# Final Publishable summary report

The BONUS BASMATI project has received funding from BONUS, funded jointly by the European Union and national funding institutions for the five countries involved: Innovation Fund Denmark, FORMAS Sweden, Academy of Finland, Latvian Ministry of Education and Science, and Forschungszentrum Jülich GmbH, Germany.

## The overall goals of the project and expected results

The overall objective of BONUS BASMATI was to develop integrated and innovative solutions for Maritime Spatial Planning (MSP) from the local scale to the Baltic Sea Region scale. This will be realised through multi-level governance structures and interactive information technology aiming at developing an ecologically and socio-economically sound network of protected marine areas covering the Baltic Sea. Based on the results of former MSP projects, the BONUS BASMATI project sets out to analyse governance systems and their information needs regarding MSP in the Baltic Sea region in order to develop an operational, transnational model for MSP, while maintaining compliance with existing governance structures.
BONUS BASMATI started officially 1st July 2017 and ended 30th September 2020 including a three-month extension due to the covid19 crisis.

## Work carried out

The project design and methodology were based on the integration of different elements in MSP, as illustrated in the figure below. These elements were organised and structured within the five research-oriented Work Packages 2-6 – se fig. 1 below. In addition to the research activities, WP1 has focused on the daily management of the project, while WP7 has focused on the communication of activities and ensured that results and findings from BONUS BASMATI have reached relevant practical, political and scientific fora.

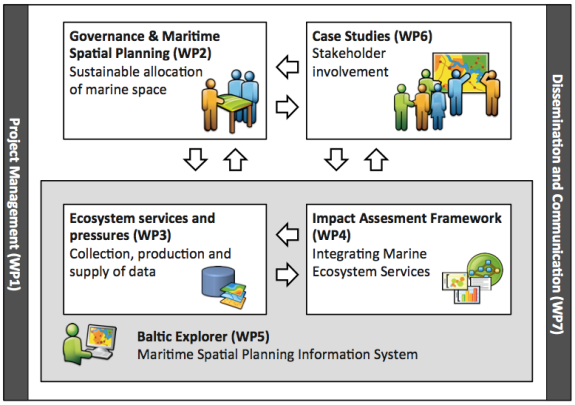


Fig. 1. The BONUS BASMATI approach

During the three years project period several scientific achievements have been made to support the adoption of an ecosystem-based approach in maritime spatial planning. The results have been obtained through a strong internal cooperation between partners supported by two annual partner meetings, dedicated workshops and meetings with various stakeholders around the Baltic Sea.
The results of the BONUS BASMATI project have mainly been published in peer reviewed scientific journals but in order to provide an impact outside the scientific community a detailed and not technical summary of the achievements are can be found in the publication "BONUS BASMATI – Supporting Maritime Spatial Planning with Science" available at https://bonusbasmati.eu/wp-content/uploads/2020/09/BONUS_BASMATI_Del_7_7_summary_report.pdf. In addition to this, a short (3:36 minutes) film telling the story about how the results from BONUS BASMATI can support maritime spatial planning is available at https://www.youtube.com/watch?v=R3rIOJ3nNRY&feature=emb_logo

## Main results achieved during the project

The results of the BONUS BASMATI project can be divided into two – but interlinked categories. The first category represents research within new concepts and approaches in maritime spatial planning – while the second category represents new tools and platforms to support maritime spatial planning in practice.

The increasing focus on the sustainable use of the sea space while maintaining blue growth poses challenges for maritime spatial planning in the Baltic Sea Region. Current impact assessment frameworks are not sufficiently addressing the integrated social, economic, and environmental impacts of plan proposals for sustainable development of marine space. In order to approach this challenge, the BONUS BASMATI project has developed a sustainability assessment framework that helps to structure and select the relevant indicators for evaluating the integrated impacts of plan proposals and facilitate discussions on planning issues among stakeholders. It was concluded that sustainability assessment should have a larger role in MSP than now found in most of the countries studied, and that socio-cultural and distributional aspects should have more attention. It proposes a sustainability impact assessment framework for MSP (MPS-SA) based on a combination and adaptation of the DPSIR and the ES cascade, addressing the ecological, social, and economic impacts in an integrated and coherent way (fig. 2). It exemplifies how social impact criteria can be addressed in a marine-adapted CICES classification, and it suggests that assessment of benefit distribution on beneficiaries are included in the planning process, to cater for social justice aspects.

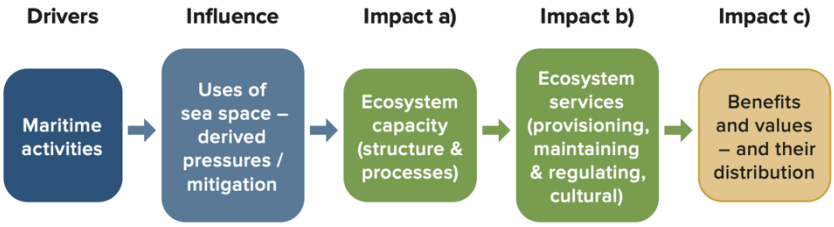


Fig. 2. BONUS BASMATI framework for sustainability assessment in MSP

MSP is a complex, data intensive process and its success depends to a large extend on the abundance and the quality of its data and the capacity for its analysis. Good data management is the fundamental pillar for MSP, and data collection, production and documentation need to be handled with great care. Thus, the consent on uniform minimum standards and requirements are the first step towards solid data management and a wide applicability of data. In a European perspective, a major development is related to the implementation of the INSPIRE Directive.

The spatial and temporal information can aid planners to define if certain phenomena occur simultaneously in the same location and whether they affect each other or not. This identification of opportunities for co-location can benefit both planners and stakeholders. The spatial dimension of data can be divided into two sub-dimensions: the vertical and horizontal dimension (fig. 3). The vertical dimension provides information on whether the objects of interest occur in the surface water, on the seafloor, or somewhere in between. In addition, data can be from above the sea surface. The horizontal dimension represents different spatial scales from local over regional to international. The temporal dimensions describe the occurrence, frequency and timeline of the data. Whether activities take place once a year or several hours a day, and whether they have regular frequency patterns, makes a difference for planning considerations. In order to accomplish a harmonised and solid data collection, templates on how to create data and metadata were developed and sent out to all project partners. Aspects on data quality where thoughtfully conferred and complemented in the data management process throughout the time. A database called The Baltic Sea Atlas was used for storing the geographical data of BONUS BASMATI and as a visualization test ground of the data gathered in the project. The concept of the Baltic Sea Atlas is simple and easy to operate with a large map window and basic operation tools. After the project the database will be accessible both for spatial data experts as well as non-experienced users. You can find the Baltic Sea Atlas here: http://bio-50.io-warnemuende.de/iowbsa/

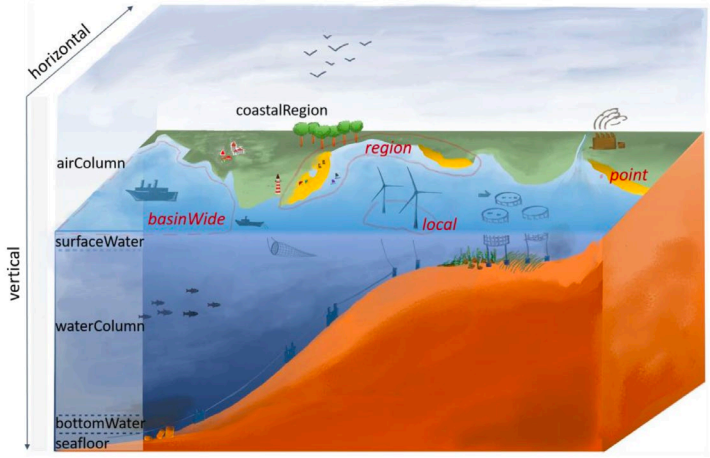


Fig. 3. Vertical and horizontal dimensions of marine space

The European Union legally requires stakeholder involvement in the MSP processes. However, this can be done with different purposes. Involvement can be of normative reasons, but often more instrumental reasons are also in play; to collect knowledge from the stakeholders or inform them or to promote interaction and legitimise the processes. A framework for analysing conflicts and synergies has been developed for use in the BASMATI case studies. When planning the use of a sea area, knowing the stakeholders and their interests and values is central. In the shared sea space, there are often open or potential conflicts between different stakeholders. The framework points at different roots of conflicts; interests in use, values or lack of facts about own and others use and needs. Understanding the roots for conflicts is a key for planners to mitigate and search for potential ways to co-existence or even synergy between some of the activities in a certain sea area. The conceptual framework asks: Why to involve stakeholders, who to involve, when in the process, and how to involve the stakeholders? The starting Why relates to the degree of power-sharing in the process – illustrated by the stairway of participation (fig. 4). Which stakeholders to involve depends on what level of involvement the planners want – from information to the general public or handing over the responsibility of some parts of the planning process to certain stakeholders. This also influences the tools to be used in the process. Based on MSP planners' experiences in the Baltic Sea Region, a Handbook aiming at supporting planners in the stakeholder involvement in the MSP processes was made.

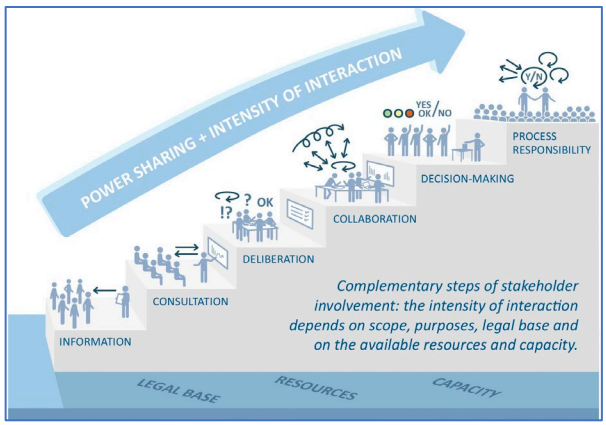


Fig. 4. Stairway of participation in marine spatial planning

Development of various tools supporting maritime spatial planning has been a key objective of the BONUS BASMATI project. One important aim has been to develop the Baltic Explorer – but also other general-purpose tools like SPACEA, ESA4MSP, MYTILUS and SEANERGY have been developed. As a rather new discipline, maritime spatial planning has experienced a general lack of tools for involving stakeholders and as support for the allocation of marine space, especially methods applying an ecosystem-based approach. As a part of the research carried out in the BONUS BASMATI project, a platform for stakeholder involvement and spatial analysis tools have been developed. The Baltic Explorer is an interactive web map application developed for supporting collaboration between planners and stakeholders (fig. 5).
To guarantee the potential future use of the system, the Baltic Explorer will be published as open source before the end of the BONUS BASMATI project.

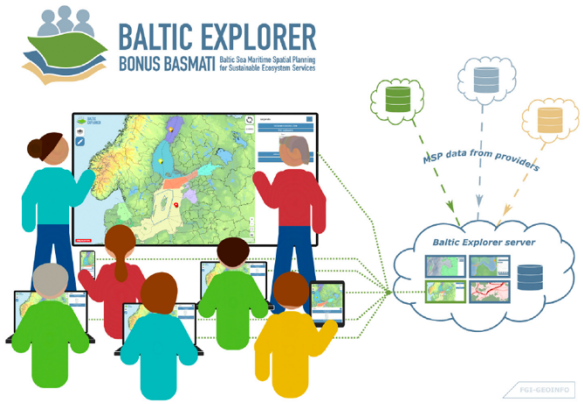


Fig. 5. The interactive web map application Baltic Explorer supports collaboration between planners and stakeholders.

The collaborative application contains basic collaborative functionalities that allow users to show data and draw and edit new features on maps. The application is aimed at planners, who can use it in various ways when collaborating with stakeholders, including for gathering knowledge from stakeholders, discussing about data and plans, and informing about decisions that are being made. Baltic Explorer has been tested in cooperation with stakeholders at workshops and the results and feedback is used for improvement of the solutions in order to enhance its practical use.

The concept of ecosystem services has been in use for many decades, but its application for policy support has been limited, particularly with respect to marine ecosystems. Gaps in the assessments of ecosystem services supply prevent its empirical application. The BONUS BASMATI project advances these assessments by providing an assessment tool (ESA4MSP), which links marine ecosystem components, functions and services, and graphically represents the assessment process and its results. The tool consists of two parts: (i) a matrix following the ecosystem services cascade structure for quantifying the contribution of ecosystem components in the provision of ecosystem services; (ii) and a linkage diagram for visualising the interactions between the elements (fig. 6).

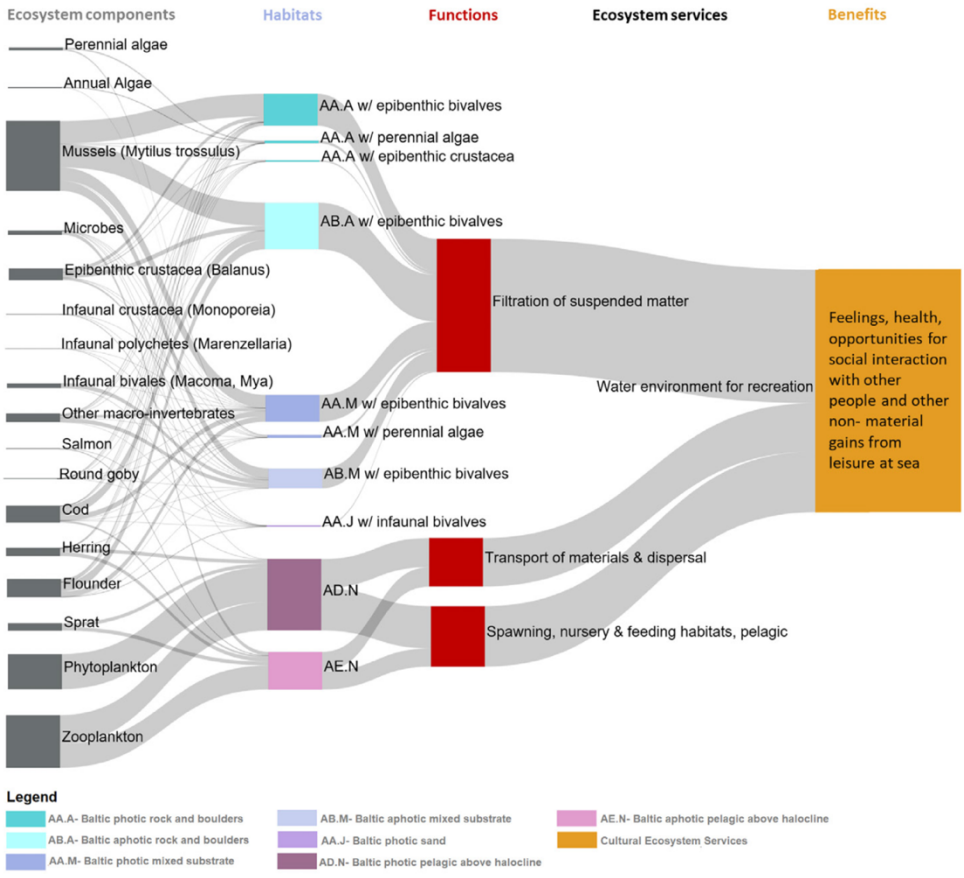


Fig. 6. Linkage diagram depicting the relative importance of species (left side) in the supply of ecosystem services (right side)

In the Danish-German aquaculture case study, a GIS suitability analysis was applied to identify potentially suitable areas for mussel farming in the south-western Baltic Sea. Three potential sites were selected for further investigation. For this purpose, a local 3D mussel farm scale model was developed with a high horizontal resolution of 10-50m, 1 metre vertical intervals and covering an area of 1.5x1.5 km. A GIS analysis and the ecological model are used to find the best locations for mussel farming in relation to nutrient mitigation potential and will be included in the MSP mapping of the case study area. The model results show the potential harvest from each site, the amount of nitrogen and phosphorus that could be removed, and the potential impacts on water transparency.

With growing pressures on marine ecosystems and on marine space, an increasingly needed strategy to optimise the use of marine space is to co-locate synergic marine human uses in close spatial-temporal proximity while separating conflicting marine human uses. The SEANERGY tool was developed as a part of the BONUS BASMATI project to facilitate a cross-sectoral approach to maritime spatial planning and to help planners and stakeholders look for co-location options. SEANERGY provides options to spatially analyse different stakeholder activities with the aim of enhancing synergies and minimising conflicts between them. The figure below summarises inputs and outputs of the four main SEANERGY tools (T1-T4) that are relevant to demonstrate cross-sectoral aspects of SEANERGY (fig. 7). The four tools produce maps and statistics that explore spatial patterns of potential synergies and conflicts between marine uses.

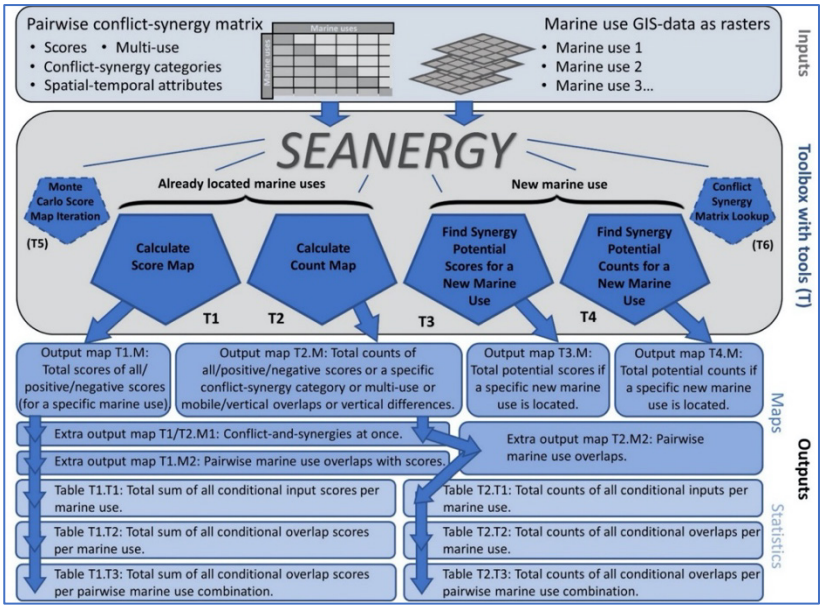


Fig. 7. SEANERGY input-output overview

Tools for supporting ecosystem-based maritime spatial planning need to consider the impacts of various maritime activities on the environment and communicate the benefits and trade-offs of different planning alternatives to stakeholders. In the BONUS BASMATI project, the MYTILUS toolset was developed to carry out high-performance calculations of cumulative impact assessment to support planners evaluate the effects of human activities on marine ecosystems and the possible conflicts between these activities. Tools for supporting ecosystem-based maritime spatial planning need to consider the impacts of various maritime activities on the environment and communicate the benefits and trade-offs of different planning alternatives to stakeholders. In the BONUS BASMATI project, the MYTILUS toolset was developed to carry out high-performance calculations of cumulative impact assessment to support planners evaluate the effects of human activities on marine ecosystems and the possible conflicts between these activities (fig. 8). Currently, the MYTILUS toolbox is being tested in the Baltic Sea, where HELCOM provides freely available Baltic Sea wide data on human activities, pressures, and ecosystems. The pressure layers available from HELCOM's data portal are used for their own assessment of the Baltic Sea Environment (HOLAS I and II) and follows the pressure layers mentioned in the Marine Strategy Framework Directive (MSFD). The figure below illustrates the flexibility and analytical capacity of cumulative impact assessment toolbox in MYTILUS.

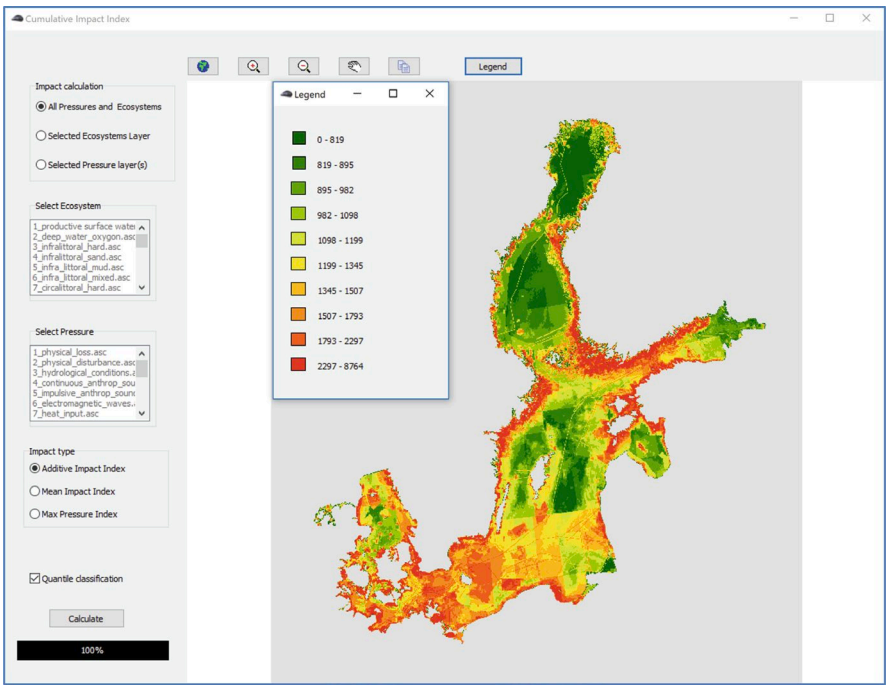


Fig. 8. Cumulative impact assessment dialog in MYTILUS

A pan-Baltic case study focused on involving the business sector in the planning process. The blue economy realm consists of various sizes and types of business operators. The business stakeholders differ from each other also in terms of authority, knowledge, capacities and interests. Both individual companies and organisations representing the blue economy sectors have their role in different planning contexts, and their views can be used to complement each other. All this emphasises the need to motivate the business stakeholders to become involved in the MSP processes. The planners perceived that willingness to participate increases when the stakeholders have an impression that they may gain or lose something.

## Expected impacts and next steps

The BONUS BASMAT project has been running in parallel to the final steps of the first maritime spatial planning round in the Baltic Sea, and generally planners and stakeholders have been very busy with this task. Nevertheless, meetings with planners and stakeholders have been arranged in most of the partner countries to spread the knowledge and tools produced by the BONUS BASMATI project to a wider audience. The Baltic Explorer have been demonstrated and tested at events in Umeå, Riga, and Copenhagen.

The MYTILUS tool for cumulative impact assessment (CIA) has gained high attention recently and was selected as one of the tools to be presented at two expert meetings in HELCOM during September and November 2020 aiming at designing the tool for CIA to be applied in HOLAS III. Outside the Baltic Sea region MYTILUS has also been invited to be presented at an expert workshop in OSPAR this Autumn.

We also envisage that the two non-technical publications “BONUS BASMATI – Supporting Maritime Spatial Planning with Science and the Handbook on stakeholder involvement as well as film telling the story about how the results from BONUS BASMATI can support maritime spatial planning can have a larger impact on MSP in practice – and particularly be valuable input the next phase of the rolling maritime spatial planning cycle.


AALBORG UNIVERSITY
DENMARK


AARHUS
UNIVERSITY


NLS
FINNISH GEOSPATIAL
RESEARCH INSTITUTE
FGI


LATVIJAS
HIDROEKOLOĢIJAS
INSTITŪTS


Leibniz Institute for
Baltic Sea Research
Warnemünde
iow


Nordregio


Turun yliopisto
University of Turku