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- Wybrane przykładowe materiały do przetłumaczenia -

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Mapping of marine green infrastructure:

Pan Baltic Scope approach

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Mapping of marine green infrastructure: Pan Baltic Scope approach

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Content

1 Introduction

Green Infrastructure (GI) is an emerging concept helping to integrate ecological aspects into spatial planning and decision making on land and sea use management. Already since 1980s scientists have suggested that ecosystems can be considered as type of infrastructure, which generate the benefits and welfare to society. During the recent decade the concept of the GI has been introduced in many EU policy documents and initiatives. Developing of GI is acknowledged as a key step towards successfully implementing the EU Biodiversity Strategy 2020. Also, the EU policy on maritime affairs and fisheries refers to GI as a tool contributing to the sustainable development of coastal areas.

By now the concept is relatively well established in terrestrial areas, though its application in maritime environment is a novelty. Also a review on the progress of implementation of the EU GI strategy, published by European Commission in May 2019, recognises that GI is not sufficiently addressed in maritime spatial planning, whereas it could contribute to healthy marine ecosystems and delivery of substantial benefits including food production, recreation and tourism, climate change mitigation and adaptation, etc.

The Pan Baltic Scope project has taken a challenge to develop a concept for marine GI applicable in maritime spatial planning and to test GI mapping at the Baltic Sea scale. The Pan Baltic Scope expert group has mapped the areas of high ecological value and associated supply of ecosystem services and aggregated this information into a synthetic map of marine GI of the Baltic Sea.

The results of this GI mapping exercise shall be taken as a first attempt towards developing of comprehensive methodology for mapping of marine GI. Further work is required to improve the knowledge base on functioning of marine ecosystem and its role in maintaining biodiversity and human well-being. In this publication we outline the concept of marine GI, describe the mapping approach applied by the Pan Baltic Scope project and obtained results as well as discuss the opportunities to apply the concept in ecosystem-based maritime spatial planning. To learn more about different ways in mapping of marine GI and the methods applied by the Pan Baltic Scope project, please, read the report on “Green Infrastructure Concept for MSP and Its Application Within Pan Baltic Scope Project”, available at the project web site: http://www.panbalticscope.eu

2 Background: what is marine green infrastructure?

EU policy context

The concept of green infrastructure (GI) was first introduced in the EU environmental policy within the EU Biodiversity Strategy 2020. Target 2 of the strategy requires that "by 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems." Following the tasks set in the Biodiversity Strategy, the European Commission adopted in 2013 an EU strategy on green infrastructure (GI strategy) [1].

The GI Strategy defines the green infrastructure as *"strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas*." Thus, the multifunctionality of ecosystems in providing benefits both for humans and for nature is featured as the essence of the GI concept.

The definition highlights the three main components of the GI:

- **network of natural and semi-natural areas**: maintaining biodiversity and areas of high ecological value is at core of the GI, given that it is expected to support achieving the aims of EU Biodiversity Strategy. The network of Natura 2000 areas serves as a backbone (or core areas) of the EU-wide GI network. The connectivity of the network is an essential functional characteristic of GI.
- **delivery of a wide range of ecosystem services**: the GI concept is a services-oriented – the well managed network of green and blue space can improve environmental conditions and therefore citizens' health and quality of life. The ecosystem services provided by the GI includes water purification, mitigation and adoption to climate change, maintaining of habitats for species as well as space for recreation, etc.
- **strategical planning**: strategic and integrated planning process is required to ensure that GI core areas are spatially and functionally connected as well as to improve human well-being through multifunctional use of ecosystems. Spatial

[1] EC, 2013. Green infrastructure (GI) – Enhancing Europe's Natural Capital. COM(2013)249.

planning is recognised as the most effective way for deploying GI, by guiding away potentially harmful developments for sensitive nature areas as well as identification of best locations of habitat enhancement/restoration projects for reconnecting healthy ecosystems. The strategic approach enables that the local scale GI initiatives or projects can be scaled up or cumulated to a higher level, contributing to the coherence and functionality of the network. At the same time national, regional or pan-European scale GI mapping can indicate where an action shell be taken at local level.

Approaches to mapping of GI

Following the objectives and task set by the EU Biodiversity strategy 2020 and GI Strategy several initiatives on GI mapping and strategic planning have been launched, ranging from local scale projects up to EU level studies. The best practice cases of GI mapping at European, national, regional and local levels were analysed by the Joint Research Centre (JRC), the EEA and the Directorate-General for Environment of the European Commission in a joint report, published in 2019[2]. The report provides guidance for the strategic design of a well-connected, multifunctional and cross-border GI, describing how geospatial methods, data and tools can be used at various geographical scales. The report also indicates a significant gap in knowledge regarding the deployment of marine GI. It states that *"the provision of a conceptual framework, data and tools for the mapping and assessment of marine ecosystems and their services (a marine MAES) would certainly help deploy a marine GI, particularly at the sea-land interface."*

The JRC report presents a conceptual framework for planning strategic GI, highlighting two complementary approaches to GI mapping:

- **physical mapping of existing GI components**, including protected areas, ecological networks and other valuable natural areas;
- **ecosystem service-based mapping**, including provisioning, regulating and cultural services.

The two approaches are presented as interconnected and complimentary perspectives, since GI is formed by biodiversity rich habitats, which provide multiple ecosystem services.

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[2] Estreguil et al., 2019. Strategic Green Infrastructure and Ecosystem Restoration: geospatial methods, data and tools, EUR 29449 EN, Publications Office of the European Union, Luxembourg, JRC113815

Application of GI concept to marine areas

As highlighted in the definition, provided by the European Commission, GI shall incorporate green (and blue) spaces and other physical features in terrestrial as well as marine areas. Though, the approaches to mapping of the green or blue space forming GI may vary significantly depending on scale and ecosystem type. GI components can be relatively easily identified in terrestrial areas – these are patches of natural or semi-natural habitats within urban or rural areas, forming the core zones of ecological networks, as well as ecological corridors connecting them. Though, the situation is more complicated in marine environment, which is formed by one interconnected, dynamic and comparatively natural ecosystem. Therefore, a more elaborated approach is required to address the complexity of the marine ecosystem. Moreover, in difference from terrestrial areas, where remarkable experience and knowledge base on GI mapping has been generated, mapping of marine GI is still a novelty.

Marine GI should include multifunctional areas of high ecological value, essential for maintaining biodiversity and functioning of marine ecosystem as well as ecosystem service supply. Typical example of marine GI can be shallow vegetated habitats, e.g. reefs (Figure 1), providing habitats for various species, nursery and spawning ground for fish, improving of water quality by filtration of nutrients provided by mussels, prevention of coastal erosion etc.

In order to assess the potential ways for mapping of marine GI, the Pan Baltic Scope project has analysed the existing experience in mapping of ecological values within the Baltic Sea region. In a survey, carried out by the project, 19 existing national-scale attempts for mapping ecologically valuable or sensitive areas as well as ecosystem service supply were identified. These cases represent a great variety of approaches for determining the value of the area. In nine of the cases, different methods for aggregation of the data on biotic features (e.g. distribution of benthic habitats, bird, fish and mammal species) and geological features were applied to estimate the ecological value of the area.

Furthermore, during the first Pan Baltic Scope GI workshop, held in Riga 29-30 May 2018, participants identified various components or aspects essential for mapping of marine GI. These includes different features and data sets characterising ecological value of marine areas:

- already designated network of the existing Marine Protected Areas (MPAs);

- the Ecologically or Biologically Significant Marine Areas (EBSAs), proposed within the framework of the UN Convention on Biological Diversity and defined as larger special areas that serve important purposes “to support the healthy functioning of oceans and the many services that it provides”;
- latest spatial information on distribution of benthic habitats of high conservation value; areas important for the main species groups (birds, fish, mammals) at different life stages; ecosystem components vulnerable to human pressures; as well as Areas important for connectivity of the core habitats;
- information on marine ecosystem functions and service supply, including supporting services as well as provisioning, regulating and cultural services.

Thereby, the definition and delineation of marine GI can encompass various criteria which characterise the marine ecosystem, its biological values, functionality and service supply. A coherent mapping of marine GI would require spatially referenced and harmonised data sets as well as a balanced representation and sensible aggregation of data on different marine features. Furthermore, the marine GI mapping should also include connectivity analysis of the core habitats and consideration of land-sea interactions.

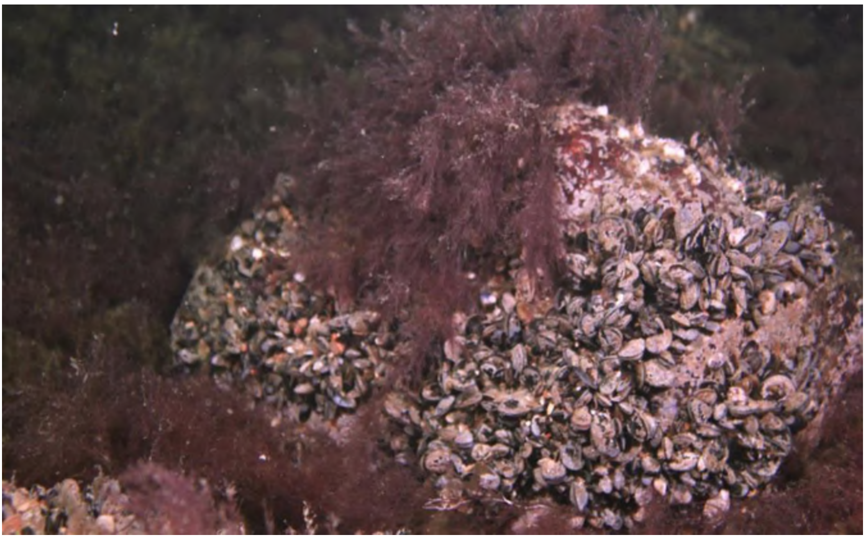


Fig. 1 Reefs forms essential component of marine GI
(Photo by Latvian Institute of Aquatic Ecology)

3 PBS approach to mapping of GI

The Pan Baltic Scope project aimed to develop tools and approaches to contribute to coherent maritime spatial plans in the Baltic Sea Region, including implementation of an ecosystem-based approach and GI planning. This included testing the application of GI concept and the approach to mapping of marine GI at the Baltic Sea scale by utilizing the available data.

The Pan Baltic Scope approach to GI mapping included the following steps:

1. **Identification of the components forming marine GI** and selection of suitable data sets for GI mapping;
2. **Mapping areas of high ecological value**: the selection of relevant assessment criteria; the assessment of marine ecosystem components against the selected criteria; the development of an aggregated ecological value map;
3. **Mapping ecosystem service supply potential**: the selection of ecosystem services relevant in the context of marine GI; the assessment of marine ecosystem components against the selected ecosystem services; the development of an aggregated ecosystem services map;
4. **Development of the GI map** by integrating the results of mapping ecological value and ecosystem services.

Fig.2. Pan Baltic Scope expert group discuss the marine GI concept at a project meeting in Gothenburg, 10-11 September 2018

The presented approach to marine GI mapping is in line with the definition proposed by the EC Communication on Green Infrastructure. The project team has interpreted the definition in relation to marine context.

One of the options to identify ecologically valuable areas could be based on existing network of MPAs or areas proposed as EBSAs. However, the project experts concluded that such approach would not be sufficient due to data limitations at the time of designation of MPAs and EBSAs. Therefore, it was agreed to apply a bottom-up approach by aggregating spatial data on the distribution of benthic habitats, birds, fish and mammals to identify the areas of high ecological value as well as ecosystem service supply potential. The areas representing the highest values are considered as the ones forming the marine GI (Figure 3).

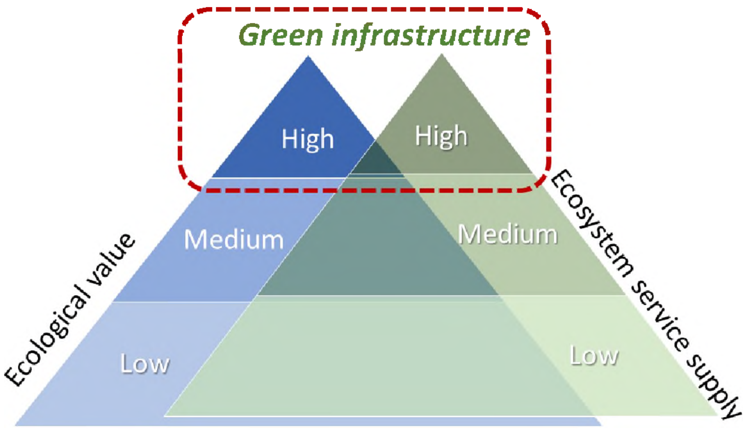


Fig.3. Pan Baltic Scope approach to mapping of marine GI

3.1. Available data for GI mapping at the Baltic Sea scale

GI mapping requires consistent and reliable data on the extent and condition of ecosystems component forming GI as well as the services they provide. The Pan Baltic Scope project was aiming to test marine GI mapping by utilising the available data. Regionally harmonised spatial data sets of the marine ecosystem components covering the whole Baltic Sea were available from the HELCOM Maps and Data services, prepared within the HELCOM HOLAS II project.

Such dataset includes more than 30 layers on the spatial patterns of various ecosystem components of the following broader groups:

Habitats:

- Pelagic habitats
- Benthic habitats and species:
  - Marine landscapes
  - EU protected (Natura 2000) habitat types
  - Presence of key benthic species
- Essential fish habitats
- Bird habitats

Mobile species:

- Presence and abundance of fish species
- Presence and abundance of mammals

However, not all data layers were suitable for GI mapping. The distribution and abundance of mobile species were not included in the aggregated maps of ecological value, ecosystem service supply and GI due to insufficient data accuracy. Data on pelagic habitats (represented by data layer on productive surface waters) were not included in the analysis because of the lack of any spatial differences. The former HELCOM data layers on essential fish habitats were replaced by new maps developed within the Pan Baltic Scope project, including spawning areas of cod, sprat, herring, European flounder, Baltic flounder, as well as recruitment areas of perch, pikeperch, and nursery areas of flounder.

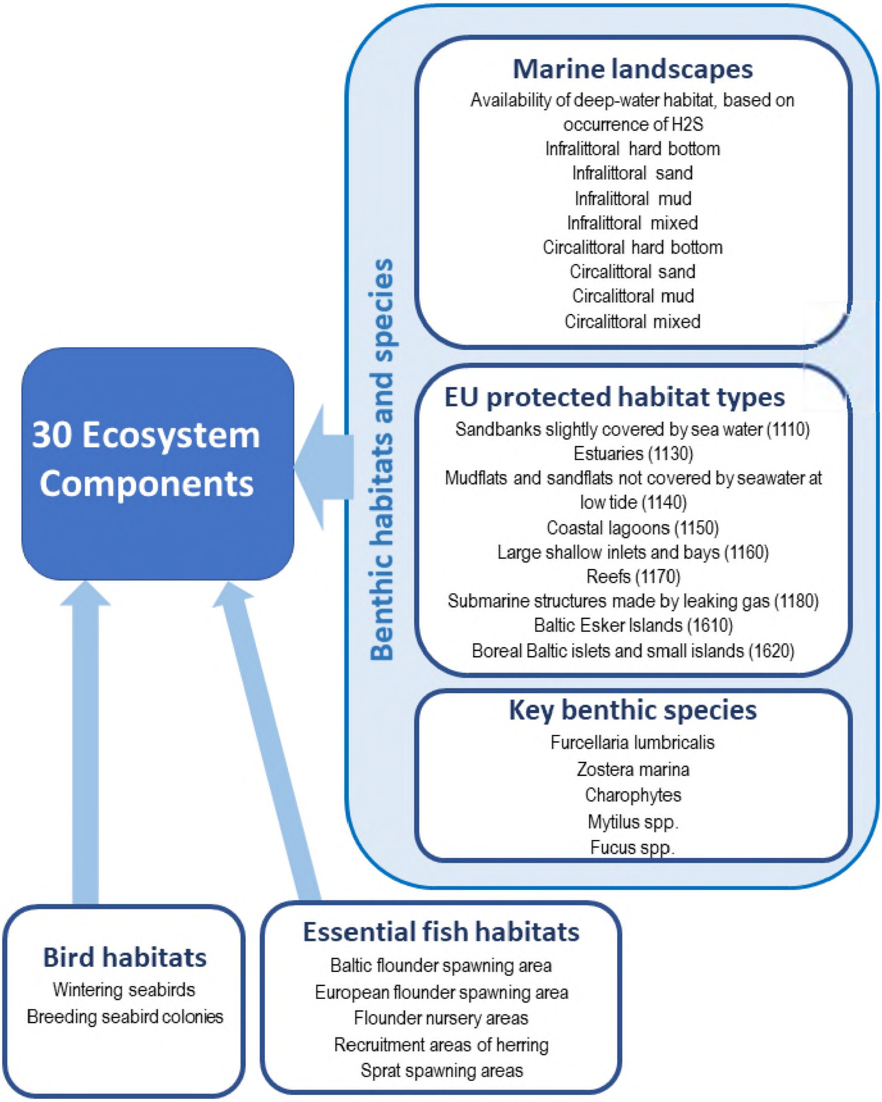


Fig.4. Data layers on ecosystem components used by the Pan Baltic Scope for marine GI mapping

3.2. Mapping marine ecosystem value

The ecological value of marine areas was assessed in relation to their importance for the maintenance of biodiversity. Pan Baltic Scope experts decided to use in assessment the criteria applied in the identification of ecologically or biologically significant marine areas (EBSAs), namely: biological diversity; rarity; importance for threatened, endangered or declining species and/or habitats; vulnerability, fragility, sensitivity, or slow recovery; special importance for life-history stages of species; and biological productivity.

To obtain maps representing areas of high ecological value in the Baltic Sea, the 30 ecosystem components (presented in Figure 4) as well as marine mammals were assessed with regard to their relevance to the six criteria, listed above. A matrix was developed to represent all possible combinations of ecosystem components and criteria. Value 1 was assigned if ecosystem component was identified as relevant for that criterion, while other combinations were assigned value 0.

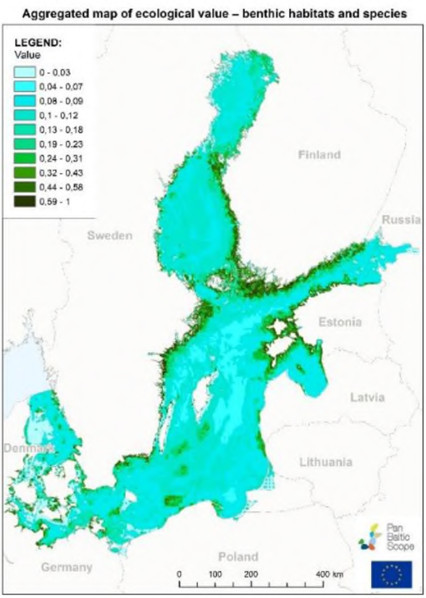


Fig.5 Agregated ecological value of benthic habitats and species

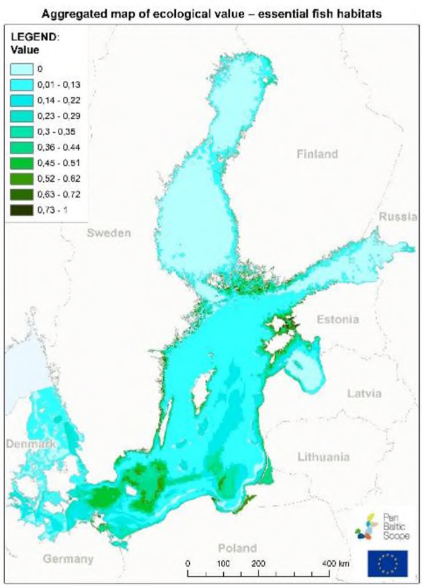


Fig.6 Agregated ecological value of essential fish habitats

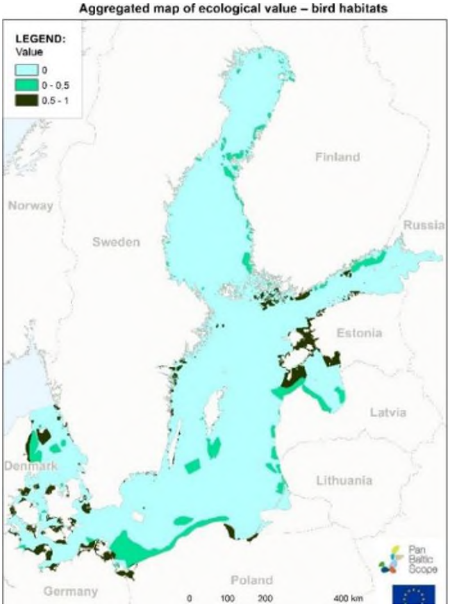


Fig.7 Agregated ecological value of birds' habitats

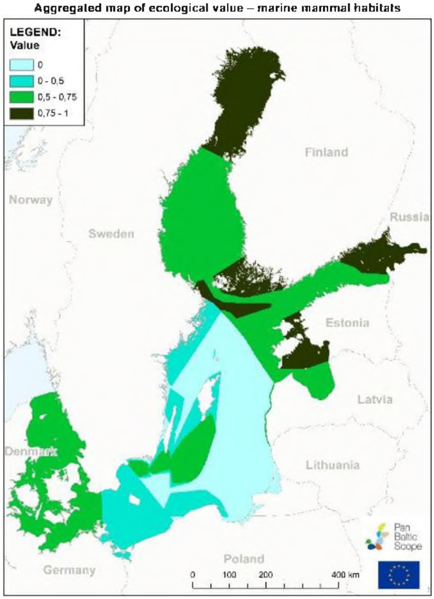


Fig.8 Agregated ecological value of marine mammals' habitats

The synthetic maps of ecological value were developed using hierarchical data aggregation method. Step 1 produced separate maps for each ecological value criterion in relation to each ecosystem component group - benthic habitats, birds, fish and mammals (24 maps). Step 2 aggregated mapping results at the level of the ecosystem component groups (4 maps, Figures 5-8). Step 3 produced a composite aggregated ecological value map by merging the aggregated maps from step 2 (Figure 9).

From the obtained results, it became evident that the maps representing areas of ecological value to mammals were not sufficiently accurate - the current data sets on seals (as used in the BSII of HOLAS II) represent the total distribution area of seals in a very coarse way, which gives rise to boundaries with little biological meaning in the resulting maps (Figure 8). Therefore, the project expert group decided temporarily to remove the component of mammals from further data aggregation exercise. Also, the accuracy of bird data is not sufficient, leading to slightly exaggerated value of bird habitats within the aggregated ecological value map.

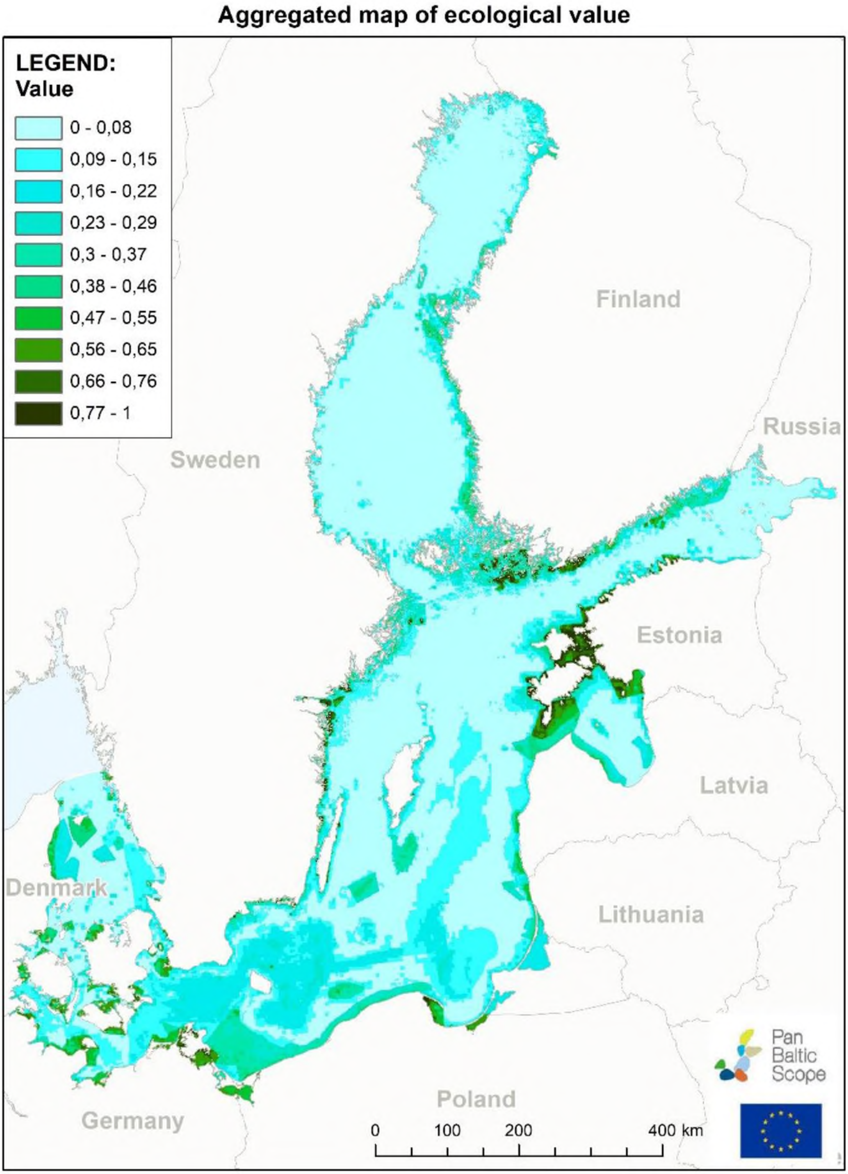


Fig.9 Agregated map of ecological value

3.3. Mapping marine ecosystem services

As described above the emphasis of the GI concept is on multifunctionality of ecosystems in providing benefits for both humans and nature. Ecosystem services demonstrate the contribution of ecosystem structure and function to human well-being. The ecosystem service mapping performed within the Pan Baltic Scope project was focusing on the potential of ecosystem structure (characterised by various ecosystem components) to deliver various services.

Ecosystem service mapping followed a similar approach as in the case of ecological value mapping. First, the experts identified the ecosystem services which are relevant in the context of marine GI and can be assessed based on the available data sets. It was decided to focus on regulation and maintenance services as well as cultural services (related to recreation) since they suite better to the concept of GI. The selection was based on the Common International Classification of Ecosystem Services (CICES), Version 5.1 (published in 2018). Two of CICES ecosystem service classes were further specified, providing sub-categories based on ecosystem service assessment work within the BONUS BASMATI project. All the ecosystems services potentially relevant for mapping of GI as well as the services selected by the Pan Baltic Scope project are presented in the Figure 10.

Each of the 30 ecosystem components (presented in Figure 4) was assessed regarding their potential contribution to each of the selected ecosystem services. For that purpose, second matrix was developed, where value 0 was assigned in case of no or negligible contribution, while 1 was used when the ecosystem component was considered to contribute to the service.

The matrix results were used as a basis for developing maps on ecosystem service supply potential. However, in order to avoid domination in the assessment results the ecosystem features that were represented by many data layers (e.g. benthic habitats) and thus double counting of the ecosystem service supply value, a slightly different hierarchical data aggregation approach was applied. Step 1 mapped each ecosystem service provided by each ecosystem component sub-group (marine landscapes, Natura 2000 habitats, key benthic species, essential fish habitats and bird habitats). Step2 produced aggregated ecological value maps for the ecosystem component groups. Step 3 produced a composite aggregated ecosystem service map.

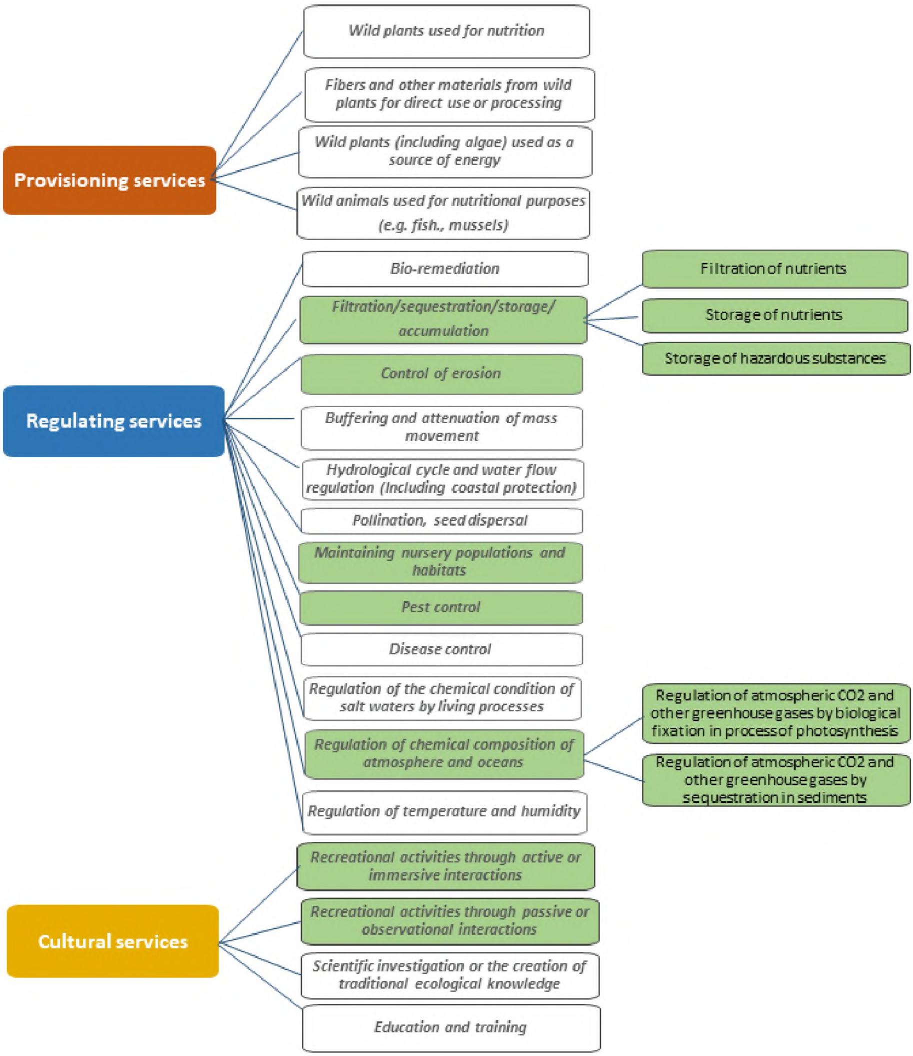


Fig. 10. The ecosystem services (CICES V5.1) potentially relevant for mapping of marine GI (services marked in green are assessed by the Pan Baltic Scope project).

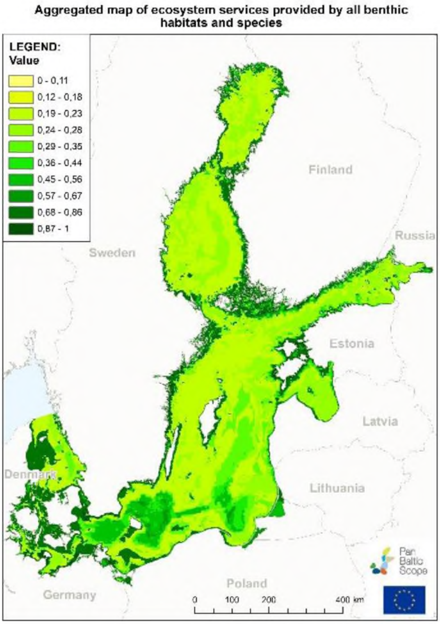


Fig.11 Agregated map of ecosystem services provided by benthic habitats and species

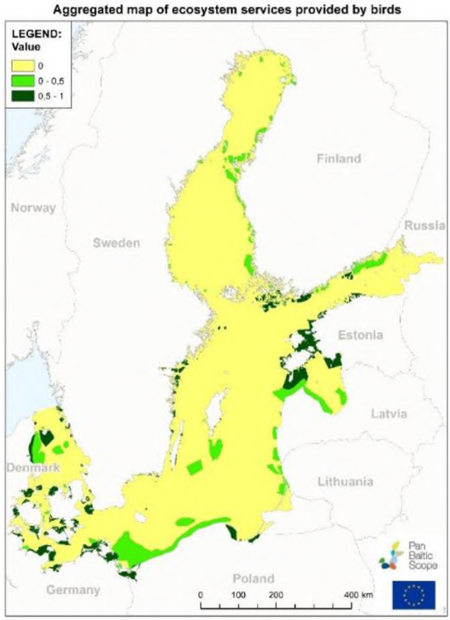


Fig.12 Agregated map of ecosystem services provided by birds

In Step 1, in total 37 single ecosystem service maps were obtained, which illustrate 10 ecosystem services provided by five ecosystem component sub-groups. The single ecosystem service maps were summed up in the five sub-groups and further combined into two ecosystem component groups (benthic habitats and birds) as presented in Figure 11 and 12. The aggregated ecosystem services map, which sums up the values of the aggregated benthic habitat and fish maps, is presented in Figure 13.

The aggregated map indicates the multi-functionality of the areas in relation to ecosystem service supply, where higher value is shown for areas that have a potential to deliver more ecosystem services. However, same as in the case of the ecological value mapping, the value of the bird habitats is slightly exaggerated within the aggregated ecosystem service map due to insufficient accuracy of the bird data.

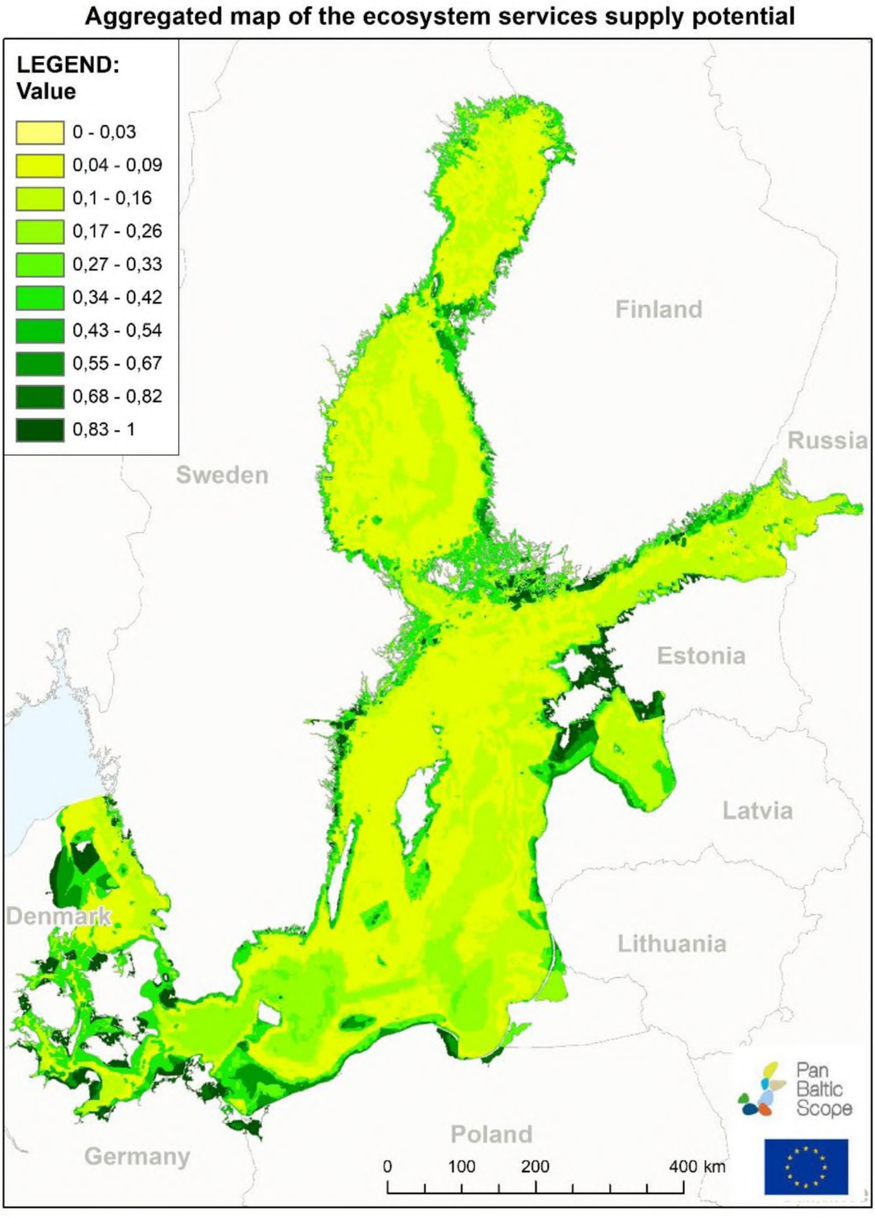


Fig.13 Agregated map of the ecosystem service supply potential

3.4. Producing aggregated green infrastructure map

The final map of marine GI aggregates the results of mapping areas of high ecological value (Figure 9) and potential for ecosystem service supply (Figure 13). Marine GI is formed by the areas which have the highest ecological value and/or highest value for ecosystem service supply. This is in line with the EC definition of GI, which should encompass a network of areas managed for protection of biodiversity and delivery of wide range of ecosystem services.

However, in difference form terrestrial areas, where patches of green or blue space have a distinct border, such mostly do not exist in marine environment. Therefore, defining a threshold above which the area would be considered of a high value is rather an arbitrary decision taken by experts or decision makers. Different approaches can be applied in defining the areas of the highest value. The Pan Baltic Scope experts have proposed an option that the 30 % of the Baltic Sea area with the highest scores for aggregated ecological and ecosystem service supply value to be recognised as marine GI (Figure 14).

Although the mapping results give an indicative information on GI of the Baltic Sea, the presented approach has certain limitations, which should be addressed in future studies:

- More accurate data sets are required on distribution of marine ecosystem components. This applies in particular to distribution or abundance of mobile species (e.g. birds and mammals). Compilation of such data sets could follow the same approach as applied by the Pan Baltic Scope project for the mapping of essential fish habitats.
- Ecological value mapping should include species-specific connectivity analysis, which is an essential criterion for functionality of ecological networks. This includes an analysis of the conditions for spreading of species and functional interconnection between sites important at different life stages of the species, etc.
- A more comprehensive approach to ecosystem services mapping should be applied by considering the spatial variations in biota and functioning of marine ecosystem as well as including the assessment of ecosystem condition, vulnerability to cumulative pressures and ecosystem service supply and demand relation.

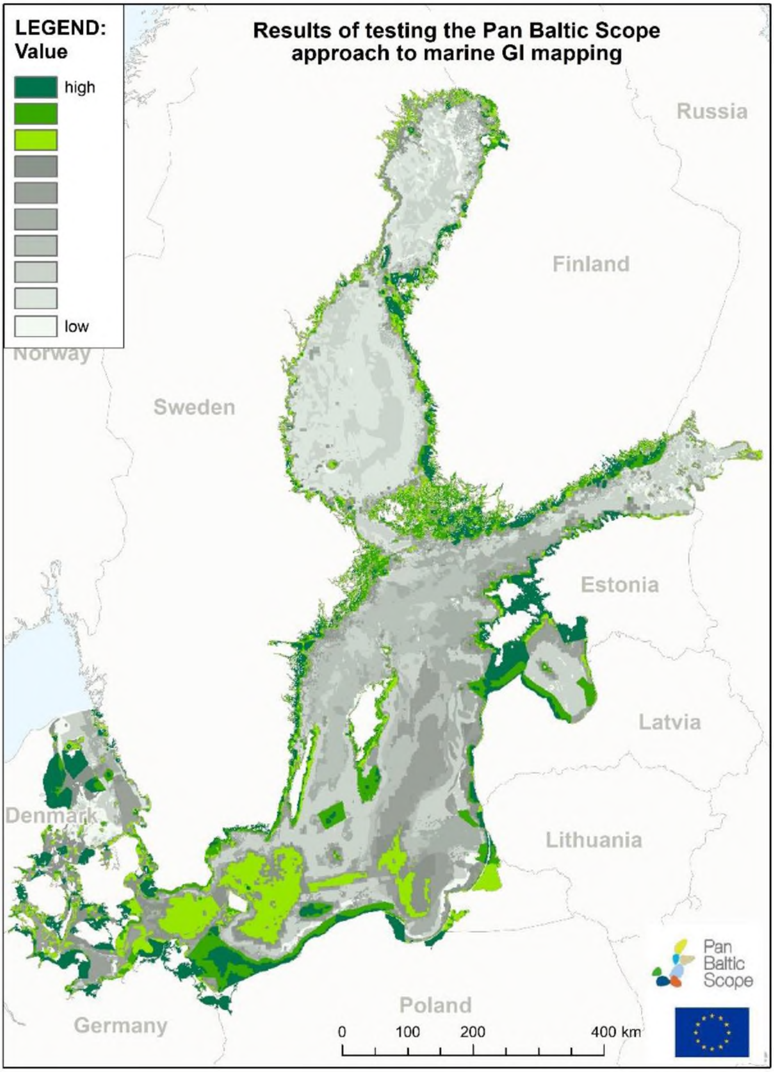


Fig.14 Results of the testing Pan Baltic Scope approach to marine GI mapping based on available spatial data: green colour indicates the 30 % of the Baltic Sea area which represents the highest ecological and ecosystem service supply value (the most valuable areas in dark green, other highly valuable areas in light green).

4 Potential for application of green infrastructure concept in MSP

In addition to its role in maintenance of biodiversity, GI is recognised as a tool for spatial planning that can enhance the human well-being and quality of life through multifunctional use of ecosystems. Mapping of GI helps to integrate the ecological aspects and information on ecosystem service supply into land and sea use planning and decision-making. Thus, the GI mapping provides an essential input for implementation of the ecosystem-based approach (EBA) in MSP. GI concept contributes to several key elements of EBA, including best knowledge and practice, identification of ecosystem services, relational understanding, precaution, mitigation, subsidiarity and coherence as well as participation and communication:

- GI mapping helps to develop the knowledge base on marine ecosystem structure, functions and service supply and thereby contributes to relational understanding of interrelation between ecological and social and economic systems.
- Consideration of the GI mapping results in development of sea use solutions can help to guide away potentially harmful development from ecologically valuable or sensitive areas, thus contributing to precaution principle.
- GI mapping results can be used in SEA of the MSPs assessing single and cumulative impacts on marine ecosystem and service supply and thereby improving the relational understanding on interactions between human activities and ecosystem.
- Baltic Sea scale GI mapping can be used to support cross-border coordination of planning solutions as well as to identify areas where solutions are needed at local level. This would be a step towards a strategic planning of marine GI at the sea basin level as well as contribute to the principle of subsidiarity and coherence.
- GI concept can help to facilitate communication across sectors and stakeholder groups and improving the understanding of marine ecosystem functioning and potentials and limitations for the use of the sea.

Furthermore, considering of the GI mapping results within MSP can help to improve the connectivity of the MPA network or functionally related parts of the ecosystems, e.g. by avoiding sea uses which increase the fragmentation of habitats or creating obstacles for species migration. GI mapping can also help to identify areas of high ecological value, which potentially can be considered for extension of MPA network.

5 Conclusions

The Pan Baltic Scope project interprets the marine GI as a spatial network of ecologically valuable marine areas significant for the maintenance of ecosystems' health and resilience, biodiversity conservation and multiple delivery of ecosystem services essential for human well-being.

Deployment of GI in terrestrial as well as marine areas is as a key tool to halt the loss of biodiversity and implementation of the objectives of EU Biodiversity Strategy 2020. At the same time, as noted in the EC Guidance on deployment of EU-level green and blue infrastructure, "healthy, resilient and productive ecosystems are a necessary pre-requisite for a smart, sustainable and inclusive economy". Therefore, maintenance of marine GI is also essential for reaching objectives of the EU Blue Growth strategy.

In difference from terrestrial ecosystems mapping of marine GI is still a novelty. A significant gap in knowledge regarding the deployment of GI in the marine environment and insufficient use of the concept in MSP is also recognised by the EC in review and guidance documents on implementation of the EU GI strategy. To our knowledge, the testing of marine GI mapping performed by the Pan Baltic Scope project was the first such kind of exercise in EU at the sea basin level. We have aggregated various spatial data layers on the distribution of benthic habitats, birds and fish to identify the areas of high ecological value and ecosystem service supply potential, which forms the marine GI. However, the proposed methodology still needs to be further developed, including connectivity analysis, more comprehensive ecosystem service assessment and improvement of input data quality.

The Pan Baltic Scope approach to GI mapping can contribute towards a holistic perspective linking MSP to maintenance of biodiversity and environmental management. Both MSP and development of the of MPA network relates to marine GI. In a longer perspective it would be possible to link these processes with conservation and development targets. MSP has potential to contribute to such targets and GI mapping is one step in that direction. To reach this, further dialogue linking planning and management is needed, as well as common development of knowledge of the Baltic ecosystems.

Pan Baltic Scope – bringing better plans

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

A sea of plans
The goal of the Pan Baltic Scope collaboration was to achieve coherent national maritime spatial planning around the Baltic Sea, and to build long lasting mechanisms for cross-border cooperation on maritime spatial planning.

Better together – created solutions
We identified focus areas and created solutions in a collaborative process. We...

- developed common tools and approaches
- built on experiences from previous projects like the Baltic SCOPE
- carried out concrete cross-border cooperation that supported national planning solutions

Results

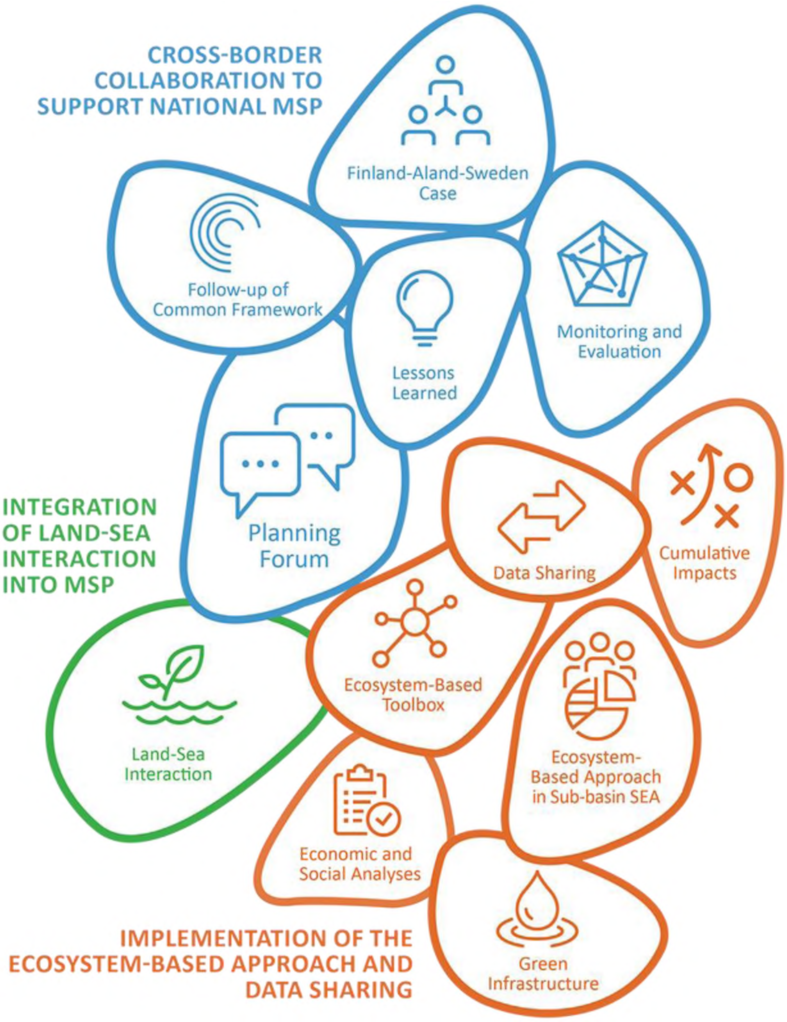
- New tools for a more coherent maritime spatial planning in the Baltic Sea Region
- Recommendations on key issues
- Deeper understanding
- Greater trust

Who could use it?
The results from Pan Baltic Scope is useful for spatial planners. The results can also be used by experts, managers, consultants and researchers working on

- environmental assessments
- economic and social analyses
- green infrastructure
- land-sea interaction stakeholder engagement
- maritime spatial planning

Key results can be important for policy-makers.

Dive into 12 of our topics:


CROSS-BORDER COLLABORATION TO SUPPORT NATIONAL MSP
Finland-Aland-Sweden Case
Follow-up of Common Framework
Lessons Learned
Monitoring and Evaluation
Planning Forum
INTEGRATION OF LAND-SEA INTERACTION INTO MSP
Land-Sea Interaction
Data Sharing
Cumulative Impacts
Ecosystem-Based Toolbox
Ecosystem-Based Approach in Sub-basin SEA
Economic and Social Analyses
Green Infrastructure
IMPLEMENTATION OF THE ECOSYSTEM-BASED APPROACH AND DATA SHARING

Planning Forum

Learning from experience
One of the lessons from the Baltic Scope project was that we needed an informal forum where planners could get together to cooperate and exchange knowledge. Coherent plans could not come about without cross-border cooperation.

Better together
By having regular meetings, the planners have had the chance to make lasting connections with colleagues around the Baltic Sea. The familiarity with neighbouring authorities responsible for maritime spatial planning led to a more effective exchange of information even outside of the forum.

By having a flexible approach to what issues we brought up to discussion in the forum, all members had the possibility to learn and contribute with their own expertise.

Cross-border understanding
The planning forum succeeded as a way to deal with hands on planning issues between partners. It enhanced the cross-border perspective and led to positive knowledge exchanges. Sharing data is not such an obstacle anymore, as the understanding of each other's plans and legal systems have increased through the Planning Forum discussions. Its role as a hub for all the activities in the project made it the natural focal point of Pan Baltic Scope.

Who could use it?
The Planning Forum was a useful arena for collaboration between planners. It also served as a basis for suggestions to policy-makers. The planning forum as a format for collaboration could be adapted and used in other sea basins.

Learn how we did it at www.panbalticscope.eu

Lessons Learned

Challenge
Transboundary MSP is a complex process facing a number of challenges including competing national interests, heterogeneous planning systems, sectoral divisions and low stakeholder participation. We need to learn about the main challenges and enablers to emerge from projects so policymakers and practitioners can learn more about transboundary MSP and receive feedback on how to develop more efficient and inclusive processes.

Solution
Throughout the project, independent researchers routinely surveyed and interviewed project participants to gauge and assess their views on how project activities were progressing. The focus of this research was to establish what challenges and obstacles they encountered during the project and how they overcame them. The aim was to identify tools and methods that could be used and replicated in future transboundary MSP activities; as we learn, we grow and when we share that knowledge, we can help others to grow.

Results
Researchers provided feedback to activity leaders on the main results. The findings from their research helped project activities so they could potentially adapt, improve and overcome challenges and obstacles. We collated the results from the surveys and interviews in a final Report and Activity Fact Sheets summarising challenges, enablers and achievements from each project activity. We also produced a lessons learned video to provide key findings and outputs from the project to a wider audience.

Who could use it?
The results are useful for policymakers, planners and researchers. They provide a valuable insight into the main challenges relating to transboundary MSP processes and outline recommendations on how to overcome them. The findings outlined are particularly useful for policymakers and planners to help guide future transboundary collaborations and projects. They also provide researchers with useful insights on recent developments in the ever growing and evolving field of MSP at different levels of governance.

Find our final products at www.panbalticscope.eu

FI-AX-SE

Challenge / Problem
The maritime spatial planning in Sweden, Finland and Åland differs in an important way. The plans in Finland and Åland are at a regional level, while the Swedish plans are national. The consequences of this was largely unknown at the start of the project.

Solution
The archipelagos of Finland, Åland and Sweden are full of planning challenges and cross-border interactions, as well as a myriad of land-sea-interactions.
The goal of our case study was to develop the tools and knowledge needed to make sure that we can preserve this fragile ecosystem, while at the same time promoting the possibilities that the blue economy brings. We did this by bringing key stakeholders to meet and exchange ideas. External maritime spatial planning experts in the area shared their knowledge of previous projects in the area with the participants.
In this case study, we investigated similar issues on different scales, from a national level down to local level, engaging stakeholders, local as well as national. What kind of knowledge did we need to exchange, and how could we handle the multi-level governance involved in decision-making for these areas.

Results
Our work has led to a greater understanding of our own challenges, as well as regional and cross-border challenges that we need to solve together. With these newfound understandings, we can continue making better plans, together.

Who could use it?
The results from the Finland-Åland-Sweden case is particularly useful for those who are starting out their maritime spatial planning process in an area with one or more close neighbours.

Check out the story map at www.panbalticscope.eu

Monitoring and Evaluation

Challenge
In order to improve the processes and effectiveness of the plans it is important to assess the quality of the MSP process and to know the results of the plans. How can we monitor and evaluate MSP, while acknowledging the reported challenges in knowing the impacts of broad-scale spatial plans and policies? The needs for monitoring and evaluation are different, since maritime spatial planning is not conducted in identical ways in the BSR countries.

Solution
The Baltic Scope project worked on a common framework for evaluation of MSP. In Pan Baltic Scope, we selected the Polish and Latvian plans as case studies. Working from the targets of the plans, we constructed evaluation frameworks that identified possible qualitative and quantitative indicators and suggest processes for conducting monitoring and evaluation.

Results
Objectives given for the plans are not always specific enough for successful monitoring and evaluation. There is a need to develop general objectives and more specific sub-objectives.

Useful indicators do not only focus on the results of the plans. We identified also indicators that focus on context of MSP, on process and inputs needed for successful MSP and on the outputs that produce the preferred results.

Finally, monitoring of MSP cannot be based only on indicators, because of the challenges of knowing the results of MSP. Input from experts and stakeholders can be collected in deliberative, systematic assessments of how MSP influences maritime sectors, marine environment and the society.

Who could use it?
The results from the monitoring and evaluation activity is of use for planning authorities, sector agencies and researchers.

Find the task report at www.panbalticscope.eu (to be published in December)

Follow-up of Common Regional Framework

Painting a common picture
We needed to know how the maritime spatial planning authorities have used the common regional framework in the national MSP. Did we all apply the common regional framework in the same way? Is it still up to date or improvements are needed?

Identifying the image
We followed-up on the implementation of various parts of the common regional framework by carrying out desk research on national MSP. Stakeholders were actively involved via a series of workshops, a survey and interviews. Countries were asked to share their experiences on successes and challenges so far and suggest tasks for the future agenda.

Seeing the whole picture
We analysed the MSP principles and found out that they are still relevant, but the newest knowledge on MSP should be incorporated.
We collected data on the guidelines via a survey, which aimed to find out how the transboundary consultations are organised and collected good practices.
We evaluated the MSP Roadmap in the HELCOM-VASAB MSP Working Group, and found out that the Baltic Sea states have achieved great progress fulfilling the tasks on the Roadmap on national and pan Baltic level. In the future there should be more tasks related to monitoring and evaluation, sectoral integration and awareness raising on MSP.

Who could use it?
Key target group of the outcomes is the HELCOM-VASAB MSP Working Group who will use the outcomes to update and elaborate common MSP framework in future. The material is also useful for maritime spatial planning authorities, policy makers, sectoral authorities and researchers.

Check the results at www.panbalticscope.eu

Find the building blocks of the common regional framework here.

Ecosystem-based Toolbox

Challenge
The ecosystem-based approach in the Baltic Sea Region is not coherently implemented. For coherent cross-border planning to be possible, approaches, methods and knowledge has to be shared between the countries in the Baltic Sea Region.
The Baltic Scope project produced a checklist toolbox for the ecosystem-based approach in MSP. It showed that the ecosystem approach was possible. Pan Baltic Scope gave an opportunity to expand on EBA, and further harmonize the Pan-Baltic approach.

Solution
We took stock of the current EBA research in maritime spatial planning, and the current practices regarding EBA in the Baltic Sea region. We also cooperated closely with other activities in the project to make sure that we covered all relevant topics regarding the ecosystem-based approach. This include the activities: Ecosystem-Based approach in sub basin SEA, Cumulative impacts, Green Infrastructure and Economic and social analysis.

We synthesised the current research on EBA in MSP, which included an evaluation of the current HELCOM and VASAB EBA guidelines in relation to the Malawi principles from the Convention of Biological Diversity. We developed proposals for revision of the guidelines based on the synthesis report, survey results and workshop input, strengthening dimensions on local knowledge and the precautionary approach in the Baltic Sea.

Results
Further developed tools, methods and concepts to support the implementation of EBA in MSP:

- Synthesis Report on the Ecosystem Approach to Maritime Spatial Planning
- Recommendations on how to revise the HELCOM-VASAB EBA guidelines.

Who could use it?
The results could be very useful for MSP-practitioners, HELCOM, sector representatives, NGOs, local authorities and upcoming research projects

Download the full synthesis report and read the recommendations at
www.panbalticscope.eu

Ecosystem-Based Approach in sub-basin SEA

Incomparable assessments
The Strategic Environmental Assessment (SEA) work in the Baltic Sea needs to be comparable between countries to be of more use. SEAs are an important tool for the EBA implementation.

Adaptation through collaboration
We developed a methodology based on a test case in the south-western Baltic. The work was thorough and innovative, by using as many sites and cross-border partners as possible. By creating an adaptable concept for the EBA implementation and making it easier to compare SEAs, cross-border coherence has come much closer than it was before.

Results
We have produced a practical handbook for the planners' daily business. Helping to compare the SEAs and benefit from methods, data and processes. The modular EBA concept will show how to implement an EBA in each step of MSP. This will result in easier implementation, stronger mutual understanding and the promotion of a trans-boundary and holistic perspective.

Who could use it?
MSP, SEA and MFSD authorities, HELCOM/VASAB MSP WG, upcoming research projects.

Check the handbook & Dive deeper with the background report - Find both at www.panbalticscope.eu

Cumulative Impacts

Problems stacking up
Many people, if not all, are affected by cumulative impacts. To minimize risks and support long-term sustainability, it is important to understand how our use of the sea use may affect the marine environment – now, in the past, and in the future.

Understanding of cumulative impacts in MSP is developing in many countries. However, many issues are transboundary and we can only solve them together. Further, there is a need to refine methods and make them coherent among countries, so that we can address impacts in a comparable way.

Building new tools
Our main aim was to increase regional capacity and knowledge to evaluate cumulative impacts in the Baltic Sea. We identified the state-of the art in countries, key issues to solve and searched for solutions. We tested the work in case studies: one on how cumulative impacts can be assessed at the Baltic Sea scale in relation to offshore wind farm development, and one with a focus on green infrastructure.

To support the work, we developed a Cumulative impact Assessment Tool which is now available for further use. It supports various analytical designs, and also the mapping of green infrastructure.

Time to use the new tools
All our results are summarized in a report, including project recommendations for future development.
The Cumulative impact Assessment Toolbox is openly available.

Who could use it?
Planners who want to understand cumulative impact assessment and how they can be carried out.
Managers set to evaluate cumulative impacts and who needs practical tips.

Get the tool at Github

Use the online tool at HELCOM

Green Infrastructure

Challenge

Green infrastructure is a network of nature that contributes to the functioning of plants and animals and to the well-being of people.

The EU 2020 Biodiversity Strategy states that ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems.

What is Green Infrastructure (GI) in the context of marine environment and how to map it?

Solution

To reach this target, we outlined the concept of the marine GI based on results from previous and ongoing studies and tested the concept at the Baltic Sea scale by using available data. We used data from the HELCOM Maps and Data services, reflecting distribution of more than 30 ecosystem components. We produced new pan-Baltic maps of essential fish habitats representing spawning, recruitment and nursery areas of commercially important fish species. This was possible thanks to close collaboration with the HELCOM, ICES and national research institutes, involving the relevant authorities and experts in cross-border meetings.. We used the newly produced spatial data to map the areas of high ecological value and associated supply of ecosystem services. We aggregated this information into a synthetic map of marine GI of the Baltic Sea.

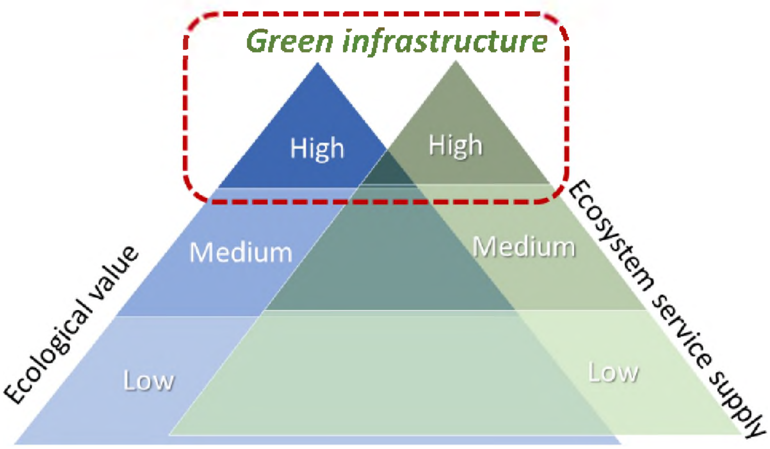
Results

We developed an approach for mapping the marine GI and demonstrated it at the Baltic Sea scale. The mapping results indicate areas of high ecological value possibly forming the GI of the Baltic Sea. We also identified the data gaps and limitations of the proposed approach as well as highlighted the further research needs to improve the methodology.

Who could use it?

The proposed concept of marine GI can support planners in applying ecosystem-based approach in MSP, as well as nature conservation authorities in assessing coherence of the MPA network. The methodology developed by the project could be adapted to other sea basins.

Learn more about the Pan Baltic Scope approach to mapping of marine GI at www.panbalticscope.eu



Pan Baltic Scope approach to mapping of marine GI

Economic and Social Analyses

Challenge

Having an overall understanding of how MSP affects human well-being is crucial. We needed to develop the assessment of economic, social, cultural and ecosystem service impacts for the purposes of MSP. We also needed to exchange experiences and information on how these impacts are evaluated across countries.

Solution

Our solution built on previous HELCOM projects that developed frameworks and results for economic and social analyses of the marine environment. We reviewed existing approaches and data for assessing economic, social, cultural and ecosystem service impacts in national MSP and synthesised contemporary literature. We produced a national model for evaluating the economic impacts of MSP in Estonia, combined with the assessment of cumulative impacts (PlanWise4Blue).

Results

We found differences in methods and gaps in knowledge and resources for assessing economic, social, cultural and ecosystem service impacts for MSP in the BSR. The main output are the recommendations on developing economic and social analyses for MSP, for coherent approaches, data and results across countries as well as to support national work. Integrated assessment of the ecosystem and socio-economic system, spatially explicit approaches and data, as well as increased resources would be crucial. The Estonian PlanWise4Blue model provided a practical solution for assessing economic impacts for MSP. The recommendations are of use for further developing the assessment of economic, social, cultural and ecosystem service impacts in MSP regionally and nationally.

Who could use it?

The recommendations can aid policy-makers and national governments, the HELCOM-VASAB cooperation, as well as planners and researchers.

Check the recommendations at www.panbalticscope.eu

Find PlanWise4Blue at www.sea.ee/planwise4blue

Data Sharing

Challenge
Data is a key to coherent MSP in the Baltic Sea. The Baltic Sea was the first region that established a particular MSP Data expert group, operating under HELCOM-VASAB. This group clearly stated a need for a Baltic Sea Region web-map of maritime spatial plans with comprehensive data specification and cartographic visualization.

Solution
The work started in the Baltic LINes project, and we continued work on the common data portal BASEMAPS. Planners and stakeholders can access national plans and background maps in the portal. We did extensive analysis and got commitment from national MSP data providers on setting up a common solution together with the MSP Data expert group.

Results
HELCOM BASEMAPS is the result of our collaboration. By collaborating and discussing with national MSP data providers to find the best solutions, we have managed to create both viewing and data upload tools within BASEMAPS. This enables knowledge exchange across borders. BASEMAPS allows you to get the overview of where the countries are in their MSP processes and offers you a possibility to browse MSP designations by types and sectors. With easy access to each other's data, cross-border collaboration is easier and we can see mismatches between plans earlier in the process and it makes it easier to get an overview.

Who could use it?
Planners and stakeholders can both benefit from BASEMAPS. The ability to compare plans across borders helps us to develop better planning solutions and take smarter decisions for our Baltic sea. Being able to access spatial materials in one place and with a harmonized visualization is a large step forward.

Check the BASEMAPS & Find the Step-by-Step guidance at www.basemaps.helcom.fi

Learn how we did it at
www.panbalticscope.eu

Integration of Land-Sea Interactions in MSP

Challenge
With the EU-directive, Land-Sea Interactions (LSI), even if not new in planning, have become a catchall phrase with many faces. Coastal areas and archipelagos had so far been less considered in cross-border MSP, mainly focusing on the exclusive economic zone. We needed a common definition of LSI applicable in both marine and coastal planning and across borders.

Approach
We set out to find out how we can work with LSI through two case studies, one in the Riga bay between Estonia and Latvia and an archipelago one, together with the FI-AX-SE activity. The cross-border nature of both cases enhanced the study further by highlighting how we interpreted LSI differently depending on which side of the border we were looking from.

Results
A literature review confirmed that LSI is not well defined, but operationalised differently. So, also asking our planners, we developed a 4-dimensional framework to think LSI, with 1) the social-ecological interactions to plan, 2) the institutional system along the land-sea planning continuum, 3) the processes and stakeholders to include, and 4) the necessary knowledge and methods.
The Riga Bay case brought insights on local authorities' needs and opportunities to engage in planning the sea, including a good knowledge base and capacity building and extending cross sector planning thinking over the land-sea boundary.
The FI-AX-SE case showed how incomplete knowledge is and how important it is to think of future needs across the land-sea boundary and collaborate across levels and sectors – also including local knowledge.
Overall, scale and topics matter to engage in LSI and public ocean literacy and capacity development for local authorities are crucial.

Who could use it?
Marine and coastal planners and sector authorities at all levels can make use of our results. Coastal stakeholders may find them useful to get engaged in planning.

Check out the Latvian-Estonian guideline at … / Find our scoping report and our Lessons, Stories and Ideas on Land Sea Interactions at www.panbalticscope.eu

Data Sharing

The countries are obliged to have their Maritime Spatial Plans in place by 2021. This also means that access output data should be arranged in a regional context to enable cross-border comparison and planning of common sea space.

The aim is to facilitate the development of Marine Spatial Data Infrastructure (MSDI) and build a web-map interface based on MSDI principles to make available output data resulting from Maritime Spatial Plans. MSP output data platform will display the available output data from national MSDIs using distributed spatial data as far as possible and following INSPIRE principles of hosting data at source and harmonization of data. Considering different development stages of planning process and spatial data infrastructure in the partner countries, standardization is required and needs to be tackled during the project to cater for a pan-Baltic collation of output datasets.

The work package will build on work carried out on initial regional mapping of data requirements for input and output data carried out by the HELCOM-VASAB MSP Data Expert Sub-Group and piloting activities carried out by e.g. Baltic Scope and BalticLines projects.

Further this WP includes:

- developing a pan-Baltic MSP output data platform
- gathering available MSP output data to the MSP output data platform, including distributed data, both as services and data available as files
- developing a guideline for making MSP output data available for the pan-Baltic MSDI

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Guidelines on transboundary MSP output data structure - Introduction

The goal of these Guidelines on transboundary maritime spatial planning (MSP) output data structure (Guidelines) is to facilitate data availability and coherence of MSP, as well as transboundary cooperation under national/regional MSP consultations. Specifically, the Guidelines set out technical requirements (data specification) for the interoperability and harmonization of spatial data sets corresponding to the transboundary/cross-border maritime spatial planning output data (MSP output data).

Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for MSP introduced an obligation to develop maritime spatial plans which are coherent and coordinated across the marine region concerned. In this regard Member States shall organize the use of the best available data, and decide how to organize the sharing of information, necessary for maritime spatial plans.

The Regional Baltic MSP Roadmap 2013-2020 indicates the necessary steps to fulfill the goal of drawing up and applying maritime spatial plans throughout the Baltic Sea region by 2020 which are coherent across borders and apply the ecosystem approach. Additionally, it requires the promotion of the creation and sharing of MSP relevant Baltic Sea regional data sets.

In order to facilitate coherent MSP process, the Guidelines on transboundary consultations, public participation and co-operation (elaborated by the joint HELCOM-VASAB MSP Working Group (HELCOM-VASAB MSP WG)) emphasizes the need for transboundary consultations at the early stage to avoid costly misalignments and negative environmental impacts, as well as promoting efficiency gains and synergies.

MSP Data could be grouped into two categories:

- Input data - data, information or evidence that is used for preparation a maritime spatial plan, such as environmental data, information about existing sea uses, social economic data, as well as other maritime spatial plans.
- Output data - outcome of maritime spatial plan (alignments and preconditions for possible sea-use in the future).

The spatial plans should be in line with other spatial plans across the borders and beyond them as much as possible.

Planned sea uses are regulated by spatial planning documents elaborated at various levels of administration, defined by responsible authorities. Sea use regulation over a geographical area could be, for example, composed of the following elements:

- An overall strategic orientation that describes the development will of the competent administrative authority which is a textual document,
- A textual regulation that determines the planned sea use,
- A cartographic representation composed of elements regulated by spatial planning documents.

These Guidelines focus on standards for spatial data sets used for cartographic representation of future sea use for two types of the MSP Output data: 1) Maritime spatial plan area and 2) Planned sea uses.

Monitoring and Evaluation for Selected National Processes

The Baltic SCOPE project developed an evaluation and monitoring framework for following and evaluating transboundary collaboration in MSP. The framework was based on a review of existing evaluation approaches and especially on the experiences gained during the Baltic SCOPE project.

Feedback from the spatial planners that worked in the Baltic SCOPE project indicates that, in addition to an evaluation framework that focuses on transboundary aspects, there is a need for guidance on evaluating national MSP processes and their impacts.

The proposed project responses to this identified need by developing evaluation guidance for national MSP processes. Monitoring & Evaluation guidance will be developed for national processes in Latvia and Poland. Hence, the countries selected are at different stages in their national MSP process, adding more value to this activity, since in each stage the M&E approach is slightly different.

The national MSP evaluation guidance will be developed together with the national MSP authorities. The frameworks will be produced for each selected country to adapt the evaluation guidance for the needs and characteristics of national MSP processes. The Baltic SCOPE experience shows that countries not only have different timings in implementing their MSP, they also have slightly different objectives for MSP and organize their MSP processes in different ways.

Even though the evaluation guidance is tailored to the need of each selected country, the project facilitates exchange and collaboration between countries. Exchange of ideas between countries is important for identifying common elements and key differences for evaluation as well as in terms of mutual capacity building in evaluating MSP.

Steps of work:

- Describe the MSP context and decide the scope of the evaluation
- Describe the target of the evaluation
- Outline the evaluation approach
- Plan the evaluation process

Monitoring & Evaluation task

- Broad and specific **objectives** are needed to provide overall direction and purpose for MSP process. For successful monitoring, also more detailed sub-objectives are needed. They should be clearly defined and verifiable, and where possible, quantitatively measurable.
- There are considerable **uncertainties in knowing outcomes** of broad policies such as MSP. This should be considered when developing quantitative and qualitative **performance indicators**. It is recommended to develop also **context indicators** to follow developments in maritime sectors and the environment.
- **Systematic expert and stakeholder assessment** processes can help to reduce uncertainties on knowing how MSP influences maritime sectors, the marine environment and society.
- Develop existing platforms that support the preparation of MSP plans into **MSP monitoring and evaluation networks**.
- VASAB-HELCOM MSP working group should organise, in the near future (2022-2024), **a monitoring workshop for all BSR countries** to discuss first monitoring outcomes and cross-border M&E co-operation.

Special challenge : To proof outcomes of MSP

Attribution: To proof that the intervention caused the observed change (or at least contributed to it)

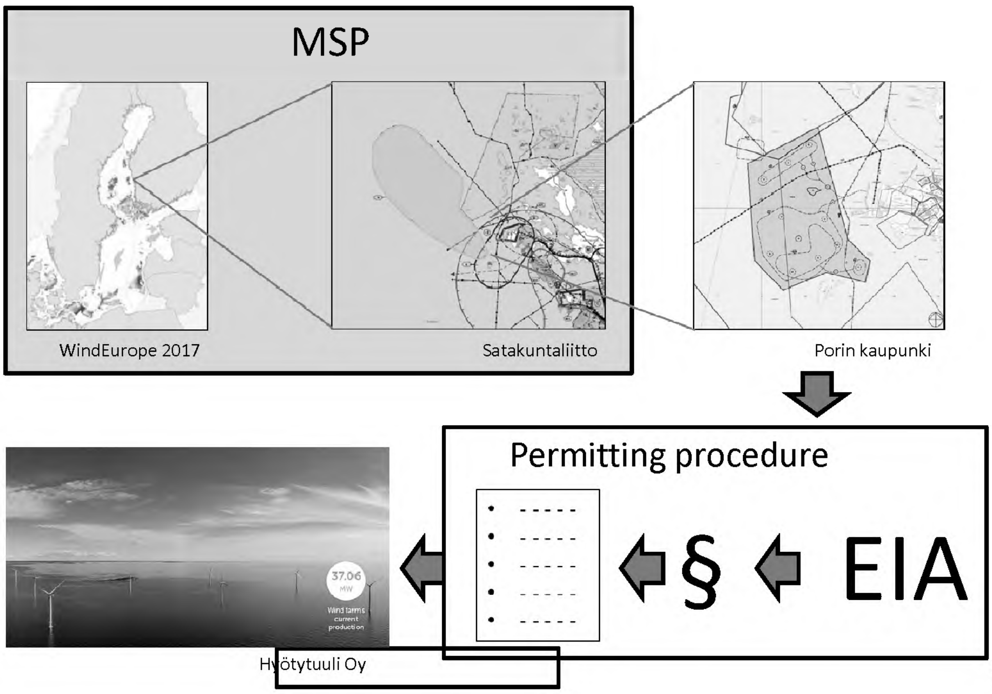
- MSP operates in an environment that is affected by economic, political, societal, technological and natural developments and processes
- Multiple other factors

- MSP operates in already governed and planned areas
- MSP has a limited mandated

- MSP does not go all the way
- The final outcomes are defined after the MSP

Special challenge : To proof outcomes of MSP

The objective: Increase production of renewable energy by X amount



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Possibilities to reduce the uncertainty of knowing

Step 1: Admit that knowing the outcomes of broad policies is difficult, partly impossible

Step 2: Acknowledge that there are ways to reduce the uncertainty

- **Indicators**
- Qualitative and quantitative, ”where possible”
    - Context
    - (Input)
    - (Process)
    - Output
    - Performance
- **Expert and stakeholder assessments**
- Systematic
    - Output-Indicator-Timing-Responsibility tables
    - Theory of change

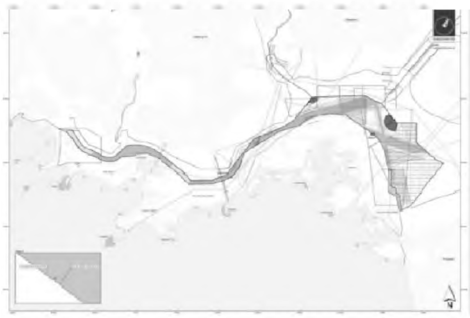
Organisation of MSP evaluation

Belgian MSP

- **Informal evaluation**
- Intensive stakeholder engagement
  - 2015: Process
  - 2017: Content
- **Formal evaluation**
- Consultation committee
  - Annual follow-up on achievement of targets
  - 2018: review of the plan -> approved in 2019

German EEZ MSP

- **Evaluation done by the planning authority**
  - Consulted a scientific expert group that provides natural science advice
- **The main focus on achievement of coordination between shipping and wind energy**



Latvian approach for implementation and follow-up

- **Strategic and spatial development priorities with an outlook until 2030**
- **Strategic objectives and measures have been defined for the implementation of the MSP strategic and spatial priorities**
- **Collection of data and information regarding the marine environment status, ecosystem services and existing sea uses**
- **The Maritime Planning Working Group ensures the exchange of the most up-to-date information and data for the purposes of the implementation of the maritime plan at least once a year, by organising a face-to-face meeting.**

SO1: Rational and balanced use of the marine space, preventing inter-sectoral conflicts and preserving free space for future needs and opportunities					
Measure	*Result indicator*	*Assessment of measure implementation (Qualitatively/ quantitatively)*	*Responsible authorities*	*Deadlines*	*Source of financing*
1.1. Update data on fishing intensity in the Baltic Sea	• Regularly updated information on fishing activities of Latvian fishermen	Qualitatively	BIOR	Regularly	State budget (within the current budget)
1.2. To carry out scientific research regarding the suitability of environmental conditions for the cultivation of different aquaculture species in the sea, assessing potential environmental risks and developing environmentally friendly technology suitable for Latvia's conditions.	• Number of scientific studies that offer aquaculture manufacturing technology suitable for the marine conditions of the sea waters of Latvia.	Quantitatively Base value (2018):0	MoA in cooperation with BIOR, MoEPRD in cooperation with LIAE	Regularly	EU funds, State and local government budgets
1.3. To perform studies regarding the accessibility of marine subterranean depths resources in the sea waters of Latvia and the technology for the extraction thereof, which would not cause significant damage to the marine ecosystem.	• The number of research studies that offer an assessment of marine subterranean depths resources and environmentally friendly technology for the extraction.	Quantitatively Base value (2018):0	MoEPRD	Regularly	EU funds, State budget
1.4. To support the development of a public infrastructure for the growth of marine tourism in significant places in the territorial sea waters of Latvia and on the coast, to promote a more varied coastal tourism offer.	• An investment programme for the coast has been prepared.	Qualitatively	MoEPRD, MoE, KPR, RPR	By 2024	EU funds, State budget
1.5. To identify the underwater and marine cultural heritage assets of Latvia and develop guidelines for the management thereof.	• Research has been carried out and guidelines developed for the management of the underwater and marine cultural heritage assets.	Qualitatively	NCHB	By 2030	EU funds, State budget
1.6. To support renewable energy demonstration projects in the sea by raising eligible funds from foreign financial aid or State budgets	• Number of (wind, wave) energy facilities installed in the sea	Qualitatively Base value (2018):0	MoE, MoF	2030	EU funds, State budget

The implementation indicators of the MSP are as follows:

(A) Input indicators:

- The authority responsible for the MSP has been defined, it coordinates the development of the MSP and monitoring of its implementation and review or updating;
- The authorities that are involved in the MSP process and simultaneously ensure the implementation thereof have been defined;
- The necessary financing is ensured for the development, monitoring, review and updating of the MSP;
- The MSP process is assured with qualified specialists and experts.

(B) Process indicators:

- An MSP development and monitoring working group has been established;
- The stakeholders have been defined and are involved in the MSP process;
- The stakeholders are satisfied with their participation in the MSP process;
- A scientific consultation committee has been established for the MSP process.

(C) Output indicators:

- A policy and legal framework ensures the implementation of the MSP and intersectoral integration;
- Information and data are regularly collated and supplemented, ensuring the implementation, review and updating of the MSP;
- The issuance of permits and licences is straightforward, mutually coordinated and open;
- The objectives and priorities of various sectors for the use of the sea are harmonised during the MSP process;
- Cross-border cooperation is ensured in the planning and use of the marine space.

Performance

- **Follow-up of implementation**
- **Environmental impact assessment linked to the MSFD – new indicators are being developed**

Polish approach

- **General objectives**
- Support of sustainable development in the maritime sector with the economic, social and environmental aspects taken into account, including the issues of improving the state of environment and resilience to climate change;
- National security and defence of the State;
- Ensuring coordination of subjects acting in the sea area and forms of using the sea, coherent management of the marine and coastal areas and their resources;
- Increasing the share of the maritime sector in GDP and growth of employment in the sector;
- Strengthening the position of Polish sea ports, improving the competitiveness of sea transport, and ensuring maritime safety;
- Space-efficient management leaving possibly much space for future forms of using the sea (including those at present unknown).
- **Sub-objectives defined within Pan Baltic SCOPE**

sub-objective a2) creating conditions for synergies and multi-use		
Intermediate steps: Knowledge of actors on synergies and multi-use increases	**Related indicators:** - Studies and examples of feasible combinations (practically tested by someone else) - Negative feedback on multiuse proposed in the plan	**Sources of information:** - R&D related information sources that would tell that relevant studies are being conducted/funded? - Contacts to the authorities - Register of conflicts and negative claim (!) - Register of new suggestions
Final outcome: Sustainable and more efficient accommodations of multiple uses	**Related indicators:** - Number of basins where multi-use is allowed - Area of basins where multi-use is allowed - Number of accomodations	**Sources of information:** - Issued permission (register) - Expert analysis of the plan
Relevant basin-specific basic and allowed functions: M – multi-functional economic growth – basin intended for development of economic functions (tourism, transport) and coastal protection.		
Relevant basin-specific restrictions:		

Process for M&E in Poland

Have you planned how to organise M&E in Poland?

Types of indicators

- **Context indicators**
- General developments in maritime sectors and marine environment
- **Input indicators**
- Actions and resources to develop plans
- **Process indicators**
- The planning process, e.g. hearing stakeholders
- **Output indicators**
- Planning decisions and publications of studies/guidelines/best practices
- **Performance indicators**
- Evidence of reaching objectives and of impacts

Types of indicators

	Latvia	Poland
Context indicators	9	20
Input indicators	(4)	
Process indicators	(4)	6
Output indicators	9 (5)	21
Performance indicators	2	23

Your plans of monitoring & evaluation?

Organisation of M&E?

Indicator development?

- Broad and specific **objectives** are needed to provide overall direction and purpose for MSP process. For successful monitoring, also more detailed sub-objectives are needed. They should be clearly defined and verifiable, and where possible, quantitatively measurable.

- There are considerable **uncertainties in knowing outcomes** of broad policies such as MSP. This should be considered when developing quantitative and qualitative **performance indicators**. It is recommended to develop also **context indicators** to follow developments in maritime sectors and the environment.

- **<u>Systematic</u> expert and stakeholder assessment** processes can help to reduce uncertainties on knowing how MSP influences maritime sectors, the marine environment and society.

- Develop existing platforms that support the preparation of MSP plans into **MSP monitoring and evaluation networks**.

- VASAB-HELCOM MSP working group should organise, in the near future (2022-2024), **a monitoring workshop for all BSR countries** to discuss first monitoring outcomes and cross-border M&E co-operation.