity	Benthic trawling, maintenance of shipping lanes, cables and pipelines, oil and gas extraction, offshore renewable energy, sand and gravel extraction
D7 Hydrographical conditions	Maintenance of shipping lanes, offshore renewable energy, other infrastructure
D8 and D9 Hazardous substances	Oil spills, shipping, dredging, dumping
D10 Marine litter	Shipping
D11 Energy and underwater noise	Shipping and offshore wind energy; however, large variety of sources

Table 10: Comparison Spatial planning characteristics of Marine Strategy Framework Directive descriptors.

33 Cochrane et al. 2010
34 Except D4, marine food webs, all mentioned descriptors are fully or partially place-specific.

Of core interest for planners is therefore what data is used in MSFD related assessments and how to make this data available as information basis for MSP. For example, such data can inform MSP on the performance of plans and if measures would be necessary. Therefore, planners should take the relevant descriptors and indicators into account for MSP and SEA.

In addition, planners can adapt MSFD data to more MSP-specific needs. For instance, overviews exist of data supporting the implementation of different directives like the MSFD or WFD. These tables[35] could – apart from the available HELCOM data – be translated and provide neighbouring countries information about data availability and corresponding contact persons. Further, the structure of the table could be used for data inventories in other countries[36], as it provides information about:

- Topic/categories
- Sector/products
- Need of data (impacted areas, geographic location, range and size of area, type of fundament of turbines in impacted area
- Name of data (data cables, energy cables, pipelines, approval of offshore wind parks)
- Description (location and course of the pipeline, offshore energy area, company, buffer zone, material)
- Administration
- Data keeper with address
- How are data stored (analogue, linear shape, GIS shape, area shape)
- Coordinate system (WGS 84, UTM Zone, ETRS89.)
- Timeline, frequency
- Continuation of data collection
- Area (EEZ, territorial waters)
- Meta data (in conformity with INSPIRE services)
- Free access?
- Examples for data (yes/no/fee)

Also, the need to harmonize data, e. g. for the cross-border topics like cables and pipelines, are outlined.[37] One example on how to attain relevant data for implementing the MSFD and at the same time for planners from Germany is provided in the following box:

1. The ad-hoc expert group on „Human Activities“ is analysing data needs for the MSFD on a regular basis and highlights where they can be found. This working group is compiled of representatives of different Federal States’ administration and experts. A table with data availability and contact persons is updated regularly.

2. Data portals of MDI (Marine Data Infrastructure), and the MUDAB (Germany), which is collecting data.

3. In addition, there is the status report for the MSFD for the Baltic Sea (and the North Sea). There it can be seen, which aspects have been taken into consideration and what the MSFD is dealing with. The report is published under meeresschutz.info: https://www.meeresschutz.info/berichte-art-8-10.html

Conversely, MSFD experts can make use of data collected under MSP processes as information basis for pressure indicators under MSFD. Data sharing in the Baltic Sea was also an important topic within the Pan Baltic Scope project. In particular, HELCOM’s role as a data collector and disseminator should be highlighted.

35 For example, MDI-DE (Marine Data Infrastructure Germany) (2017) Daten zu menschlichen Aktivitäten und anthropogenen Belastungen – Evaluierung der Datenverfügbarkeit und -qualität, 2017; https://www.researchgate.net/publication/321224575_Daten_zu_menschlichen_Aktivitaten_und_anthropogenen_Belastungen_-_Evaluierung_der_Datenverfugbarkeit_und_-qualitat_mit_Abschluss-Workshop

36 A similar approach has been taken for indicators: all indicators not mentioned in the HELCOM overviews, are collected in indicator sheets per BSR country to show the differences and opportunities for possible, future harmonization.

37 ibidem

4.3. Different entry points to link MSFD with MSP

In addition to reflecting on which kind of information could be used to inform the SEA process, planners can also link the overall aims of the SEA to the MSFD[38] indicators.

Related to the cycles of the MSFD , the environmental assessment, the establishment and review of environmental targets and of the programme of measures seem to be main entry points for a link between MSFD and MSP processes.

Some European countries have already started to link the MSP process to the MSFD, using EBA through the application of the "essential features of the planning process" and the use of economic and environmental impact assessments[39]:

Finland includes the scenario variable state of water according to MSFD.

In **Germany**, several MSFD measures refer to the implementation in MSP (e. g. migration corridors).

The **Netherlands** included in its National Water Act strategy an article, which foresees that GES act as the baseline towards which the Strategic Environmental Assessment should be measured. On a MSP project level, a compensation scheme with five steps is foreseen to integrate EBA: 1) Defining spatial claim and applying the precautionary principle, 2) Choosing the location and assessing requisite space and time, 3) Demonstrating national interest to impact on nature 4) Mitigating measures and 5) Compensation of effects.

Sweden uses a method to link MSP themes and sectors with the MSFD to assess pressures coming from activities dealt with in spatial planning. To support the linkage between the two directives, relevant input data are provided for planners. MSP assessment, based on EBA, aims to compare environmental impacts (including cumulative impacts) of different plan alternatives. The main pressures are then discussed with stakeholders and alternative plans developed.

The United Kingdom sees MSP as a tool for the implementation of the MSFD indicators. The UK's Marine Policy Statement mentions "The use of the marine environment is spatially planned where appropriate and based on an EBA which takes account of climate change and recognizes the protection and management needs of marine cultural heritage according to its significance".

In addition to the above-mentioned tools to link the MSFD to the MSPD, it should be mentioned that cumulative impact assessments, Green infrastructure, and Socio-economic modelling, all of which have been part of the Pan Baltic Scope project could be useful tools to understand how MSP can facilitate to reach GES in the Baltic Sea Region.

Further options for linking MSFD and MSP Directive's aims exist through:

- The design of monitoring programs for measuring MSFD indicators, assessing predominant pressures and impacts and environmental status of marine waters[40]

38 Claussen, U. et al (2011)
39 HELCOM, 2016
40 According to the indications provided in the Commission Decision 2017/848/EU of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU.

- The evaluation of pressures and impacts produced by activities, including cumulative impact assessments
- The setting of management targets
- Considering ecosystem boundaries, instead of administrative ones
- Taking into account the ecosystems limits of the carrying capacity
- Regularly undertaking assessments and considering marine ecosystems in a holistic way (including humans as part of the system[41]).

4.3.1. Which measures can be provided by MSP to achieve GES?

MSFD measures are not easily integrated (e. g. compensation measures) into MSP. However, the following approaches may foster a better linkage:

- Choosing smart locations for activities so that the negative impact on the environment is as small as possible
- Reducing the impact of certain activities, which have adverse effects on the environments
- Relocating or stopping activities currently conducted in ecologically important areas, including protected areas

4.3.2. Which conditions have to be fulfilled to integrate contributions of the MSFD into the MSP process?

- Awareness of the methods used to evaluate the environmental status in MSP and the MSFD
- The operational environmental targets of the MSFD have to be more clearly quantified for more descriptors so that they could serve better for MSP
- Sharing of data

41 Borja, A. et al. (2013); Brennan, J. et al. (2014);

5. Modular EBA Implementation Concept

5.1. Assessment of selected EBA tools

The tools, methods and practice (in further text referred to as 'EBA tools') for the implementation of an EBA, which have or could potentially be used in MSP and SEA processes (and also other approaches) have been reviewed. Specific attention has been paid to a variety of geographical scales, government setups, natural conditions and sectors represented when reviewing different approaches to EBA in MSP. The aim has been to achieve the appropriate distribution of tools and methods collected across the 5 EU sea basins, as well as from non-EU sources. The steps of a MSP process with the relevant EBA tools and some of the relevant sources and their brief description are provided in the Table 11. Such approach will allow for a differentiation to be made between different MSP contexts and their suitability for the application of the proposed modular concept.

The review of relevant EBA tools will follow the steps of a MSP process. A few EBA elements have been selected, to be analysed more in depth[42].

Initiation & Scope (Step 1–4) Relevant Elements: MSP/EBA principles and objectives, MSP indicators, precautionary principle.
The Handbook on Developing indicators in MSP (MSP for Blue Growth Study developed by the EU MSP Platform) provides a methodology for setting up SMART MSP objectives and indicators
EcAp/IMAP ecological objectives (11 EO) and indicators for MSP applied in Montenegro
Eionet Reporting Obligations Database
Stocktaking and analysing (Step 5–6) Relevant Elements: consideration of ecological elements and human pressures
Approaches implemented to assess the limit of carrying capacity and develop sensitivity maps, including the NOAA – coastal sensitivity maps (index) on oil spills (US), DEFRA- marine sensitivity assessments (UK), Scottish Government – Fishery Sensitivity maps (UK), Plan4Blue project – The Gulf of Finland marine and coastal environmental risk profile (FI and EE), Wildlife Sensitivity Maps (many Member States, as well as cross border approaches)
Latvia stocktaking of conditions and ecosystem components for MSP (HELCOM, national surveys)
The Netherlands National Water Act where GES acts as the baseline towards which the Strategic Environmental Assessment should be measured
Swedish Agency for Marine and Water Management application of a SYMPHONY tool, used in MSP to understand and illustrate the environmental pressure on ecological values
Developing (Step 7) Relevant Elements: Defining spatial and temporal scales, identifying and selecting alternative spatial options
The Netherlands five steps compensation scheme which includes choosing the location and assessing requisite space and time
Portuguese MSP tool for identifying priority conservation areas
The PLASMAR-INDIMAR tool (DSS) to identify best marine areas for setting up different maritime activities – according to group of parameters
The ECODUMP project guidelines explicitly dealing with the influence of MSP and EBA principles on the search and assessment of new disposal sites at near-shore of Lithuania.
The projects BALANCE, BalticSCOPE and Pan Baltic Scope outline the concept of blue corridors and how to work with it during practical marine spatial planning processes.

42 The methodology largely relied on the relevant online platform sources and databases including the EU MSP Platform, Tools for MSP, and European Environment Agency: Eionet Reporting Obligations Database.

ADRIPLAN, SimCelt and TPEA projects all provide techniques and methods based on the EBA for practically implementing MSP in the sea basin and macro reginal scales
ECOMAGIS project complex GIS for an ecosystem-based management through integrated monitoring and assessment of the status of flora and fauna in the Romanian part of the Black Sea
MareFrame Decision Support Framework for a pragmatic planning process for Ecosystem Approach to Fisheries Management (Scenario visualization tools, MultiCriteria Analysis tool, Bayesian Belief Net tool)
PLASMAR project Methodology for Blue Growth Zoning applying the ecosystem approach
and INDIMAR tool (DSS) to identify best marine areas for setting up different maritime
The Bonus Basmati Baltic Explorer online multichannel decision-support system providing access to data/information through interactive web-map and tools for impact assessment (incl. a DPSIR scenario framework).
Assessing (Step7) Relevant elements: SEA, cumulative and in-combination effects, ecosystem services
ESMERALDA project databases and guidelines for a comparable and unified assessment of ecosystem services
Latvian characterisation of the ecosystem services based on the CICES v4.3 (2013) classification system. The produced maps were used in the SEA
The Toold4MSP Geo platform (following the ADRIPLAN project) the Marine Ecosystem Services Threat Assessment (MES-Threat)
InVest Tool widely used in the context of ecosystem services valuation worldwide, including the Belize MSP.
The German Federal State Development Plan 2016 of Mecklenburg-Vorpommern, which includes spatially explicit designations on ecosystem services
The pilot plan for the Western Gulf of Gdansk developed in the project BaltSeaPlan outlines the preparation of an SEA report for maritime spatial plans in line with the EBA and with the special issue that the planned area contains Natura 2000 sites
The SIMCelt project tools for Ecosystem Services in Transboundary Maritime Spatial Planning, ODEMM to offshore Brittany and Marlin to the Irish Sea, illustrate how different data sets can be used to map ecosystem services for decision making in trans-boundary MSP
Multiple EU Member States have already developed SEA for MSP including Belgium, Germany, Norway, Lithuania, Malta, Netherlands, Sweden, Poland (pilot), Latvia and UK.
Maritime Use Conflicts (MUC) Analysis, and Cumulative Effects Assessment (CEA) tools developed as part of the ADRIPLAN & Toold4MSP Geo platform. Tools4MSP Geo-platform includes spatial data and metadata to assess cumulative impacts for different categories like coastal defence, sand extraction or energy. The ADRIPLAN Cumulative Impact Tool is the main methodological tool used in the project to evaluate the potential impact of maritime activities on the environment. The Data Portal also includes the ADRIPLAN Conflicts Score Tool.
Recommendations from the SIMNORAT / SIMWESTMED projects on a common methodology for cumulative impact assessment
HELCOM's Baltic Sea Impact Index
ESaTDOR and Med-IAMER projects investigated typologies of land-sea interactions and developed associated spatial indicators, which were then used in a cumulative impact assessment of environmental pressures
Baltic SCOPE and Pan Baltic Scope projects EBA toolbox and a checklist to be used in the planning process to identify potential synergies and conflicts in relation to the environment
Recommendation from the International cooperation between North Seas countries on Marine Spatial Planning & Cumulative Effect Assessment[43]: An environmental subgroup (Countries involved: UK, IRE, NO, DK, GE, NL, BE, FR and EC) works on a common approach for cumulative effect assessment (CEAF) of offshore renewable energy
Plan4Blue environmental cumulative impact and risk assessment tool
DISPLACE model for spatial fishery planning and effort displacement[44] allows evaluation of effects on stocks and fisheries and ultimately incorporating other uses such as energy production, transport, recreation, etc.
Implementing (Step 8): Relevant elements: precautionary principle, preventive and mitigation measures, EIA
Available MSP and sectoral development plans including the EIA procedures and related documentation and guidance
Monitoring & evaluating performance (Step 9–10) Relevant Elements: System for monitoring, evaluating and adapting
The review done under the Handbook on Developing indicators in MSP as part of the MSP for Blue Growth Study developed by the EU MSP Platform can provide relevant source on setting up indicators in MSP
EcAp/IMAP ecological objectives (11 EO) and indicators for MSP applied in Montenegro

Table 11: Selection of relevant sources for EBA tools under each of the steps of a MSP.

43 https://www.msp-platform.eu/events/cumulative-impacts-tools-expert-roundtable
44 https://www.msp-platform.eu/node/85

Focusing on these tools, assessments have been conducted by the authors: for selected tools a more detailed assessment, for the other ones a basic approach has been chosen as outlined for the example of the Polish SEA Heuristic forecasting method (see table 12). The table presents how the different methods, tools and practices (called collectively as 'tools' below) will be assessed for the example of the Polish SEA Heuristic forecasting method.

The table lists in the first column the key EBA requirements as presented in the directive text (especially in the recital 14). The second column presents links to the EBA requirements and e. g. to the Baltic SCOPE EBA Checklist[45].

The aim is to link the assessment to broader discussion on EBA with a perspective on future developments. The EBA checklist that was prepared within Baltic SCOPE project to support countries in application of EBA while preparing their national maritime spatial plans is also used as one of the basis for the methodology proposed herein.

The third column links the assessment criteria to general principles of EBA as presented in the previous sections. The purpose of this additional perspective is to verify the criteria and link the assessment to broader discussion on EBA with a perspective on future developments.

5.1.1. Example: Polish SEA Heuristic forecasting method

Basic assessment		
Topic	**Assessment criteria**	**Response options**
Management	Link to the stage of a MSP Process	Assessing; the method was applied as part of the SEA
	Type of element	Heuristic forecasting method (Kruk-Dowgiałło et al. 2011), which uses the knowledge and experience of specialists of the interdisciplinary team of authors. It is based on rational, scientific premises, it has a definite time horizon and a qualitative character.
	Link to other Directive and administrative processes	Applicable for the implementation of other directives and based on the assessment of the state of the environment according to the MSFD and WFD indicators and was carried out mainly on the basis of the results of the Sea Water Monitoring Program implemented according to the HELCOM COMBINE guidelines, including monitoring of radioactive contamination (HELCOM MORS PRO) as well as measurements and observations carried out at the IMGW-PIB Maritime Department statutory activity of the Oceanography and Hydrosphere and Atmosphere Monitoring Center (in the scope of: water mixing, water exchange, exposure to waves, etc.). The underwater noise was characterized based on HELCOM data and the European BIAS (Baltic Sea Information on Acoustic Soundscape) project.
	EBA principles covered	Contribution to the GES, consideration of alternatives, sound knowledge base, participation and communication
	Sectors covered	Multi-sector (fishing, shipping, environmental protection, etc.)
Scope	Ecosystem focus	Multiple species
	Geographical scope	sub-national/national/transnational
Data	Data demanding	No
	Type of data (input/output)	Qualitative

45 http://www.balticscope.eu/content/uploads/2015/07/BalticScope_Ecosystem_Checklist_WWW.pdf

Basic assessment		
Topic	**Assessment criteria**	**Response options**
Process/ methodology	Quality of the methodology	Applied already (in the official statutory process)
	Open source	Yes
	Spatial analysis	Yes
	Time horizon	Yes, definite (6 years?)
Implementation	Expert judgment/validation	Yes
	Type of implementation	Applied in an official MSP process
	Outcomes	Information about outcomes (costs and benefits from applying the method) available
Outputs	Type of outputs	Maps; text; tables and matrices
	Level of complexity of outputs	9 maps were produced and over 500 pages in total for the SEA
	Scenarios	Not full scenarios, rather different options in specific areas following the subsidiarity principle, which focused on specific issues with regard to future economic development (i.e. entrance to the port, future energy developments).
Accessibility & Sustainability	Transferable to other contexts and/or countries	Yes, the tool is relatively easy to use and based on existing studies and experts' judgement. As such it is scalable and not space specific.
	Supporting documentation/ training	Chapter on methodology and a list of used sources
	Language	Polish
	Tool update	Not specified

Table 12: Basic assessment of the tool.

5.2. Development of the modular implementation concept

A clear, practical and hands-on **method** is proposed with a set of **guidelines and tools to support planners in the practical implementation of EBA in MSP, taking into account SEA and MSFD processes as well**.

Basic principles used when developing a practical method on EBA in MSP include:

- Help users understand and move through each of the steps of MSP for implementing EBA and allow users with limited formal knowledge to use the method.
- Provide access to guiding information: reports, case studies, guidelines, manuals, etc., especially those available by web links.
- Inform planners to make optimal use of information gathered and/or reported in supported policies (e.g. MSFD, WFD, N2000, etc.)
- Assist planners in choosing tools appropriate for their situation, by summarizing how each tool works and providing criteria such as cost, technical difficulty, and level of participation and data requirements to assist the selection.
- Be adaptable and open to innovations and improvements so that they can be incorporated without delay.

The selection of EBA tools is based on the chosen EBA principles linked to a MSP step, and the recommendations as outlined in related initiatives like Baltic SCOPE (2017)[46], WWF (2017)[47]. We acknowledge that the ways certain EBA tools are implemented in MSP processes differs among countries. Thus, the modular concept highlights, in which of the contexts a certain EBA tool may be suitable, or if the same element may be applied in other steps of a MSP process depending on the local context.

For example, depending on the level of detail taken in a MSP process, the consideration of different alternatives (or scenario development) might come at the beginning or later in the process. The following chapter describes: step in the MSP process, relevant EBA principles, relevant questions related to practical implementation of an EBA in a MSP context, tools and their selection criteria.

5.3. The modular concept

The following modular concept presented in Figure 5 is one possible model of organising the EBA implementation in MSP. The external circle 'General MSP Steps' should be seen as flexible – as the step at which some EBA principles/elements and EBA tools are considered may differ from process to process. Moreover, some EBA principles may have relevance throughout the whole MSP process, rather than only at a certain step. For example, the precautionary principle or best available knowledge could be used throughout the process, rather than only at the shown stages. The modular concept presented here should be understood as an example, which is used in further sections to structure the description of the EBA tools. It is up to the planner to use it in a flexible way according to the specific context and need.

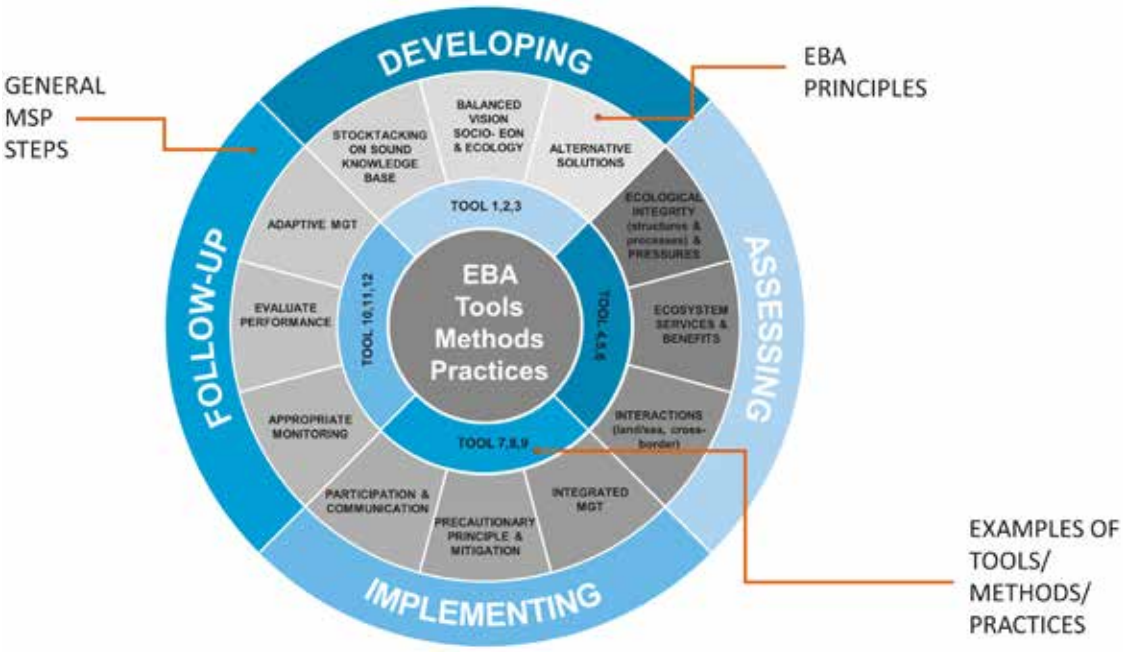


Figure 5: The modular concept containing tools for the implementation of EBA in MSP.

46 Baltic SCOPE (2017). Development of a maritime spatial plan: the Latvian recipe. 56 pp.
47 WWF (2017). Delivering ecosystem-based marine spatial planning in practice: an assessment of the integration of the ecosystem approach into UK and Ireland Marine Spatial Plans. 132 pp.

5.3.1. DEVELOPING

At this stage, MSP usually goes throughout the following three steps:

1. **Initiation & Scope where relevant EBA tools may be used to define appropriate spatial and temporal scales MSP/EBA principles and objectives, MSP indicators, and the precautionary principle.**

Definition of spatial scales most often follows political and jurisdictional borders, as MSP is normally conducted by national or sub-national authorities. Typically, these borders do not correspond to the limits of maritime activities or ecosystems. The definition of objectives and vision for the maritime space is also conducted early on in the process. Which objectives will prevail, economic or environmental may depend on the under-laying political context as well as the specific needs in the given area.

2. **Stocktaking and analysing where relevant EBA tools may be used for consideration of ecological elements and human pressures using the sound knowledge base.**

The amount of available data and its accuracy varies greatly across countries and sectors. The relevant data is also often scattered across different agencies and institutions. Lack of data may be especially challenging when applying modelling tools which usually rely on a big amount of standardised and highly accurate data. In such cases, it is important to acknowledge the data gaps which may by corrected in the next planning rounds and to ensure that the available knowledge and expertise is being effectively used. Collecting experts' opinions is also one of the methods often used in cases where information is lacking or is not up-to-date.

3. **Developing, identifying and selecting alternative options.**

Developing different scenarios that primarily focus on different driving forces can affect spatial use in the maritime area and its marine resources. The analysis of possible future planning options and definition of a vision for the maritime space in question is often conducted through interactive exercises by using SWOT (strengths, weaknesses, opportunities, threats) or PEST (political, economic, socio-cultural and technological) analysis technique. To contribute to a better communication and engagement, scenarios can take different forms including a story or "narrative", with maps, graphics, drawings, pictures, etc. The 'Handbook for developing Visions in MSP' provides multiple examples of scenario development processes and relevant literature and scenario toolboxes from other relevant fields such as sectoral and urban planning.

NOTE: It is essential that **stakeholders, authorities and the public are engaged at an very early planning stage in the preparation of maritime spatial plan** to build necessary trust and support. However, as the modular concept is a flexible approach, stakeholder involvement and related tools are outlined here under **stage III – Implementation**, relevant,

described tools can be easily approached at a different stage by the planner.

The following section provides the description of three EBA tools relevant in the context of the above-mentioned steps and related EBA elements together with examples of their implementation.

TOOL 1: Assessment of the limit of carrying capacity and development of sensitivity maps

Multiple approaches have been developed to structure the stocktaking and assess the limit of carrying capacity and develop sensitivity maps at a range of spatial scales. These include the DEFRA - marine sensitivity assessments (UK), Plan4Blue project – The Gulf of Finland marine and coastal environmental risk profile (FI and EE) , and Wildlife Sensitivity Maps . Some approaches have focused on specific sectors such as the Scottish Government – Fishery Sensitivity maps (UK), and the NOAA – coastal sensitivity maps (index) on oil spills (US). Assessing ecological vulnerability can provide an important tool to support blue growth and to preserve the capacity of ecosystems to provide valued services. Thus, vulnerability assessments are increasingly used and demanded in environmental decision-making and policy-making.

Tool Example: Marine Evidence based Sensitivity Assessment (MarESA)

The MB0102 sensitivity assessment methodology was developed by Tillin et al. (2010) to create a pressure vs. feature sensitivity matrix to support marine and coastal management. Due to the project MB0102 timescales, the approach relied on expert judgement to create sensitivity assessments at two workshops.

The methodology was modified to introduce a detailed evaluation and audit trail of evidence on which to base the sensitivity assessments. The revised methodology (henceforth termed MarESA) was subsequently applied to Ecological Groups based on species characteristic of offshore, circa-littoral biotopes and to biogenic habitats. The methodology involves the following stages: (1) Define the key elements of the feature (in terms of life history, and ecology of the key and characterizing species); (2) Assess the feature's resistance (tolerance) and resilience (recovery) to a defined intensity of pressure (the benchmark); (3) Combine resistance and resilience to derive an overall sensitivity score; (4) Assess the confidence in the sensitivity assessments; (5) Document of the evidence used; and undertake quality assurance and peer review. The method was applied in England where a total of 88 birds, 13 fish (and a crustacean) and 5 marine mammal species were assessed for their sensitivity to 36 anthropogenic pressures. All species were notified features of existing or planned MPAs in British waters. All features were assessed against the same standardised list of human pressures as defined by the Inter-sessional Correspondence Group on Cumulative Effects, 2011.

Selection criteria for planners: Method requires a solid baseline data – the assessment of sensitivity should be guided by the presence of key structural or functional species/assemblages and/or those that characterize the biotope groups.

Selection criteria for planners: The method has two versions that may be applied depending on the available time and resources.

TOOL 2: Data models for developing scenarios

In order to come up with suitable planning options, planners usually consider multiple alternative solutions. These are usually defined early on and discussed jointly with the stakeholders. Later in the process alternative options may be developed and assessed more in detail in scenarios for a specific location, specific sectors or the plan as a whole as part of the SEA.

Tool example: MYTILUS

MYTILUS aims at providing a set of tools with high-performance analytical capabilities that are easy to use in order to consider different planning solutions. It is a stand-alone desktop application independent of other software or licenses, but using the same data models that are common in GIS software such as ArcGIS and QGIS – i. e. shapefiles and ESRI ASCII grids. This enables the exchange of data between MYTILUS and most other GIS software packages without the need for any conversions. In terms of functionality, the work within MYTILUS is organised into projects – typically representing different geographical areas – within which the user can define different scenarios. These may include, for example a baseline scenario describing the impact on the environment today followed by a set of alternative scenarios describing various spatial planning options or changes in human activities. The cumulative impact analysis is based on the method devised by Halpern and co-authors (2008). Results are described by means of different statistics and metrics describing the effect of human activities on the environment.

Selection criteria for planners:

MYTILUS has the capacity to considerably shorten the time for cumulative impact calculations.

TOOL 3: Spatial subsidiarity and the nested approach

The majority of the 66 Large Marine Ecosystems (LMEs) around the world span across national jurisdictional boundaries and the majority of marine species are migratory. As a result, ecosystem boundaries do not always correspond to the given jurisdictional boundaries of the countries with potential authority over a formal MSP process. Given this multi-dimensional nature, an effective MSP process may consider the wider translational context but still adhere to the principle of spatial subsidiarity, which proposes that spatial challenges should be dealt with at the lowest most appropriate spatial level. More detailed MSP may lead to a 'nested' approach (i. e. below the national or sea-basin planning level) where certain 'hotspot' areas are identified and planned more in detail.

Tool Example: LME MSP ToolKit

This toolkit is mainly targeted towards supporting MSP at various transboundary scales relevant to an LME. These could be the entire LME itself, or sub-LME areas shared by two or more national jurisdictions, such as ecologically or biologically significant marine areas (EBSAs).

The chapter 2 of the ToolKit highlights the special considerations regarding ecosystem boundaries and legal boundaries when defining a planning area for MSP, especially given the interconnected nature of maritime activities and ecosystems, including species connectivity

The chapter 5 of the ToolKit provides examples of the flexible/soft approach to defining the boundary of transboundary areas which involves setting or defining broad areas which are not necessarily based on jurisdictional boundaries but rather to consider other factors important in better analysing and understanding the transboundary area especially for cross border

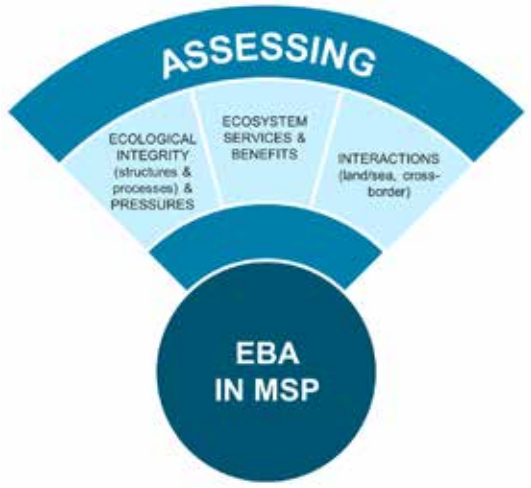
purposes. Such an approach enhances the application of the ecosystem-based approach where connectivity and ecosystems boundaries are considered.

To implement the spatial subsidiarity principle, many countries take a nested approach to MSP, where plans are organised in a hierarchical order, meaning that there are appropriate linkages across administrative levels (vertical integration).

Selection criteria for planners:
The nested approach to MSP is often appropriate for countries where there is divided jurisdiction between the national and local level, resulting in different plans created for different sea areas.

5.3.2. ASSESSING

At this stage, MSP usually goes through the following three steps:



1. **Development of a Strategic Environmental Assessment**

The development of a SEA provides a mechanism for the strategic consideration of environmental effects, assessment of plan-alternatives and potential development of mitigation measures. The SEA process requires consideration of the effects of 'alternatives to the plan'. Interpretation of 'alternatives' varies across different contexts; in some processes the alternative is defined as 'no plan', and the options are simply therefore the proposed plan, or considering the implications of not implementing the plan.

2. **Assessment of ecosystem services**

Some projects as well as national MSP processes (i. e. Latvia or a German Federal State of Mecklenburg-Vorpommern) have mapped the ecosystem services i. e. provisioning, regulatory and cultural services. While choosing the appropriate method for valuing ecosystem services may be challenging, their consideration in a MSP context contributes to a more structured consideration of environmental aspects.

3. **Assessment of cumulative and in-combination effects**

Cumulative impact assessment tools are highly dependent on the quality of data used and caution is advised when interpreting the results. A critical perspective is needed in order to understand and communicate the uncertainties involved in such complex, model-based assessments. Applying different tools and comparing results provides a method of testing the predictions made. The application of the ecosystem services assessment tools helps to establish the link between the MSP and MSFD, given that MSFD indicators are used in assessment models.

The following section provides a description of three EBA tools relevant in the context of the above-mentioned steps and related EBA elements together with examples of their implementation.

TOOL 1: Ecosystem services assessment models and software.

Many software-programmes have been developed to date that integrate the ecosystem services assessment to a certain extent. The State Development Plan 2016 of Mecklenburg-Vorpommern offers an example where an ecosystem services assessment was conducted in MSP. The planning includes spatially explicit designations of ecosystem services. Spatially-explicit mapping approaches by means of bio-geophysical units suitable for the ecosystem services categories and indicators were also developed in Burkhard et al. 2014, & Kandziora et al. 2013. Understanding and Applying Ecosystem Services in Transboundary Maritime Spatial Planning was one part of the SIMCelt project. In this context a tool was developed as part of a case study to understand the concept and application of Ecosystem Services for MSP in a transboundary context by using existing and readily available datasets. The aim was to help planners understand and apply Ecosystem Services in a practical way. The tool uses three types of data sets to map ecosystem services including provisioning, regulatory and cultural services in a transboundary context (Celtic Seas). It also illustrates how different data sets can be used to map ecosystem services for decision-making in transboundary MSP.

Tool Example: InVEST

InVEST ecosystem service models were used in the development of the Belize Integrated Coastal Zone Management Plan (ICZMP). The models were used to quantify fisheries catch (pounds) and revenue (BZ$), visitation (number of people) and expenditures (BZ$) by tourists, and land protection (square meters) and avoided damages (BZ$) from storm-induced flooding and erosion. Coastal Advisory Committee was organised to garner local knowledge, set priorities for each planning region, and map, measure and value the flow of benefits originating from natural capital and delivered to people (called "ecosystem services") using the spatially explicit modelling software, InVEST. Data were collected piecemeal from myriad sources including industry, government agencies, NGOs, and academic researchers. Following the assessment in Belize, the InVEST tool has been transferred to and applied in new contexts such as The Bahamas, Barbados, United Arab Emirates, and Vietnam and over much shorter period of time.

Selection criteria for planners:

Limiting factors include the neccesity of solid of baseline data, planners with strong technical skills and the fact that the model has been so far used only in tropical systems.

TOOL 2: Geospatial analysis tools considering a wide range of interactions (cross-sector, land-sea and cross-border)

Multiple geospatial analysis tools that allow for interactions to be considered both cross-sector, land-sea as well as the cross-border, have been developed. Nevertheless, their application in actual MSP processes has been limited to date. For example, the Tools4MSP and Symphony have been applied in statutory MSP processes. Tools4MSP has supported the development of the pilot marine spatial plan for Region Emilia-Romagna in Italy. Symphony has been used extensively in the design and assessment of the Swedish national MSP. The main purpose of the decision support tools is commonly to assist MSP professionals in assessing current and future conditions affecting planning decisions in a given marine area. That assessment focuses on the environmental effects of human activities in the ocean and coastal zones.

Tool example: Tools4MSP Geoplatform

The Tools4MSP software package is a Python-based free and open source software for geospatial analysis designed by the National Research Council of Italy, Institute of Marine Science to support MSP and marine environmental management processes. Initially developed within the ADRIPLAN data portal, it was later upgraded into the Tools4MSP Geoplatform available on http://data.tools4msp.eu. The Geoplatform enables the application of different tools, such as collaborative geospatial modelling of cumulative effects assessment and marine use conflict analysis. It includes four components:

- the Tools4MSP Geoplatform for interoperable and collaborative sharing of geospatial datasets and for MSP-oriented analysis;
- the Tools4MSP package as stand-alone library for advanced geospatial and statistical analysis;
- the desktop applications to simplify data curation;
- the third party data repositories for multidisciplinary and multilevel geospatial datasets integration.

The Tools4MSP Geoplatform is a community-based integrated web application. Data are managed in a spatial data infrastructure over the entire workflow, from the collaborative upload in a web portal, to the creation of metadata, the choice of appropriate visual encodings, the composition of maps, the set-up of user cases and the elaboration through specific modules producing final maps and descriptive reports.

Selection criteria for planners: The tool and the library can be downloaded and used as stand-alone library of MSP-relevant data, independently from the GeoNode software.

TOOL 3: Tools for assessing impacts on the marine environment

Cumulative effects assessments offer valuable information for MSP processes by assessing the cumulative load of human activities on the environment. The analysis of cumulative pressures using complex data sets and mapping is becoming one of the key components of MSP in many countries.

Tool example 2: The Baltic Sea Impact Index

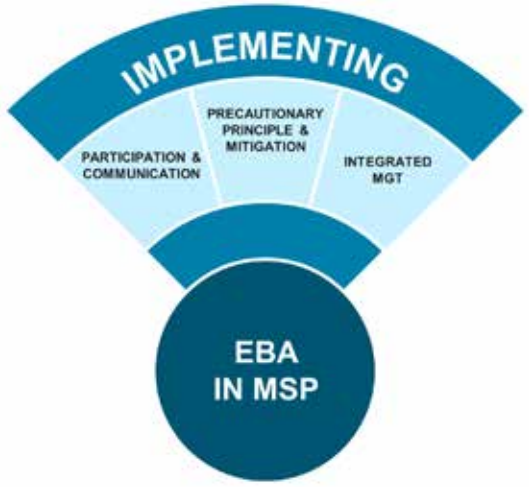
The Baltic Sea Impact Index (BSII), although not developed to support any particular MSP process, is likely to have influenced MSP and other marine management processes in Baltic Sea countries, as part of the wider efforts at characterising the status of the Baltic Sea environment. The methodology follows the concept originally created by Halpern et al. (2008), which has been subsequently developed in the HARMONY project (Andersen et al. 2013), and customized further for the Baltic Sea applicability in HOLAS II (HELCOM 2018). The methodology relies on an additive model to detect the spatial pattern and the intensity of the cumulative impacts on the environment. This is carried out by synthesizing pressures, ecosystems and sensitivity scores to produce a map on the distribution of cumulative impacts. The current BSII uses 18 aggregated pressure layers, 36 ecosystem components and a sensitivity matrix linking these data sets.

Selection criteria for planners:

The scope of BSII reaches also to land-based pressures.

5.3.3. IMPLEMENTING

At this stage, MSP usually goes through the following three steps:



1. **Specifying and implementing the precautionary approach and mitigation measures;**

The extent to which mitigation measures are integrated in the MSP varies greatly. The precautionary principle is also interpreted in different ways depending on, for example, how uncertainty is addressed in the decision-making process.

2. **Obtaining the support;**

It is essential that stakeholders, authorities and the public are engaged at an appropriate stage in the preparation of maritime spatial plans. Building the necessary coalition of support is crucial given that stakeholders are likely to feel more ownership of, and commitment to the MSP they helped to develop. Stakeholder involvement ideally starts in the early stages during the development phase I or assessment phase II to increase the legitimacy of the plan and to affect the objectives of the plan. However, as the modular concept is a flexible approach, stakeholder involvement and related tools are outlined here under stage III and can be easily approached at a different stage by the planner.

3. **Putting the plan and its elements in to force.**

After being accepted by the relevant authorities and the public, the plan usually enters in to force by receiving a certain legal standing. Not all the plans are legally binding and rather serve as a strategic guidance while enforcement of certain measures is done via other legal instruments. Nevertheless, for an effective EBA implementation, MSP should ensure integrated management of marine resources, which integrates both different branches and different levels of government.

The following section provides the description of three EBA tools relevant in the context of the above-mentioned steps and related EBA elements together with examples of implementation.

TOOL 1: Methods for considering the precautionary principle and mitigation measures

While MSP may suggest certain mitigation measures or establish guiding policies, more specific measures are usually specified on a project level of specific development. One of the most common tools used worldwide is the implementation of the mitigation hierarchy. It foresees the avoidance, reduction and offset of environmental impacts of authorized development projects by the Environmental Impact Assessment (EIA). Furthermore, there are tools used in MSP processes for assessing the cumulative impacts and considering different planning options that may be of use to discuss and decide on appropriate mitigation measures and aid the decision making process in the times of uncertainty.

Tool example: SYMPHONY

Symphony is a tool developed within the Swedish MSP for assessing the cumulative environmental impacts of different planning options. It has been used during the strategic environmental assessment of the plans and in the identification of suitable areas for **precautionary measures.** SYMPHONY also functions as a library of MSP-relevant data on marine ecosystems, including human pressures. The underlying data consists of 32 different ecosystem components and 41 different human pressures. Its development kicked off in 2016 and was first applied in planning in 2018. Symphony is a collaborative effort of the Swedish Agency for Marine and Water Management (SwAM) who owns the tool, and the Geological Survey of Sweden and other organisations, whose role has mostly been as providers of data. It is currently only available to SwAM marine spatial planners.

TOOL 2: Interactive methods

The benefits of effective stakeholder participation and communication may extend beyond the actual spatial planning decision. Identification and engagement of relevant stakeholders as early as possible is necessary for ensuring that the plan has broad relevance and buy-in. Stakeholders are also valuable sources of information for plan development and decision-making process. The type of stakeholders to be engaged, as well as the engagement method, may differ substantially depending on the scale of the MSP process. Checklists and tips for how and when to engage stakeholders across multiple levels can help with designing and ultimately carrying out the process.

Tool example: PartiSEApate Multi-level Governance planning stakeholder involvement checklist

The Handbook was developed within the context of "PartiSEApate – Multi-level Governance in Maritime Spatial Planning throughout the Baltic Sea Region". It provides an insightful checklist of tasks that MSP organizers should perform at different stages of the MSP process together with stakeholders at multiple levels. It emphasises the importance of MSP focal points in each country to facilitate cross-border consultations and describes the respective roles and tasks of the multiple players within a transboundary MSP process. It is meant to help maritime spatial planners decide 'why and how' to involve stakeholders from a given level at an appropriate time in the planning cycle. The handbook has a universal character: although it was developed based on the experience of the Baltic Sea Region countries, it can be applied in other EU sea basins and other parts of the world.

Tool example: MSP Challenge

The MSP Challenge 2050 is a visual game on MSP to encourage stakeholders to engage in a deeper understanding of other parties' objectives. The MSP Challenge 2050 comes in two formats: as a board game and as a computer supported simulation-game. It gives insight into the diverse challenges of sustainably planning human activities in the marine and coastal ecosystem. This is an innovative format to quickly introduce the essence of MSP to outsiders, in particular politicians, decisions makers and stakeholders from various sectors using the sea space. It aims to cultivate a spirit of collaboration and shows what can and cannot be achieved through MSP. A board game covers several square meters and uses physical tokens representing human activities, including maritime sectors as

well as ecological functions, that players' (the planners) are moving across the board, in an exercise that recreates the space that maritime sectors take up in a given marine area. Several special editions have been launched, including focuses on short sea shipping, sustainable blue development, sustainable coasts and oceans, as well as a special edition for Marine Scotland. The board game presents a fictional marine space to avoid any political tensions, and planners are assigned to one of the three fictional countries represented on the board, with the instruction to achieve 'Good environmental status' and simultaneously, 'Blue Growth', according to different specific objectives and targets. The game is best played with around 20 players and should not take longer than a few hours.

Selection criteria for planners:

For stakeholders who are only being introduced to the MSP concept, the board game is more suitable, while the computer game is best used with stakeholders who have previous MSP experience.

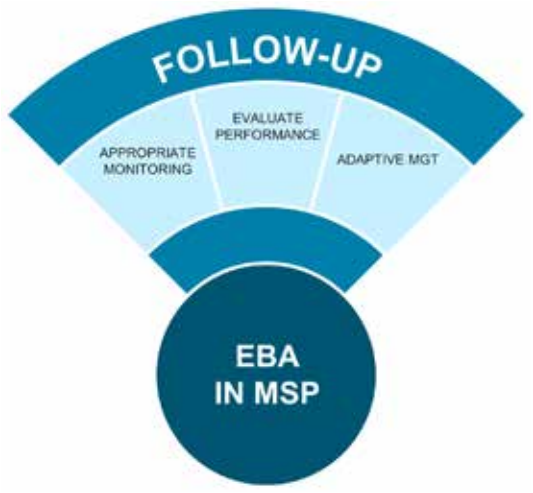
TOOL 3: Integrated management

The effective implementation of MSP requires integration on multiple levels across sectors (horizontal integration) as well as across administrative and planning levels (vertical integration). These factors are also relevant in a multi-national MSP context, with an added dimension: cooperation is required among the same sectors and administrative levels across countries (thus integration on different levels of government). Integration across the different levels of government is especially relevant when it comes to data sharing and streamlining implementation of various EU policies including the Marine Strategy Framework Directive, Strategic Environmental Assessment Directive and the Water Framework Directive among others.

5.3.4. FOLLOW-UP

At this stage, MSP usually goes through the following three steps:

1. and 2. Defining the monitoring and evaluation system including the indicators and measures.



Even though it is often placed at the end of a planning cycle, the actual design of the appropriate framework for **evaluation** should be developed at the very beginning of a planning cycle. **Monitoring** can only be done well if objectives are clearly set as part of the logical framework analysis process during the MSP project design stage, and potentially subsequently when more specific objectives are set for actual planning, following the analysis and clarification of specific issues.

3. Ensuring adaptability of the plan (i. e. revisions and adaptations timeline)

In order to continue being effective, a plan needs to be periodically revised and adapted. According to the MSPD, plans are revised every 10 years, although smaller adaptations especially with regard to new integrated data are often made on a much shorter timeline (i. e. 6 months).

The following section provides the description of three EBA tools relevant in the context of the above-mentioned steps and related EBA elements together with examples of their implementation.

TOOL 1: Monitoring and evaluation system

Monitoring and evaluation lies at the heart of good practice to any MSP process to measure whether or not goals and objectives are being met. This step is also important for improving and adapting MSP during the "next generation" MSP so that changes, both internal and external to the MSP project, can be incorporated, as well as lessons learned from the previous "generation."

Tool example: MSP indicator development handbook

The MSP indicator development handbook is a guidance document developed to assist policy makers and stakeholders' in their decision-making processes of blue growth development. The handbook provides an overview of the indicator development process, detailed descriptions of the role of indicators in the MSP cycle and a process description for the development of indicators.

The handbook has been designed to help experts develop MSP indicators that are context and objective specific, using a systematic 3-step approach. The first step is to define SMART (Specific, Measurable, Attainable, Realistic and Timebound) objectives (please see for more definitions) that are scale and context specific for an identified blue growth project. Developing indicators involves source identification, defining baselines and targets as well as external factors that may influence output. This enables the development of the indicators to later conduct monitoring and evaluation to assess whether expected results are delivered. The indicators included in the plans should be monitored throughout the plan implementation and the evaluation results should be made available to the relevant stakeholders. The handbook makes distinction between the different kinds of indicators, methods for their measuring and provides examples. For instance, one of the 'output' indicators given as an example is the 'percentage of space assigned for MPAs out of the overall maritime space'. In addition to assigning space for MPAs, having a working plan for management of the MPA is also rather important and may be considered as a qualitative element of the indicator.

Selection criteria for planners:

The results allow for adaptability: New data that become available can be included and results can be re-calculated using the new data.

TOOL 2: Models that allow for adaptive planning

At the time of fast technological progress, changing trends in maritime sectors and changes in the environment (i. e. climate change) the plan needs to be adaptable and allow for possible changes as new data and information become available. New models and tools are being increasingly developed to allow for such flexibility. Online data viewers and crowd sourcing data platforms are just some of the methods for keeping up with the data and information changes.

Tool Example: The Gulf of Finland Marine and coastal environmental vulnerability profile

The cross-border Environmental Vulnerability Profile (EVP) was developed for the Gulf of Finland, to be used for eco-

system based MSP processes in Estonia and Finland. EVP is a spatial data layer that incorporates the distribution of nature values and their sensitivities to disturbances; higher value indicates a presence of more sensitive nature values. The distribution of the following nature values were included in the calculation of EVP:

- Key seabed flora and fauna: bladder wrack, red seaweed Furcellaria lumbricalis, filamentous algae, epibenthic bivalves, in-faunal bivalves, vascular plants, charophytes;
- Species richness of seabed flora and fauna
- Water birds
- Seals

Selection criteria for planners: Suitable for the cross-border context

Selection criteria for planners: The results allow for adaptability; New data that becomes available can be included and results can be recalculated using the new data.

6. Link to other outcomes in the Pan Baltic Scope project

This handbook has been developed under the project activity "implementation of EBA in sub-basin SEA". The outcome of this activity is closely linked to other project activities and their findings, in particular the work on cumulative impacts, green infrastructure, economic and social analyses and integrating land-sea interactions into MSP.

Cumulative Impacts
The aim was to enhance shared Baltic-wide knowledge capacity and tools for addressing cumulative environmental impacts in connection to maritime spatial planning.
Outcome:
- Shared experiences on CI assessments in different countries
- Development of a tool for assessments in a coherent way
- Test of the tool in case studies
- Identification of the connections between CI assessments & other aspects of the EBA

Green Infrastructure
The aim was to clarify the concept of marine GI and its possible application in MSP. In addition: Testing of the methodological approaches and data availability for mapping of marine GI in the Baltic Sea.
Outcome:
- New pan-Baltic maps of essential fish habitats developed
- Proposal of methodology for the mapping of marine green infrastructure
- Test of the methodology at the Baltic Sea scale

Economic and Social Analyses
The aim was to improve the understanding on the assessment of economic, social, cultural and ecosystem service impacts for the purpose of MSP.
Outcome:
- Literature review and survey of assessing economic, social, cultural and ecosystem service impacts in MSP in the BSR.
- Recommendations on developing a framework for economic and social analyses for MSP.
- Estonian economic model for assessing the economic and cumulative impacts of sea use scenarios (PlanWise4Blue).
- Collaboration within WP1.2 on advancing the implementation of the ecosystem-based approach.

Integrating Land-Sea Interactions into MSP
The aim was to identify important aspects and challenges of LSI in MSP. Testing ways of practical implementation.
Outcome:
- Improved understanding of land-sea interactions and development of an analytical framework
- Scoping for two needs-based practical case studies (practical approach)
- Scoping of issues, challenges, enablers in relation to the cases
- Storymap of the FIAXSE case
- Planning guideline for coastal municipalities

7. Conclusion

- The implementation of EBA in MSP relies on a complex interplay between multiple policy tools. There are differences in how countries approach the issue. However, the toolkit can support the implementation of some of the modules or even all modules as one EBA concept. This is achieved by bringing together topic and process focused elements as the core of EBA.

- While there is a wide range of possible approaches, the toolkit presented in chapter 5 provides one possible example on how to integrate EBA into MSP, with a view to transboundary aspects. The toolkit may serve as an inspiration for planners when implementing EBA in MSP or when revising their existing plans. It provides suggestions on what tool and aspect of EBA may be relevant at which step of a MSP process.

- Although a large number of tools for implementing EBA in MSP is available their application in MSP is still limited. This is mainly due to lack of resources and data.

- SEA remains the main tool for EBA in MSP, although the understanding of its content and level of detail is not in any sense uniform across the EU countries. In most cases it is conducted in parallel or to integrate in MSP, which may contribute to the efficiency of a MSP process.

- The wide discrepancy in detail among MSP processes, as well as the overall approach (i. e. legally enforced zoning rules versus more guiding character), makes it difficult to establish a stronger link between the plans (i. e. joint area management). Nevertheless, data sharing across countries is advanced, facilitated by the transnational cooperation projects.

- To better link the MSFD to MSP and SEA, the determination if a descriptor a) is relevant for spatial planning and b) each activity affects each descriptor in different ways and has different spatial and temporal footprints, is a promising approach. Available data sources, applied by MSFD experts, can be used by planners as well. This data can help to understand the approach with the MSFD perspective.

- The main entry points for linkages between MSFD and MSP processes are a) the environmental targets (Art. 10 MSFD), b) the programme of measures (Art. 13), and the assessment of the environment (Art. 8); existing approaches on how to link MSFD with MSP are a valid source for practitioners.

- The SEA translation matrix (as provided) seeks to make SEA related to MSP more transparent and comparable and offers an approach to understand and learn from each other.

- Harmonization can be additionally strengthened by HELCOM data and further Pan Baltic Scope tools.

8. References

- Ansong, J., Gissi, E., & Calado, H. (2017). An approach to ecosystem-based management in maritime spatial planning process. Ocean & coastal management, 141, 65–81.

- Boyes, S. J. and Elliott, M. (2014). Marine legislation – The ultimate 'horrendogram': International law, European directives & national implementation. Mar. Pollut. Bull. 86, 39–47. doi: 10.1016/j.marpolbul.2014.06.055.

- Borja, A., M. Elliott, J. H. Andersen, A. C. Cardoso, J. Carstensen, J. G. Ferreira, A.-S. Heiskanen, J. C. Marqués, J. M. Neto, H. Teixeira, L. Uusitalo, M. C. Uyarra, N. Zampoukas (2013). Good Environmental Status of marine ecosystems: What is it and how do we know when we have attained it? Marine Pollution Bulletin, 76: 16–27.

- Brennan, J., C. Fitzsimmons, T. Gray, L. Raggatt (2014). EU marine strategy framework directive (MSFD) and marine spatial planning (MSP): Which is the more dominant and practicable contributor to maritime policy in the UK? Marine Policy, 43: 359–366.

- CBD (2000) Decision V/6, Ecosystem approach UN Doc UNEP/CBD/COP/5/23 (22 June 2000).

- Claussen, U., Connor Claussen U, Connor D, de Vrees L, Leppänen JM, Percelay J, Kapari M, Mihail O, Ejdung G, Rendell J. (2011).
Common Understanding of (Initial) Assessment, 639 Determination of Good Environmental Status (GES) and Establishment of Environmental Targets (Art. 8, 9 & 10 640 MSFD). WG GES EU MSFD. https://circabc.europa.eu/sd/d/ce7e2776-6ac6-4a41-846fa04832c32da7/05_Info_Common_understanding_final.pdf

- Cochrane, S. K. J., D. W. Connor, P. Nilsson, I. Mitchell, J. Reker, J. Franco, V. Valavanis, S. Moncheva, J. Ekebom, K. Nygaard, R. Serrão Santos, I. Narberhaus, T. Packeiser, W. van de Bund, and A. C. Cardoso., 2010. Marine Strategy Framework Directive–Task Group 1 report on biological diversity. EUR 24337 EN. Joint Research Centre, Office for Official Publications of the European Communities, Luxembourg City, Luxembourg.

- Ehler, C. & Douvere, F. (2009). Marine Spatial Planning: a step-by-step approach toward ecosystem-based management. IOC/2009/MG/53

- Frazão Santos, C., Z.G. Teixeira, J. Janeiro, R. S. Gonçalves, R. Bjorkland, and M. Orbach, 2012. The European marine strategy: contribution and challenges from a Portuguese perspective. Marine Policy36(5): 963–968. http://dx.doi.org/10.1016/j.marpol.2012.02.011

- Gilbert, A. J., K. Alexander, R. Sardá, R. Brazinskaite, C. Fischer, K. Gee, M. Jessopp, P. Kershaw, H. J. Los, D. March Morla, C. O'Mahony, M. Pihlajamäki, S. Rees, R. Varjopuro, 2015. Marine spatial planning and Good Environmental Status: a perspective on spatial and temporal dimensions. Ecology and Society, 20.

- Habitats Directive 1992, Council Directive E92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wildfauna and flora. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN

- HELCOM, 2015. Guideline for the implementation of ecosystem-based approach in Maritime Spatial planning (MSP) in the Baltic Sea area, Helsiniki 2015, Internet: http://www.helcom.fi/news/Pages/New-Guideline-adopted-on-ecosystem-based-approach-in-maritime-spatial-planning-in-the-Baltic-Sea.aspx

- HELCOM, 2018. Thematic assessment of cumulative impacts on the Baltic Sea 2011–2016. Available at: http://www.helcom.fi/baltic-sea-trends/holistic-assessments/state-of-the-baltic-sea-2018/reports-and-materials/

- Maccarrone, V. Filiciotto, F., de Vincenzi, G., Mazzola, S., Buscaino, G. (2015). An Italian proposal on the monitoring of underwater noise: Relationship between the EU Marine Strategy Framework Directive (MSFD) and marine spatial planning directive (MSP). Ocean & Coastal Management 118, 215–224. doi: 10.1016/j.ocecoaman.2015.07.006.

- Partidario, M. R., & Gomes, R. C. (2013). Ecosystem services inclusive strategic environmental assessment. Environmental Impact Assessment Review, 40, 36–46.

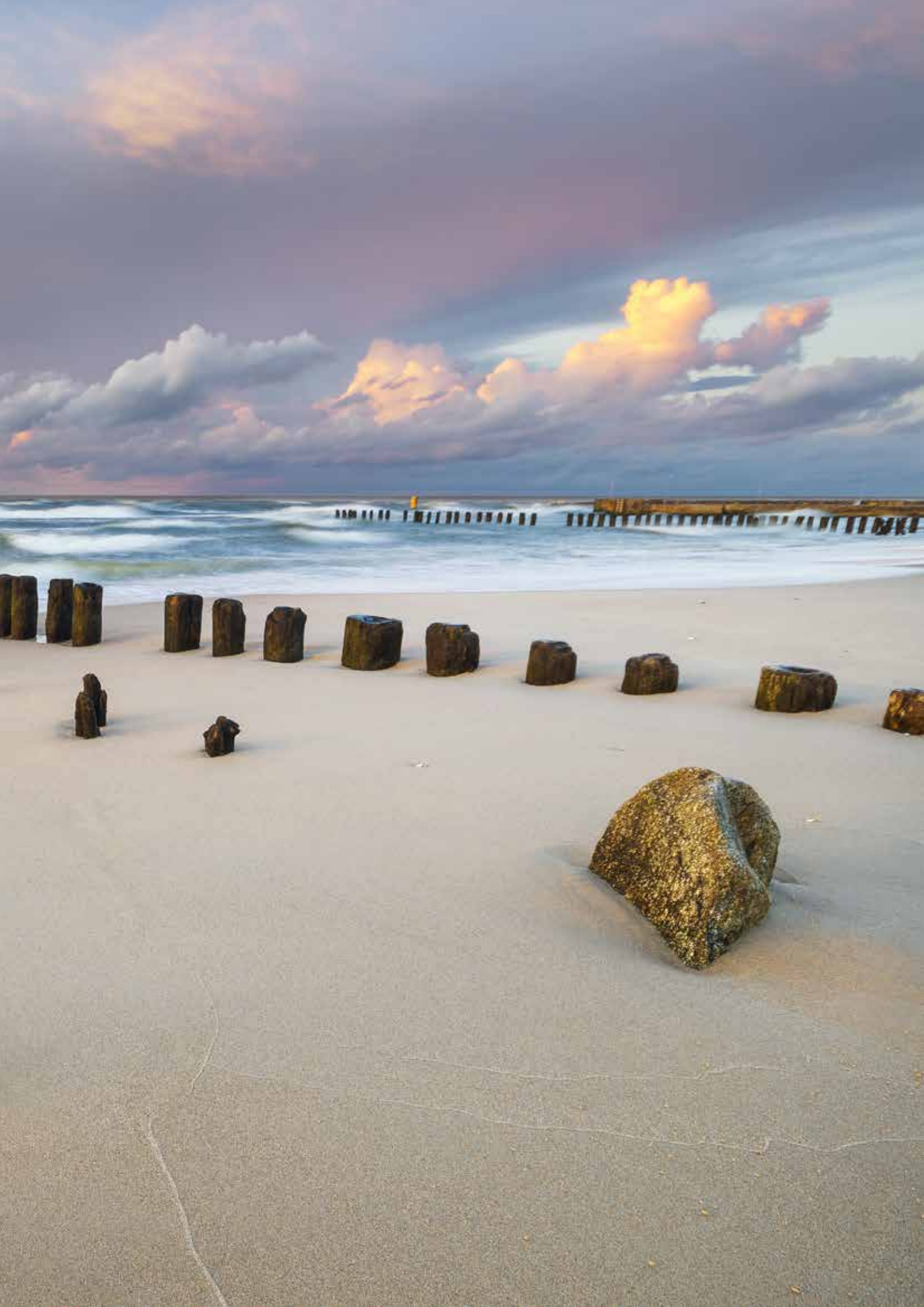
- SUP Richtlinie, 2001, Richtlinie 2001/42/EG des Europäischen Parlaments und des Rates vom 27.Juni 2001 über die Prüfung der Umweltauswirkungen bestimmter Pläne und Programme (SUP-Richtlinie).

- Tillin, H. M., Hull, S. C. & Tyler-Walters, H. (2010). Development of a sensitivity matrix (pressures MCZ/MPA features). Report to the Department of the Environment, Food and Rural Affairs from ABPmer, Southampton and the Marine Life Information Network (MarLIN) Plymouth: Marine Biologicial Association of the UK.

- Urtāne I., Kedo K., Vološina M., Ruskule A., Ustups D., Āboltiņš R., Aigars J., Sprukta S., Konsap A., Aps R., Kopti M., Kotta J., Kull A., Rosenhall E., Schmidtbauer Crona J., Selnes T. (2017). Towards Coherent Cross-Border Maritime Spatial Planning in the Central Baltic Sea – Case Study Report From the Baltic SCOPE Project. Edited by A. Morf (main editor), A. Giaccometti, M. Kull and J. Moodie. Baltic SCOPE Project Final Report. Gothenburg, Riga, Stockholm, and Tallinn.

- www.msp-platform.eu

Notes



Pan Baltic Scope focuses on cross-border collaboration and has three interlinked work packages with 12 activities.

We establish a **Planning Forum** as the central platform for our collaboration on specific planning issues identified by the planning authorities and regional organisations.

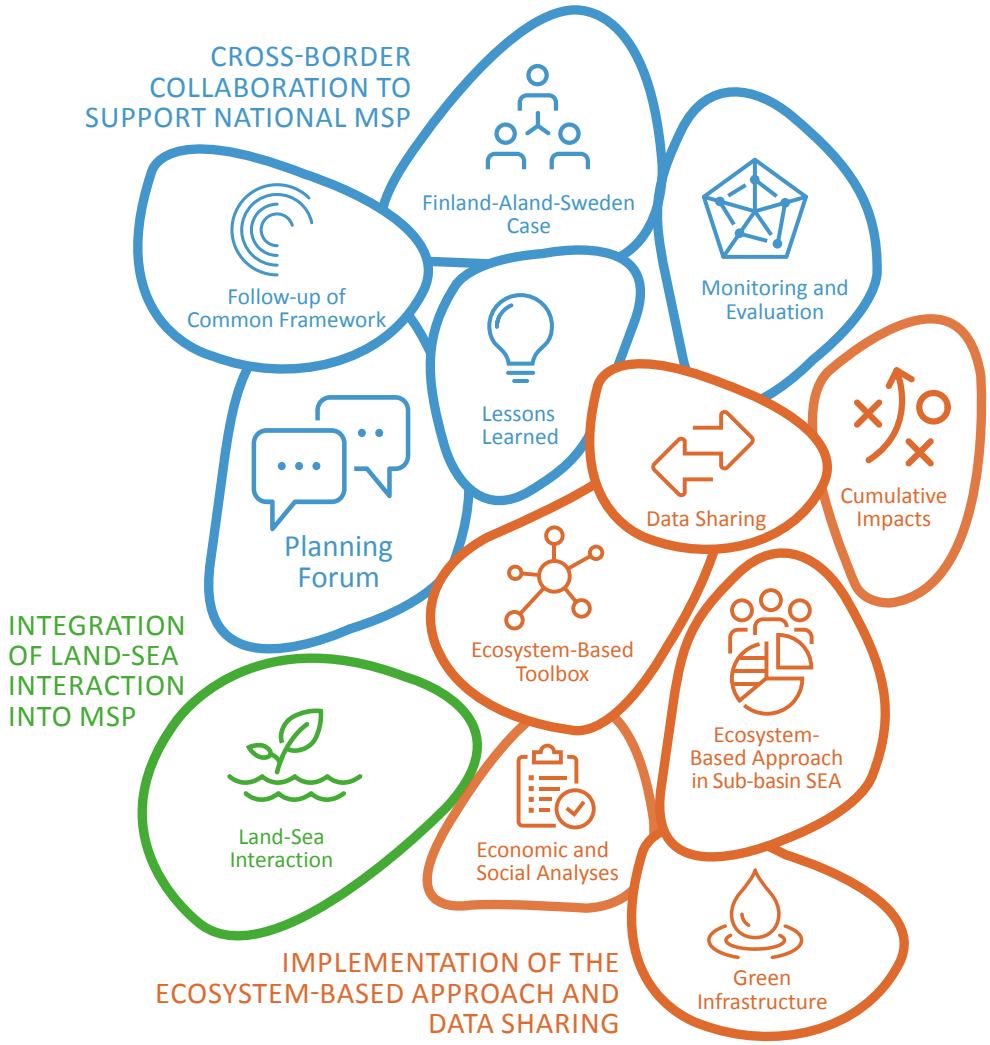
We carry out concrete cross-border activities at **different geographical levels** to meet the **needs of the national** maritime spatial planning processes and to support the successful implementation of the **EU MSP Directive**.

We develop **tools and approaches** at pan-Baltic level, to contribute to coherent maritime spatial plans in the Baltic Sea Region, including:

- implementation of an ecosystem-based approach;
- cumulative impacts;
- green infrastructure;
- socio-economic analyses.

We establish a **Planning Forum** as the central platform for our collaboration on specific planning issues identified by the planning authorities and regional organisations.

We carry out concrete cross-border activities at **different geographical levels** to meet the **needs of the national** maritime spatial planning processes and to support the successful implementation of the **EU MSP Directive**.



The handbook „EBA in MSP – a SEA inclusive handbook“ aims to be a practical tool for the daily-planners-work in a transboundary environment – in the Baltic Sea and beyond. Addressing the implementation of an Ecosystem-based Approach (EBA), guiding through the comparison of different Strategic Environmental Assessments (SEA) and linking MSP to other key policies like the EU Marine Strategy Framework Directive (MSFD.) It is based on literature research, analyses of existing plans and interviews with experts.

Pan Baltic Scope is a collaboration between 12 planning authorities and organisations from around the Baltic Sea. We work towards bringing better maritime spatial plans in the Baltic Sea Region.

Swedish Agency for Marine and Water Management · Nordregio · BSH Bundesamt für Seeschiffahrt und Hydrographie · Ministry of Environmental Protection and Regional Development of the Republic of Latvia · SYKE · VASAB Vision & Strategies around the Baltic Sea

Danish Maritime Authority · HELCOM · Urząd Morski w Szczecinie · Republic of Estonia Ministry of Finance · Satakuntaliitto The Regional Council of Satakunta · Ålands landskapsregering

Pan Baltic Scope

Co-funded by the European Maritime and Fisheries Fund of the European Union

Get our results:
www.panbalticscope.eu

ISBN 978-3-86987-990-1