MARINE PROTECTED AREAS EUROPE

BALTIC SEA STAKEHOLDER WORKSHOP

29th February 2024

In collaboration with
PROTECT BALTIC

Co-funded by the European Union

UK Research and Innovation

EU MISSIONS
RESTORE OUR OCEAN & WATERS
Concrete solutions for our greatest challenges

CONTENTS

INTRODUCTION

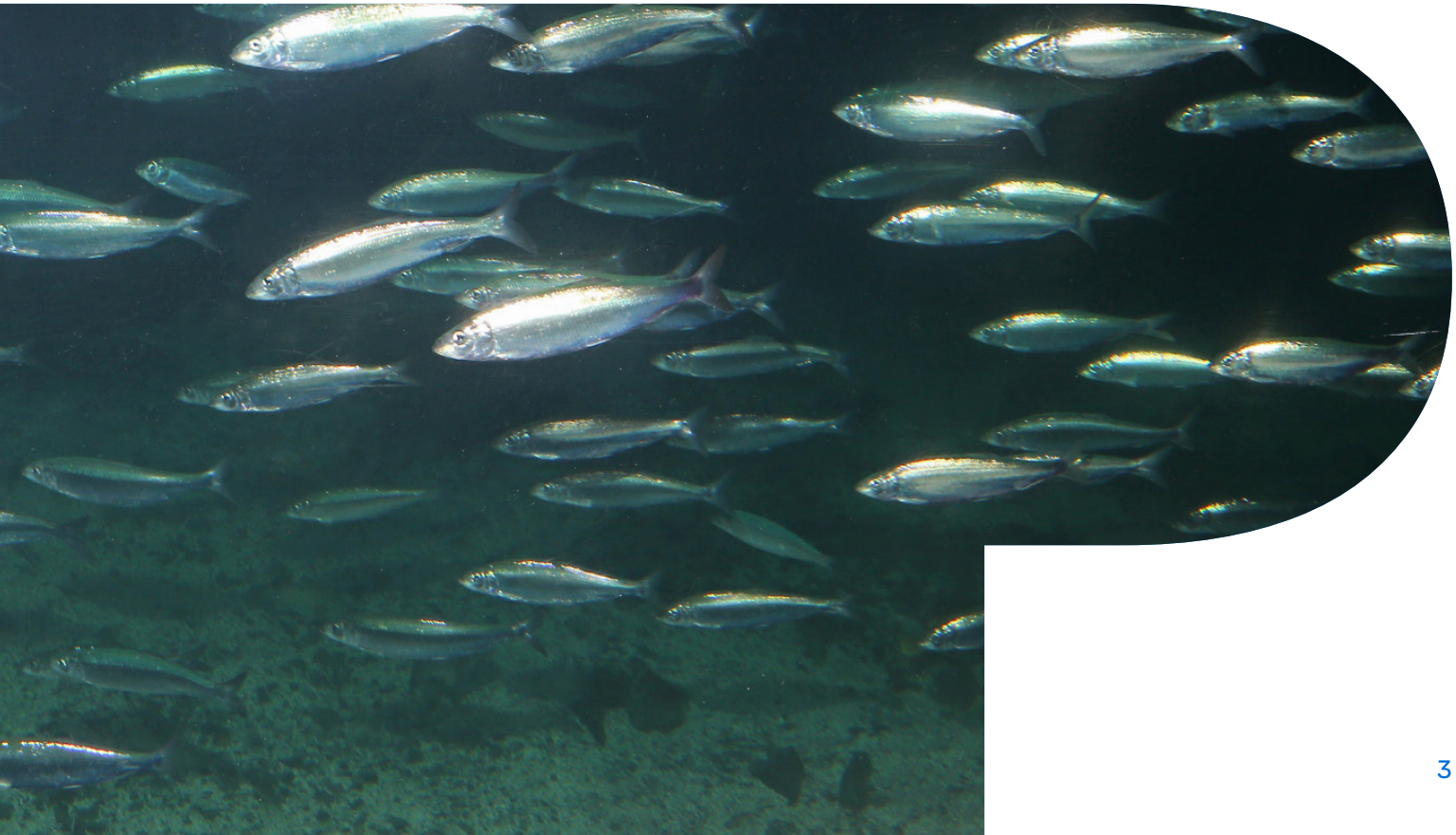
29th February 2024 was an auspicious date for stakeholders in the Baltic Sea region, as the MPA Europe project joined forces with the PROTECT BALTIC project for a major stakeholder event both online and in person at the Hanaholmen Swedish-Finnish Cultural Centre, Hanasaarenranta, Espoo, Finland.

The ambitious conference agenda to engage stakeholders from the region in the activities of PROTECT BALTIC and MPA Europe included ten in-person workshops during the day and ten separate but parallel themed workshops online at the same time. A youth conference was also hosted simultaneously online by PROTECT BALTIC. MPA Europe and PROTECT BALTIC are multi-year projects supported by Horizon Europe, with similar yet different goals and approaches, as set out below.

As part of this event six members of the MPA Europe team facilitated in-person and online workshops to present our project's aims, approaches and results to date and to discuss with the region's stakeholders how our work can support national, transboundary and regional designation of marine protected areas and science-based marine spatial planning in a changing climate.

Three of the team also participated in person in PROTECT BALTIC stakeholder workshops to contribute our thoughts on Spatial Modelling, Legal Frameworks and Marine Protected Area (MPA) Management.

This short report sets out the key discussion points from our in-person and online workshops and has been shared with all Baltic Sea stakeholders who joined the workshops and other project stakeholders not present for the discussions.



CONTEXT

The Baltic Sea is unique in the world and the special nature of this sea is borne out by our new marine ecosystem classification results for Europe, discussed below. It is young, shallow (with an average depth of only 54 m), brackish, small and isolated, but also variable. The most recent holistic assessment by HELCOM of the Baltic Sea for the period 2016-2021, HOLAS 3, reports that the Baltic is under increasing impacts from climate change and biodiversity degradation, catalysed by eutrophication, pollution, land use and resource extraction and that little to no improvement of the Baltic Sea environment occurred during the assessment period (HELCOM, 2023). The assessment reports that achieving a healthy Baltic Sea ecosystem requires measures both to limit the extent and intensity of current human-induced pressures and to protect and restore species and habitats.

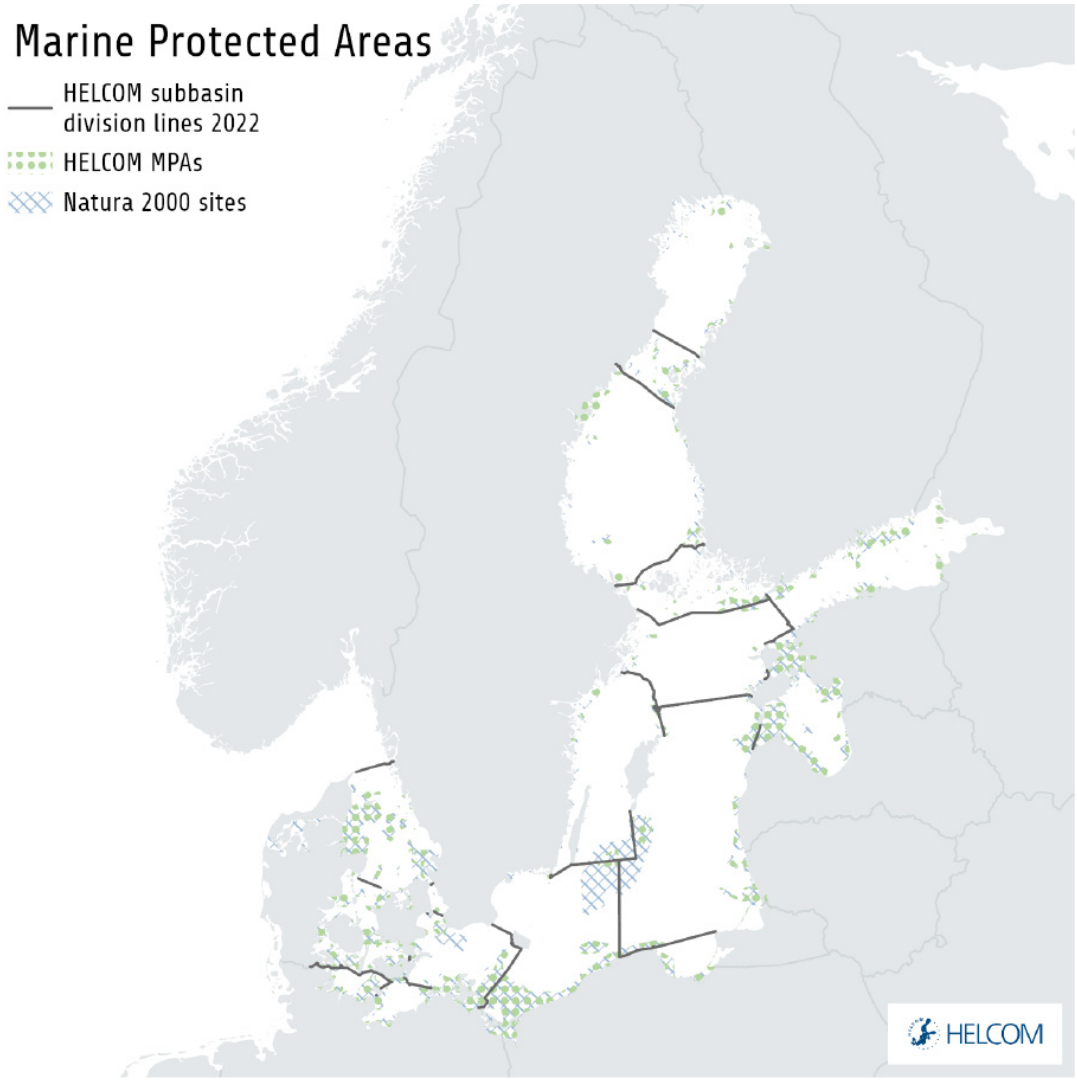


Figure 1. Current HELCOM marine protected areas 2016-2021. Source: HELCOM 2023

As noted in HOLAS 3, the current Baltic network of MPAs covers approximately 16 % of the Baltic Sea, as depicted in Figure 1. This network is expected to increase substantially in the coming years to cover at least 30% of the marine area of the Baltic Sea, of which at least one third will be strictly protected, to reach the spatial protection targets agreed upon by HELCOM countries in the Baltic Sea Action Plan (BSAP), the EU Biodiversity Strategy 2030 and the Global targets for 2030 of the UN Convention on Biological Diversity (CBD) set under the Kunming-Montreal Global Biodiversity Framework.

Networks of MPAs are important to provide connectivity across space for marine species, in addition to natural stepping stones such as seamounts and small islands. Coherent networks of MPAs should not only support connectivity for species dispersal, but also represent the full range of marine biodiversity; cover adequately large areas for species to thrive; and replicate protection of habitats and species across individual MPAs in order to insure against local damage or die-offs caused by mounting pressures such as marine heatwaves. Networks of MPAs designed to accommodate climate change will also ensure climate refugia are protected.

HELCOM has been gathering data on the marine environment for many years and there is a knowledgeable and well-connected community of actors in the region engaged in marine science, monitoring and conservation. Marine Spatial Planning (MSP) is well advanced in the region and links to national MSPs may be found here. As noted in HOLAS 3, Baltic countries that are also members of the European Union have implemented their first (or, in some cases, second) generation of marine spatial plans, in alignment with the EU Maritime Spatial Planning Directive (MSPD). Important topics for future iterations of the plans are dealing with climate change, meeting the visions of the European Green Deal, monitoring and evaluating the existing plans, and the cooperative development of coherent plans to better support an ecosystem-based approach towards reaching good environmental status. The Baltic is the first EU sea basin to establish regional structures, via HELCOM and the Vision and Strategies Around the Baltic (VASAB), to support the implementation of the EU MSPD at Member State level and to establish a regional MSP roadmap for 2021-2030, which may be found here.

As reported by WWF in its report on Maritime Spatial Planning in the Baltic (WWF, 2022):

> "A key Baltic MSP success has been in how data is collected, reported and made available through a shared database via the regional sea convention HELCOM. The convention's data hub is a valuable source of MSP knowledge as, in addition to storing spatial data, the environmental status of different sea areas is available and regularly updated by technical experts. This data is essential for Member States to adapt their resource management strategies over time, and thus improve future national maritime plans. The Baltic's cooperative approach serves as a positive example to other regional seas for how to successfully support an ecosystem-based approach to MSP."

One goal of the regional MSP roadmap is to "identify how MSP can support conservation and sustainable use in an equitable way reflecting marine protected areas (MPAs) and possible Other Effective area-based Conservation Measures (OECMs) or other areas of high natural values in maritime spatial plans (as a basis for steering harmful activities away from such areas) and identify possibilities for MSP to support the Baltic Sea Action Plan (BSAP) targets related to protected areas as well as national and regional strategies. This will include development of "Green Infrastructure maps" including ecosystem services based on HOLAS 3, 2025".

MPA Europe and PROTECT BALTIC

As noted earlier, MPA Europe and PROTECT BALTIC have similar goals and logic for effecting optimal networks of MPAs for the region. The two projects are compared below:

	PROTECT BALTIC	MPA Europe
Timing	Aug 2023- Aug 2028	Jan 2023 -April 2026
Geographic scope	Baltic Sea	All European Seas (see Figure 2)
Thematic scope	MPA network coherence, adaptive management, restoration, legislation and governance	MPA networks identification, based on systematic conservation planning, and science-based marine spatial planning
Shared interests	Coherence and connectivity of MPA networks under climate change, reflecting species and habitats modelling	
Different and complementary contributions	National datasets Assessing ecosystem services	European/global datasets Mapping and scoring blue carbon sediments and their drivers.
Shared stakeholders	National authorities with responsibility for MPAs and MSP; regional MSP bodies; NGOs and others.	

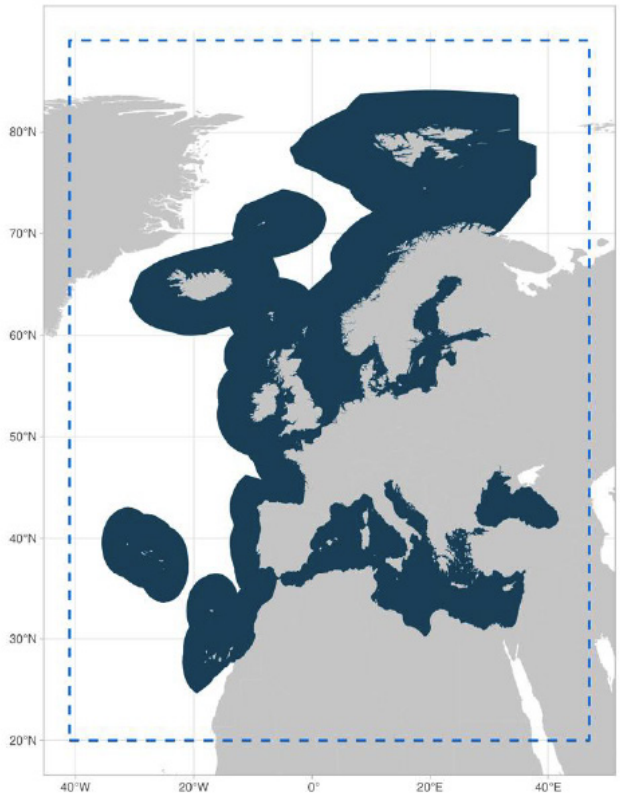


Figure 2. *Area of Study of the MPA Europe project. The dashed line depicts the expanded study area considered for model fitting of both species and habitat distribution predictions.*

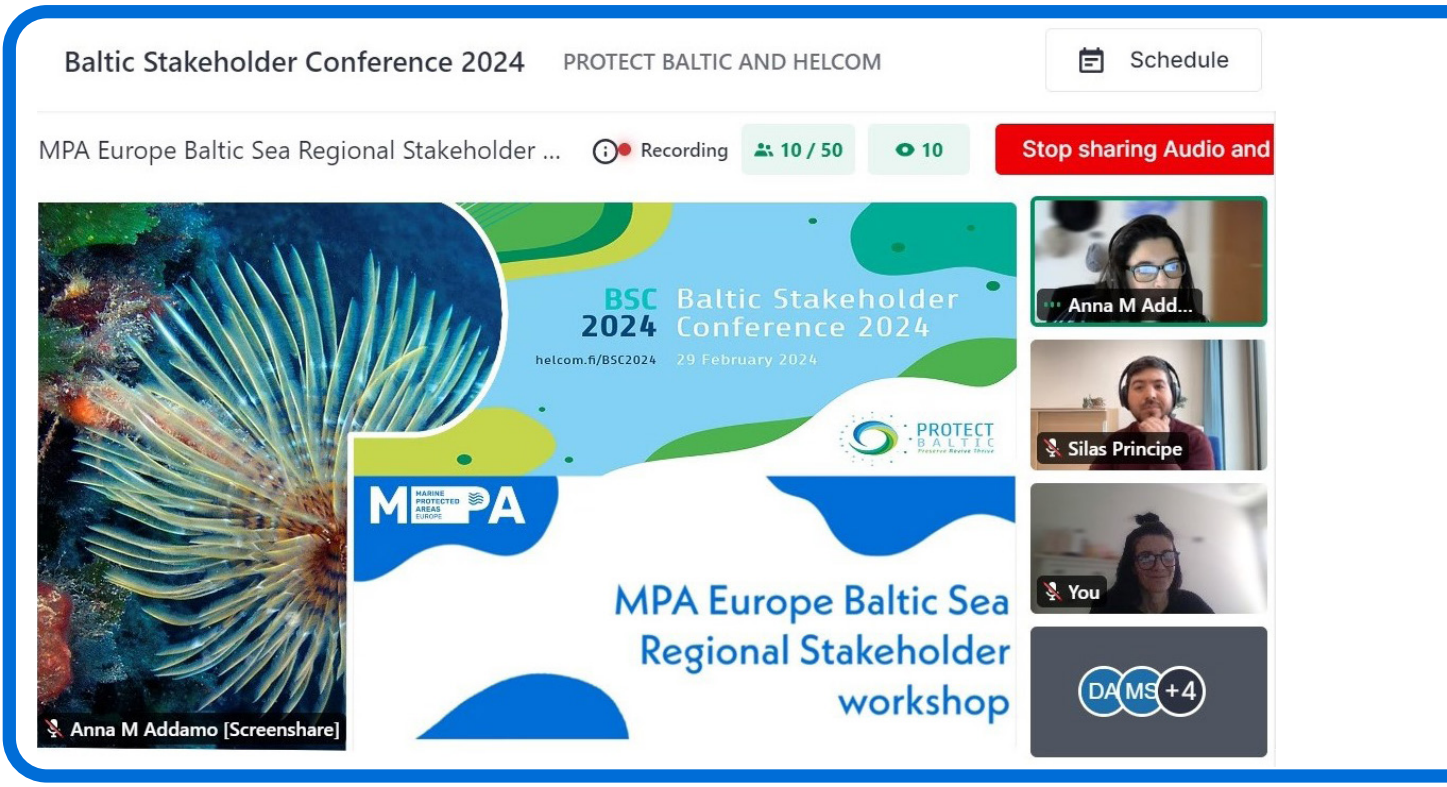
A key consideration for MPA Europe is how to integrate productively with PROTECT BALTIC and existing initiatives nationally and regionally. We are seeking opportunities to synergise with existing efforts towards marine protection and adaptive MSP and are keen to see how our atlas and results based on European and global marine biodiversity datasets compare with the results of PROTECT BALTIC in due course.

PROTECT BALTIC is using richer, more refined local data and comparison of our respective species distribution models will be a good test of the quality of the MPA Europe modelling approach. Our approach could be improved by the inclusion of absence and abundance data. Both projects will use prioritisation software (e.g., Zonation, Marxan or PrioritizR) to score areas for biodiversity richness and this presents another opportunity to share lessons and refine approaches. A comparison of our approaches to coherence will also be beneficial. Both projects will gain by reviewing the level of consistency between our respective results and describing how they inter-relate.

MPA Europe is creating a new Euro Carbon database, a scoring system and maps of blue carbon sediments across Europe, based on empirical observations, and this may support PROTECT BALTIC's work on assessing ecosystem services.

WORKSHOP APPROACH

For both our online and in-person workshops, we presented MPA Europe's goals, scientific approaches and results to date.



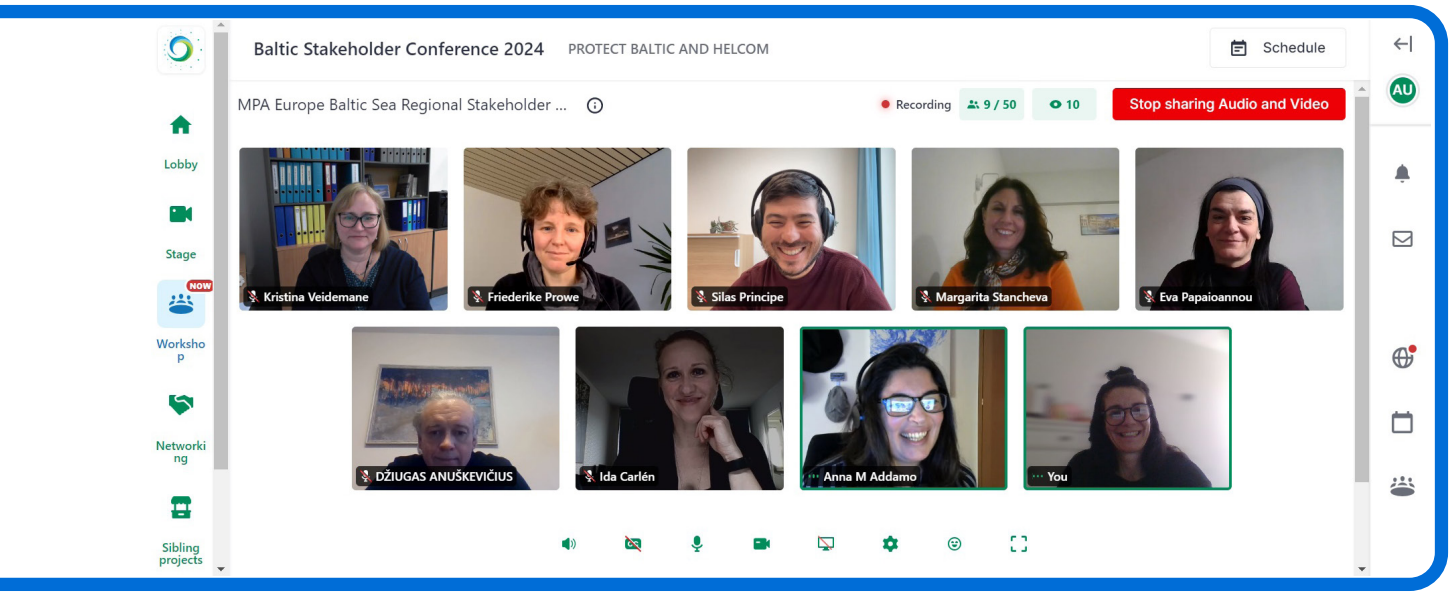
We asked stakeholders for their questions during the presentation and then we asked stakeholders to consider the following three questions:

1. *How can MPA Europe's results support science-based MSP, at national, transboundary or regional levels?*
2. *How can MPA Europe's results support strengthening existing MPAs?*
3. *How can MPA Europe's results support extending the network of MPAs in the region?*

We also asked stakeholders to propose possible use cases for the project's results.

For both workshops we held discussions among the whole group, discussing the individual comments and questions raised by our stakeholder groups. The fruits of these discussions are summarised below.

In total we welcomed 26 attendees from a range of sectors and organisations, as noted in Appendix 1.



MPA EUROPE APPROACH

We started the workshop with a presentation on MPA Europe (available here). This included presenting the goals and scope of the project; the systematic approach to modelling that we have adopted; our results to date; the need for MSP to balance marine protection with other uses of the sea and our stakeholder engagement goals and work to date.

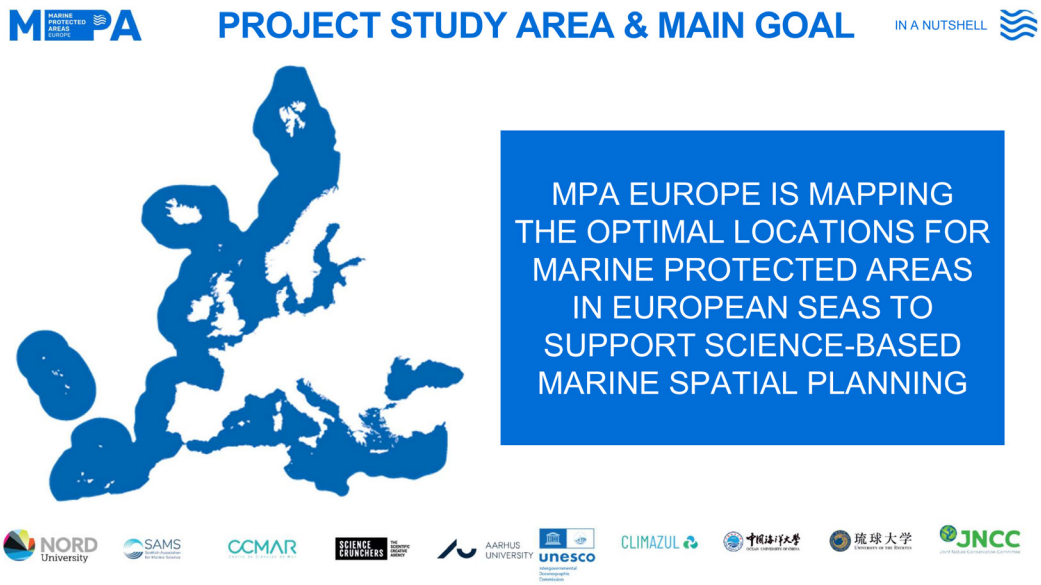


Figure 3. *Goal of MPA Europe*

In a nutshell, MPA Europe is mapping the optimal locations for marine protected areas in European seas to support science-based marine spatial planning. Conservation and restoration of marine ecosystems underpins sustainable use and the blue economy, and therefore the two concepts should be taken together as a single goal for MSP, rather than separated. For example, many studies show how MPAs rebuild fisheries and sustain tourism, whilst safeguarding biodiversity and helping to adapt to climate change (Costello, 2024). Areas with no or very few pressures are essential to understand what Good Environmental Status (GES), as defined by the Marine Strategy Framework Directive (MSFD), looks like and to act as controls for comparison with similar areas under a range of human pressures.

Rather than bias our approach to particular species or habitats, we take a holistic, data-driven approach to map the full range of marine biodiversity and of blue carbon stores so that protection of either or both can be optimised under a changing climate. Our results will be shown in an online atlas in 2025 and available for use by marine spatial planners and any other stakeholders with an interest in optimising networks of protected areas or in particular groups of species or habitats.

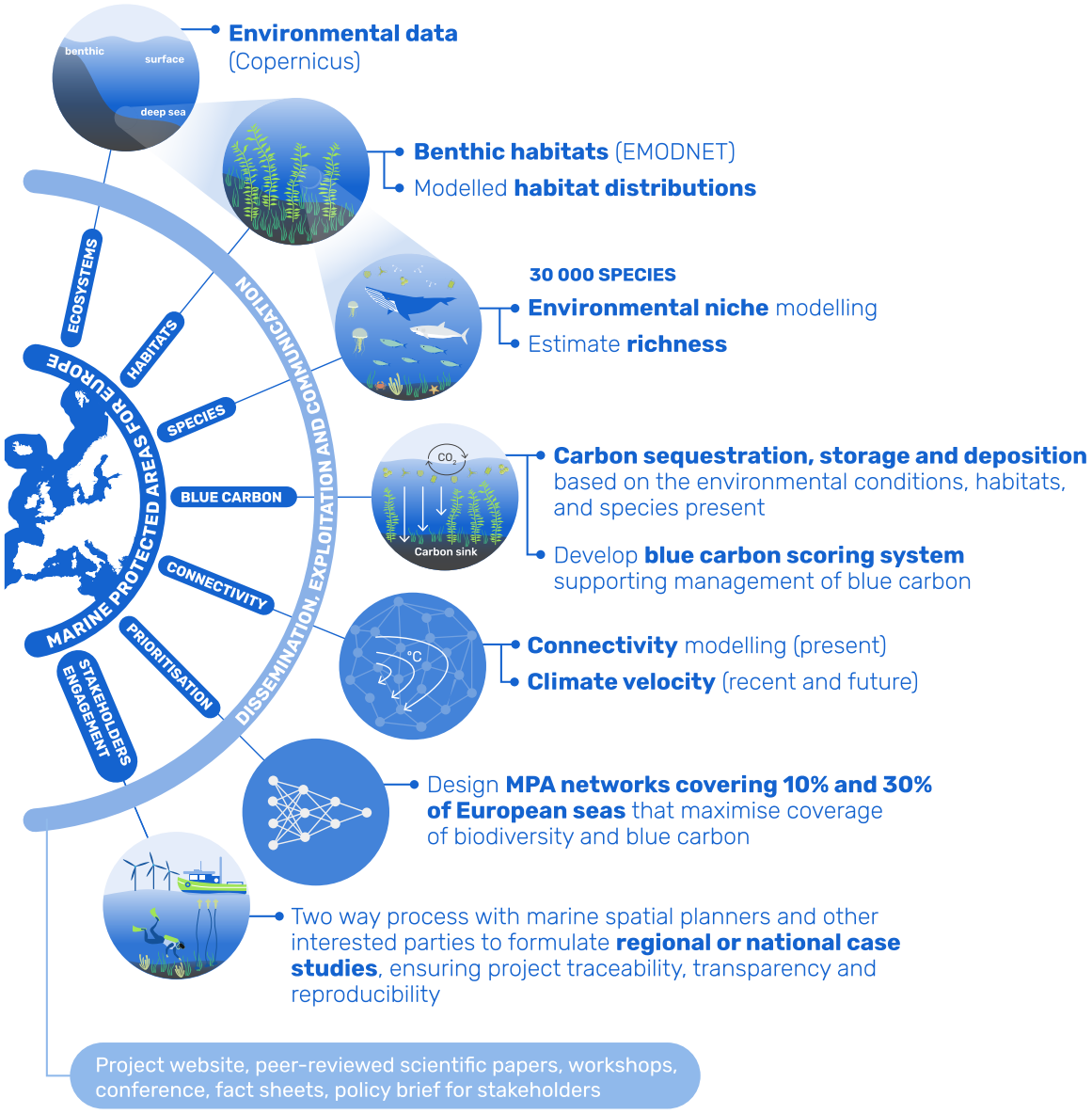


Figure 4. *MPA Europe Approach through Work Packages*

Whilst MPAs are ultimately a societal choice, we think it is also essential that decisions regarding the establishment of networks of MPAs are informed by an understanding of how species are currently distributed and how this may be impacted by climate change. As the Intergovernmental Panel on Climate Change notes, protected areas are key elements of adaptation, but they need to be planned and managed in ways that take account of climate change, including shifting species distributions and changes in biological communities, and ecosystem structure and function (IPCC, 2022). Adaptation to protect ecosystem health and integrity is essential to maintain ecosystem services, including for climate change mitigation and the prevention of greenhouse gas emissions.

We do not constrain our analysis to particular habitats and species but consider all marine biodiversity groups, except for the Viruses, Protozoa, Fungi, Bacteria, and Archaea kingdoms. Modelling the ranges of species using spatially standardised data layers can remove the bias inherent in using sampling data alone.

In 2025 we will run prioritisation scenarios at regional, country and territorial seas levels, and we expect that regional prioritisations of networks of protected areas will be more efficient in maximising the range of biodiversity that is protected than the cumulative combination of national or sub-national prioritisation analyses. This type of analysis can support the incorporation of MPAs in MSP at regional, transboundary and national scales.

MPA EUROPE RESULTS TO DATE

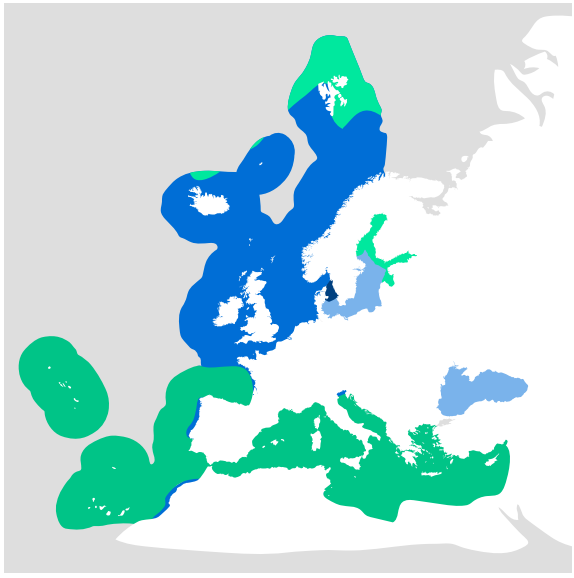
Our results so far include the following:

1. The first marine ecosystem classifications for Europe's waters

The term ecosystem is used very loosely but is imbedded in European and international policies. For data-driven systematic conservation planning we need a data-driven definition. Thus, we use the original "ecosystem function" concept as a region where energy flows are greater within the area than between adjacent areas, and we use ecologically relevant environmental variables to demarcate these areas.

For the purposes of the MPA Europe project, "ecosystems" are defined as "enduring, spatially bounded environments where biological and energy interactions are greater within than with other ecosystems" (Zhao et al., 2019). These classifications are driven by a wide range of spatially complete and standardised environmental data that reflect both ecosystem conditions and functioning. Our methodologies and data parameters may be found here.

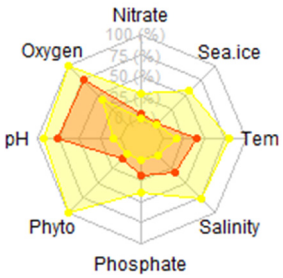
Using this basis, we created the first marine ecosystem classification for surface and near seabed waters of Europe and then created an additional depth-integrated marine ecosystem classification for Europe. Overall our analysis yielded eight distinct clusters across the different depth ranges for the project area, each defined by a set of environmental variables: dissolved molecular oxygen, nitrate, ocean temperature, pH, phosphate, phytoplankton, salinity, and sea ice cover. Three of the eight clusters we identify are relevant for the shallow Baltic Sea (Figure 5).



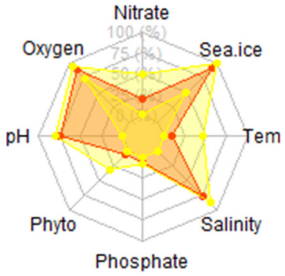
Overall most of the Baltic Sea's waters fall within cluster 3, which is characterised by the lowest salinity among the clusters, along with relatively high dissolved oxygen, low to moderate nitrate levels, average ocean temperature, slightly alkaline pH, low phosphate levels, and moderate phytoplankton levels.

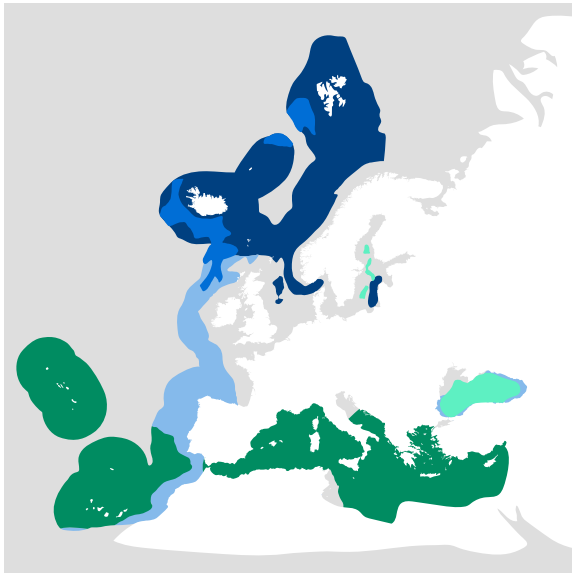
Cluster 1 is the only cluster featuring sea ice and also demonstrates relatively high oxygen levels and moderate nitrate concentrations, with a narrow temperature range suggesting stable conditions. Surface waters in the Gulf of Bothnia, Gulf of Finland and Gulf of Riga fall within this cluster.

Cluster 3



Cluster 1





Finally, at 150 m depth, the Northern Baltic Proper and the Eastern Gotland fall within Cluster 4, which displays moderate oxygen levels and nitrate concentrations, and (like Cluster 1) a narrower temperature range. Further details of the cluster analysis and methodology may be found here.

Cluster 4

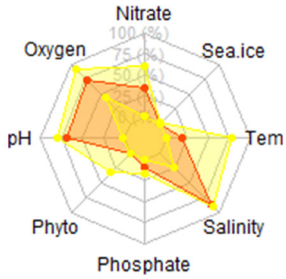


Figure 5. *The three marine ecosystem clusters based on environmental data (oxygen (Oxygen), nitrate, ocean temperature (Tem), pH, phosphate, phytoplankton (Phyto), salinity, sea ice cover (Sea.ice)), by depth found for the Baltic Sea. Source: MPA Europe*

This analysis highlights that the Baltic Sea's particular environmental conditions support unique assemblages of flora and fauna and hence the need for a self-contained regionally coherent, network of marine protected areas in the European context, which nonetheless incorporates connectivity to other marine ecosystems through transition zones such as the Kattegat. Maintaining connectivity across transitional areas between different marine ecosystem clusters through MPAs is important in supporting climate-induced range shifts (Assis et al., 2021). Connectivity and climate change impacts on it should be factored into adaptive MSP (Abecasis et al., 2023).

2. Maps of species richness in European seas based on multiple indicators

Our species distribution models are based upon actual observations, statistical estimators, and modelled geographic range maps. We found over 30,000 marine species within our study area with available occurrence records in at least one of the data platforms we used, and 606 species were chosen for testing our framework and were modelled as part of this work. We expect to model the ranges of ~15,000 species by the end of the project. Our methodology (Figure 6) may be found here and species distribution models will be published on the Ocean Biodiversity Information System (OBIS) database later this year.

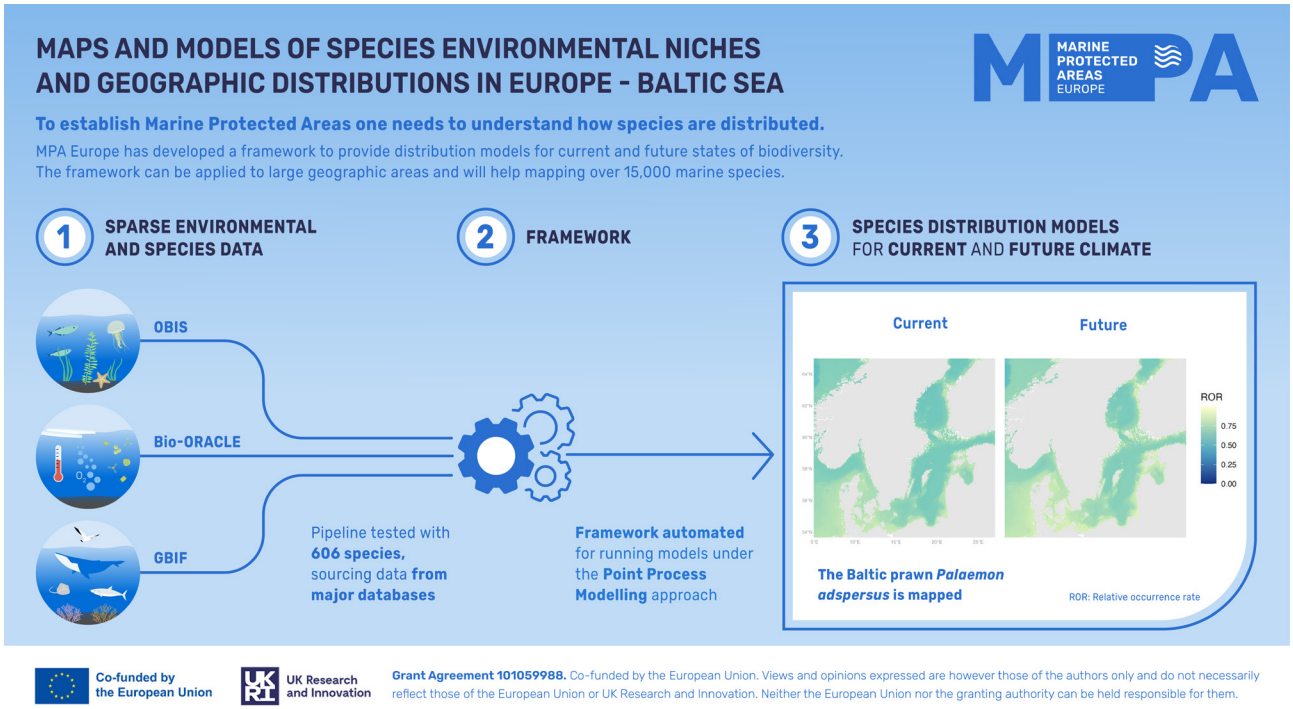
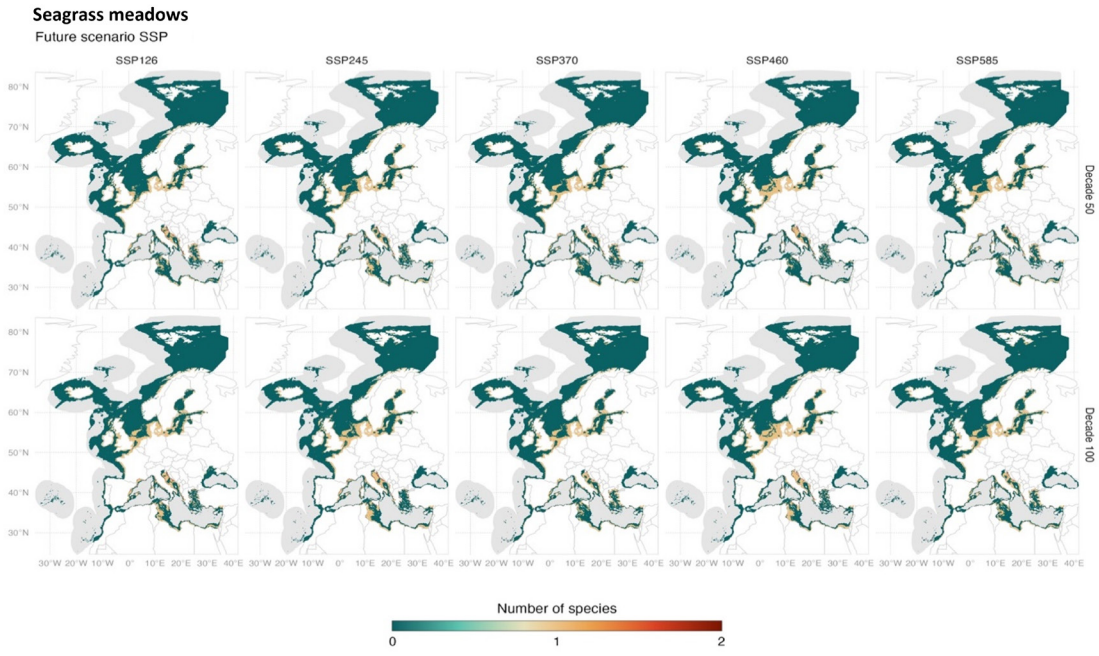


Figure 6. *Infographic on methodology framework used to produce species distribution maps. Source: MPA Europe*

3. Potential geographic distributions of important biogenic habitats in European seas

Habitat-forming species significantly alter their environment by enhancing its structural complexity, thereby creating resources that support a richer diversity and abundance of species. We used Stacked Species Distribution Models to begin to forecast the distribution of biogenic habitats across European seas, considering nine distinct groups of habitat-forming organisms (see e.g. Figure 7). These groups include habitat forming algae; bryozoan reefs; cold-water coral reefs; coralligenous platforms; deep-sea sponge grounds; mollusc reefs (composed of Gastropoda and Bivalvia species); polychaete reefs (mainly Sabellaridae); seagrass meadows; and shallow-water sponge reefs. The list of species modelled so far and the methodology we used may be found here. We continue to refine our modelling framework and the more complete habitat range maps and results will be compared to the biogenic habitat maps available on the European Marine Observation and Data Network (EMODnet) platform.

Figure 7. *Examples of biogenic habitat (seagrass meadows) distribution and prediction maps under different climate scenarios. On the right, the predicted current distribution of two species. Below, the predicted future distribution of the same species considering five climate scenarios (i.e. Shared Socioeconomic Pathways (SSPs) defined by International Panel on Climate Change (IPCC)) over two time periods (2050, marked as decade 50, and 2100, marked as decade 100). The five SSPs exploring possible future socioeconomic and climate pathways are: SSP1-2.6 (Sustainability ("Taking the Green Road") - low GHG emission); SSP2-4.5 ("Middle of the Road" - intermediate GHG emission), SSP3-7.0 (Regional Rivalry ("A Rocky Road") - high GHG emission); SSP4-4.60 (Inequality ("A Road Divided")), and SSP5-8.5 (Fossil-fueled Development ("Taking the Highway") - very high GHG emission). Source: MPA Europe*



4. Sedimentary blue carbon database and maps

Marine sediments are one of the major organic carbon (OC) reservoirs on the planet and the efficiency of these sinks are important in regulating earth's climate. The protection of carbon sinks requires data on their location and size as well as knowledge on drivers. Blue carbon research has mainly focused on the management of vegetated coastal habitats to protect and increase their capacity to capture carbon dioxide and retain OC while also supporting biodiversity and other key ecological functions. The blue carbon concept is expanding, and marine sediments are categorised as "emerging blue carbon ecosystems" where human action may be able to increase these sinks. In addition to further studies on how protection may affect marine sediment OC levels, there is a need for a robust understanding of the factors controlling these. However, despite decades of research into the factors controlling OC storage, relatively few larger scale studies have attempted to link OC levels across diverse seafloor habitats with variables regulating these standing stocks.

In April 2023 the scientific community was invited to contribute data to establish a Euro-Carbon database of Total Organic Carbon (TOC) stocks in marine sediments, i.e., blue carbon. Researchers were encouraged to submit both previously published and unpublished data. For this purpose, we created a template that all contributors used. The current version of the database contains the data received so far and the final database will, in addition, encompass data from existing databases and scientific literature. Key information on sampling sites, methods and analytical techniques were provided along with the data. From our data call, we received 34,815 data entries (updated on 31st October 2023) of which 25,751 consisted of TOC values that were specified as "directly measured". Averaging the TOC values from the top 10 cm of each sediment core, we obtained 6,847 unique datapoints.

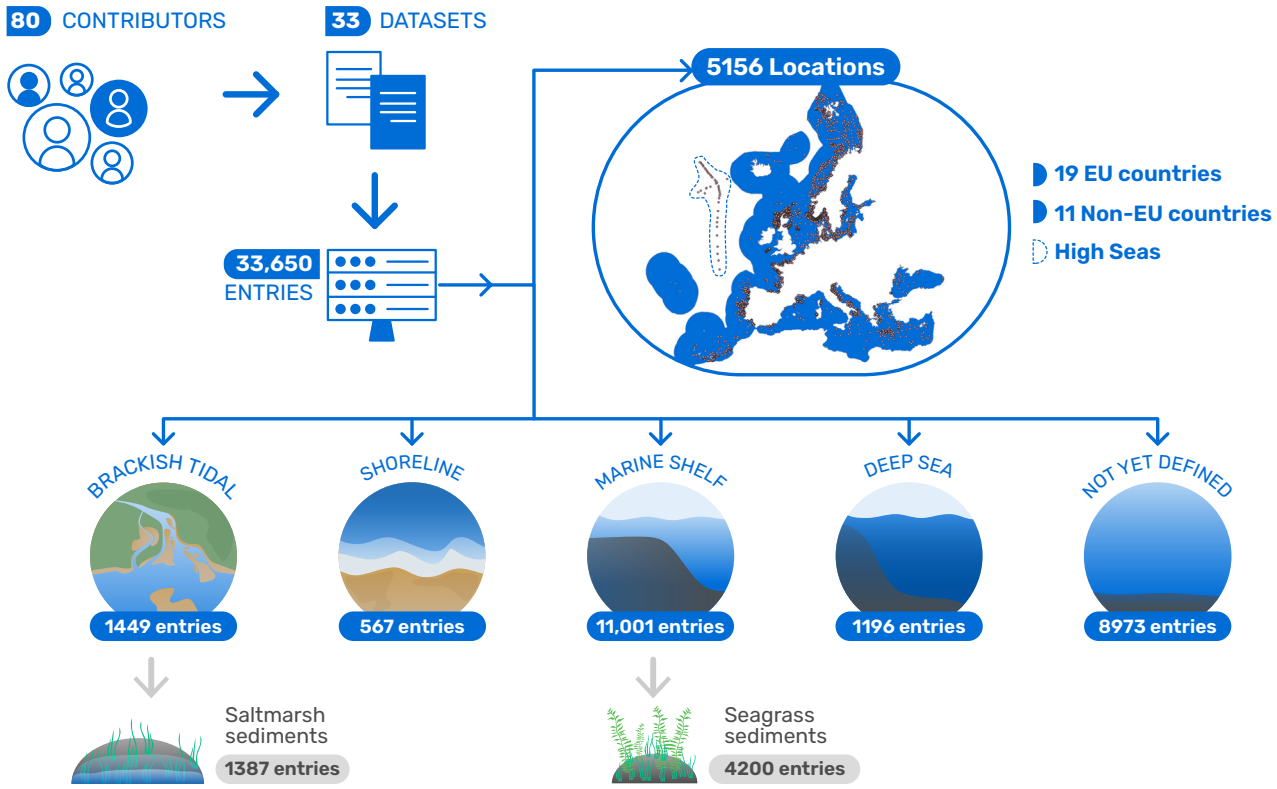


Figure 8. *Infographic on the MPA Europe Euro-Carbon database at a first glance. Overview of the data received until 31st October 2023. Please note that this does not represent the final version of the project output. Source: MPA Europe.*

Our results show that the main environmental predictors of sediment OC levels were wave exposure (which also drives patterns of biodiversity), maximum temperature, distance from shore and water depth, with highest OC content in sheltered, cool, shallow near-shore locations. The highest OC contents were generally found in muddy sediments, saltmarshes, seagrass meadows (in particular meadows of Posidonia oceanica) and in fine mud and coarse and mixed sediment substrata. These findings lay the foundation for developing a blue carbon scoring system and related blue carbon maps in subsequent tasks. The scoring system will allow us to classify the "blue carbon" levels of different sea basins based on a combination of environmental drivers and habitat characteristics. The blue carbon maps will, together with the biodiversity maps for species and biogenic habitat distributions, serve as a basis for proposing a network of MPAs that maximises marine biodiversity and carbon stocks across European seas as part of a systematic conservation planning approach.

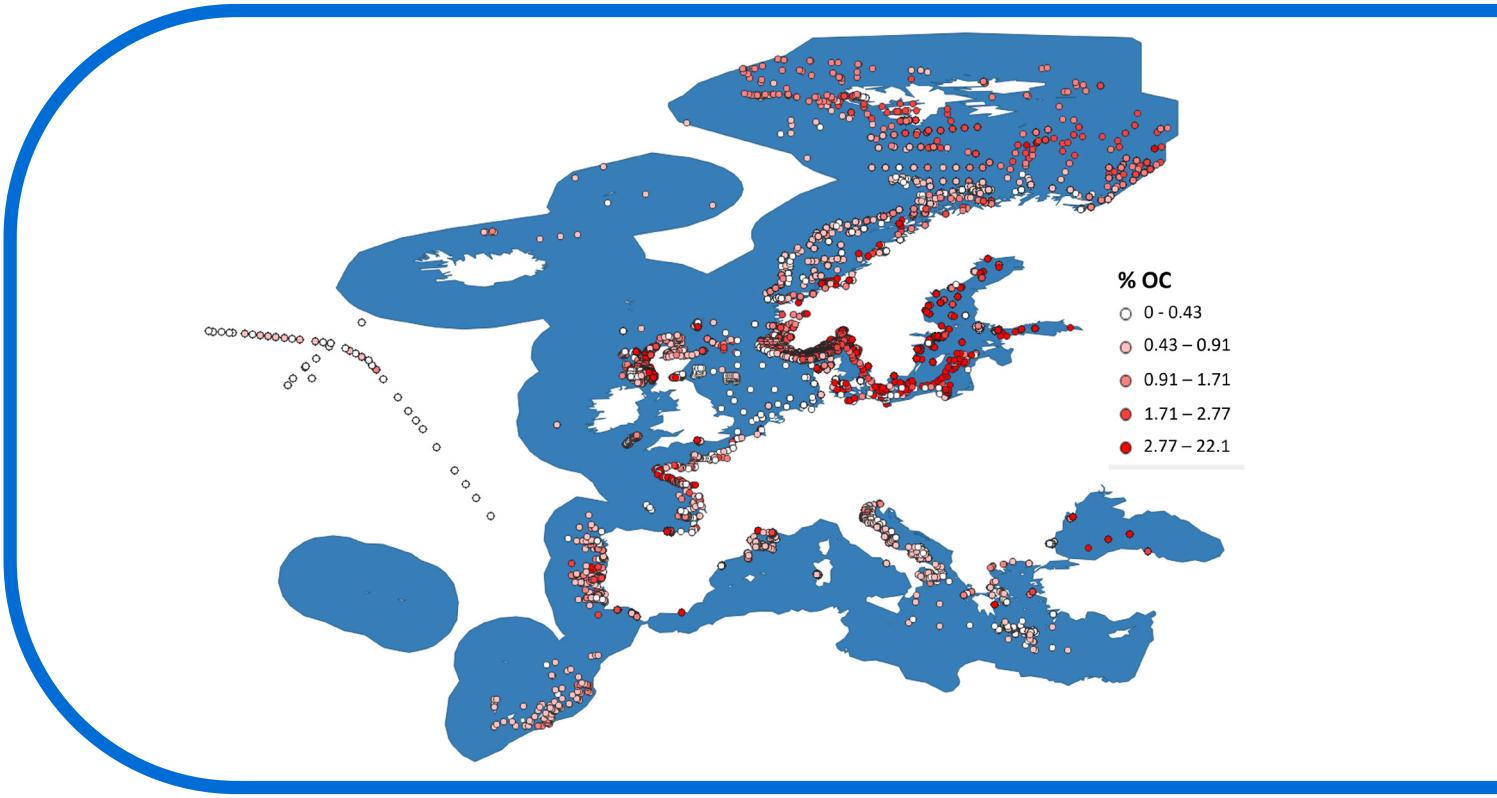


Figure 9. *Map showing the spatial distribution of the sediment organic carbon (OC in %) observations included in the MPA Europe Euro-Carbon Database. The MPA Europe study area is in blue. Source: MPA Europe.*

STAKEHOLDER FEEDBACK

As noted earlier, after answering questions from stakeholders, we asked our participants to consider the following three questions:

1. *How can MPA Europe's results support science-based MSP, at national, transboundary or regional levels?*
2. *How can MPA Europe's results support strengthening existing MPAs?*
3. *How can MPA Europe's results support extending the network of MPAs in the region?*
4. *We also asked stakeholders to propose possible use cases for the project's results.*

All the key discussion points are set out below.

KEY POINT	IN DETAIL
How can MPA Europe's results support science-based MSP?	
MPA Europe's results can assist transboundary and regional MSP, but could be too coarse for planning at national level.	Our scale is 5 km which is better suited to regional planning in the Baltic, where finer level data is already available for species. However, a comparison between MPA Europe's results for MPA networks prioritised at either national or regional level with those protected areas planned or pledged by national authorities may provide new evidence and insights for MSP.
Marine spatial planners need to switch between different plan scales.	Regional planning informs Europe-wide planning and vice versa. Please reflect on this for case studies.
Projects like MPA Europe and sister projects can bridge the divide between MPA and MSP communities and increase the interchanges between MPA and MSP policy and decision makers.	Marine management and regulation is very siloed in Europe, mitigating against effective marine protection. Stakeholder engagement across disciplines, sectors and levels is important to share knowledge and find common ground for developing solutions.
Please include Birdlife bird sensitivity maps approach for supporting bird-friendly MSP.	MPA Europe or Birdlife can compare our bird distribution methods and maps with Birdlife's analysis of Important Bird Areas (IBAs) and identify any scope to improve our models or vice versa. We can consider IBAs as a potential additional comparative layer; also IMMAs (Important Marine Mammal Areas), ISRAs (Important Shark and Ray Areas) and Convention on Migratory Species (CMS) data.
Identify priority biodiversity/protection zones for MSP.	Work from Finland has shown that raising priority areas for protection helps ensure beneficial implementation and impactful MSP.

KEY POINT	IN DETAIL
Connectivity of MPAs needs to be respected in MSP. The identification of refugia and climate change analyses are also key for adaptive MSP.	Both MSP and the identification of future MPAs need to consider the likely effects of climate change on the ranges of species. MPA Europe's models can provide insights on this and prioritise climate refugia in optimal MPA network design to help future-proof MSP. All the results of MPA Europe including the network analysis will be helpful for MSP and informing extending MPA networks.
Blue carbon mapping will be particularly useful for MSP. Including other blue carbon habitats beyond seagrass and saltmarsh (e.g., muddy sediments) would add value for MSP.	Seagrass and saltmarsh areas are already protected in the North Sea, for example, by Germany. But it is helpful to know more about other blue carbon stores. For Latvia the blue carbon data will be very valuable when we talk about climate policies and as a new consideration for MSP.
Could shipping be treated as a "species" for MSP?	Mark had mentioned the idea that locations for wind farms could be modelled based on environmental data layers. Could the same idea apply to shipping and shipping lanes?
It is important to keep the database/dataset created by MPA Europe updated for MSP and future MPAs as conditions change.	All MPA Europe's results are open access and our atlas will be made available online. Species distribution models will be published on OBIS and available to the scientific community to use and adapt. The updating aspect is still under discussion.
Improved ecological data and criteria are crucial but socio - economic criteria are also needed for MSP. This is being developed by MSP4BIO therefore synergies are important.	MPA Europe is actively collaborating with sister initiatives including for example MSP4Bio and PROTECT BALTIC. We are open to working on joint case studies with any stakeholders, including sister projects.
How can MPA Europe's results strengthen existing MPAs?	
The blue carbon database provides added value, including for existing MPAs.	There is an opportunity to communicate the role of protected areas in meeting climate goals and integrate with national/EU policies. Use location-based blue carbon rates, .e.g., HOLAS 3 results.
Compare MPA Europe results with national and regional data on MPAs.	MPA Europe may provide new data or insights for existing MPAs, and/or generate new research questions.

KEY POINT	IN DETAIL
Good quality maps can assist stakeholders in consultations on MPA boundaries.	Good spatial maps such as species distribution models can support stakeholder consultations when justifying new MPA boundaries. MPA Europe's species models will be made freely available online, e.g. via OBIS
MPA Europe's results can support and improve the management of legally designed MPAs.	Data and information could be used to improve and update protected area management plans.
Consider key functional habitats and species that are most threatened.	MPA Europe's models can indicate where species of particular interest may be found. It is a matter of national and regional choice about prioritising areas as MPAs and which to highly protect, in particular.
Ships can be re-routed to avoid forthcoming MPAs or key biodiversity areas.	It is possible for shipping to avoid important areas for biodiversity, but this information needs to be known well in advance, for effective itinerary planning. This point emphasises the role MSP can play in bringing different sectoral stakeholders together.
Have you considered geodiversity and abiotic values?	The Baltic has unique geological formations which influence patterns of biodiversity; have you considered these factors? MPA Europe is only considering marine environmental data, but we think this would be a great research topic.
Temporal resolution: are you considering seasonal dynamics?	For marine spatial planners this is also very important. Models that include seasonal variation are very interesting, however MPA Europe considers long-term climatology in its data modelling approach rather than shorter-term factors.
How can MPA Europe's results support extending the network of MPAs in the region?	
How can MPA Europe's biodiversity richness maps be used to extend the MPA networks?	A potential use of results is to integrate the network of existing MPAs for the Baltic Sea within our prioritisation process.
What is MPA Europe's methodology for assessing integrity, connectivity and coherence of MPA networks?	This will help with integrating MPA Europe's results with existing projects and initiatives in the region, including PROTECT BALTIC. For example, connectivity is already being integrated into prioritisation of new MPAs.

KEY POINT	IN DETAIL
Please include new Important Bird Areas in 30 by 30 pledges.	It is for Member States to designate their MPAs. As noted above, MPA Europe could consider how to incorporate data on IBAs, IMMAs, ISRAs, and the CMS for a fuller representation of key biodiversity areas in the MPA network design. However, we have no spatial information on pledges submitted by Member States.
There is a need to raise awareness and educate the business sector and civil society on MPA networks.	The need for urgent biodiversity protection is not as widely understood as the need to address climate change. Understanding why coherent networks of MPAs are needed must be shared with non-scientific audiences, and their significance clearly conveyed. MPA Europe analysis and results can help companies to move toward sustainability, optimizing the selection of the areas where activities could be developed with minimal impacts on marine life.
MPA Europe results can benefit those countries that have yet to pledge new MPAs, but also those that have already reached the 30% .	For example Latvia has protected 15% of its marine environment so far, MPA Europe's results could be used to help identify new areas. Germany has reached already the 30% and MPA Europe's results could be useful to update or modify MPAs and /or MSP in future.
Blue Carbon results could be used as an additional criterion to identify new protected areas	This criterion could complement other criteria used such as those based on the Habitat and Bird Directives, on ecosystem services etc. while simultaneously contributing to climate related targets. Adding a Habitat and Birds Directives/Natura 2000 information layer to MPA Europe maps could be useful.
Do you have suggestions for potential case uses?	
Compare MPA Europe's prioritisation in Finland with local analysis.	Compare results with those of Finnish Velmu inventory programme for marine biodiversity.
Compare MPA Europe's prioritisation for Åland with the LIFE Biodiversea project.	
Compare MPA Europe's results with HOLAS 3 aggregated Green Infrastructure/ ecosystem services maps for the whole of the Baltic Sea.	Green Infrastructure Mapping can inform MPAs, OECMs (Other Effective Conservation Measures) and MSP.

KEY POINT	IN DETAIL
Compare MPA Europe results with cumulative impact maps, e.g., HOLAS 3 Spatial Pressure and Impact Assessment results.	
Test stakeholder sentiment on marine protection versus decarbonisation.	Conduct a survey or study with business and civil society.
Different modelled scenarios for new MPAs can support national discussions with policymakers.	For example modelling for Birds and Habitats Directives species, or broader groups, along with blue carbon maps.
Do you have any other comments or questions?	
Consider business and public perceptions of protecting marine biodiversity.	This topic is not treated with the same urgency as climate change and decarbonisation. There is a big role for ocean literacy education and communication.
What is your threshold or concentration of biodiversity for mapping?	We derive range models for species, based on environmental conditions and observations. We do not have data on lack of presence or abundance, both of which would improve our models.
Provide a clear methodology on the state of ecosystems and response to pressures.	We do not consider the state of ecosystems. We are mapping where most marine biodiversity is, in order to identify which areas to protect for maximum conservation effectiveness. However, stakeholders can compare our atlas with cumulative impact maps/human layers.
Have you considered invasive species and their effects on the ecosystem?	Our models include all species for which sufficient occurrence records exist in OBIS. Invasive species may therefore be included in our maps.
How do inland waters impact marine biodiversity?	The health of freshwater systems in the Baltic region has a strong influence on the condition of marine habitats and the species they support. Removing pressures on inland waters will improve conditions in the marine environment, both within and beyond MPAs.
Can MPA Europe clarify terminology with stakeholders related particularly to ecosystems and habitats classification?	For example, what do we mean by biogenic habitats and how does this term relate to corresponding terms used in the Baltic? MPA Europe can explore creating a mapping table between ecosystem/habitat classification systems used by our project and those used by HELCOM and others in the region.

KEY POINT	IN DETAIL
MSP4Bio have created an app bringing a lot of relevant data together which may benefit stakeholders.	The app may be found here.
What is the difference between the two categories of sandy mud and muddy sand on slide 28, which have different organic carbon content levels?	The classification is based on EUNIS and the Folk sediment triangle used to determine the type of sediment. The sandy mud is predominantly mud (50-90%) with some sand (10-50%), the muddy sand mostly sand (50-90%) with some mud (10-50%).
There are many uses of your project's results beyond MSP.	It is always helpful to have broader information available on the marine environment. It is also important to keep this information updated as conditions change.

NEXT STEPS

We would like to thank the PROTECT BALTIC team for supporting a joint approach to convening stakeholders, and all stakeholders who were able to join us for sharing their feedback.

MPA Europe will co-host three further regional workshops this year, for the Atlantic and North Sea region, the Mediterranean Sea region and the Black Sea region, to seek stakeholder feedback following the same approach as for the Baltic Sea region. The outcomes of these regional discussions will inform our Policy Brief in 2025.

MPA Europe will also host an international conference on MPAs in MSP in July 2025 in Bodo, Norway. We encourage stakeholders to save the date and register here for updates.

We invite stakeholders to contact us with any further suggestions for case studies or to discuss any of these in more detail.

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APPENDIX - Workshop Participants

Organisation	Which sector do you represent?	Country of organisation	Attending
Baltic Environmental Forum	Enviromental NGO	Latvia	In person
GTK	Scientific and research institutes	Finland	In person
HELCOM Secretariat	HELCOM Secretariat	Finland	In person
s.Pro-Sustainable projects/ SUBMARINER Network	Consultancy/Sustainable Blue Economy Network organisation (Baltic Sea and beyond)	Germany	In person
Baltic Sea Advisory Council	Regional body	Denmark	In person
OTOP/BirdLife Poland (Polish Society for Protection of Birds)	Environmental NGO	Poland	In person
Marine Stewardship Council	International organization	Finland	In person
Estonian Fund for Nature	Environmental NGO	Estonia	In person
HELCOM Secretariat	HELCOM	Finland	In person
HELCOM	HELCOM	Finland	In person
Åbo Akademi	Scientific and research institutes	Finland	In person
Estonian Water Association (belonging into CB and GWP CEE)	International organization	Estonia	In person
Lithuanian Ministry of the Environment	National authority or ministry	Lithuania	In person
CLIA - Cruise Line International Association	Business association	Belgium	In person
Latvian Institute of Aquatic Ecology	Scientific and research institutes	Latvia	In person
Ministry of the Environment	National authority or ministry	Finland	In person
HELCOM Secretariat	HELCOM Secretariat	Finland	Online
Bird Life Europe	Environmental NGO	Belgium	Online
MINISTRY OF ENVIRONMENT	National authority or ministry	Lithuania	Online
GEOMAR Helmholtz Centre Ocean Research Kiel	Scientific and research institutes	Germany	Online
BioConsult GmbH & Co. KG	Consultant on MSP & MSFD	Germany	Online
CCB/Swedish Society for Nature Conservation	Environmental NGO	Sweden	Online
Baltic Environmental Forum - Latvia	Environmental NGO	Latvia	Online
Center for Coastal and Marine Studies (CCMS)	Research foundation	Bulgaria	Online
PROTECT BALTIC	Horizon project	Finland	Online
Nefco	International organization	Finland	Online

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