D6.2: Policy solutions for biodiversity conservation in marine and maritime policies

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Acronyms

PS – Policy solutions

MSP – Maritime spatial planning

MPA – Marine protected area

EU – European Union

GNSBI - The Greater North Sea Basin Initiative

HELCOM – Helsinki Commission

OSPAR – Oslo-Paris Convention

ICZM – Integrated coastal zone management

CFP – Common Fisheries Policy

GES – Good environmental status

MSFD – Marine Strategy Framework Directive

DG MARE – Directorate-General for Maritime Affairs and Fisheries

DG ENV – Directorate-General for Environment

EMODnet – European Marine Observation and Data Network

EMFAF – European Maritime, Fisheries, and Aquaculture Fund

CoP – Community of practice

CBD – Convention on Biological Diversity

UNEP – United Nations Environment Programme

SPIA – Spatial pressure impact assessment

Natura 2000 – EU-wide network of nature protection areas

EUBS2030 – EUBS2030

NbS – Nature based solutions

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Grant Agreement number	101060707
Project title	MSP4BIO: IMPROVED SCIENCE-BASED MARITIME SPATIAL PLANNING TO SAFEGUARD AND RESTORE BIODIVERSITY IN A COHERENT EUROPEAN MPA NETWORK
Deliverable title	Policy solutions for biodiversity conservation in marine and maritime policies
Deliverable number	6.2
Deliverable version	2
Contractual date of delivery	31.3.2025
Actual date of delivery	31.3.2025
Document status	Final
Document version	2
Online access	Yes
Diffusion	Public
Nature of deliverable	Report
Work Package	WP6
Partner responsible	Finnish Environment Institute (Syke), HELCOM
Contributing Partners	UNANTES, VLIZ, UCA, UAc, UTARTU, PAP/RAC, HELCOM, CNR, s.PRO, GMU, CEREMA, CCMS
Author(s)	Kemal Pinarbasi, Lotta Ruokanen (HELCOM), Päivi Haapasaari, Riku Varjopuro (Syke), Volcy Boilevin, Brice Trouillet (UNANTES), Hanneloor Heynderickx, Inne Withouck, Fien De Raedemaecker, Lawrence Whatley (VLIZ), Camila Pegorelli, Javier Garcia Sanabria (UCA), Helena Calado, Débora Gutierrez (UAc), Jacek Zaucha, Magdalena Matczak (GMU), Francisco Rafael Barboza Gonzalez, Liisi Lees, Robert Aps (UTARTU), Marina Markovic, Ivan Sekovski, Tea Marasovic (PAP/RAC), Olivier Laroussinie, Neil Alloncle (CEREMA), Andrea Barbanti, Martina Bocci, Stefano Menegon, Lucia Bongiorni (CNRISMAR), Margarita Stancheva, Hristo Stanchev (CCMS), Mauro Randone, Anna Barbanti (WWF-Med), Ivana Stojanovic (s.Pro)
Editor	Volcy Boilevin (UN), Jacek Zaucha (GMU)

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Approved by	Ivana Stojanovic, s.Pro
Project Officer	Victoria Beaz Hidalgo
Abstract	The effective integration of biodiversity considerations into marine and maritime policies as well as into Maritime Spatial Planning (MSP) is crucial for achieving the EU's environmental and sustainability objectives. Despite policy advancements, challenges such as governance fragmentation, data accessibility issues, insufficient funding, and the absence of legally binding biodiversity objectives hinder progress. This deliverable (D6.2) builds on the findings of Deliverable 6.1, which identified barriers and enabling factors for policy coherence, by presenting concrete policy solutions to enhance biodiversity mainstreaming in marine and maritime policies across the EU. The proposed solutions are structured into institutional, organizational, technical, and resource-related categories, addressing key governance and implementation challenges. They focus on strengthening institutional coordination, aligning relevant policies with biodiversity targets, increasing investment in data collection and decisionsupport tools, integrating climate-smart approaches into MSP, and developing financial mechanisms to support long-term biodiversity initiatives. Solutions address national, regional, and EU-level interventions, ensuring a multi-level approach to policy implementation. Co-developed with project partners and validated through regional dialogues and EU-level discussions, these recommendations aim to bridge the gap between policy commitments and practical implementation. The findings underscore the need for improved policy integration, cross-border cooperation through Regional Sea Conventions, and enhanced financial and data-driven decision-making mechanisms. By adopting these solutions, MSP can evolve into a proactive tool that balances economic and conservation objectives while strengthening ecosystem resilience in the face of climate change. This deliverable provides a structured roadmap for policymakers, planners, and stakeholders to take decisive steps in ensuring the EU's maritime spaces are managed sustainably, aligning with longterm biodiversity conservation goals.
Keywords	Policy solutions, Barriers and levers, Biodiversity Strategy, Biodiversity mainstreaming, Environmental policy integration, Policy coherence, Maritime Spatial Planning

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Table of contents

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Acknowledgements

We thank all the experts and project partners for their valuable contribution to this work.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Executive Summary

The EU's commitment to marine biodiversity conservation is outlined in the EUBS2030, the Marine Strategy Framework Directive, and the Maritime Spatial Planning Directive, among other regulatory frameworks. However, despite these policy advancements, significant challenges persist in integrating biodiversity considerations into marine environmental and economic sector policies. Insufficient coordination between governance levels, gaps in data availability and accessibility, inadequate funding mechanisms, and the lack of legally binding biodiversity objectives across policies remain major obstacles. This deliverable (D6.2) builds upon the findings of Deliverable 6.1, which identified key barriers and enabling levers for policy coherence, to propose concrete policy solutions that support biodiversity mainstreaming in marine and maritime policies across the EU. The analysis pays special attention to the potential of MSP in fostering biodiversity conservation as has been done throughout the MSP4BIO project.

This document presents targeted policy solutions addressing critical gaps in biodiversity conservation in marine and maritime policies. These solutions were co-developed with project partners and validated through engagement with the Community of Practice, regional dialogues, and EU-level discussions. The recommendations focus on strengthening institutional coordination, aligning relevant policies with biodiversity targets, increasing investment in data collection and decision-support tools, integrating climate-smart approaches into MSP, and developing financial mechanisms to support long-term biodiversity initiatives.

The 11 policy solutions designed to address institutional, organizational, technical, and resource-related barriers to biodiversity mainstreaming are presented as fact sheets, to provide more detailed information of their rationale, alignment with existing policies and frameworks, key implementation steps, and expected benefits. The 11 policy solutions are:

CATEGORY	***POLICY SOLUTION NUMBER***	***POLICY SOLUTION***
INSTITUTIONAL POLICY SOLUTIONS	PS 1	Establish a dedicated coordination framework or bolster existing structures to focus specifically on marine biodiversity, including regular inter-jurisdictional meetings and policy sessions.
	PS 2	Utilize existing groups like the maritime economy group to establish compulsory assessments and reporting mechanisms that include biodiversity considerations.
	PS3	Revise MPA objectives to be specific and measurable, aligned with each area's ecological needs, and involve MSP authorities in a consultative capacity.
ORGANIZATIONAL POLICY SOLUTIONS	PS4	Create continuous input channels for stakeholders, ensuring research institutes and others contribute regularly and influentially to policymaking.
	PS5	Create mandatory, clear measures connecting human activities with biodiversity goals, including specific targets for success.
TECHNICAL POLICY SOLUTIONS	PS6	Strengthen MSP's role in achieving GES through capacity building, technical training, and dialogue across governance levels.

	PS7	Develop comprehensive guidelines and enforcement mechanisms, including adequate training, resources, and designated MPA managers for effective reserve management.
	PS8	Climate-smart maritime spatial planning in EU countries (an additional overall policy solution as part of EUBS2030)
RESOURCE-RELATED POLICY SOLUTIONS	PS9	Allocate a portion of maritime-related tax revenue to directly fund National Biodiversity Strategy projects and bolster its operational effectiveness.
	PS10	Increase investment in biodiversity research and monitoring to build a comprehensive knowledge base for improved policy evaluation.
	PS11	Invest in data collection and standardization, develop more accessible decision support tools, and provide guidelines for their use in planning, monitoring, and adaptation processes.

Key national-level recommendations include establishing dedicated coordination frameworks, developing clear biodiversity targets within MSP, and enhancing the role of marine protected areas (MPAs) in spatial planning. At the regional level (sea basin level), solutions emphasize cross-border cooperation through Regional Seas Conventions such as HELCOM, Bucharest Convention, Barcelona Convention and OSPAR, ensuring transboundary biodiversity conservation efforts. At the EU level, policy recommendations include aligning marine and maritime policy objectives, including MSP, with the EUBS2030, strengthening synergies with the Common Fisheries Policy (CFP), and promoting the use of climate-informed MSP frameworks.

The findings highlight the need for stronger integration between MSP and existing climate, fisheries, and biodiversity policies to enhance the effectiveness of conservation measures. Additionally, leveraging financial instruments such as the European Maritime, Fisheries, and Aquaculture Fund (EMFAF) is essential to support biodiversity-mainstreaming planning initiatives. The role of data-driven decision-making is also emphasized, advocating for better data accessibility through platforms like EMODnet and standardized biodiversity monitoring methodologies across Member States.

Many of the proposed policy solutions address MSP. Through their implementation, MSP can evolve into a proactive tool that not only balances economic and conservation objectives but also strengthens ecosystem resilience in the face of climate change. This deliverable serves as a roadmap for policymakers, planners, and stakeholders to take decisive steps to ensure the EU's maritime spaces are managed sustainably, aligning with long-term biodiversity conservation goals.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

1. Introduction

The EUBS2030 (EUBS2030) sets an ambitious framework for the protection and restoration of nature, committing to the "30 by 30" target—protecting at least 30% of European seas, with 10% under strict protection (European Commission, 2020). EU policies such as the Birds and Habitats Directives, the EU Restoration Law, and the Marine Strategy Framework Directive (MSFD) support the EUBS2030 by their aims to conserve marine ecosystems. In addition, biodiversity considerations must be mainstreamed into sectoral decision-making, as recognized in the Convention on Biological Diversity (CBD) (2010), the IPBES (2019), and the EU (; COM(2020) 380 final). MSP4BIO Deliverable 6.1 analyzed the status of biodiversity mainstreaming[1] in marine environmental and economic sector policies in the EU region and identified related barriers and levers. A specific objective was to scrutinize the role, potential, and limitations of maritime spatial planning (MSP) for enhancing biodiversity mainstreaming and coherence across policy domains. The study suggested that MSP can play an important role in balancing conservation with economic and societal needs, and that its alignment with biodiversity objectives is fundamental for achieving Good Environmental Status (GES) under the MSFD and for ensuring ecosystem-based approach (EBA). SWD(2019) 305 final; COM(2020) 380 final). MSP4BIO Deliverable 6.1 analyzed the status of biodiversity mainstreaming[2] in marine environmental and economic sector policies in the EU region and identified related barriers and levers. A specific objective was to scrutinize the role, potential, and limitations of maritime spatial planning (MSP) for enhancing biodiversity mainstreaming and coherence across policy domains. The study suggested that MSP can play an important role in balancing conservation with economic and societal needs, and that its alignment with biodiversity objectives is fundamental for achieving Good Environmental Status (GES) under the MSFD and for ensuring ecosystem-based approach (EBA).

MSP4BIO D6.1 analyzed policy processes from agenda setting to policy formulation and further implementation**,** to identify barriers to biodiversity mainstreaming. A variety of institutional, organizational/operational, technical, and resource-related barriers were recognized. For example, governance fragmentation, policy misalignment, and resource constraints were identified as challenges shared by many countries. The findings also indicated that while biodiversity conservation is often a policy priority, its implementation is frequently hindered by competing socio-economic interests, unclear policy formulation, and weak enforcement mechanisms. Legally binding policies, specified targets, practical guidelines, collaboration, and funding were identified as important levers for biodiversity mainstreaming. The report also found that although MSP has much potential to support biodiversity mainstreaming, its effectiveness is hampered by issues similar to those affecting biodiversity mainstreaming in general, such as, conflicting objectives, lack of coordination between sectors, ambiguity of the EBA, and the missing GES thresholds. D6.1 concluded the need for mechanisms to connect MSP with actions focusing on biodiversity.

This deliverable (D6.2) builds upon the insights of D6.1. Through an iterative, stakeholder-driven process, MSP4BIO Task 6.2 identified policy solutions addressing institutional coordination, policy

[2] The process of integrating biodiversity objectives into policy, planning, and decision-making across sectors. It ensures that conservation is not treated as an isolated concern but is embedded within economic and development agendas.

integration, stakeholder involvement, funding mechanisms, capacity building, and technical support at the national, regional, and EU levels. These solutions were developed in collaboration with project partners, tested through country-specific engagements, and validated through regional and EU-level discussions, including think tank meetings and contributions from the stakeholders. The document presents a structured approach to future policy directions, offering practical solutions to align MSP with biodiversity objectives and enhance coordination across governance levels, supporting the effective implementation of the EUBS2030 in coastal and marine regions.

2. Methodology

D6.2 builds upon the findings of D6.1 which identified key barriers and levers to mainstreaming biodiversity concern and objectives into marine environmental and economic sector (fisheries, energy,and maritime transport) policies, strategies, and practices, — including MSP —, in the EU region.

T6.2 employed a structured, multi-stage approach to develop robust and evidence-based policy solutions for biodiversity mainstreaming. The methodology integrates empirical analysis, participatory stakeholder engagement, and iterative refinement to ensure the validity, feasibility, and alignment of the proposed solutions with national and regional policy frameworks. The approach follows a stepwise process combining qualitative and quantitative data collection through interviews, workshops, policy document reviews, and surveys (Figure 1).

The work on D6.2 covered nine countries in four regional seas (Table 1). These countries were selected based on the presence of MSP4BIO test sites and the availability of project partners from these locations.

Table 1. Countries covered in this study categorized according to where respective test sites are located. Finland and Germany provided stakeholder feedback on the proposed policy solutions, while Spain was covered at both the national level and the Cádiz test-site level.

Regional seas	***Countries***
Baltic Sea	Poland Estonia
North-East Atlantic	Belgium Portugal Spain
Mediterranean Sea	France Italy
Black Sea	Bulgaria Romania

In Step 1, a detailed barrier analysis was conducted for each test site and region, as outlined in D6.1. The analysis provided a foundation for understanding country-specific challenges and their characteristics. Following this, common barriers across different countries were identified. This allowed for the pinpointing of shared challenges that could be addressed through collaborative and scalable solutions, ensuring relevance across multiple regions.

In Step 2, a country-specific solution co-development process was organized, to design solutions to national contexts. This included the use of interactive platforms (see: Figure A1 and A2 in Appendices) and hosting dedicated country specific meetings (8 meetings for 8 countries) for in-depth discussions with a total of 20 project partners. During these meetings, potential solutions were proposed, and their feasibility for national implementation was analyzed. This step produced altogether 56 proposals (see Appendices). The feasibility of implementing these solutions at the national level was evaluated, considering existing policy frameworks, regulatory environments, and institutional capacities. This ensured that the proposed solutions were not only innovative but also practical and aligned with national policy priorities. By engaging directly with country representatives in the MSP4BIO project, the process facilitated the co-creation of solutions that were both contextually relevant and policy-compliant, thereby enhancing their potential for successful implementation.

In Step 3, a structured prioritization exercise took place during the 3rd MSP4BIO General Assembly workshop, involving representatives from all project partners (around 30 participants from 15 institutions). Each of the 56 initially identified policy solutions was evaluated against two key criteria: (1) impact (expected contribution to biodiversity mainstreaming) and (2) required effort (resources, coordination, and time needed for implementation). This process involved scoring the feasibility of each solution, engaging in open discussions, and systematically eliminating those deemed unfeasible. As a result, the initial 56 solutions were narrowed down to 15 preferred and feasible options, ensuring a focused and actionable set of solutions for further development.

In Step 4, a comprehensive survey was targeted to 10 MSP-MPA relevant projects (MSP4BIO, eMSP, MPA Europe, CrossGov, MarinePlan, Blue4All, ReMAP, MSP Green, Regina MSP, and Protect Baltic) to assess how their project outcomes will support to each of the 15 solutions. Respondents were also asked to score the importance and feasibility of each solution, providing quantitative data to inform further refinement and prioritization. In addition, the 15 prioritized solutions were presented to the national MSP authorities of Finland and Germany to gather specific feedback on their feasibility, alignment with existing governance frameworks, and potential for implementation. These opinions are presented in this deliverable. During the project lifetime, policy solutions will be shared with stakeholders, including representatives from test site countries and members of the CoP. This will ensure that the solutions were reviewed and validated by those directly involved in MSP implementation. These opinions will be explained and discussed in D6.3.

In Steps 5 and 6, additional validation was carried out through consultations with EU-level authorities (DG MARE, DG ENV), Regional Sea Conventions (HELCOM-VASAB MSP WG, MED MSP WG), and national MSP authorities in Finland and Germany. In Step 5, a comprehensive online think tank meeting was hosted to gather additional input from EU-level authorities (e.g., DG MARE, DG ENV) and national authorities. This meeting provided high-level perspectives and ensured alignment with broader EU policies and priorities. A physical think-tank meeting was organized during the “MSP week” on 24th October 2024 in Marseille, France (see D6.3). While the step 3 workshop assessed the impact and required effort to implement the solutions, the think-tank meetings asked for feasibility (support by existing institutions, legal frameworks, or political will) and importance scores (experts’ personal assessment).

In Step 6, feedback was collected from some key regional bodies, including the HELCOM-VASAB MSP Working Group and the MED MSP Working Group, to ensure alignment with regional MSP

processes. This ensured that the solutions were consistent with regional frameworks and priorities.

During these validation rounds, four of the 15 solutions were found to overlap with others in scope and objectives. To enhance clarity and avoid redundancy, they were merged into existing, broader solutions, resulting in the final set of 11 coherent and feasible policy solutions presented in the deliverable.

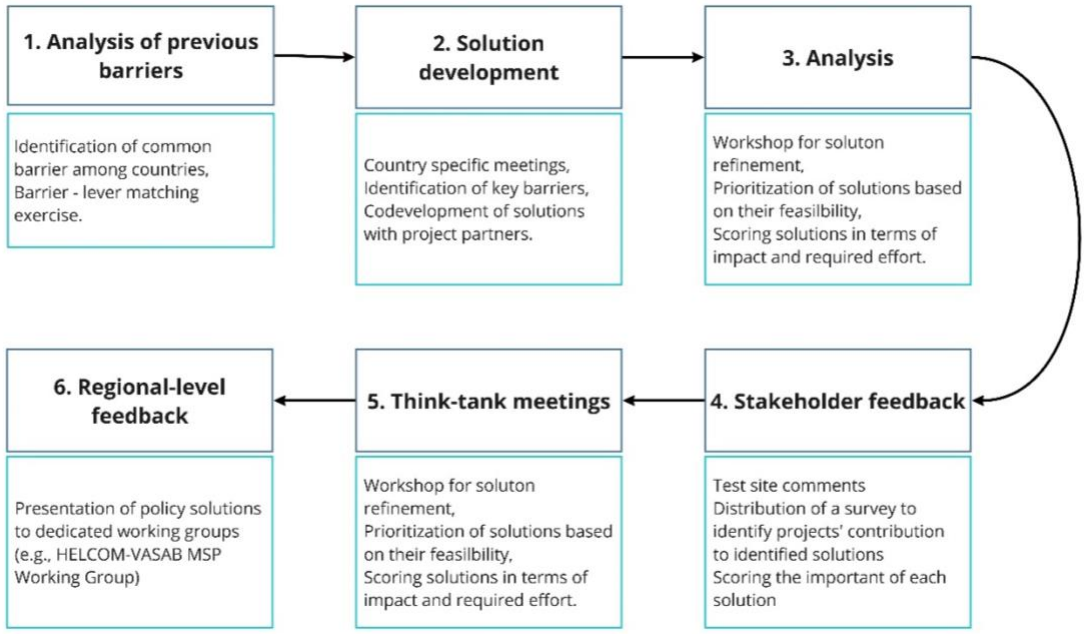


Figure 1: Step by step policy solution development process.

The process created 11 policy solutions, which are listed in Section 3.2.1. Each policy solution is outlined in a dedicated fact sheet to provide guidance for policymakers, planners, and stakeholders (Sections 3.2.1-3.2.5). The fact sheets follow a standardized format, detailing the rationale behind the solution, its alignment with existing policies and frameworks, key implementation steps, and expected benefits. By categorizing the solutions into institutional, organizational, technical, and resource-related policy measures, D6.2 offers a practical roadmap for integrating biodiversity considerations into marine and maritime policies at multiple governance levels, including MSP.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

3. Results

3.1 Matching barriers and levers

In Table 2, the barriers and levers identified in D6.1 are matched to provide a structured understanding of how biodiversity mainstreaming could be advanced by building on levers to address barriers. The barriers and levers are categorized into institutional (governance structures, policies, and legal frameworks), operational/organizational (coordination and stakeholder engagement), technical (data, tools, and methods), and resource related (financial, human, and infrastructural) ones, similarly to D6.1.

Table 2. Matching barriers and levers.

CATEGORY	BARRIER	LEVER
INSTITUTIONAL	Biodiversity is politically undervalued, leading to a lack of prioritization in policy decisions.	Increased public opinion shifts, improved scientific understanding, and the EMFAF Program promote biodiversity importance.
	Conflicting policy objectives between biodiversity conservation and economic interests.	High-level agreements, clear division of responsibilities, and national strategies aligning biodiversity with economic policies.
	EU policy constraints on national biodiversity policy implementation.	The Common Fisheries Policy Transition Package, and updated Natura 2000 guidance ensure biodiversity policy flexibility.
	Unclear policy hierarchies and fragmented mandates across multiple governance levels.	High-level agreements, national strategies with clear targets, and inter-agency collaboration improve coherence.
	The non-binding nature of biodiversity regulations at various governance levels.	Implementation of binding EU legislation and enforceable national strategies
OPERATIONAL / ORGANIZATIONAL	Weak coordination between governance levels, leading to inefficient biodiversity integration.	High-level processes, expert panels, and inter-agency collaboration at the sea basin level enhance coordination.
	Lack of stakeholder participation in biodiversity-related policy development.	Ocean literacy initiatives and stakeholder engagement platforms encourage inclusive decision-making.
	Varying capacities between EU member states in implementing biodiversity policies.	Sea basin-level collaboration and funding for research and innovation strengthen capacity-building efforts.
TECHNICAL	Lack of biodiversity monitoring programs leading to data gaps.	Establishing monitoring and data-sharing requirements and developing a roadmap for marine protected area (MPA) designations.

	Unclear or unrealistic policy formulation that fails to address biodiversity integration effectively.	Strengthened EU and national biodiversity platforms and the introduction of binding EU legislation.
	Mismatch of policy methodologies, creating inconsistencies across governance levels.	Alignment of the MSFD methodology with the methodologies of Birds & Habitats Directives and updated Natura 2000 guidance.
	Uncertainty of environmental impacts due to insufficient assessment methods.	Improved scientific understanding, enhanced monitoring indicators, and better data analysis mechanisms.
RESOURCE-RELATED	Insufficient financial and political support for biodiversity initiatives.	Increased biodiversity financing mechanisms and high-level political commitments, and the EMFAF Program for funding conservation actions.
	Limited resources at regional and national levels to implement biodiversity policies.	Financial support programs and capacity-building initiatives at various governance levels.
	Low environmental literacy among decision-makers and the general public.	Ocean literacy campaigns and public awareness initiatives aimed at influencing decision-making.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

3.2 Policy solutions

3.2.1 List of 11 policy solutions

Table 3 presents the 11[3] policy solutions designed to address institutional, organizational, technical, and resource-related barriers to biodiversity mainstreaming. In the next sections (3.2.1 - 3.2.4) the policy solutions are presented as fact sheets, to provide more detailed information of their rationale, alignment with existing policies and frameworks, key implementation steps, and expected benefits.

Scores for impact, required effort, importance and feasibility are presented at the beginning of solution description:

- impact: expected contribution to biodiversity mainstreaming
- effort: required resources, coordination, and time needed for implementation
- feasibility: support by existing institutions, legal frameworks, or political will
- importance: experts' personal valuation of importance

The numerical values presented reflect the simple average of partner scores for each criterion, derived from individual assessments during the workshop and subsequent survey responses. The process of deriving the assessments ais described in section 2: Methodology.

[3] Three policy solutions of the original 15 (Table 2) were found to closely align with existing ones and were therefore integrated into other solutions to avoid redundancy and enhance coherence. The proposal to improve public administration and technical staff training for biodiversity conservation efforts was alike to PS 6 and was consequently merged. Similarly, the recommendation to amend MSP policies to equally prioritize economic and biodiversity objectives while introducing mandatory conservation targets overlapped with other existing solutions (PS 5 and PS 6) and was incorporated accordingly. Lastly, the regional-level proposal to strengthen mechanisms such as monitoring commissions for better coordination and establish a public participation body for stakeholder engagement was also consolidated with similar solutions (PS 4) to streamline the policy framework.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Table 3. List of 11 policy solutions designed in T6.2

CATEGORY	POLICY SOLUTION NUMBER	POLICY SOLUTION
INSTITUTIONAL POLICY SOLUTIONS	PS 1	Establish a dedicated coordination framework or bolster existing structures to focus specifically on marine biodiversity, including regular inter-jurisdictional meetings and policy sessions.
	PS 2	Utilize existing groups like the maritime economy group to establish compulsory assessments and reporting mechanisms that include biodiversity considerations.
	PS3	Revise MPA objectives to be specific and measurable, aligned with each area's ecological needs, and involve MSP authorities in a consultative capacity.
ORGANIZATIONAL POLICY SOLUTIONS	PS4	Create continuous input channels for stakeholders, ensuring research institutes and others contribute regularly and influentially to policymaking.
	PS5	Create mandatory, clear measures connecting human activities with biodiversity goals, including specific targets for success.
TECHNICAL POLICY SOLUTIONS	PS6	Strengthen MSP's role in achieving GES through capacity building, technical training, and dialogue across governance levels.
	PS7	Develop comprehensive guidelines and enforcement mechanisms, including adequate training, resources, and designated MPA managers for effective reserve management.
	PS8	Climate-smart MSP in EU countries (an additional overall policy solution as part of EUBS2030)
RESOURCE-RELATED POLICY SOLUTIONS	PS9	Allocate a portion of maritime-related tax revenue to directly fund National Biodiversity Strategy projects and bolster its operational effectiveness.
	PS10	Increase investment in biodiversity research and monitoring to build a comprehensive knowledge base for improved policy evaluation.
	PS11	Invest in data collection and standardization, develop more accessible decision support tools, and provide guidelines for their use in planning, monitoring, and adaptation processes.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

3.2.2 Institutional policy solutions:

Effective biodiversity conservation requires robust institutional frameworks with coherent policies, unambiguous policy objectives, and clear responsibilities and mandates. Institutional solutions focus on strengthening governance structures to enhance biodiversity mainstreaming within marine and maritime policies, including MSP. By establishing dedicated coordination mechanisms, reinforcing stakeholder participation, and aligning policies with broader biodiversity strategies, these solutions aim to create a more structured and accountable approach to conservation. Policy alignment at both the national and EU levels is crucial for ensuring that biodiversity objectives are integrated into all decision-making and key frameworks, such as the MSP and CFP.

Policy Solution 1: Establishing a dedicated coordination framework for marine biodiversity

General description

Effective marine biodiversity conservation needs a coordinated approach across jurisdictions and sectors. However, fragmented governance structures and the absence of dedicated coordination frameworks often hinder the implementation of comprehensive biodiversity policies (European Commission, 2020; IPBES, 2019). To address this, the proposed solution advocates for the establishment of a dedicated coordination framework—or the strengthening of existing structures—focused specifically on marine biodiversity.

This framework would facilitate regular inter-jurisdictional meetings and policy sessions, fostering collaboration among stakeholders and ensuring that biodiversity priorities are consistently integrated into decision-making processes (Ehler & Douvere, 2009; UNEP, 2021). By enhancing coordination, the framework would streamline efforts, reduce duplication, and align actions with national and international biodiversity goals, such as those outlined in the Kunming-Montreal Global Biodiversity Framework (CBD, 2022). This approach promotes a more cohesive and effective strategy for marine biodiversity conservation.

The proposed coordination framework is intended to operate at multiple governance levels—primarily at the national and regional sea-basin scales. At the national level, it would facilitate inter-ministerial coordination and policy coherence, while at the regional scale (e.g. HELCOM, OSPAR, Barcelona Convention), it would strengthen transboundary collaboration and alignment of biodiversity objectives. The framework is thus multi-level by design, ensuring consistency between EU-wide goals and country-specific implementation.

Main purpose: To improve coordination and policy coherence for marine biodiversity conservation, the following actions are recommended:

- Establish a dedicated coordination framework or strengthen existing structures to focus exclusively on marine biodiversity.
- Facilitate regular inter-jurisdictional meetings and policy sessions to align efforts across relevant authorities.
- Enhance cross-sectoral collaboration and data sharing to support informed decision-making.

Barriers addressed:

1. Fragmented governance structures:
    - Lack of a centralized body to coordinate biodiversity-related initiatives.
    - Duplication of efforts and inconsistent policy implementation.
    - Limited communication between local, regional, and national authorities.
2. Insufficient stakeholder engagement:
    - Weak engagement with key stakeholders, including local communities and industry representatives.
    - Lack of structured forums for dialogue and collaboration.
3. Policy incoherence:
    - Divergent policies and conflicting priorities across jurisdictions.
    - Limited integration of biodiversity considerations into broader maritime planning frameworks.

Policy relevance:

This solution directly supports the EUBS2030, which calls for enhanced governance and coordination to achieve biodiversity targets, including the protection of 30% of European seas. By establishing a dedicated framework, this policy solution promotes better alignment with the biodiversity policies, including the MSFD and the MSP Directive. It also contributes to the ecosystem-based approach outlined in EU directives, ensuring that biodiversity considerations are embedded within national and regional maritime planning processes.

Implementation

Developing the coordination framework: A dedicated coordination framework should be established through legislative or policy amendments, ensuring clear mandates, roles, and responsibilities for relevant authorities. This framework should facilitate inter-jurisdictional coordination and provide a platform for stakeholder engagement.

Regular inter-jurisdictional meetings and policy sessions: Coordination efforts should include periodic meetings involving national, regional, and local authorities to align objectives, review progress, and address emerging challenges in marine biodiversity conservation.

Cross-sectoral collaboration and data sharing: Encouraging collaboration among environmental agencies, fisheries, tourism, and maritime sectors is crucial for integrated management. Establishing shared databases and decision-support tools can enhance data-driven policymaking.***Implementation strategy:***

Figure 2 describes the implementation steps of policy solution 1.

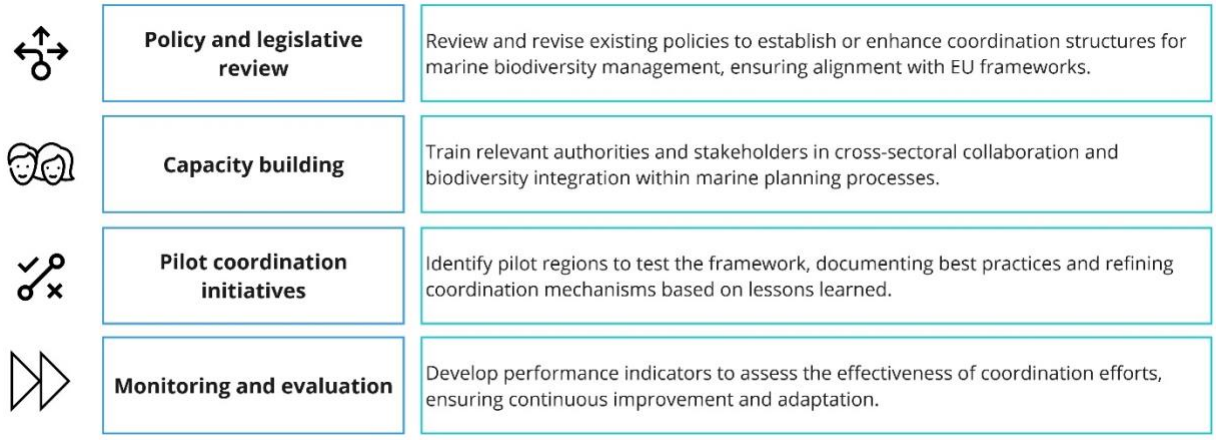


Figure 2: Steps for the implementation strategy of Policy Solution 1

Impact and effort

Impact: High

The proposed solution has the potential to significantly enhance marine biodiversity conservation by improving policy coherence, fostering stakeholder engagement, and ensuring efficient resource allocation. Enhanced coordination will lead to better alignment of national and regional priorities, contributing to broader sustainability goals.

Required effort: Moderate

Implementing this solution requires moderate effort, involving policy adjustments, stakeholder consultations, and capacity-building initiatives. While establishing new structures may take time, leveraging existing frameworks can reduce implementation complexity and accelerate progress toward achieving biodiversity targets.

Establish a coordination framework for marine biodiversity: good practices

Cross-sector policy alignment: The EU Strategy for the Baltic Sea Region includes a dedicated policy area for spatial planning, which supports the integration of biodiversity considerations into MSP and sectoral policies. The EU Biodiversity Platform offers implementation roadmaps and guidance to align national policies with regional biodiversity objectives, promoting knowledge-sharing and capacity building across countries.

Inter-ministerial coordination mechanisms: Regional Sea examples, such as the Baltic Sea HELCOM-VASAB MSP and BioDiv working groups demonstrate how regional bodies can facilitate cooperation across jurisdictions to align biodiversity policies with MSP processes. At national level, France and Italy facilitate cooperation between ministries by aligning marine conservation strategies with economic policies.

The Barcelona Convention facilitates cross-border coordination between EU and non-EU countries on marine biodiversity, ensuring integrated policymaking at the Mediterranean level.

Germany's inter-agency working groups on MSP and biodiversity provide a model for structured, ongoing collaboration between national ministries and regional stakeholders.

Collaboration between EU institutions: Regular dialogue and coordination between the European Commission's DGs (such as DG Environment and DG MARE) create opportunities for enhanced policy coherence, linking biodiversity conservation targets to maritime policies

The Greater North Sea Basin Initiative (GNSBI): This initiative brings together stakeholders from multiple North Sea countries to collaborate on MSP, biodiversity conservation, and addressing shared environmental challenges

OSPAR Commission's coordination efforts: The OSPAR network fosters international cooperation for the conservation of the North-East Atlantic through regional assessments, joint monitoring programs, and policy formulation to address transboundary environmental challenges.

Barcelona Convention's institutional coordination framework: The convention's compliance mechanisms and reporting systems provide valuable insights into how inter-jurisdictional cooperation can be structured to promote biodiversity conservation across multiple national boundaries.

Stakeholder engagement platforms: The Barcelona Convention has established a working group to support an ecosystem-based approach in MSP, fostering collaboration between different authorities and ensuring biodiversity integration across the Mediterranean region.

Policy Solution 2: Utilizing existing groups to establish compulsory biodiversity assessment and reporting mechanisms

General description

Biodiversity integration into policies and planning is hindered by insufficient coordination between ministries and agencies. The lack of structured reporting mechanisms and assessments leads to fragmented decision-making and missed opportunities for coherent biodiversity conservation efforts (see e.g., Russell et al. 2018). This solution proposes leveraging existing inter-ministerial and cross-sectoral groups as identified in Policy Solution 1 to establish compulsory biodiversity assessment and reporting mechanisms. By embedding biodiversity considerations into routine assessments and requiring transparent reporting, this approach enhances policy coherence and strengthens biodiversity mainstreaming across governance levels.

Main purpose: To improve inter-ministerial coordination and ensure that biodiversity considerations are systematically included in decision-making, the following actions are recommended:

- Utilize existing working groups and inter-ministerial committees to establish standardized biodiversity assessment and reporting mechanisms.
- Mandate biodiversity considerations in all relevant policy assessments through compulsory reporting frameworks.
- Ensure transparent, cross-sectoral data-sharing to enhance policy coherence and decision-making.

Barriers addressed:

1. Lack of inter-ministerial coordination*:*
    - Ministries and agencies operate in silos, leading to policy inconsistencies.
    - Biodiversity is often treated as a secondary issue in decision-making.
    - Limited collaboration reduces the effectiveness of conservation measures.
2. Absence of standardized biodiversity assessment and reporting**:**
    - No formal requirement to evaluate biodiversity impacts in key sectoral policies.
    - Variability in data collection and reporting leads to inconsistencies.
    - Lack of accountability for biodiversity outcomes in national policy frameworks.
3. Weak integration of biodiversity in governance:
    - Biodiversity is not systematically included in policy evaluation and implementation.
    - Poor data accessibility hinders cross-sectoral collaboration.
    - Lack of clear mandates results in biodiversity considerations being overlooked.

Policy relevance: This solution aligns with the EUBS2030 and the MSFD, both of which emphasize improved governance and accountability for biodiversity integration. By making biodiversity assessments and reporting compulsory, this solution supports compliance with the CBD and regional commitments under HELCOM, OSPAR, and the Barcelona Convention. It also strengthens policy coherence in line with the EU MSP Directive, ensuring that biodiversity is a core consideration in decision-making.

Implementation

Leveraging existing groups for biodiversity assessments: Identify and formalize the role of existing inter-ministerial committees, advisory groups, and sectoral councils to take responsibility for biodiversity assessments and reporting.

Establishing compulsory reporting frameworks: Develop legally binding reporting requirements for biodiversity considerations in policy decisions, ensuring consistency and accountability across ministries.

Enhancing cross-sectoral data-sharing: Create shared digital platforms and standardized reporting templates to facilitate transparent data exchange and improve biodiversity monitoring.

Implementation strategy

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Figure 3 describes the implementation steps of Policy Solution 2:

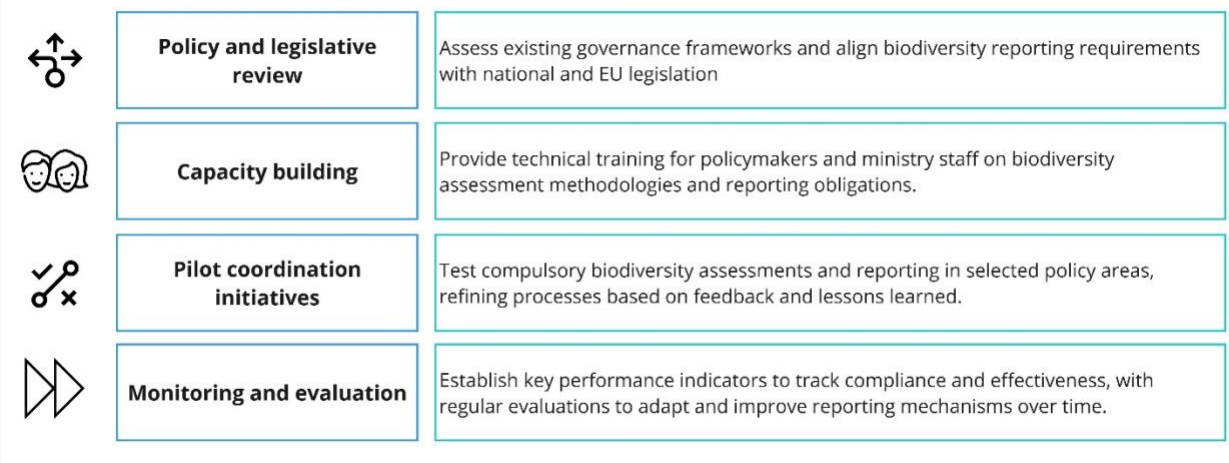


Figure 3: Steps for the implementation strategy of Policy Solution 2

Impact and effort

Impact: High

By embedding biodiversity considerations into routine policy assessments and requiring transparent reporting, this solution significantly improves policy coherence and decision-making. It enhances accountability and ensures biodiversity is a fundamental component of governance.

Required effort: Low

This solution leverages existing structures, reducing implementation costs and complexity. It primarily requires procedural adjustments, training, and digital infrastructure improvements, making it a cost-effective and feasible approach to strengthening biodiversity governance. Although standardization of biodiversity assessment and reporting mechanisms is part of PS2, the required effort is considered low because it builds on existing inter-ministerial structures and data systems rather than creating new ones. The process mainly involves procedural alignment and the use of common templates or digital platforms, which can be integrated with relatively modest administrative and technical adjustments.

Existing groups establish assessment and reporting mechanisms: good practices

Regional Seas Conventions such as HELCOM and OSPAR facilitate regional coordination, assessments, and reporting, helping to align national and regional biodiversity commitments with broader European policies.

Consultations between biodiversity and MSP authorities, such as in the MSFD process, foster integration of biodiversity objectives into sectoral policies.

HELCOM-VASAB MSP Working Group has established a cross-sectoral coordination mechanism that enhances biodiversity considerations in MSP and ensures policy coherence across regional seas.

France's National Strategy for the Sea and Coast (2023) has set up an offshore wind energy and biodiversity observatory, managed by the French Biodiversity Agency, to ensure biodiversity considerations are mainstreamed into marine energy policies.

Poland's use of EIA and SEA mechanisms in marine policies demonstrates how integrating biodiversity assessments at the policy design stage ensures alignment with conservation objectives.

Policy Solution 3: Revise MPA objectives to be specific and measurable, aligned with each area's ecological needs, and involve MSP authorities in a consultative capacity.

General description

Successful MPAs management is often limited by generic objectives that fail to address specific ecological needs, reducing their impact on biodiversity conservation (Grorud-Colvert et al., 2021; OECD, 2017). To address this, the proposed solution recommends refining MPA objectives to be specific, measurable, and tailored to the unique ecological characteristics of each area. This approach ensures that conservation efforts are targeted and impactful, addressing the distinct challenges and opportunities within individual MPAs.

Additionally, the solution suggests involving MSP authorities in a consultative capacity during MPA designation and management processes. By integrating MSP expertise, MPA planning and implementation can be better aligned with broader marine spatial strategies, fostering a more cohesive and collaborative approach to biodiversity conservation (Ehler & Douvere, 2009). These measures aim to enhance the MPA ecological effectiveness while ensuring their alignment with regional and national marine planning frameworks.

Main purpose: To maximize MPA effectiveness and ensure biodiversity is mainstreamed within MSP processes, it is recommended to:

- Adjust MPA objectives to be specific and measurable, tailored to each area's unique ecological needs.
- Involve MSP authorities in the MPA designation and management processes through consultative mechanisms.

Barriers addressed:

1. Generic MPA objectives
    - Lack of specificity leads to unclear management priorities.
    - Difficulties in measuring progress and success.

- Inadequate addressing of site-specific ecological issues.

2. Limited involvement of MSP authorities

- Disconnection between MPA management and broader spatial planning.
- Missed opportunities for holistic and integrated management.
- Potential conflicts between conservation and other maritime activities.

Policy relevance

This solution directly supports the EUBS 2030, which sets targets to protect at least 30% of European seas, with 10% under strict protection, as part of the broader "30 by 30" goal. By proposing specific and measurable objectives for MPAs, this solution ensures that conservation measures are tailored to the unique ecological needs of each area, thereby enhancing their effectiveness. Additionally, involving MSP authorities in MPA designation and management fosters policy coherence and aligns conservation efforts with spatial planning processes, a key principle of the EUBS2030. This integration strengthens the implementation of other EU directives, such as the MSFD, which aims to achieve GES for EU marine waters, and the Habitats and Birds Directives, by ensuring that biodiversity priorities are reflected in marine spatial plans. Furthermore, this solution supports the ecosystem-based approach promoted by the MSP Directive, contributing to the sustainable use of marine resources while safeguarding biodiversity. By addressing these barriers, this solution operationalizes EU policies, advancing the restoration and protection of marine ecosystems in line with EUBS2030 targets.

Implementation

Adjusting MPA objectives to be specific and measurable: Achieving effective MPA management requires specific and measurable objectives. This begins with detailed ecological assessments, where unique habitats, species, and ecological processes are identified and critical areas requiring protection are mapped. Objectives should follow the SMART framework because it is considered best practice in conservation planning, widely endorsed by international organizations, and helps ensure effective, results-oriented management. The SMART framework ensures that objectives are specific (clearly defining goals), measurable (establishing criteria to track progress), achievable (realistic within available resources), relevant (aligned with conservation priorities), and time-bound (with defined timelines). To ensure ongoing effectiveness, monitoring and evaluation frameworks should be implemented, regularly assessing progress and adapting management strategies as needed based on findings.

Involving MSP authorities in consultative processes: MSP authorities play a crucial role in aligning conservation and development objectives. To enhance collaboration, formal consultation mechanisms should be established, such as including MSP authorities in MPA planning committees and/or fostering regular communication between MPA managers and maritime spatial planners. It is essential to integrate MPA objectives into maritime spatial plans, ensuring that conservation priorities are reflected, and activities are coordinated to minimize conflicts while enhancing synergies. Collaborative data sharing between MPA and MSP authorities should be encouraged to provide a shared basis for informed decision-making, leveraging ecological and spatial data to achieve common goals.

Implementation strategy

Figure 4 describes the implementation steps of Policy Solution 3:

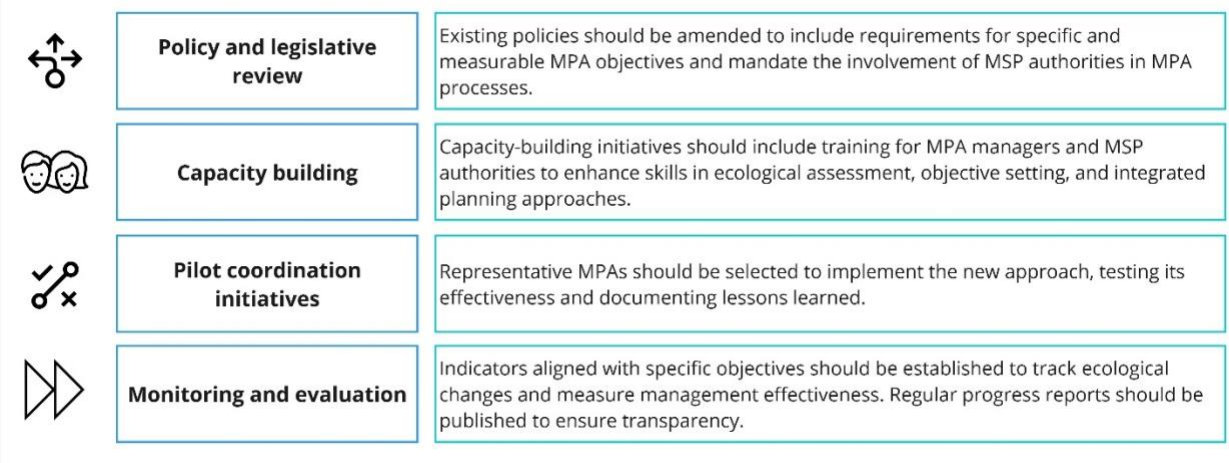


Figure 4: Steps for the implementation strategy of Policy Solution 3

Impact and effort

Impact: High

This solution has the potential to significantly enhance the MPAs effectiveness by ensuring objectives are SMART, directly supporting the "30 by 30" target under EUBS2030. Improved coordination between MPA and MSP authorities strengthens policy coherence, aligning conservation goals with maritime activities. The integration of biodiversity-focused MPAs into MSP frameworks will reduce conflicts and enhance synergies, contributing to the achievement of GES under the MSFD.

Required effort: High

Achieving this solution requires substantial effort, including detailed ecological assessments to develop site-specific objectives, capacity-building for MSP authorities, and establishing formal consultative mechanisms. Significant investment in data collection, monitoring, and decision-support tools is needed to facilitate adaptive management. Legislative amendments or updates may also be required to operationalize the integration of biodiversity objectives into MSP and MPA frameworks. The effort is substantial but realistic and achievable within current governance systems, because these actions rely on well-established institutional frameworks and existing legislative mandates (e.g., MSP and MSFD processes). This is reflected as a moderate score in feasibility.

Revising MPA objectives and involving MSP authorities: good practices

The Belgian Royal Decree for MSP (2020-2026) explicitly includes biodiversity objectives, linking MSP to environmental policies such as the Natura 2000 Directives, MSFD, and the EUBS2030. It emphasizes "naturalness" as a core principle, ensuring planned activities align with GES and biodiversity goals. MSP integrates spatial measures for conservation, helping to bridge biodiversity legislation and marine users, thereby fostering social acceptance of conservation directives.

France's National Strategy for the Sea and Coast (NSSC) explicitly integrates biodiversity objectives into MSP, including targets to designate 30% of marine areas as MPAs and 10% under strict protection by 2030. This strategy aligns national biodiversity goals with Regional Seas Conventions such as OSPAR

and the Barcelona Convention. The inter-ministerial committee for marine biodiversity and the regional biodiversity committees foster consultative processes across governance levels.

Portugal MSP legislation includes biodiversity conservation as an explicit objective, with a Situation Plan identifying areas for nature conservation, biodiversity, and ecosystem services. The framework balances conservation and economic priorities.

Estonia's MSP plan integrates biodiversity goals from the EUBS2030 and HELCOM, aiming for 30% protection of marine areas. While implementation is ongoing, the plan highlights sustainable use and environmental conservation as primary objectives.

Collaboration between the HELCOM-VASAB Maritime Spatial Planning Working Group and the HELCOM Biodiversity Working Group represents an exemplary practice for integrating biodiversity considerations into MSP processes. These two groups maintain continuous communication and hold joint meetings to share knowledge, align strategies, and address cross-cutting issues between spatial planning and biodiversity conservation. This collaborative approach ensures that MSP processes in the Baltic Sea region incorporate up-to-date ecological data and specific biodiversity objectives, contributing to a harmonized and ecosystem-based regional planning framework.

A recently established MSP working group in the Barcelona Convention supports the implementation of an ecosystem-based approach by enhancing harmonization across sectors and the integration of GES requirements in MSP in the Mediterranean Sea.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

3.2.3 Organizational policy solutions

Ensuring that biodiversity considerations are well integrated into marine and maritime policies requires strong organizational structures that promote collaboration and knowledge exchange. Organizational policy solutions emphasize the importance of continuous stakeholder engagement, particularly by creating institutionalized channels for research institutions, industry representatives, and civil society to contribute meaningfully to policymaking. By establishing clear and mandatory links between human activities and biodiversity objectives, these measures help ensure that conservation goals are not only recognized but also actively pursued in spatial planning decisions.

Policy Solution 4: Creating continuous input channels for stakeholder engagement in policymaking.

General description

Policymaking in MSP and biodiversity conservation requires ongoing, structured input from key stakeholders, including research institutions, industry representatives, and civil society. However, existing engagement processes are often fragmented, ad hoc, or lack mechanisms to ensure that stakeholder contributions are consistently considered in decision-making. This solution proposes the establishment of continuous input channels to facilitate regular and influential stakeholder participation in policymaking processes. These channels would enhance transparency, build trust, and ensure that policies are informed by the latest scientific knowledge and stakeholder perspectives.

Main purpose: To enhance stakeholder engagement in MSP and biodiversity policymaking, the following actions are recommended:

- Develop structured, permanent platforms for stakeholder input, ensuring regular contributions to policymaking.
- Establish mechanisms to integrate stakeholder feedback into policy formulation and revision processes.
- Foster collaboration between policymakers and research institutions to enhance evidence-based decision-making.

Barriers addressed:

1. Lack of institutionalized stakeholder engagement:
    - Current engagement mechanisms are often sporadic and lack long-term continuity.

- Insufficient frameworks to incorporate stakeholder input systematically.

2. Limited influence of stakeholder contributions:
    - Existing structures may not effectively consider stakeholder recommendations in decision-making.
    - A disconnect between policymakers and research institutions reduces the impact of scientific contributions.
3. Coordination challenges across sectors:
    - Weak coordination between stakeholders from different sectors leads to fragmented policy outcomes.
    - Lack of collaboration across governance levels complicates the integration of stakeholder insights.

Policy relevance:

This solution supports the EUBS2030, which emphasizes stakeholder involvement as a crucial element for achieving conservation goals. Establishing continuous input channels aligns with the MSFD and the MSP Directive by promoting participatory approaches in marine management. By ensuring regular stakeholder engagement, this solution contributes to better policy coherence and implementation, supporting actions towards GES objectives and fostering a collaborative governance model.

Implementation

Developing stakeholder engagement platforms: Create dedicated platforms for structured and ongoing stakeholder engagement, such as advisory committees, working groups, and online consultation portals.

Formalizing input processes: Establish formal procedures for incorporating stakeholder feedback into decision-making, ensuring contributions are reviewed and addressed in policy development.

Capacity building and awareness: Provide training and resources to stakeholders to enhance their understanding of policymaking processes and improve the quality of their contributions.

Implementation strategy:

Figure 5 describes the implementation steps of Policy Solution 4:

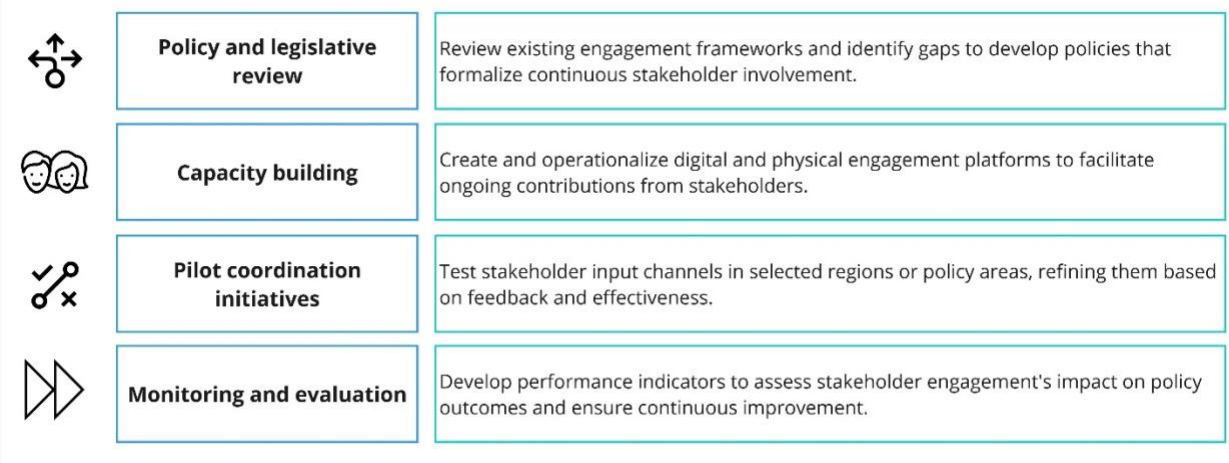


Figure 5: Steps for the implementation strategy of Policy Solution 4

Impact and effort

Impact: High

This solution can significantly improve policy relevance and effectiveness by integrating diverse perspectives, leading to more informed, accepted, and implementable policies. Regular stakeholder input strengthens trust, collaboration, and policy coherence.

Required effort: High

Implementing continuous input channels requires substantial effort, including policy revisions, platform development, and resource allocation for stakeholder engagement activities. However, the long-term benefits of improved decision-making and stakeholder satisfaction justify the investment.

Creating channels for stakeholder engagement: good practices

Stakeholder engagement platforms: Several EU countries, including France and Spain, have established permanent consultation platforms to provide structured and continuous stakeholder input into policy development and implementation processes.

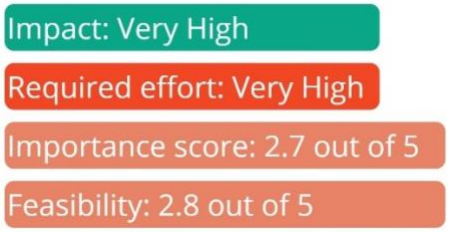
Cooperation between ministries and regional authorities: In Belgium, coordination mechanisms between federal and regional authorities under the National Biodiversity Strategy have been instrumental in ensuring a coherent approach to biodiversity policymaking.

Multi-level governance mechanisms: Countries such as Belgium have implemented governance frameworks that include structured stakeholder consultation processes at various administrative levels, facilitating regular and meaningful input from research institutions and other key actors.

Belgium's Coordination Committee for International Environmental Policy (CCIEP): This body facilitates dialogue across governance levels by bringing together diverse stakeholders, including government agencies, academia, and NGOs, to ensure effective policy integration.

France's Regional Sea Commissions: These platforms serve as a forum for local stakeholders, research institutions, and policymakers to discuss and align marine biodiversity initiatives with national and EU directives.

Policy Solution 5: Create mandatory, clear measures connecting human activities with biodiversity goals, including specific targets for success



General description

Achieving meaningful progress in biodiversity conservation requires clear, enforceable measures that directly link human activities with biodiversity goals. Currently, the lack of legally binding measures and specific success targets hinders the effective integration of biodiversity considerations into sectoral activities such as fisheries, tourism, and offshore energy (European Commission, 2020; CBD, 2022). This gap often results in fragmented efforts and insufficient accountability, undermining conservation objectives (IPBES, 2019).

To address this, the proposed solution advocates for the establishment of mandatory measures that set explicit biodiversity targets and ensure accountability through robust monitoring and enforcement mechanisms. By embedding these targets into legally binding frameworks, human activities can be managed more effectively to align with conservation goals (UNEP, 2021). Such frameworks would not only enhance conservation efforts but also foster greater transparency and accountability across sectors, ensuring compliance with global biodiversity targets like those in the Kunming-Montreal Global Biodiversity Framework (CBD, 2022).

The legally binding measures and biodiversity targets would be established by national competent authorities, typically through ministries responsible for environment, marine affairs, or spatial planning, in alignment with EU-level frameworks such as the MSP Directive, the MSFD, and the EU Biodiversity Strategy 2030. These measures would be addressed to sectoral agencies and actors—for example, fisheries, energy, transport, and tourism authorities—whose activities directly affect marine ecosystems. In practice, the EU provides the overarching policy direction, but the Member States can formalize and enforce the binding measures. One should note that the MSP Directive does not require the Member States to have legally binding MSP.

Main purpose: To ensure the effective integration of biodiversity goals into policies steering human activities, the following actions are recommended:

- Develop *legally binding measures* that establish clear links between sectoral activities and biodiversity objectives.

- Set specific, measurable *targets* for success to track progress and ensure compliance.
- Implement robust *enforcement mechanisms* to hold stakeholders accountable for biodiversity outcomes.

Barriers addressed:

1. Lack of legal mandates:
    - Current policies provide only voluntary guidelines with limited enforcement capabilities.
    - Absence of accountability mechanisms hinders compliance with biodiversity goals.
    - Difficulty in aligning sectoral economic activities with conservation priorities.
2. Inconsistent monitoring and evaluation:
    - Inadequate monitoring frameworks to assess the impact of human activities on biodiversity.
    - Lack of standardized indicators to track progress and measure success.
    - Fragmented data collection and reporting across different sectors and governance levels.
3. Sectoral resistance to regulation:
    - Stakeholders often perceive biodiversity measures as restrictive to economic growth.
    - Need for increased awareness and capacity-building to ensure sectoral buy-in.
    - Limited incentives to encourage voluntary compliance with biodiversity objectives.

Policy relevance: This solution aligns with the EUBS2030, which calls for legally binding targets to protect 30% of EU marine areas and restore degraded ecosystems. It supports the MSFD by promoting GES and advances the integration of biodiversity objectives into MSP frameworks. Establishing mandatory measures also strengthens compliance with international commitments under the CBD and regional agreements such as HELCOM and OSPAR.

Implementation

Developing legally binding measures: Establish new regulations or strengthen existing frameworks to ensure human activities are aligned with biodiversity targets, incorporating sector-specific guidelines and legally enforceable requirements.

Setting specific biodiversity targets: Define measurable biodiversity targets for each sector and align with broader environmental objectives.

Enhancing monitoring and enforcement: Implement a robust compliance framework that includes regular inspections, reporting requirements, and penalties for non-compliance, supported by advanced monitoring technologies such as remote sensing and automated data collection.

Implementation strategy:

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Figure 6 describes the implementation steps of Policy Solution 5.

Figure 6: Steps for the implementation strategy of Policy Solution 5

Impact and effort

Impact: Very High

This solution can significantly improve biodiversity conservation by ensuring human activities contribute to, rather than undermine, biodiversity objectives. Clear targets and enforcement mechanisms will enhance compliance and accountability across all relevant sectors.

Required effort**:** Very High

The implementation of mandatory measures requires extensive legislative changes, stakeholder engagement, and capacity building. Substantial financial and technical investments will be needed to establish monitoring systems and enforcement mechanisms, ensuring the success and sustainability of the proposed measures.

Mandatory measures to connect human activities and biodiversity goals: good practices

Legislative integration: The MSP Directive requires EU Member States to integrate biodiversity objectives into marine spatial plans, ensuring compatibility between human activities and environmental goals.

Monitoring frameworks: The MSFD mandates quantitative criteria for GES, serving as a benchmark for connecting human activities with biodiversity outcomes.

Cross-sectoral collaboration: The use of inter-ministerial working groups in several countries, such as Finland, enables effective coordination and knowledge sharing to align sectoral activities with biodiversity targets.

Germany: Implementation of research programs that focus on the spatial and temporal distribution of species affected by human activities, such as offshore wind energy development. These studies provide critical data for setting biodiversity targets.

Finland: Finland's VELMU program has been systematically collecting marine biodiversity data for over 20 years, offering a robust foundation for policy formulation and evaluation.

3.2.4 Technical policy solutions

The implementation of biodiversity-aware marine and maritime policies relies heavily on technical capacity, knowledge, and enforcement mechanisms. Technical policy solutions address the need for capacity-building, professional training, and the development of comprehensive guidelines to support effective biodiversity integration. Strengthening the role of MSP in achieving GES, providing technical resources for conservation efforts, and ensuring climate-smart planning approaches are key components of this solution group. By equipping policymakers and planners with the necessary tools and knowledge, these solutions enhance the effectiveness of biodiversity protection measures across governance levels.

Policy Solution 6: Strengthening MSP's role in achieving GES through capacity building, trainings and multi-level dialogue

Impact: Very High

Required effort: Low

Importance score: 2.3 out of 5

Feasibility: 2.4 out of 5

General description

Achieving GES in marine environments requires an integrated and informed approach within MSP processes. However, MSP's main objective is to find spatial solutions to foster and coordinate economic, social and environmental goals, which are not always compatible with the goal of GES (Ehler & Douvere, 2009). Furthermore, its effectiveness in contributing to GES is often limited by insufficient technical capacity, knowledge gaps, and weak coordination across governance levels (OECD, 2017).

To address these challenges, this solution proposes strengthening MSP's role in achieving GES through targeted capacity-building initiatives, technical training programs, and enhanced dialogue across governance levels. By equipping stakeholders with the necessary skills and fostering collaboration, this approach aims to improve the alignment of MSP with biodiversity and environmental objectives, ensuring more effective and cohesive marine management (CBD, 2022; UNEP, 2021).

It is important to note that this solution does not propose granting MSP legally binding authority itself but rather strengthening the binding implementation of biodiversity objectives through related sectoral and environmental legislation, ensuring that MSP serves as a coherent coordination framework for their application.

Main purpose: To empower MSP processes to contribute effectively to GES, the following actions are recommended:

- Implement comprehensive capacity-building programs for MSP practitioners and stakeholders.

- Provide technical training on ecosystem-based approaches and data-driven decision-making.
- Foster structured dialogue and knowledge-sharing across local, regional, and national governance levels.

Barriers addressed:

1. MSP lacks the mandate for legally binding spatial measures:
    - MSP primarily serves as a strategic and advisory tool, guiding spatial use and environmental considerations, but it lacks the authority to impose legally binding restrictions or requirements. It should be noted that the EU's MSP Directive does not require that the national MSPs would be legally binding.
2. Limited technical expertise:
    - Lack of specialized training on integrating ecosystem-based approaches within MSP.
    - Difficulty in utilizing scientific data for evidence-based planning and decision-making.
3. Fragmented governance structures:
    - Inconsistent coordination between governance levels, leading to misaligned objectives.
    - Limited communication and knowledge exchange across institutions and regions.
4. Stakeholder engagement challenges:
    - Low awareness and understanding of MSP's role in achieving GES.
    - Limited participation from relevant sectors due to a lack of engagement mechanisms.

Policy relevance:

This solution directly supports the EUBS2030 and the MSFD, which aims to achieve GES for EU marine waters. Strengthening MSP's capacity contributes to improved policy coherence and facilitates the integration of environmental objectives into spatial planning processes. Additionally, it is consistent with the MSP Directive's EBA that is aligned with the MSFD by giving concrete means for addressing the GES objectives and by promoting informed decision-making and multi-level governance cooperation. Enhanced capacity and dialogue will also support the achievement of regional environmental commitments under initiatives such as HELCOM, OSPAR, and the Barcelona Convention.

Implementation

Capacity-building programs: Develop and deliver targeted training programs for MSP authorities, planners, and stakeholders, focusing on ecosystem-based management, data integration, and adaptive planning approaches. Capacity-building and training activities are

expected to be financed through diverse sources, depending on national contexts and available instruments (e.g. EMFAF, national budgets, or regional cooperation programmes).

Technical training workshops: Organize specialized workshops to enhance technical skills related to marine spatial data interpretation, cumulative impact assessments, and scenario planning to improve MSP effectiveness in achieving GES.

Multi-level dialogue forums: Establish regular dialogue platforms to facilitate knowledge exchange, foster collaboration across governance levels, and ensure alignment of objectives between national, regional, and local authorities.

Implementation strategy:

Figure 7 describes the implementation steps of Policy Solution 6:

Figure 7: Steps for the implementation strategy of Policy Solution 6

Impact and effort

Impact: Very High

This solution has the potential to significantly enhance MSP's contribution to achieving GES by building technical expertise, fostering collaboration, and ensuring informed decision-making processes. Improved capacity and knowledge-sharing can lead to better integration of environmental goals into MSP, benefiting marine biodiversity and ecosystem resilience.

Required effort**:** Low

The implementation of this solution requires relatively low effort, as it builds on existing frameworks, leverages available resources, and focuses on enhancing skills and cooperation rather than introducing new regulatory requirements. Capacity-building initiatives can be rolled out progressively, making this a cost-effective and impactful approach to achieving GES through MSP.

Strengthening MSP's role in achieving Good Environmental Status: good practices

Funding opportunities from EU programs such as the EMFAF provide resources to enhance the technical and institutional capacities of MSP-related personnel and organizations.

Cross-border coordination: The HELCOM-VASAB MSP Working Group provides a successful example of fostering cross-border cooperation and developing practices for ecosystem-based MSP through jointly produced guidelines. In addition, Planners` Forum is a platform for informal collaboration among MSP practitioners. During Planners` Forums participants discuss pressing MSP issues, knowledge gaps and future MSP project needs. (Baltic Sea Region).

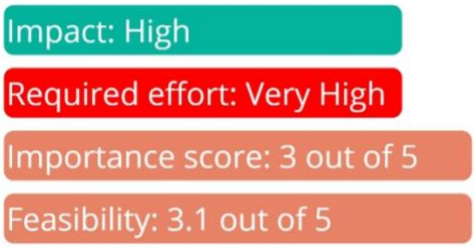
Germany's MSP process: The establishment of national and regional MSP working groups that include environmental agencies and stakeholders to ensure alignment with GES goals.

Belgium's MSP process: The use of MSP to operationalize environmental objectives within marine areas, ensuring a direct link between MSP and GES targets through dedicated plans and responsible institutions.

Portugal's MSP legislation: The integration of biodiversity objectives into MSP legislation, facilitating a balanced approach between economic activities and conservation efforts through dedicated planning processes.

Baltic Sea Region: The HELCOM Baltic Sea Action Plan (BSAP), which integrates MSP as a crucial tool for achieving regional environmental objectives and fostering transboundary cooperation.

Policy Solution 7: Developing comprehensive guidelines and enforcement mechanisms for effective MPA management



General description

Inadequate guidelines, weak enforcement mechanisms, and insufficient resources, limit effective management of MPAs, undermining their conservation potential (Grorud-Colvert et al., 2021; OECD, 2017). To address these challenges, this solution proposes the development of comprehensive guidelines for MPA management. These guidelines would include the designation of dedicated MPA managers, the establishment of robust enforcement mechanisms, and the provision of adequate training and resources for staff.

By implementing these measures, MPA management can become more consistent and effective, enhancing biodiversity conservation and ensuring alignment with broader marine spatial planning objectives (Ehler & Douvere, 2009). This approach not only strengthens the operational capacity of MPAs, but also fosters greater accountability and transparency, contributing to the achievement of national and international conservation targets.

Main purpose: To enhance the effectiveness of MPAs, the following actions are recommended:

- Develop and implement comprehensive management guidelines tailored to the specific needs of each MPA.
- Establish robust enforcement mechanisms to ensure compliance with conservation objectives.
- Designate and train MPA managers, providing them with the necessary resources and authority to oversee reserve management effectively.

Barriers addressed:

1. Lack of comprehensive guidelines:
    - Inconsistent management practices across MPAs.
    - Gaps in addressing site-specific ecological needs.
    - Difficulty in achieving measurable conservation outcomes.
2. Weak enforcement mechanisms:
    - Limited capacity to monitor and enforce regulations.
3. Insufficient training and resources:
    - Insufficient funding and resources to support management activities.
    - Inadequate stakeholder involvement and public awareness.

Policy relevance:

This solution aligns directly with the EUBS2030, which calls for protection and effective management of at least 30% of European seas, including 10% under strict protection. By developing comprehensive management guidelines and enforcement mechanisms, this solution ensures that MPAs achieve their conservation objectives. Designating trained MPA managers and equipping them with resources ensures sustainable management practices, operationalizing EU biodiversity targets and enhancing marine ecosystem resilience. When the guidelines include clear connections to MSFD and MSP and is coordinated with the EU's Marine Action Plan, it contributes to achieving GES, strengthens the ecosystem-based MSP and gives an important input to sustainable fisheries management.

Implementation

Developing comprehensive guidelines: Effective MPA management begins with creating detailed, science-based guidelines tailored to the ecological and socio-economic characteristics of each site. These guidelines should define clear objectives, management actions, and monitoring protocols. Collaboration with stakeholders, including local communities, scientists, and industry representatives, is essential to ensure guidelines are practical and widely supported.

Establishing enforcement mechanisms: Robust enforcement mechanisms are critical to ensuring compliance with MPA regulations. This includes:

- Deploying trained enforcement officers and surveillance technology (e.g., drones, satellite monitoring).
- Implementing penalties for non-compliance to deter illegal activities.
- Establishing partnerships with law enforcement agencies and local stakeholders to enhance monitoring and enforcement capacity.

Designating and training MPA managers: Each MPA should have a designated manager responsible for overseeing its implementation and management. These managers should receive specialized training in ecological assessment, stakeholder engagement, and adaptive management techniques. Providing sufficient financial and technical resources is crucial to empower MPA managers and support their roles effectively.

Implementation strategy:

Figure 8 describes the implementation steps of Policy Solution 7:

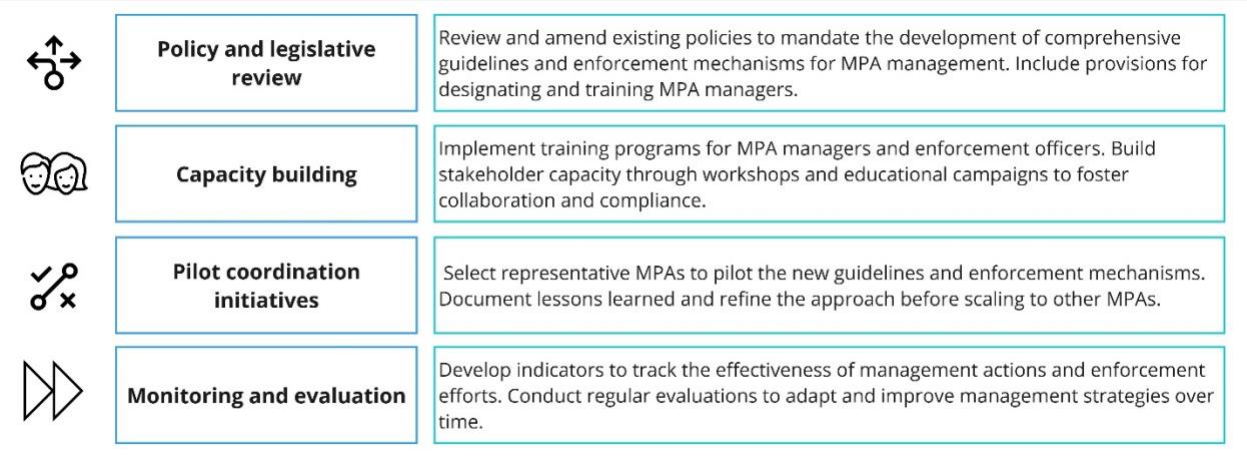


Figure 8: Steps for the implementation strategy of Policy Solution 7

Impact and effort

Impact: High

This solution has the potential to significantly improve MPA management, ensuring that conservation objectives are met and biodiversity is safeguarded. By establishing clear guidelines, robust enforcement mechanisms, and dedicated managers, this approach enhances the effectiveness and resilience of marine ecosystems, contributing to EU biodiversity targets and broader sustainable development goals.

Required effort: Very High

Implementation requires substantial effort, including legislative amendments, capacity-building initiatives, and significant investment in training, technology, and resources. The complexity of developing tailored guidelines and establishing enforcement mechanisms demands a coordinated and sustained effort involving multiple stakeholders. However, the long-term benefits to biodiversity conservation and ecosystem resilience justify the high level of effort required.

Developing more effective MPA management: good practices

The EMFAF program offers a model for co-financing biodiversity-aligned projects, ensuring targeted financial support for MPA management improvements.

OSPAR's biodiversity monitoring mechanisms in the North-East Atlantic provide a robust framework for tracking and evaluating MPA management success.

The Barcelona Convention's approach to integrating MSP with ICZM efforts across Mediterranean countries exemplifies effective multi-level governance for biodiversity conservation.

Capacity-building programs in Finland and the Baltic Sea Region underscore the importance of training administrative and technical staff to enhance ecological assessment and management expertise.

Azores Marine Protected Area Network (Portugal): In October 2024, the Azores established the largest marine protected area in the North Atlantic, covering nearly 300,000 square kilometers. This initiative aims to preserve underwater mountain ranges, vulnerable ecosystems, deep-sea corals, and hydrothermal vents. Half of this network is fully protected, prohibiting fishing, while the other half allows highly selective fishing. This approach balances conservation efforts with sustainable use, setting a precedent for large-scale marine protection.

Lamlash Bay No Take Zone (Scotland): Established in 2008, Lamlash Bay on the Isle of Arran became Scotland's first No Take Zone (NTZ). This area prohibits the removal of marine life, allowing ecosystems to regenerate naturally. Studies have shown increased biodiversity and biomass within the NTZ, demonstrating the effectiveness of such measures in marine conservation.

Policy solution 8: Climate-smart maritime spatial planning in EU countries[4]

General description

Climate change is fundamentally altering marine ecosystems, affecting biodiversity, resource distribution, and ecosystem services. MSP could be important for addressing these challenges by integrating climate-related knowledge, being adaptive to change, and supporting climate adaptation and mitigation measures in spatial planning. While MSP is used widely as a process for the deployment of offshore wind and sometimes also other renewable energy, most of the current MSP processes do not adequately account for climate change risks or impacts.

This policy solution advocates for the development of climate-smart MSP in EU countries, ensuring that MSP frameworks incorporate climate resilience, adaptation, and mitigation measures[5]. By integrating climate-smart principles into MSP, decision-makers can create forward-

[4] *This solution was not evaluated by the stakeholders, and it was developed from other relevant sources including previous and ongoing EU projects such as eMSP Project and MSP Green Project. This is why it has not values for impact, effort, importance or effectivity.*

[5] For practical recommendations see the eMSP NBSR project's policy brief on climate-smart MSP: https://www.emspproject.eu/wp-content/uploads/2024/01/Climate-smart-MSP-Policy-Brief-eMSP-NBSR-January-2024.pdf (opens a pdf file)

looking, flexible, and adaptive spatial plans that balance ecological sustainability with economic development.

Main purpose of climate-smart MSP:

The main purpose of climate-smart MSP is to integrate climate knowledge into planning evidence and decision-making by utilizing climate projections, ecosystem models, and vulnerability assessments to anticipate climate-driven spatial shifts. This solution aims to ensure proactive and adaptive planning through dynamic ocean management approaches that enable adjustments in response to environmental changes. Additionally, it supports climate adaptation and mitigation by allocating space for ocean-based climate solutions, such as offshore wind farms, as well as nature-based solutions (NbS), including blue carbon ecosystems, MPAs, and climate refugia, which protect biodiversity and enhance the climate resilience of marine ecosystems.

Effective implementation requires enhancing cross-sectoral coordination by aligning MSP with climate policies, fisheries management, and biodiversity strategies to achieve integrated governance. Finally, a climate-smart assessment framework should be developed to establish standardized methodologies for evaluating the effectiveness of climate integration in MSP.

Barriers to climate-smart MSP implementation (in Europe):

Limited integration of climate change considerations:

- Most MSP frameworks only acknowledge climate change as a challenge but do not integrate it into specific measures beyond the deployment of offshore wind and lack concrete adaptation and mitigation actions.
- Few EU Member States explicitly include climate adaptation measures in their spatial plans (Rilov et al., 2020).

Static planning approaches:

- MSP traditionally relies on fixed zoning**,** which does not account for shifting species distributions and ecosystem changes due to climate change (Frazão Santos et al., 2024).
- Lack of anticipatory planning mechanisms such as dynamic zoning and scenario-based forecasting.

Insufficient coordination with climate policies:

- Climate and ocean governance frameworks operate in silos, limiting the effectiveness of MSP as a climate adaptation and mitigation tool (UNESCO-IOC, 2021).

Data gaps and uncertainty*:*

- Climate projections and ecosystem models are often underutilized in MSP processes due to data accessibility issues and uncertainties (UNESCO-IOC, 2021).
- The need for multi-scenario analysis is not well-integrated into MSP practices.

Implementation

1. Member states to strengthen the MSP Directive implementation with climate provisions:

- Mandate climate-change assessments and adaptation - mitigation planning as core components of national MSP frameworks.
- Establish binding climate-smart MSP guidelines at the EU level, ensuring consistency across Member States.

2. Foster climate smartness through spatial planning and conservation planning:

- Prioritize the designation of MPAs that support climate adaptation and biodiversity conservation.
- Identify and protect blue carbon ecosystems (e.g., mangroves, seagrasses, salt marshes) as natural carbon sinks.
- Implement NbS, such as multi-use offshore wind farms that integrate artificial reefs and marine habitat restoration.

3. Develop dynamic and adaptive MSP approaches:

- Develop and test with planning provisions that foster adaptive MSP frameworks that account for changing oceanographic conditions and resource distribution.
- Encourage the use of dynamic ocean management tools to adjust spatial plans as species distributions and ecological conditions shift.

4. Improve cross-sectoral governance and integration:

- Align the implementation of MSP directive more closely with the other EU directives and policies (MSFD, CFP etc.).
- Strengthen inter-ministerial and cross-sectoral coordination between climate, energy, biodiversity and maritime sectors to create overall, climate-smart marine governance frameworks.

5. Enhance data collection and accessibility:

- Invest in climate-informed marine spatial data systems to improve climate projections and assessments.
- Promote data-sharing platforms such as EMODnet to facilitate climate-driven decision-making in MSP.

Implementation strategy

Figure 9 describes the implementation steps for Policy Solution 8:

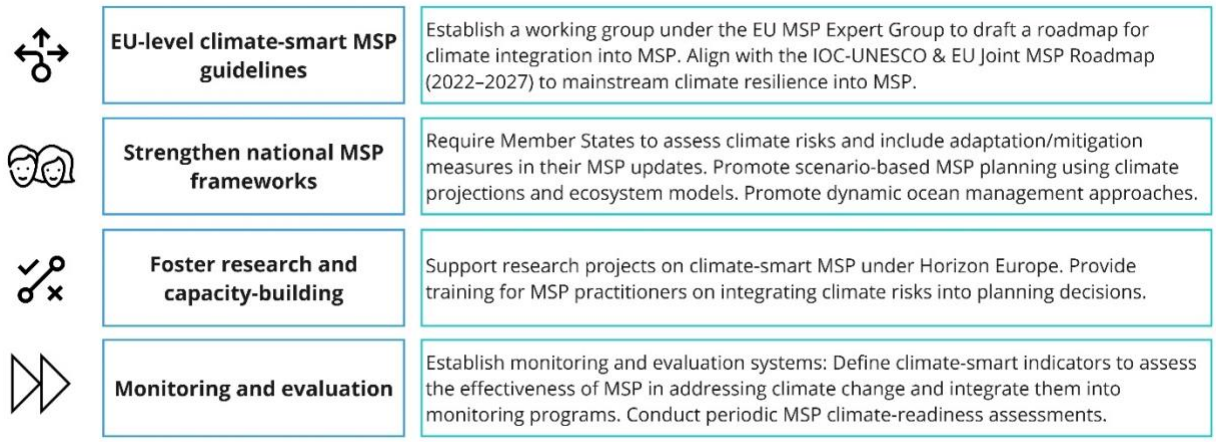


Figure 9: Steps for the implementation strategy of Policy Solution 8

Impact and effort

Impact: High

The impact of climate-smart MSP is expected to be high, as it strengthens the role of MSP in climate adaptation and mitigation while enhancing ecosystem resilience, biodiversity conservation, and carbon sequestration. By fostering a proactive approach to climate change, it also reduces conflicts between maritime sectors by promoting both forward-looking and flexible planning and sustainable resource use. Forward-looking plans are more efficient.

Required effort: Moderate to high

The effort required to implement climate-smart MSP is moderate to high. It might require updates to the EU MSP Directive, stronger policy alignment with climate frameworks, and increased investment in data infrastructure, scenario modeling, and decision-support tools. Additionally, capacity-building efforts will be needed to equip MSP authorities and marine planners with the necessary skills to integrate climate considerations into spatial planning effectively.

Climate-smart MSP: good practices

Integration of climate adaptation into MSP: Some EU countries have incorporated climate adaptation considerations into their MSP processes. This is often linked to national climate adaptation strategies, ensuring MSP supports climate resilience and biodiversity conservation. (France, Germany, Sweden)

Alignment with EU Green Deal and Biodiversity Strategy: Climate-smart MSPs align with EU-level commitments, including the European Green Deal and the EUBS2030, which call for NbS and ecosystem-based management in marine planning. (see MSP Green project)

Use of ecosystem-based approaches: Several countries have adopted the EBA in their MSP processes to enhance climate resilience and ensure that climate adaptation strategies consider biodiversity protection.

Development of cross-border cooperation frameworks: Regional Seas Conventions have mechanisms for transboundary collaboration, supporting knowledge sharing on climate adaptation and MSP.

Sweden's Ecosystem-based MSP: Sweden applies an EBA in MSP, incorporating climate adaptation measures (e.g., climate refugia) to ensure that marine activities do not compromise the resilience of

marine ecosystems. The Symphony tool supports the implementation of an EBA by modeling how ecosystem components respond to human pressures.

France's National Strategy for the Sea and Coast: France has incorporated climate change adaptation into its MSP framework, ensuring that MSP supports both carbon sequestration and biodiversity conservation.

HELCOM climate change factsheet: HELCOM has integrated climate change considerations into its regional action plan, providing guidelines for how MSP can contribute to climate resilience.

Germany's Marine Spatial Planning and Climate Adaptation: Germany has integrated climate change projections into its MSP process, using scenario planning to prepare for sea-level rise and changes in marine ecosystem conditions.

The Netherlands' North Sea Energy Outlook: The Dutch government has included climate-smart principles in the North Sea Plan, prioritizing offshore renewable energy while ensuring that biodiversity considerations are embedded in the planning framework.

Multi-use approaches in the North Sea (e.g., eMSP Project, NESBp project Dutch system of granting permits): Multi-use approaches facilitate climate-smart planning by optimizing space for different sectors (e.g., offshore wind farms combined with aquaculture or nature restoration). These approaches reduce conflicts, enhance resource efficiency, and contribute to climate adaptation and mitigation goals.

MPA Europe climate change projection website: The MPA Europe project integrates climate change projections into marine protection to assess future shifts in the distribution of key species. By incorporating species-specific climate projections, planners can adapt MPA networks to ensure long-term biodiversity conservation and ecosystem resilience.

3.2.5 Resource-related policy solutions

Sustainable and well-funded biodiversity initiatives are essential for achieving long-term conservation success within policy frameworks. Resource-related policy solutions focus on securing financial support for biodiversity strategies, ensuring continuous investment in research, data collection, and decision-support tools. By allocating maritime-related tax revenues to biodiversity projects and enhancing funding mechanisms for monitoring and evaluation, these measures aim to provide the necessary resources for evidence-based policy implementation. Strengthening financial commitments to biodiversity within MSP processes will also improve both the effectiveness and adaptability of conservation efforts.

Policy Solution 9: Allocating maritime tax revenue for national biodiversity strategy

General description

The financial sustainability of biodiversity initiatives often faces significant challenges, limiting their operational effectiveness and long-term impact (European Commission, 2020; OECD, 2020). To address this, the proposed solution recommends allocating a portion of maritime-related tax revenue directly to fund projects under the National Biodiversity Strategy (NBS). This dedicated funding mechanism would provide steady financial resources, ensuring the continuity and scalability of biodiversity conservation efforts.

By linking tax revenue to biodiversity objectives, this approach fosters accountability and incentivizes conservation-friendly practices within maritime sectors (UNEP, 2021). It also strengthens the operational capacity of NBS initiatives, enabling the implementation of targeted projects that align with national and international biodiversity goals, such as those outlined in the Kunming-Montreal Global Biodiversity Framework (CBD, 2022). This solution not only enhances the financial viability of biodiversity efforts but also promotes a more integrated and sustainable approach to marine conservation.

Main purpose: To ensure the financial sustainability of NBS initiatives, the following actions are recommended:

- Allocate a dedicated percentage of maritime-related tax revenue to directly fund biodiversity projects.
- Use the revenue to enhance the implementation, monitoring, and evaluation of biodiversity initiatives.
- Establish transparent reporting mechanisms to track fund allocation and effectiveness.

Barriers addressed:

1. Inadequate funding for biodiversity projects:

- Limits the implementation of critical biodiversity initiatives.
- Constrains long-term project planning and sustainability.
- Hinders the achievement of ambitious conservation targets.

2. Lack of dedicated funding streams for plan implementation**:**

- Creates dependency on external or temporary funding sources or projects.
- Reduces accountability and effectiveness of biodiversity strategies.

3. Limited engagement of maritime sectors

- Lack of incentive structures linking maritime activities to conservation outcomes.

*Policy relevance***:**

This solution directly aligns with the EUBS2030, which emphasizes mobilizing resources to achieve its goals, including the protection of 30% of marine areas. By establishing a sustainable funding mechanism, this approach supports the integration of biodiversity objectives into broader maritime economic activities, contributing to policy coherence across sectors. Furthermore, it aligns with the MSFD and the MSP Directive by promoting ecosystem-based management and sustainable use of marine resources while safeguarding biodiversity. This mechanism also strengthens national implementation of international commitments under the Convention on Biological Diversity (CBD).

Implementation

Allocating maritime tax revenue: Effective implementation requires legislative amendments to allocate a fixed percentage of maritime-related tax revenue—such as port fees, shipping levies, or maritime business taxes—towards biodiversity funding. This revenue stream should be ring-fenced to prevent diversion and ensure consistent funding for NBS projects. Transparency in fund allocation and use is essential to build public trust and stakeholder confidence.

Enhancing operational capacity: The allocated funds should prioritize key NBS activities, including MPA management activities, habitat restoration, species conservation, monitoring, and capacity-building initiatives. This includes supporting innovative projects such as marine habitat restoration, reducing pollution in marine ecosystems, and fostering stakeholder collaborations.

Public awareness and engagement: A communication strategy should highlight the link between maritime activities and biodiversity funding. Public campaigns and stakeholder workshops can enhance awareness and promote active participation from industries, local communities, and NGOs in conservation efforts. Incentives for maritime businesses that adopt biodiversity-friendly practices can further strengthen engagement.

Implementation strategy:

Figure 10 describes the steps for the implementation of Policy Solution 9:

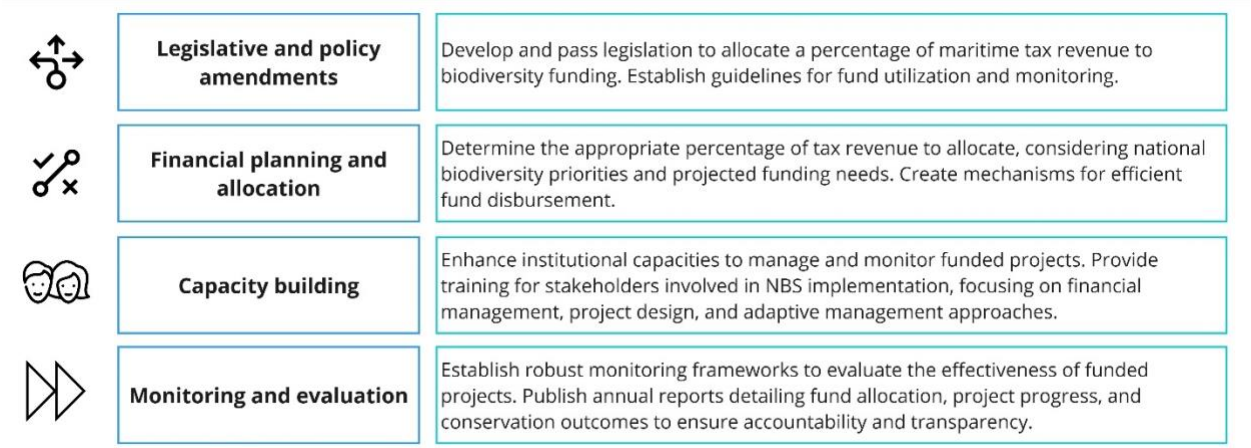


Figure 10: Steps for the implementation strategy of Policy Solution 9

Impact and effort

Impact: High

This solution has the potential to significantly enhance the financial sustainability and operational effectiveness of NBS initiatives. By providing a reliable funding stream, it enables long-term planning, implementation, and scaling of biodiversity projects. This mechanism also strengthens public and stakeholder support for conservation efforts, contributing to broader societal engagement in achieving biodiversity goals.

Required effort: Moderate

Implementation requires moderate effort, including legislative amendments, financial planning, and capacity-building activities. Establishing transparent reporting mechanisms and fostering stakeholder collaboration will necessitate coordination among government agencies, maritime industries, and conservation organizations. However, the potential benefits in achieving biodiversity targets outweigh the required effort, making this a viable and impactful solution.

Tax revenue for national biodiversity strategy: good practices

The EMFAF program provides a model for co-financing projects that align with biodiversity goals, demonstrating the feasibility of earmarked funds.

Financial support for innovative projects in ports and logistics (e.g., Italy and France) shows how targeted investments can enhance biodiversity outcomes.

Stakeholder engagement platforms and interdisciplinary working groups help align diverse interests, as seen in France and the Mediterranean region.

France's National Biodiversity Strategy (NBS2030): France has integrated biodiversity into its National Strategy for the Sea and Coast (NSSC) and other policies. A significant example includes funding restoration projects and ecosystem enhancements under its Recovery Resilience and Plan, supported

by the NextGeneration EU funds. This initiative demonstrates the potential of targeted investments in biodiversity enhancement.

Italy's Port and Maritime Transport Policies: Italy utilizes the Recovery and Resilience Plan to fund habitat mapping, restoration actions, and biodiversity conservation. Additionally, Italy's National Port Strategy encourages innovative local biodiversity projects in partnership with universities and environmental organizations.

Belgium's Covenant for Fisheries and EMFAF Program: Belgium has developed biodiversity-focused programs under its fisheries policy, supported by the European Maritime, Fisheries, and Aquaculture Fund (EMFAF). These initiatives prioritize restoring and conserving biological resources and ecosystems.

Policy Solution 10: Increase investment in biodiversity research and monitoring to build a comprehensive knowledge base for improved policy evaluation.

Impact: Very High

Required effort: Moderate

Importance score: 2.7 out of 5

Feasibility: 2.7out of 5

General description

Effective marine biodiversity management and conservation require a robust knowledge base built on comprehensive research and monitoring efforts. However, current gaps in data collection, ecosystem assessments, and long-term monitoring hinder informed decision-making and policy evaluation. This solution proposes increasing investment in biodiversity research and monitoring to develop a comprehensive knowledge base that supports evidence-based policymaking and adaptive management strategies. Enhanced funding will facilitate data collection, analysis, and dissemination, enabling policymakers to better assess progress toward biodiversity targets and refine conservation strategies accordingly. The source of funding may vary across Member States and can include national research budgets, EU programmes, or regional cooperation mechanisms; the solution focuses on prioritizing biodiversity research investment rather than prescribing its financing source.

Main purpose: To strengthen the evidence base for biodiversity policymaking, the following actions are recommended:

- Increase funding for biodiversity research programs to fill critical knowledge gaps.
- Expand monitoring initiatives to provide long-term data on marine ecosystem health and trends.
- Enhance collaboration among research institutions, policymakers, and stakeholders to improve data accessibility and usability.

Barriers addressed:

1. Insufficient data availability**:**
    - Lack of comprehensive and consistent biodiversity data across marine areas.
    - Difficulty in evaluating policies and limited knowledge on ecosystem trends due to fragmented monitoring efforts.
    - Limited access to data for policymakers and stakeholders.
2. Inadequate funding and resources**:**
    - Limited financial resources allocated to biodiversity research and monitoring programs.
    - Insufficient investment in advanced monitoring technologies and methodologies.
    - Dependence on short-term project-based funding, leading to data discontinuities.
3. Coordination challenges**:**
    - Weak integration of research outputs into policy processes.
    - Limited collaboration between scientific institutions, government agencies, and industry stakeholders.
    - Lack of standardized methodologies for biodiversity assessments across jurisdictions.

*Policy relevance***:** This solution directly aligns with the EUBS2030 and the MSFD, both of which emphasize the need for improved knowledge and data to achieve GES for marine waters. Increased investment in research and monitoring will support the implementation of the EBA promoted by the MSP Directive and contribute to the effective evaluation of biodiversity policies. Moreover, it will enhance compliance with international commitments, such as the CBD and regional sea conventions, by ensuring the availability of reliable data for informed decision-making.

Implementation

*Expanding research programs***:** Increase funding and support for biodiversity research projects, focusing on priority areas such as habitat restoration, species conservation, and climate change adaptation.

*Enhancing monitoring infrastructure***:** Invest in advanced monitoring technologies, such as remote sensing, automated data collection systems, and citizen science initiatives to improve data coverage and quality.

Strengthening data management and sharing: Develop centralized data repositories and enhance interoperability between existing platforms to facilitate access to biodiversity information for policymakers and stakeholders.

Implementation strategy:

Figure 11 describes the steps for the implementation of policy solution 10:

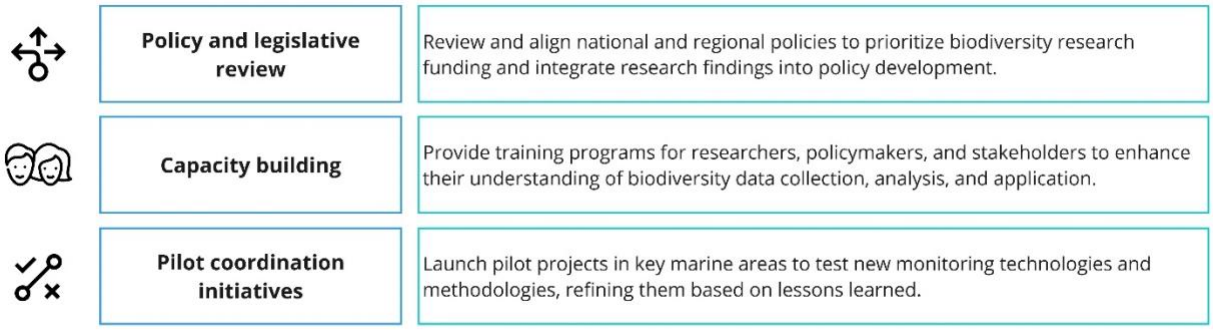


Figure 11: Steps for the implementation strategy of Policy Solution 10

Impact and effort

Impact: Very High

This solution has the potential to significantly enhance biodiversity conservation efforts by providing a comprehensive knowledge base that informs policy decisions, supports adaptive management, and ensures long-term sustainability of marine ecosystems. Improved data availability and integration will lead to more effective implementation of biodiversity objectives at national and regional levels.

Required effort: Moderate

Implementing this solution requires moderate effort, involving financial investments, stakeholder collaboration, and technological advancements. While initial investments in infrastructure and capacity building may be substantial, the long-term benefits of informed policymaking and efficient biodiversity management will outweigh the costs.

Investments in biodiversity research and monitoring: good practices

Funding programs such as the European Maritime, Fisheries and Aquaculture Fund (EMFAF) provide financial support for biodiversity research and monitoring projects.

The use of standard methodologies for biodiversity assessments, such as those promoted by the MSFD, ensures consistency and comparability of data across countries.

The Regional Seas Conventions (HELCOM, OSPAR, Barcelona Convention and Bucharest Convention for Black Sea) serve as frameworks for integrating biodiversity research and monitoring across countries.

The European Commission's biodiversity platform facilitates the transfer and implementation of biodiversity goals into national policies, providing guidance and monitoring mechanisms.

Germany data-sharing platforms: Implementation of biodiversity data-sharing platforms to enhance policy evaluation and foster collaboration between governmental and research institutions.

France: Development of long-term biodiversity monitoring programs in coastal and marine protected areas, ensuring data availability for adaptive management strategies.

HELCOM Data and Map Service: The HELCOM data portal provides a centralized platform for storing and accessing marine environmental data, facilitating cross-border collaboration and evidence-based decision-making for biodiversity protection and MSP processes.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Policy Solution 11: Invest in data collection and standardization and develop accessible decision-support tools

General description

Effective MSP processes and biodiversity management require robust data collection systems and application of user-friendly decision support tools. Currently, limited access to high-quality data and a lack of practical tools hinder informed decision-making and adaptive management processes (Pinarbasi, 2017). This solution proposes investing in comprehensive data collection, developing accessible decision support tools, and providing clear guidelines for their application in planning, monitoring, and adaptation efforts. By enhancing data availability and usability, stakeholders can make more informed and effective decisions to achieve biodiversity and sustainability objectives.

Main purpose: To improve data-driven decision-making in MSP and biodiversity management, the following actions are recommended:

- Increase investment in comprehensive data collection initiatives to fill critical information gaps.
- Develop and implement user-friendly decision support tools tailored to the needs of planners and stakeholders.
- Provide clear guidelines and training for the effective use of these tools in planning, monitoring, and adaptive management.

Barriers addressed:

Limited data availability:

- Incomplete or outdated datasets hinder accurate assessments and planning.
- Difficulty in accessing standardized and comparable data across regions.

Complexity of decision support tools:

- Existing tools are often too complex or not tailored to user needs.
- Lack of training and guidance reduces the effectiveness of these tools.

Fragmented data management systems:

- Inconsistent data collection and storage practices across institutions.

- Limited integration of data from multiple sources into cohesive platforms.

Policy relevance: This solution supports the EUBS2030 and the MSFD by improving the availability and accessibility of data necessary to achieve GES. It also aligns with the MSP Directive by promoting an EBA and evidence-based planning. By addressing data and tool-related barriers, this solution enhances policy coherence and facilitates the integration of biodiversity objectives into planning and monitoring processes at national and regional levels.

Implementation

Data collection initiatives: Invest in targeted data collection programs to gather high-quality, up-to-date information on marine biodiversity, ecosystem health, and human activities. Prioritize areas with significant data gaps and ensure standardization of methodologies.

Development of decision support tools: Design and implement user-friendly tools that integrate spatial and ecological data to support planning and monitoring efforts. These tools should be adaptable to different scales and contexts, ensuring broad applicability.

Guidelines and training: Develop clear guidelines and provide training programs for planners and stakeholders on the effective use of decision support tools. Emphasize practical applications, such as scenario planning, impact assessments, and adaptive management.

Implementation strategy:

Figure 12 describes the steps for the implementation of policy solution 11.

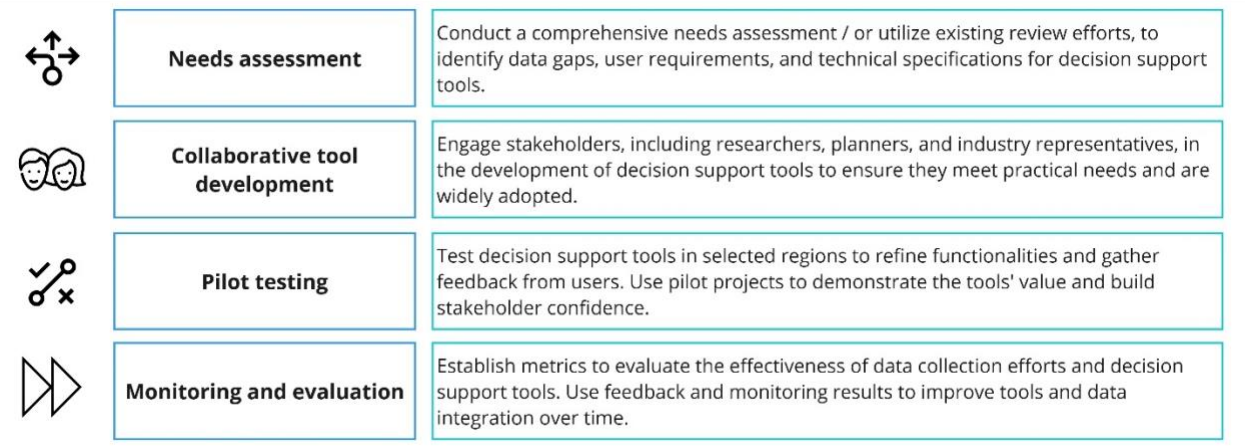


Figure 12: Steps for the implementation strategy of Policy Solution 11

Impact and effort

Impact: Moderate

This solution enhances data-driven decision-making, improving the integration of biodiversity objectives into MSP and adaptive management processes. While the impact may be moderate due to its focus on supporting rather than driving policies, it lays the foundation for more effective and informed planning.

Required effort: Moderate

The implementation of this solution requires moderate effort, including financial investment, stakeholder engagement, and technical development. However, leveraging existing data platforms and collaborating with stakeholders can reduce complexity and accelerate adoption.

Investing in data collection and decision support tools: good practices

The European Biodiversity Strategy for 2030 serves as a key lever by mandating improved monitoring and data collection to support biodiversity objectives across Member States.

Regional Seas Conventions such as HELCOM, OSPAR, Barcelona Convention and Bucharest Convention provide frameworks that promote data-sharing and cross-border collaboration to enhance biodiversity mainstreaming.

Integration of biodiversity monitoring requirements into sectoral policies, particularly in fisheries and maritime transport, to improve policy coherence and evaluation mechanisms.

Good practices:

The European Marine Observation and Data Network (EMODnet) provides open and free access to interoperable data and data products on the temporal and spatial distribution of marine species across European regional seas. By adhering to FAIR principles (Findable, Accessible, Interoperable, Reusable), EMODnet ensures that its data and metadata are standardized and easily accessible for various stakeholders.

The EU's Maritime Spatial Planning Platform provides resources and case studies related to DSTs in MSP. This platform offers insights into practical applications of DSTs, their benefits, and challenges encountered during implementation.

Decision support tools assist planners throughout various stages of the MSP process, including defining spatial and temporal boundaries, mapping significant areas, and designing appropriate management actions. See: Pinarbasi K. et al. 2017: Decision Support Tools in marine spatial planning: present applications, gaps, and future perspectives. Marine Policy 83: 83-91. https://doi.org/10.1016/j.marpol.2017.05.031

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

4. Conclusions

The MSP4BIO project has an overall aim to support the implementation of the EU and global biodiversity commitments by mainstreaming biodiversity into all marine and maritime policies, decision making, and practices at all governance levels. This document presents actionable institutional, organizational, technical and resource-related policy solutions to achieve this aim.

Based on an iterative process of analysis and project partner engagement we identified 11 key policy solutions. The institutional policy solutions suggest improving governance frameworks for enhancing policy coordination and coherence (PS1), utilizing existing groups to establish compulsory biodiversity assessment and reporting mechanisms (PS2), and revising MPA objectives and practices towards a more specific and measurable form, involving MSP authorities in MPA planning (PS3).

As organizational / operational policy solutions we recommend creating channels for stakeholder engagement (PS4), and developing clear, legally binding measures and targets for aligning human activities with biodiversity goals (PS5).

The technical policy solutions relate to strengthening MSP's role in achieving GES through capacity building, training, and multi-level dialogue (PS6), producing guidelines and enforcement mechanisms for effective MPA management (PS7), and developing climate-smart maritime spatial planning (PS8).

In terms of resources, the policy solutions suggest allocating maritime tax revenue for national biodiversity strategies (PS9), increasing investments in biodiversity research and monitoring (PS10) and investing in data collection and decision support tools for planning and monitoring (PS11).

Feedback collected from Finnish and German MSP authorities indicated support for many of the policy solutions while some also provoked criticism. A broader set of stakeholder perspectives on the applicability of the policy solutions will be gathered in D6.3 including the viewpoints of industry representatives, environmental NGOs, and cross-sectoral policy experts. Reflections from the Cadiz Bay workshop were also collected, providing additional insights into the practical challenges and opportunities in mainstreaming biodiversity in test-site level policies.

The uptake of these policy solutions by MSP practitioners and policymakers—through targeted dialogue, capacity-building activities, and integration into national and regional planning frameworks—can play a pivotal role in advancing biodiversity-positive outcomes across European sea basins.

References

1. Barcelona Convention. (2020). *Integrated Coastal Zone Management (ICZM) Protocol for the Mediterranean*. UNEP/MAP. Available at https://www.unep.org.
2. Bucharest Convention....
3. Cadiz Bay Strategy. (2023). *Integrated management approaches for socio-ecosystems in coastal areas*. University of Cadiz, Spain.
4. CBD. (2022). *Kunming-Montreal Global Biodiversity Framework*.
5. CrossGov Project. (2023). *Enhancing governance for marine biodiversity conservation in MSP*. Available at https://crossgov.eu.
6. Ehler, C., & Douvere, F. (2009). *Marine Spatial Planning: A Step-by-Step Approach toward Ecosystem-Based Management*. UNESCO.
7. European Commission. (2020). *EU Biodiversity Strategy for 2030: Bringing nature back into our lives*. Brussels, Belgium. Retrieved from https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_en.
8. European Commission. (2023). *Marine Spatial Planning and Integrated Coastal Management*.
9. European Maritime, Fisheries, and Aquaculture Fund (EMFAF). (2021). *Regulation (EU) 2021/1139 of the European Parliament and of the Council*. Brussels, Belgium.
10. Grorud-Colvert, K., et al. (2021). *The MPA Guide: A Framework to Achieve Global Goals for the Ocean*. *Science*.
11. HELCOM-VASAB MSP Working Group. (2021). *Guidelines on ecosystem-based approach in Maritime Spatial Planning*. Helsinki, Finland. Available at https://www.helcom.fi.
12. IPBES. (2019). *Global Assessment Report on Biodiversity and Ecosystem Services*.
13. Marine Strategy Framework Directive (MSFD). (2008). Directive 2008/56/EC of the European Parliament and of the Council establishing a framework for community action in the field of marine environmental policy. *Official Journal of the European Union*, L164, 25 June 2008.
14. Metsähallitus. (2022). *Biodiversity conservation efforts in Finnish marine protected areas*. Helsinki, Finland.
15. MSP Green Project. (2022). *Policy recommendations for biodiversity integration in maritime spatial planning*. Retrieved from https://mspgreen.eu.

16. OECD. (2017). *Marine Protected Areas: Economics, Management, and Effective Policy Mixes*.

17. OSPAR Commission. (2019). *North-East Atlantic Environment Strategy 2030*. London, UK. Retrieved from https://www.ospar.org.

18. Pınarbaşı, K., Galparsoro, I., Borja, Á., Stelzenmüller, V., Ehler, C.N., & Gimpel, A. (2017). Decision support tools in marine spatial planning: Present applications, gaps and future perspectives. *Marine Policy*, 83, 83–91. https://doi.org/10.1016/j.marpol.2017.05.031.

19. Russel, Duncan J., Roos M. den Uyl, and Laura de Vito. (2018). Understanding policy integration in the EU—Insights from a multi-level lens on climate adaptation and the EU's coastal and marine policy. *Environmental Science & Policy*, 82, 44-51. https://doi.org/10.1016/j.envsci.2017.12.009.

20. Sea2Land Navigator. (2023). *A decision-support tool for maritime spatial planning*. Accessed from https://navigator.sea2land.eu.

21. UNEP. (2021). *Making Peace with Nature*.

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Appendices

Policy solutions – a long list

Table A.1: Policy solutions, addressed barriers and source country, required effort and impact levels. Each solution includes an importance and feasibility score, defined by stakeholder survey outcomes.

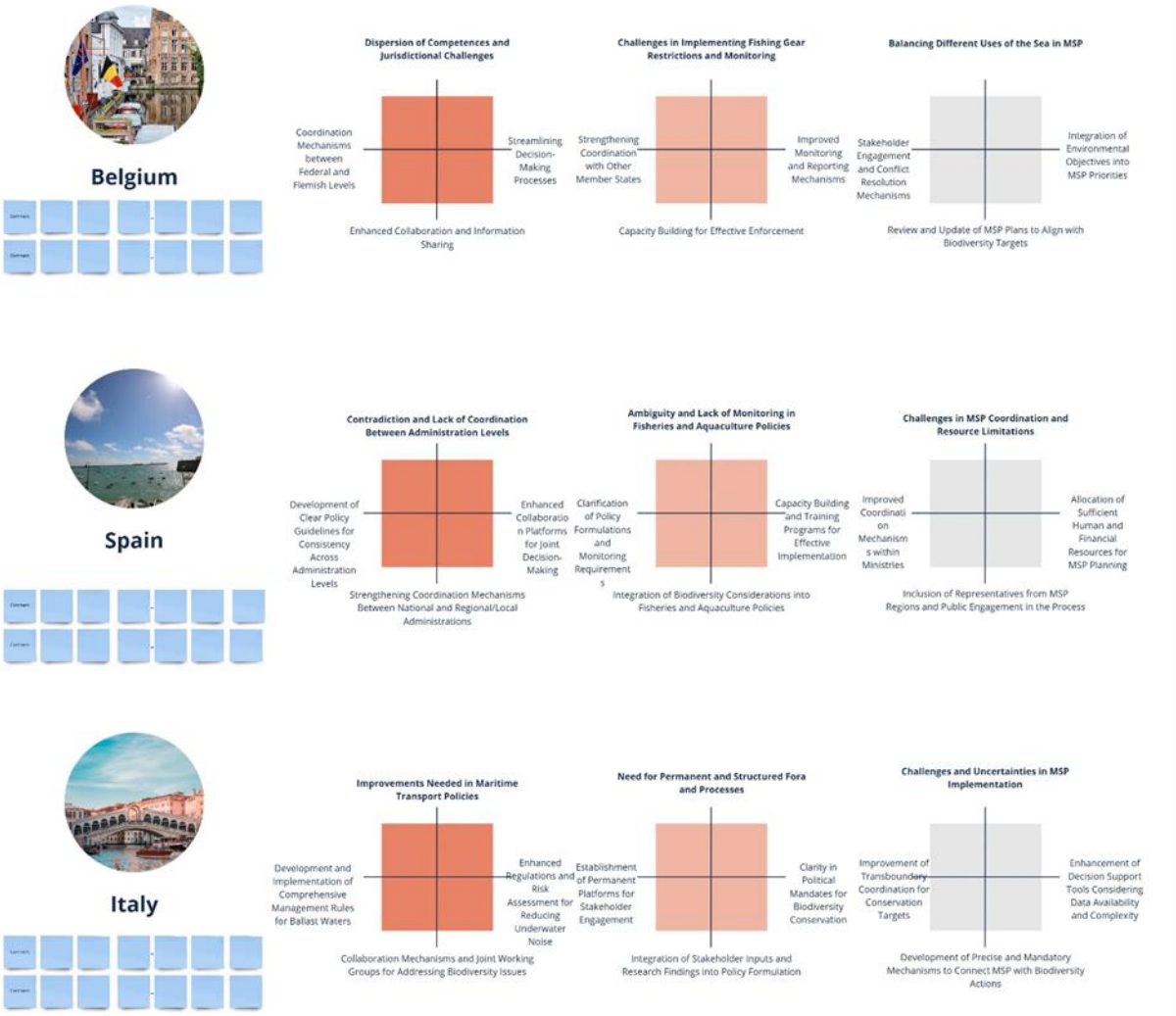
Country	Barriers	Solutions	Effort	Impact
Belgium	The dispersion of competences between the federal jurisdiction and the Flemish level	Establish a dedicated coordination framework or bolster existing structures to focus specifically on marine biodiversity, including regular inter-jurisdictional meetings and policy sessions. (I2.6, F2.3)	Moderate	High
Belgium	Practical implementation and enforcement	Develop comprehensive guidelines and enforcement mechanisms, including adequate training, resources, and designated MPA managers for effective reserve management. (I3, F3.1)	Very High	High
Bulgaria and Romania	Weak integration of the Common Fisheries Policy	EU LEVEL: Integrate the CFP more closely with MSP by enhancing the coherence between CFP requirements and MSP frameworks. (I2.4, F3) (This solution will be presented in D6.3)	High	Very High
Bulgaria and Romania	Objectives of MPAs are general, and MSP and MPA integration is weak.	Revise MPA objectives to be specific and measurable, aligned with each area's ecological needs, and involve MSP authorities in a consultative capacity. (I2.5, F2.7)	High	High
Bulgaria and Romania	MSP lacks the mandate for legally binding spatial measures	Strengthen MSP's role in achieving GES through capacity building, technical training, and dialogue across governance levels. (I2.3, F2.4)	Low	Very High
France	Current plan lacking sufficient economic resources for its implementation	Allocate a portion of maritime-related tax revenue to directly fund National Biodiversity Strategy projects and bolster its operational effectiveness. (I3.3, F3)	Moderate	High
France	Evaluating policies is difficult due to a lack of knowledge	Increase investment in biodiversity research and monitoring to build a comprehensive knowledge base for improved policy evaluation. (I2.7, F2.7)	Moderate	Very High
Italy	Inputs from stakeholders and research institutions are sometimes overlooked	Create continuous input channels for stakeholders, ensuring research institutes and others contribute regularly and influentially to policymaking. (I2.2, F2.1)	High	High
Italy	MSP policy implementation lacks mandatory mechanisms	Create mandatory, clear measures connecting human activities with biodiversity goals, including specific targets for success. (I2.7, F2.8)	Very High	Very High
Italy	Decision support tools in MSP are limited	Invest in data collection, develop more accessible decision support tools, and provide guidelines for their use in planning, monitoring, and adaptation processes. (I2.9, F3)	Moderate	Moderate
Poland	Insufficient coordination between the ministries	Utilize existing groups like the maritime economy group to establish compulsory assessments and reporting mechanisms that include biodiversity considerations. (I2.5, F2.4)	Low	High

Poland	The legal MSP act of Poland does not explicitly mention biodiversity as an objective	EU LEVEL: Align MSP objectives with EU Biodiversity Strategy: Use EU Biodiversity Strategy objectives to guide MSP initiatives towards biodiversity conservation. (I2.8, F3) (This solution will be presented in D6.3)	Moderate	Very High
Portugal	Economic interests often override biodiversity conservation due to pressure from local authorities	Improve public administration and technical staff training to strengthen biodiversity conservation efforts. (I3.2, F2.8) (Same as PS 5) (This solution was merged with similar ones)	Moderate	High
Portugal	Biodiversity conservation is considered secondary to economic goals within MSP	Amend MSP policies to prioritize both economic and biodiversity objectives equally and introduce mandatory conservation targets. (I3.2, 3) (This solution was merged with similar ones)	Moderate	Very High
Spain	Lack of coordination between national and regional/local administrations and between regions	Regional: Strengthen existing mechanisms like monitoring commissions to improve coordination and establish a public participation body for stakeholder engagement. (I2.9, 3.4) (This solution was merged with similar ones)	Very High	Very High

This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

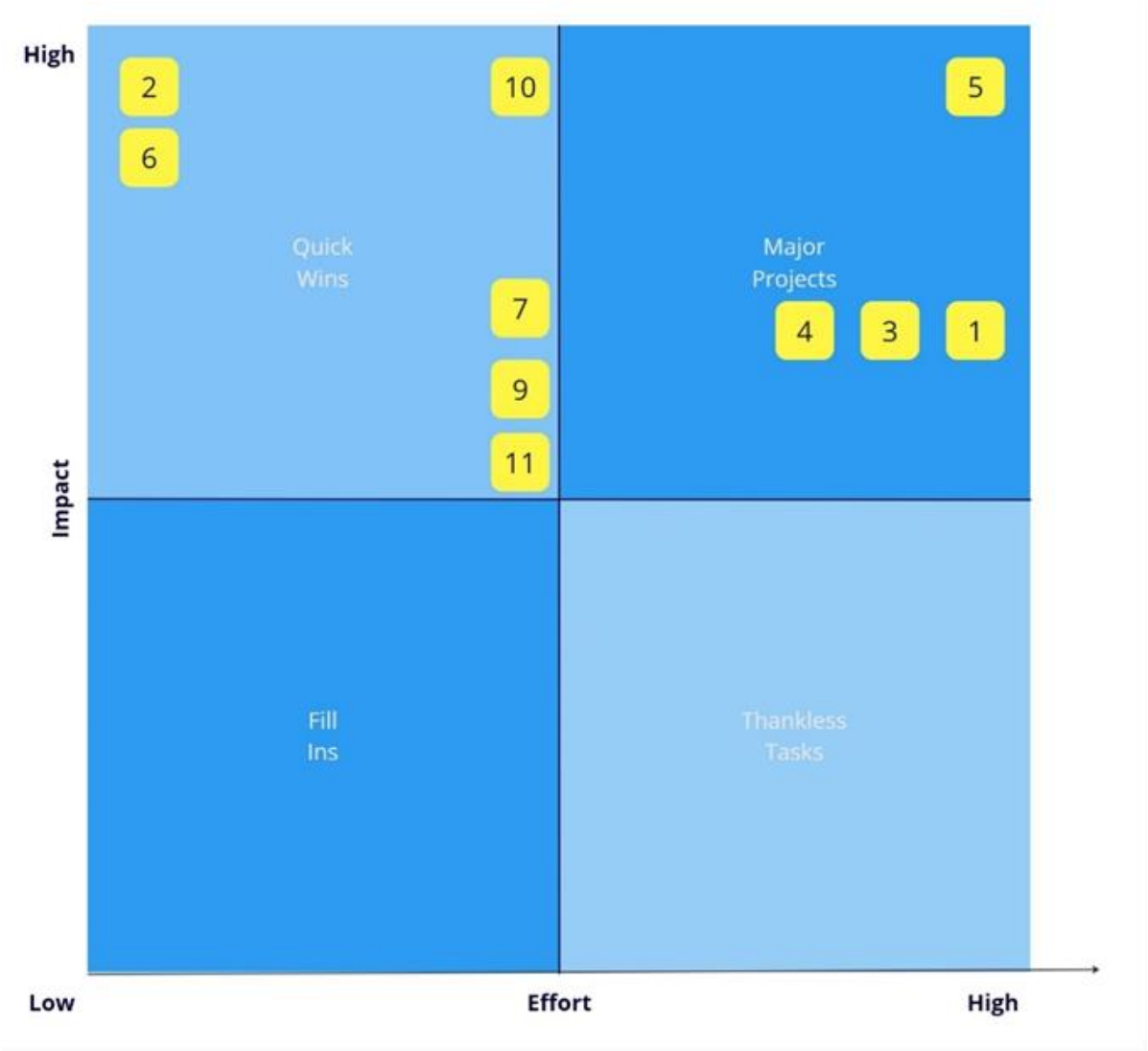
Examples of online interactive boards utilized in the process

Figure A.1: A section of the interactive board utilized during the solution development process, enabling participants to discuss and comment on solutions, identify barriers, and contribute good practices from their respective countries.



This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Figure A.2: A section of the interactive board used in the solution development process, illustrating the placement of developed policy solutions on the impact–effort index, based on input from stakeholders and project partners. Each square represents a policy solution by their respective number.



This project has received funding from the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Local and national level reflections

Following the development of policy solutions, application and evaluation of policy solutions were explored at different governance levels. This exercise helped to understand how tailored strategies can address test site-specific and broader governance challenges. The section is divided into two parts. First, it presents an in-depth analysis of the Cadiz Bay test site, where localized policy solutions were co-developed with stakeholders to overcome barriers related to management, stakeholder engagement, and institutional coordination. The Cadiz Bay example illustrates how participatory approaches, and a place-based strategic framework can enhance integrated management in complex socio-ecological settings. Second, the section includes reflections from national MSP authorities in Finland and Germany, offering comparative insights into how different governance frameworks and institutional structures influence the feasibility and adoption of developed policy solutions within MSP processes.

Applying the policy solutions in the Cadiz Bay

The Cadiz Bay test site stands out within T6.2 as a unique example where policy solutions were specifically tailored to address test site-level barriers. This focused approach was shaped through in-depth discussions with the CoP members, enabling the identification of local challenges and the co-creation of solutions. Unlike other test sites, where broader frameworks were applied, Cadiz Bay served as a pilot for developing specific strategies to overcome its barriers in management, stakeholder engagement, and institutional coordination. This process exemplifies the potential of localized, participatory approaches to foster effective and context-sensitive MSP.

In general, Cadiz Bay test site faces a couple of challenges that hinder its potential as a model for integrated management and sustainable development. Currently, the area lacks a cohesive management framework that encompasses the Bay and its several natural parks. Public participation in environmental management, especially in the contexts of MSP and MPAs, remains ineffective, limiting stakeholder engagement and community buy-in. Institutional collaboration and coordination are fragmented, with significant gaps among various entities responsible for managing the protected areas. This disjointed approach impedes the instrumental integration of different tools, plans, and measures within the Bay, leading to inefficiencies and missed opportunities for holistic management.

Cadiz Bay requires a paradigm shift to be viewed as a socio-ecosystem rather than through sectoral lenses. This perspective emphasizes land-sea integration, recognizing the interconnectedness of natural and human systems. Existing mechanisms for public participation, such as the "Junta Rectora" of the Cadiz Bay Natural Park, fall short in representativeness and fail to meaningfully engage stakeholders. Moreover, inadequate information dissemination exacerbates this problem, leaving many stakeholders uninformed and unable to participate effectively.

Core guiding questions

Addressing these challenges necessitates developing an integrated management framework for Cadiz Bay. The guiding questions shaping this effort include:

- *GQ1: How to transform participation in cultural behavior?*
- *GQ2: How to move from participation to engagement and co-creation, transforming participation in cultural behavior?*
- *GQ3: How to create a culture of collaboration among responsible institutions?*

Developing a shared agenda and securing funding

Description: Establish a collaborative agenda with clear guidelines for Cadiz Bay, supported by adequate financial resources to ensure its implementation. This agenda should reflect shared goals and priorities among all stakeholders.

Step 1: Define a shared agenda or guidelines (a strategy) to the entire Cadiz Bay as a socio-ecosystem

- Take advantage of the role of the University as independent actor to lead or speed the process of achieving agreements
- Agree on common intersectoral priorities or goals shared to the Cadiz Bay among sectors, administrations, institutions, and other relevant stakeholders.
- Agree on the scope of the Cadiz Bay as a socio-ecosystem, considering land-sea interactions and relevant marine planning tools (South-Atlantic Demarcation: Marine Spatial Plan and Marine Strategies), for example with the development of offshore windfarms or new MPAs.

Rationale of the proposal:

Cadiz Bay lacks a unified agenda that considers the entire socio-ecosystem, making it necessary to establish shared goals among stakeholders to improve coordination and public participation, with the University of Cadiz positioned as a neutral leader to facilitate this process.

Practical experience to be inspired by:

The ICZM Strategy for the Mar Menor coastal lagoon successfully implemented a Joint Declaration to unify goals for managing the socio-ecosystem effectively.

Step 2: Create a Fund for the Cadiz Bay to develop the previous agreed agenda or guidelines to the Cadiz Bay

The Fund can provide funding for collaboration between different stakeholders in Cadiz Bay.

Rationale of the proposal:

A dedicated fund for Cadiz Bay, established by competent authorities, is essential to implement the agreed objectives and guidelines, demonstrating political support and encouraging local managers to work consistently toward long-term goals.

Practical experience to be inspired by:

The ICZM Strategy for the Mar Menor lagoon, initially funded by European funds, transitioned to a locally supported fund to ensure sustainable, long-term management of its socio-ecosystem goals.

Stakeholder opinions: Positive

CoP interactions in Cadiz Bay test site revealed strong stakeholder support for two proposals: designing a shared agenda or strategy for the Bay of Cádiz as a socio-ecosystem and creating a dedicated fund linked to the implementation of this agenda. Participants identified the potential to unify local, provincial, and regional efforts into a single platform while addressing the lack of collaborative political culture in the Bay as a significant barrier. Suggestions included establishing recognized seals of good practices, leveraging existing decrees and agreements to align proposed actions, and fostering a metropolitan vision to guide integrated management. Stakeholders emphasized the importance of a joint declaration by municipalities to solidify political and social commitment, enabling a cohesive approach to both terrestrial and marine management within the Bay.

The creation of a dedicated fund for the Bay was viewed as essential to ensure the sustainability of integrated projects and reduce reliance on sporadic funding. However, consolidating dispersed resources into a single, stable pool was recognized as a significant challenge. Stakeholders proposed securing adequate budgets to motivate municipalities and advance a shared vision, with the University of Cádiz positioned as a neutral facilitator to strengthen governance and coordination. Recommendations included starting with scalable objectives and progressively advancing towards higher levels of collaboration, incorporating the ecological and socio-economic importance of the inner Bay into management plans, and leveraging existing agreements to propose a supraregional strategy. Highlighting achievements, such as the approval of the SIPAM proposal by the United Nations and the FAO's recognition of the salt marsh system, was also suggested to build momentum and mobilize support for the initiatives.

Enhancing coordination mechanisms

Description: Implement robust coordination mechanisms to facilitate effective collaboration among institutions. These mechanisms should address the current gaps in communication and planning, ensuring alignment and synergy across all efforts.

Step 1: Create or reformulate previous existing fora for collaboration and coordination between the Cadiz Bay responsible institutions (vertical & horizontal coordination)

- Define an official space for meetings
- The coordination mechanism should meet periodically to develop the agenda/guidelines of the Cadiz Bay
- Increase the quality and ensure proper frequency of meetings to achieve ongoing and meaningful engagement.
- Implement structured engagement processes that include representatives from all relevant administrations and sectors within the Cadiz Bay.
- The minutes of every meeting should be published to ensure transparency
- Ensure instrumental integration to achieve the shared objectives/priorities defined by the agenda/guidelines of the Cadiz Bay

Rationale of the proposal:

Management problems in the Cadiz Bay usually go beyond the competences of the relevant authorities, so the responses and goals established by the proposed Cadiz Bay agenda/guidelines will also cut across the administrative borders of the Bay.

Practical experiences to be inspired:

The Mar Menor ICZM strategy created two coordination bodies for the lagoon. The first was focused on policy-decision making coordination, and therefore is composed by high-level managers or politicians. The second has a technical-operative character and is created for coordination among managers of different institutions/administrations acting in the Mar Menor.

Step 2: Enhance coordination with MSP South-Atlantic Demarcation

- Enlarge the role of existing inter-ministerial committees from merely providing information to actively participating in decision-making and project implementation.
- Create and empower regional monitoring committees per marine planning area to include representatives from all relevant bodies, granting them greater authority in oversight and decision-making processes.
- Identify/create a regional authority/leader within the Autonomous Communities to ensure land-sea coordination in the marine planning areas.
- Implement regular feedback mechanisms and public consultations to tailor cultural transformations better.

Stakeholder Opinions: Cautious

Most CoP members expressed reservations about the proposal to create or reformulate a collaborative forum for institutional coordination, citing previous unsuccessful experiences with similar forums as a significant barrier. Participants emphasized that existing institutional challenges, such as the absence of a "Bay Commission" and fragmented mechanisms, require targeted solutions beyond simply establishing another forum. Suggestions included creating a

"Coast to Coast Commission" at the provincial level to periodically unite stakeholders and clarify the role of the Junta de Andalucía in advancing the shared Cadiz Bay agenda.

To address coordination challenges, stakeholders recommended reviewing and unifying existing plans to identify overlaps, engage key entities like the Port Authority and Coastal Demarcation in decision-making, and ensure regulatory enforcement for sustainable activities. Additionally, they highlighted the importance of involving the private sector by improving legal security and simplifying administrative procedures to facilitate investment. Practical steps such as developing technical guidelines, simplifying laws, and using scenario-based techniques to align stakeholder aspirations were also suggested to translate initiatives into concrete, actionable outcomes with visible short-term impacts.

Strengthening stakeholder engagement:

Description: Design and operationalize mechanisms to engage stakeholders actively in the development and implementation of the Cadiz Bay agenda. This includes improving existing participation tools, ensuring representativeness, and fostering meaningful co-creation processes.

Step 1: Establish structured engagement processes:

- Reform and strengthen bodies like the "Junta Rectora", or create a new one for the Cadiz Bay, to ensure broader and more effective stakeholder representation and decision-making.
- Implement structured engagement processes that include representatives from all regions and sectors affected by policies, adapted to both marine-coastal management and cultural programs.
- Increase the frequency and quality of meetings to ensure ongoing and meaningful engagement.

Step 2: Training and education:

- Provide training and education opportunities for local authorities and stakeholders on coastal-marine management principles, tools, and best practices. This builds local capacity to engage effectively in the planning process.
- Develop a comprehensive guideline that integrates extensive stakeholder engagement, respects local cultural practices, and empowers local governance to effectively manage marine and coastal areas.

Step 3: Expert exchange programs:

- Facilitate exchange programs with regions that have established successful MSP or MPA practices including local level (e.g., Latvia), allowing local planners to gain firsthand experience and knowledge.

Step 4: Co-creation workshops:

- Involve diverse community stakeholders in the co-creation and participation of cultural programs, ensuring respect for and integration of their views and traditions. In addition, organize workshops where community members can actively co-create cultural content, ensuring their voices and ideas are integral to the development process.

Stakeholder opinions: Positive

The CoP interactions highlighted strong support for proposals aimed at transforming participation into a cultural behavior and shifting from participation to engagement and co-creation within the Bay of Cádiz. Key endorsed actions include reforming and strengthening existing mechanisms, implementing structured participation processes, and fostering more frequent and meaningful stakeholder meetings. Training and education initiatives, expert exchange programs, and co-creation workshops were also emphasized as important steps to build capacity and promote interdisciplinary collaboration. Opportunities identified include developing communication plans, promoting citizen science methodologies like Coastwatch, and leveraging public spaces for awareness campaigns. However, barriers such as the passive nature of previous participation efforts, limited collaboration culture, and the novelty of co-creation approaches were recognized as challenges to overcome.

Participants also proposed additional strategies to address these guiding questions. Suggestions included strengthening the sense of identity and belonging to the Bay by linking its cultural, historical, and natural values and engaging stakeholders through positive marketing and communication efforts. Workshops to visualize future scenarios, testimonials from other regions, and concise educational reports were recommended to promote collaboration and public awareness. Other ideas included identifying positive catalysts for collective action, reconnecting urban and natural visions for the Bay, and encouraging entrepreneurial investment in restoring salt flats. These comprehensive and creative approaches aim to foster an active, engaged, and collaborative community for the sustainable management of the Bay of Cádiz.

Beyond the three guiding questions, discussions among CoP members and regional actors brought valuable insights, including the need to identify common issues, leverage climate change as a unifying catalyst, adopt preventive approaches, carefully consider the geographical scope, and secure funding for problem identification to enhance the management of the Bay of Cádiz.

Reflections from Finland and Germany

The developed policy solutions were presented to the national MSP authorities of Finland and Germany to gather targeted feedback on their feasibility, alignment with existing governance frameworks, and potential for implementation. Their insights provide a structured perspective on how maritime policies and biodiversity integration can be strengthened within national contexts. While D6.2 focuses on the viewpoints of these two national authorities, D6.3 will expand on a broader range of stakeholder perspectives, including think tanks, industry representatives, environmental NGOs, and cross-sectoral policy experts. The inclusion of this focused national-level analysis in the current deliverable serves as an illustrative example of how different governance approaches influence the adoption and adaptation of biodiversity mainstreaming solutions within MSP processes.

Finland's perspective on policy solutions

Finland demonstrates a generally supportive stance toward the developed policy solutions, particularly those that emphasize stakeholder engagement, data-driven decision-making, and institutional coordination. However, concerns arise regarding the feasibility of implementation due to resource constraints and the strategic nature of MSP in Finland.

- *Support for stakeholder engagement and coordination:* Finland highlights its *Meriverkko* initiative as a good practice in engaging stakeholders in marine biodiversity discussions. The country supports the idea of continuous stakeholder input into MSP processes and recognizes the importance of structured institutional collaboration, as reflected in its *MSP Coordination Group* and *MSP Cooperation network*. However, Finland notes that such processes are resource-intensive and may require further capacity-building efforts.
- *Skepticism toward mandatory biodiversity measures:* while Finland acknowledges the importance of linking MSP with biodiversity conservation objectives, it expresses concerns about the enforceability of mandatory biodiversity measures. MSP in Finland is strategic and not legally binding , which makes it difficult to introduce legally binding biodiversity-related requirements. Instead, Finland favors qualitative monitoring indicators and voluntary guidelines to encourage biodiversity integration.
- *Data and decision-support tools as enablers*: Finland actively supports technical solutions that enhance biodiversity mainstreaming through data collection and analysis. The country highlights its long-standing *VELMU program* and the use of *Zonation* to assess marine biodiversity hotspots as strong examples of how data-driven approaches can inform MSP. Finland also recognizes the value of using decision-support tools to align offshore wind energy development with biodiversity conservation.
- *Cautious approach to MPA-MSP integration*: Finland questions the necessity of revising MPA objectives, as they are already defined within national legislation. However, it acknowledges the potential benefits of involving MSP authorities in MPA planning processes, provided that this involvement remains consultative rather than prescriptive. Finland suggests rewording the proposed "consultative capacity" into “involvement” or “engagement” to better reflect the intended role of MSP authorities in supporting MPA management.
- *Limited capacity for strengthening GES through MSP:* Finland acknowledges the value of aligning MSP with Good Environmental Status (GES) objectives but stresses that resource limitations are a major challenge. While Finland actively participates in dialogue between MSP and GES authorities through shared data platforms like *Pisara*, the country points out that the lack of dedicated resources for MSP-related environmental monitoring remains a significant constraint.

Germany's perspective on policy solutions

Germany generally aligns with the developed policy solutions but emphasizes the importance of sectoral planning, legal enforcement, and structured institutional collaboration. Germany tends to focus on aligning biodiversity conservation efforts with existing regulatory frameworks rather than introducing new mandatory requirements within MSP.

- *Strong support for institutional coordination and knowledge exchange:* Germany recognizes the HELCOM-VASAB MSP Working Group and OSPAR as key platforms for facilitating cross-border cooperation and institutional dialogue on MSP and biodiversity. The country suggests that informal working groups on specific biodiversity-related topics could further enhance these efforts. Germany fully supports policy solutions aimed at improving coordination frameworks, if they complement existing mechanisms rather than duplicate efforts.
- *Emphasis on research and monitoring for biodiversity integration:* Germany places a high value on research-driven policy development and monitoring. The country highlights its use of decision-support tools like *GeoSeaPortal*, *MARLIN*, and *PINTA*, which aid in evaluating biodiversity considerations in MSP processes. Germany also invests in monitoring the impacts of human activities, such as offshore wind farms, on marine species. These efforts align well with the proposed technical policy solutions that emphasize data-driven decision-making.
- *Preference for sectoral planning over direct MSP regulation of biodiversity*: unlike Finland, Germany has a more formalized approach to integrating biodiversity into spatial planning through sectoral nature conservation planning. EU-designated protected areas in Germany undergo detailed regulatory processes, including the revision of conservation ordinances and management plans. Germany stresses that MSP should not duplicate these efforts but rather support them by facilitating spatial coordination between different marine uses.
- *Cautious approach to MPA objectives and MSP involvement:* Germany expresses the need for a clear distinction between MSP and nature conservation planning. The country highlights that MPA regulations in Germany are already implemented through legally binding sectoral planning processes. While Germany acknowledges the importance of cooperation between MSP and MPA management authorities, it argues that MSP should primarily focus on planning human activities rather than directly influencing MPA objectives.
- *Application of an ecosystem-based approach in MSP*: Germany supports strengthening the role of MSP in achieving GES but highlights that this must be done within the existing legal framework. The country asserts that its MSP processes already apply the ecosystem-based approach "to the highest extent possible" and emphasizes the importance of monitoring and evaluation mechanisms to assess the environmental impacts of MSP designations.

Comparative reflection

Both Finland and Germany acknowledge the relevance of the proposed policy solutions but approach them from different governance perspectives.

- *Institutional coordination*: both countries support enhanced institutional coordination but stress the importance of building on existing mechanisms rather than creating parallel structures.
- *Stakeholder engagement*: Finland is highly engaged in stakeholder-driven approaches, while Germany prefers structured institutional mechanisms at the regional level.

- *Data and monitoring*: Finland's strength lies in its long-term biodiversity data collection programs, while Germany excels in applying research and decision-support tools for biodiversity assessment.
- *Enforcement and regulatory considerations*: Finland sees MSP as a strategic tool with limited enforcement capacity, whereas Germany integrates biodiversity into legally binding sectoral planning frameworks.
- *MPA-MSP integration*: Finland is open to greater MSP involvement in MPA planning but wants the process to remain consultative. Germany, on the other hand, prefers to keep MSP and MPA regulations as separate but coordinated processes.