



Deliverable 7.5 Policy brief

Policy brief



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Author(s)	Ivana Stojanovic, Marina Markovic, Helena Calado, Debora Guitterez, Martina Bocci, Päivi Haapasaari, Margarita Stancheva, Mauro Randone, Kemal Pinarbasi, Francisco Barboza, Natascha Jaspert
Editor	Mauro Randone (WWF MED), Volcy Boilevin (UN)
Approved by	Ivana Stojanovic
Project Officer	Victoria Beaz Hidalgo
Abstract	This policy brief presents the final recommendations from the MSP4BIO project to support the effective integration of biodiversity into Maritime Spatial Planning (MSP) across Europe. Drawing on three years of research, working in test sites, and together with



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	<p>stakeholders, MSP4BIO highlights key challenges to ecosystem-based MSP and offers concrete policy solutions. The brief calls for embedding biodiversity targets in all maritime policies and planning approaches, updating and aligning MSP with the Marine Strategy Framework Directive, the EU Nature Restoration Law, and the Ocean Pact. It recommends institutionalizing regional approaches to MSP through cross-sector and transboundary coordination platforms such as HELCOM, the Barcelona Convention, and inter-ministerial bodies. The adoption and scaling of the ESE Framework is urged to support the spatial integration of conservation, ecosystem services, and sustainable uses. To ensure effective implementation, the brief emphasizes the need for dedicated training and resources for planners, the use of EU funding instruments to apply MSP4BIO tools in practice, and sustained investment in data, capacity-building, and inclusive participation using MSP4BIO's open-access resources and Communities of Practice.</p>
<p>Keywords</p>	<p>Policy brief, MSP, MPA, policy recommendations</p>
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Acronyms

CBD – Convention on Biological Diversity
CFP – Common Fisheries Policy
CIA – Cumulative Impacts Assessment
CoP – Community of Practices
DG – Directorate General
DST(s) – Decision Support Tool(s)
EBA – Ecosystem-based Approach
EBSA – Ecologically or Biologically Significant Marine Areas
EGD – European Green Deal
ESE Framework – Ecological-Socio-Economic Framework
EUBS2030 – EU Biodiversity Strategy 2030
GES – Good Environmental Status
MaS – Marine Strategies
MPAs – Marine Protected Areas
MS – Member States
MSFD – Marine Strategy Framework Directive
MSP – Marine Spatial Planning
MSPD – Marine Spatial Planning Directive
NGO- Non-Governmental Organization
ORE – Offshore Renewable Energy
PS – Policy Solution
RBMPs – River Basin Management Plans
SEA – Strategic Environmental Assessment
SNA – Social Network Analysis
SPIA – Spatial Pressure and Impact Assessment
SPS – Science-Policy-Society
WFD – Water Framework Directive



1. The Challenge: Why is MPA/MSP integration needed?

Europe's seas face increasing pressure from climate change, resource extraction, shipping, and expanding blue economy sectors. Marine ecosystems are being pushed beyond their limits, and biodiversity loss is accelerating.

Despite progress in MSP implementation, many planning processes still lack systematic integration of ecological knowledge and biodiversity priorities. Marine protected area networks remain fragmented, while trade-offs between conservation and development are rarely made transparent, participatory or evidence based.

The EU Biodiversity Strategy calls for at least 30% of the sea to be protected and 10% strictly protected by 2030. To deliver on these targets, MSP must become a vehicle for coordinated, ecosystem-based action across national boundaries and policy domains.

There is an urgent need to shift from fragmented conservation efforts toward integrated spatial governance that embeds biodiversity across all sectors and decision-making processes. Simply designating more Marine Protected Areas (MPAs) is not enough; what is needed is a holistic approach that treats biodiversity as a cross-cutting priority, not an isolated sectoral concern. Biodiversity underpins ecosystem health, climate resilience, and long-term socio-economic stability, yet it is often sidelined in spatial planning. MSP plays a key role in addressing this gap by serving as a platform to integrate ecological integrity, climate adaptation, and sustainable use into spatial decisions. As pressures on marine and coastal ecosystems intensify, resolving these issues through coordinated, science-based planning becomes not only necessary—but critical—for achieving resilient and equitable futures.

The Role of MSP in Delivering 30x30

MSP provides a strategic, cross-sectoral platform to guide marine use. Ecosystem-based planning allows integration of MPAs, OECMs, and ecological connectivity. MSP supports multi-use zoning, stakeholder engagement, and conflict resolution.

Maritime spatial plans, already established across many coastal nations, offer significant untapped potential to strengthen MPA network design, strategic planning, and cross-sector coordination. By providing a structured, spatially explicit framework, MSP can guide the strategic placement of MPAs to ensure ecological coherence, connectivity, and resilience. It also supports the integration of biodiversity objectives into Strategic Environmental Assessments (SEA), enabling long-term, ecosystem-based planning. Moreover, MSP serves as a platform for cross-sector dialogue, facilitating alignment between conservation goals and maritime sectors such as fisheries, aquaculture, shipping, tourism, and energy. However, despite this potential, biodiversity is still inconsistently integrated into MSP processes. Unlocking the full value of MSP for nature



requires embedding biodiversity as a core, measurable priority within planning frameworks—bridging the current gap between ecological science and spatial decision-making.

Progress in marine conservation status in Europe

Marine Protected Areas are central to achieving the EU’s biodiversity goals—but urgent action is needed. EU policies have played a pivotal role in expanding MPAs, growing coverage from 5.9% in 2012 to 12.3% in 2023. Only 0,2% of MPAs are fully or highly protected, while 86% show low protection levels or incompatibility with conservation.¹ Beyond numbers, which are still far from the 30% target set for 2030, true protection remains weak—many MPAs lack effective management, enforcement, and clear planning, leaving biodiversity vulnerable. The quality of protection varies widely, with inconsistent management measures and insufficient resources. Several gaps have been identified in MPA designation process, such as the length of process and limited or not impactful stakeholder engagement, as well as in their implementation, including insufficient monitoring and control. Yet, when different protection measures are well-coordinated—as seen in successful cases across the EU—they create powerful synergies. The MSP4BIO sea-basin wide analysis confirms that combining protection and restoration within maritime spatial planning is a potent strategy for biodiversity. To succeed, Europe must scale up designation efforts, radically improve MPA management, and invest in stronger governance and stakeholder engagement.

Current Gaps²

Several persistent barriers hinder the effective integration of MPAs into MSP, undermining progress toward coherent and resilient marine governance. One of the core issues is the limited and often fragmented incorporation of biodiversity objectives into MSP processes. Biodiversity protection is frequently treated as a separate consideration, rather than an integral component of spatial decision-making. A significant challenge in current marine protection efforts lies in the design and coherence of MPA networks. Many MPAs lack connectivity and fail to adequately represent ecologically important habitats and species, resulting in less effective conservation outcomes.

Ecological functions and processes—essential for maintaining healthy marine ecosystems—are often underrepresented due to data gaps or the lack of accessible tools, leading to the common disconnect between ecological science and policy implementation.

¹ Aminian-Biquet et al., 2024

² All WP2, WP4, WP5, WP6 deliverables, Deliverable 3.1: <https://msp4bio.eu/publications/>



Conceptual and technical gaps also hinder progress. The ecosystem-based approach, although widely referenced, lacks a clear and consistent application in MSP practice. Similarly, the absence of threshold values for determining Good Environmental Status (GES) makes it difficult to assess ecological progress and enforce related objectives. The lack of mechanisms connecting MSP with concrete biodiversity measures, such as the creation or effective management of MPAs and establishment of OECEMs, further limits MSP's potential to operationalize biodiversity targets. Moreover, aligning biodiversity goals with socio-economic development is still challenging, as conservation measures are often perceived to conflict with economic interests. Planners frequently face difficulties in navigating trade-offs between environmental protection and the needs of various maritime sectors. Additionally, planning processes often lack the integration of climate-related considerations, making it difficult to anticipate and respond to future environmental changes and ensure long-term resilience of marine ecosystems.

Marine planning often struggles with limited stakeholder engagement, partly due to complex, technical processes and tools that are not easily accessible or transparent. This can result in ecological priorities being poorly understood or insufficiently integrated into decision-making. Moreover, translating broad policy goals into concrete, locally relevant actions remain a persistent challenge, particularly in ensuring that biodiversity objectives are both actionable and aligned with diverse stakeholder interests.

Another major challenge is the fragmentation of policy frameworks, with limited coordination between MSP, the Marine Strategy Framework Directive (MSFD), the Common Fisheries Policy (CFP), and EU nature directives. As a result, MPAs are often weakly integrated into MSP processes, typically represented as passive spatial layers rather than active components of planning.³ This is compounded by a lack of robust ecological data, indicators, and thresholds, along with insufficient incorporation of climate adaptation into planning frameworks. Centralized, top-down planning structures and well-established sectoral silos further inhibit collaborative, ecosystem-based approaches. Additionally, MPA networks often suffer from gaps in ecological representativity, effectiveness, and connectivity, limiting their contribution to biodiversity goals. Another critical barrier is the fragmented and uneven implementation of the MSP Directive across EU countries. Variability in national planning approaches undermines the coherence and effectiveness of MSP at the regional sea level and complicates transboundary cooperation.

Furthermore, even where MPAs are fully integrated into MSP across sectors, gaps remain, including the non-binding legal status of MSP, limiting enforceability,

³ D4.4 Strategic Guidance on the integration of MPA and MSP on multiple governance and ecosystem levels (under review)



misalignment and lack of integration among different governance levels or sectors. Threats like insufficient monitoring, climate change impacts, limited data, and economic sectoral dominance also hinder conservation goals. Integration of MPAs via SEA or other environmental strategies suffers from fragmented responsibilities between MSP and MPA management, inconsistent enforcement of conservation objectives, sectoral conflicts, limited data-driven decisions, poor stakeholder coordination, and inadequate adaptability to climate change, compounded by monitoring gaps and reliance on pre-existing legislation.

Governance challenges further limit MSP's ability to support biodiversity. Siloed policymaking, weak cross-sector coordination, centralized planning, and limited public engagement without real decision-making power reduce MSP's integrative potential. Moreover, stakeholder pressure can lead to prioritizing economic uses of the sea over environmental objectives. In some contexts, environmental stakeholders remain unfamiliar with MSP processes or perceive MSP as an ineffective instrument for achieving biodiversity goals.

Regional Sea Conventions and European Sea Basin Strategies (e.g. WestMed) can support MSP and biodiversity integration, but their engagement varies. HELCOM and the Barcelona Convention actively work on integrating an ecosystem-based approach and biodiversity into MSP and have adopted regional MSP roadmaps. In contrast, OSPAR has not formally incorporated MSP, although coordination opportunities exist, particularly around aligning MPA networks with wind energy development. The Black Sea Commission does not explicitly include MSP in its frameworks, but it has supported cross-border MSP cooperation between Bulgaria and Romania.

These barriers have serious consequences for the effectiveness and impact of marine conservation efforts. Progress on marine restoration remains slow, and efforts are frequently isolated, lacking coordination across administrative and ecological boundaries. Legal fragmentation between MSP and MPA policies further complicates implementation, creating unclear mandates, in some cases conflicting targets (e.g. protection vs renewables) and overlapping responsibilities. MSP also often lacks the authority to influence key sectoral decisions, particularly in areas like fisheries and energy, limiting its capacity to balance ecological needs with economic activities. Persistent data gaps or insufficient data sharing and limited application of ecosystem-based management reduce the scientific basis for spatial decisions. Together, these issues threaten the EU's biodiversity and climate targets, underscoring the need for more integrated, participatory, and ecologically grounded spatial planning.



2. ESE Framework – towards biodiversity inclusive MSP⁴

To address the above-mentioned challenges and gaps, MSP4BIO project has developed Ecological-Socio-Economic management framework (ESE) as a tool-based step-by-step guidance for enhancing protection and restoration of marine ecosystems and biodiversity and integration with MSP. It supports decision-makers in designing maritime plans that are both ecologically sound and socio-economically balanced.

The ESE Framework enables planners to identify ecologically valuable areas, assess cumulative human impacts, and spatially prioritise actions for protection, restoration, and sustainable use.

One of the key strengths of the framework lies in its structured approach to assessing ecological and socio-economic criteria and link ecological functions with sector activities. It integrates decision-support tools and enables users to map and evaluate ecosystem services, identify high-value areas for biodiversity, and explore spatial trade-offs between conservation and use. It also includes comprehensive guidance to support the integration of MPAs into broader MSP processes, promoting greater policy coherence across conservation and sectoral objectives. By aligning ecological priorities with spatial planning mechanisms, the framework ensures that MPAs are not planned or managed in isolation, but as part of a wider, strategically connected marine management approach. Integrating practical guidance and tools tailored to blue economy sectors such as fisheries, aquaculture, renewable energy, tourism, and marine resource extraction, it provides practical tools that assist blue economy sectors in adopting Good Management Practices that minimise environmental pressures and support the delivery of ecosystem services. This helps create spatially coherent and climate-resilient conservation networks that work in synergy with human activities.

As Europe moves forward with the implementation of the EU Biodiversity Strategy and the 30x30 conservation target, and with the recently adopted the EU Ocean Pact which announced review and update of both MSFD and MSP directives, the ESE Framework offers a timely and practical contribution. It supports the design of spatially coherent and ecologically meaningful conservation networks, strengthens the integration between MPAs and MSP, and enhances cross-sector collaboration. By turning scientific evidence into practical planning tools, MSP4BIO helps ensure that marine space is used effectively, protecting ecosystems while supporting sustainable use.

The framework is conceived as a user-oriented guidance combined with an online platform. The expected users of the framework are MSP authorities and marine planners,

⁴ Deliverable 4.5 Integrated Ecological-Socio-Economic Management Framework - ESE Step-by- Step guidance



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environmental authorities, MPA managers, decision maker involved in marine and coastal management. The entry point to the framework are management questions: the ESE framework presents several questions the user can select on the basis of her/his management needs. Based on the type of question, the user can navigate through the solutions offered by the different ESE modules and other outputs from the MSP4BIO project (Figures 1, 2).

The knowledge from the above components is made available through a number of Practices (i.e operative instructions) that users can follow to address their questions through the application of ecological and socio-economic criteria and tools. The ESE framework also provides the user with a list of criteria, decision-support tools, measures (i.e. good practices) and policy solutions dealing with mainstreaming marine protection in maritime sectors and MSP.



Figure 1 ESE framework conceptual model – ESE modules.

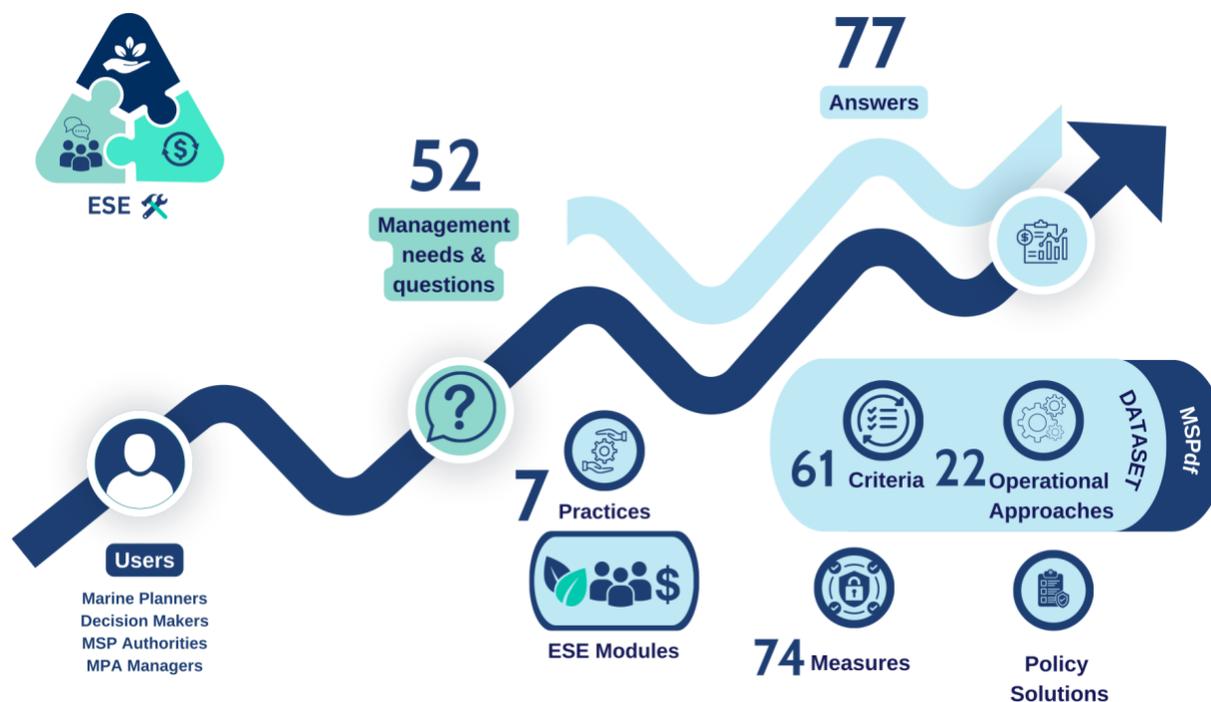


Figure 2 ESE framework conceptual model.

3. Key Recommendations

3.1 Policy recommendations

To support effective integration of MPAs into MSP⁵, **strengthening legal and policy frameworks** is a critical starting point. Binding legal frameworks for MSP, as seen in countries like Latvia, ensure enforceability and coherence with MPA objectives. Harmonising existing legal instruments across planning and conservation domains—as advocated in examples from Denmark—reduces regulatory fragmentation. Incorporating EU directives, such as the CFP, MSFD and the Habitats Directive, within MSP processes helps ensure biodiversity protection is central to spatial planning. In all sea basins, there is also an emphasis on integrating ecosystem-based approaches into marine governance, through spatial zoning, cross-sectoral planning, and improved environmental safeguards.

Another foundational enabler of effective biodiversity mainstreaming in MSP is **the establishment of dedicated coordination frameworks**. Fragmented governance

⁵ [D4.4 Strategic Guidance on the integration of MPA and MSP on multiple governance and ecosystem levels](#)



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structures and overlapping mandates across institutions often lead to disjointed or conflicting marine policies. To address this, countries such as Germany have instituted inter-agency working groups that align spatial planning with biodiversity objectives, while regional examples like the HELCOM-VASAB MSP Working Group demonstrate how structured collaboration can bridge national and transnational policy divides. Establishing regular inter-ministerial dialogues and sectoral coordination platforms ensures that biodiversity priorities are systematically integrated into marine governance, contributing to the coherence and long-term viability of Europe's 30x30 targets.

Equally important is **improving stakeholder engagement and governance**. Structured participation of local communities, sectoral actors, and conservation managers strengthens alignment between MPA and MSP goals. Practices in Poland highlight the value of participatory approaches for MPA management, although such processes are still detached from MSP frameworks. Developing multi-stakeholder governance structures, improving public awareness, and investing in awareness and engagement tools are key for building trust, legitimacy, and inclusive decision-making.

Effective integration further depends on **science-based monitoring and data systems to inform policy integration, knowledge sharing and collaboration**, including cross-sectoral task forces and joint educational initiatives, alongside **adaptive management principles**, such as regular review cycles to update strategies in line with scientific evidence. These are reinforced by **clear guidance and protocols**, as demonstrated in Sweden, ensuring that sustainable use and conservation objectives are effectively balanced across marine spatial planning frameworks.

In parallel, MSP should move beyond general guidance and adopt **enforceable measures that directly link human activities to biodiversity outcomes**. This involves developing clear, legally binding targets: such as limits on habitat disturbance from offshore energy or fisheries and aligning them with national and EU biodiversity strategies through the implementation of MSFD descriptors and threshold. Countries like Belgium and Finland have taken steps in this direction by integrating specific conservation indicators into spatial planning frameworks. Embedding biodiversity metrics and compliance mechanisms into sectoral authorizations ensures that marine users are accountable for their ecological impacts, thus supporting measurable progress toward 30x30 goals.

To ensure that such enforceable measures translate into meaningful conservation and restoration outcomes, careful consideration of **spatial and temporal scales** is essential. The suitability of location and size is crucial to securing ecosystem benefits and maximizing return on resource investment. These activities also require a long-term perspective: they must be embedded in strategic planning and implementation processes



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that account for future socio-economic and environmental changes. OECMs appear to be promising tools for extending marine protection, but clear criteria must be defined for their diverse typologies.

3.2 Other recommendations

Achieving the EU's 30x30 targets also depends on **sustained investments in biodiversity monitoring**, knowledge systems, and financial mechanisms. National strategies should earmark funding—potentially sourced from maritime tax revenues or EU instruments like the Horizon Europe, cohesion funds - to support long-term ecological monitoring and adaptive management. **Enhancing monitoring, data integration and adaptive frameworks** underpins the ability to assess, adjust, and enforce spatial measures effectively. Countries like Belgium demonstrate best practices in ecological monitoring of Natura 2000 sites. Tools such as remote sensing and SYMPHONY⁶ support tracking of conservation progress and MSP compliance. Open data initiatives and collaboration with research institutions ensure transparency and informed decision-making (see [MSP4BIO database](#)). Regular dissemination of SEA updates and adaptive revisions to MSP frameworks help align with evolving scientific and climate resilience needs.

Integrating ecological connectivity and climate resilience into MSP calls for addressing ecological corridors and connectivity to mitigate habitat fragmentation, while embedding resilience measures to respond to climate change impacts such as sea-level rise, ocean acidification, and ecosystem shifts (see MSP4BIO [Ecological Toolkit](#)). These priorities are best advanced through **strategic environmental assessment (SEA)**, which supports long-term strategic planning, and the early application of the ecosystem-based approach. Countries like Germany and Estonia exemplify how SEAs can align MSP and MPA objectives while promoting transparency and systematically addressing cumulative impacts and Sweden has begun integrating climate adaptation considerations into MSP through climate refugia areas, joint scenario planning and risk assessments (see [MPA/MSP integration guide](#)). Climate-smart MSP supports the anticipatory design of conservation areas, helps prevent maladaptation, and ensures that the ecological integrity of MPAs can be sustained under future ocean conditions (see [Guide on climate change scenarios for protection strategies](#)). Complementary to these efforts, **cross-border coordination** enhances impact management and connectivity through transboundary cooperation and the standardisation of national and regional MSP implementation. This is supported by **cumulative impact assessments** that rely on

⁶ <https://maritime-spatial-planning.ec.europa.eu/practices/symphony-tool-ecosystem-based-marine-spatial-planning>



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standardised protocols and innovative tools such as pressure-impact matrices and ecosystem service models¹¹.

When it comes to blue economy sectors such as fisheries, aquaculture, and tourism, recommendations include **supporting socioeconomic transition** through financial incentives, capacity building, and communication strategies that highlight co-benefits such as improved fish stocks, tourism opportunities, and reduced conflicts between uses. Examples like pesca-tourism and shellfish aquaculture in MPAs are cited as promising win-win approaches¹³.

Nature-based and multi-use solutions are increasingly recommended as a way to reconcile economic activity with ecosystem restoration. Many sea basins suggest promoting co-location of compatible activities—such as aquaculture within offshore wind farms—and adopting nature-inclusive infrastructure designs that double as artificial reefs or species corridors. Restorative aquaculture, ecotourism, and sustainable maritime heritage activities are highlighted as ways to enhance local economies while preserving marine ecosystems.

A shift toward strategic, forward-looking planning is also advised. Reactive, conflict-avoidance-based planning remains prevalent, but it is increasingly seen as inadequate. MSP and sectoral strategies should adopt **scenario-based approaches** that account for future climate change, spatial trade-offs, and ecological thresholds¹². Adaptive management frameworks are essential for dealing with uncertainty and long-term environmental change.

Together, these strategic guidelines lay the groundwork for a robust, integrated marine management approach across Europe and beyond.



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3.3 Summary of key recommendations

	Category	Recommendations	Target group(s)
	Governance & Coordination	<ul style="list-style-type: none">• Dedicated MPA/MSP coordination frameworks• Cross-scale and cross-sector collaboration• Strengthen Sea Basin Cooperation	<ul style="list-style-type: none">• National and regional authorities
	Adopt Integrated Planning Frameworks	<ul style="list-style-type: none">• Apply the ESE Framework in national MSP updates to enable a holistic and participatory planning approach.• Promote ecological and socio-economic integration from early planning stages, including restoration goals and connectivity.	<ul style="list-style-type: none">• MSP Planners• Planning and environmental authorities
	MPA-Related Planning	<ul style="list-style-type: none">• Redefine and align MPA objectives with MSP• Include MPAs in spatial and regulatory planning• Support for OECMs and strictly protected areas	<ul style="list-style-type: none">• MSP Planners• Planning and Environmental authorities• Regional Sea Conventions
	Legally Binding Biodiversity Targets	<ul style="list-style-type: none">• Bridge EU Policy Frameworks - Integrate into sectoral policies and MSP processes• Monitoring, enforcement, and performance reviews	<ul style="list-style-type: none">• EU policy makers• National authorities



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	<h3>Strengthen Sea Basin Cooperation</h3>	<ul style="list-style-type: none">• Support transboundary governance for habitats and species beyond national borders, especially for mobile and migratory species.• Align monitoring and planning across countries using regional sea conventions such as OSPAR and HELCOM.	<ul style="list-style-type: none">• National authorities• Regional seas conventions
	<h3>Stakeholder & Institutional Capacity</h3>	<ul style="list-style-type: none">• Permanent stakeholder platforms• Engage research institutions and communities• Training for MSP practitioners on biodiversity integration• E-learning and dialogue forums	<ul style="list-style-type: none">• Planners and MPA managers• Research and academia• Relevant authorities• Local communities• Students
	<h3>Align Biodiversity and Blue Economy Goals</h3>	<ul style="list-style-type: none">• Use MSP4BIO's criteria and DSTs to assess trade-offs between sectoral uses (e.g. fisheries, wind energy) and biodiversity.• Foster nature-inclusive design across marine sectors, from aquaculture to offshore renewables.	<ul style="list-style-type: none">• Blue Economy sectors• MPA Managers• MSP Planners and environmental agencies• Permitting authorities



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	Tools, Data, and Assessment	<ul style="list-style-type: none">• Standardized biodiversity assessment & reporting• FAIR data principles, interoperable platforms• Use of cumulative impact tools & scenario planning	<ul style="list-style-type: none">• Planners and MPA managers• Environmental and planning agencies• Research• Students
	Funding and Research	<ul style="list-style-type: none">• Dedicated biodiversity funds (e.g., from maritime taxes)• Support for adaptive MPA management• Long-term monitoring and cross-border research	<ul style="list-style-type: none">• EU DGs and national authorities• Regional seas conventions
	Climate-Smart MSP	<ul style="list-style-type: none">• Integration of climate adaptation and mitigation• Ecosystem-based and nature-based solutions• Climate vulnerability assessments	<ul style="list-style-type: none">• MSP and environmental authorities• MSP planners



4. Opportunities for Upscale and further Uptake

The MSP4BIO project offers a robust set of tools, methods, and data that can be directly integrated into ongoing marine planning and conservation efforts across multiple governance levels. Several key opportunities for uptake are identified:

4.1 Upscale at Sea-basin level

Across all sea basins, several common themes and recommendations have emerged from the MSP4BIO project. A key priority is the need to better align Maritime Spatial Planning (MSP) with Marine Protected Area (MPA) planning through integrated, ecosystem-based approaches that reflect the interconnectedness of marine systems. Strengthening transboundary cooperation is also critical to ensure ecological coherence and more consistent policy implementation across national boundaries. The adoption of MSP4BIO tools was widely recognised as essential for supporting biodiversity-inclusive planning and enabling more informed trade-off analysis. Engaging stakeholders, particularly local communities and sectoral representatives, remains a cornerstone for legitimacy and uptake of nature-based solutions. To facilitate the use of these tools and approaches, investment in capacity-building and training is necessary to support planners, authorities, and practitioners. Lastly, leveraging regional governance mechanisms and EU policy frameworks will be key to embedding biodiversity considerations into future MSP updates and sustainable blue economy strategies.

While common challenges persist across regions, each MSP4BIO test site⁷ offers unique potential for scaling up solutions, reflecting its specific ecological, institutional, and socio-economic context. In the Baltic Sea, where robust institutional frameworks already exist, there is strong potential to further integrate ecosystem-based approaches and align MSP and MPA planning to address fragmentation in ecological governance. In the Belgian part of the North Sea, the emphasis on the spillover effects of MPAs and transboundary species management highlights the importance of enhanced regional cooperation and policy alignment to manage shared marine resources. In the North-East Atlantic, particularly in the Azores and Cádiz, progress hinges on local stakeholder empowerment, the promotion of multi-level governance models, and the integration of biodiversity objectives into broader socio-economic development agendas. The North-Western Mediterranean stands out for its pioneering work on the systematic integration of climate change considerations into scenario-based spatial planning, advancing a more adaptive

⁷ [D5.1 Site specific gaps and opportunities to support knowledge-based MSP](#)



and forward-looking MSP approach. Meanwhile, the Black Sea region demonstrates the critical need to build regional governance structures, strengthen stakeholder coalitions, and promote cross-border collaboration to improve ecological coherence and scale up nature-inclusive planning at the basin level.

Regional Fora

To encourage cross-border collaboration and harmonised uptake, MSP4BIO findings should be actively promoted through sea basin–level dialogues and regional cooperation frameworks. These platforms can catalyse shared understanding and coordinated action for biodiversity protection in European seas.

4.2 Uptake in National MSP Processes

Countries revising or updating their maritime spatial plans can adopt and implement the MSP4BIO ESE Framework. Different components of the Framework provide a scientifically grounded approach to enhancing biodiversity mainstreaming within national MSP processes.

4.3 EU Projects and Funding

MSP4BIO tools are highly relevant for future Horizon Europe projects focused on marine conservation and sustainable spatial planning. They can support data-driven planning, impact assessments, and restoration strategies aligned with EU environmental goals.

4.4 Training and Capacity Building

A broad range of stakeholders—including planners, governmental agencies, and NGOs—can benefit from training materials, recorded sessions, and engagement through the MSP4BIO Community of Practice. These resources support knowledge transfer and foster collaborative learning on biodiversity-inclusive planning.

4.5 Digital Accessibility

MSP4BIO tools and outputs are fully accessible via open-access platforms such as the MSP Platform, EMODnet, Zenodo, the MPA Community Network, and NatureNetwork. This ensures long-term availability and usability for diverse user groups across Europe.



5. Exploitation and next steps

Looking Ahead – From 2025 to 2030 and Beyond

The results of MSP4BIO offer timely and valuable contributions to shaping the future of ocean governance in Europe. As the EU prepares for the upcoming revisions of the Maritime Spatial Planning (MSP) and Marine Strategy Framework Directives (MSFD), there is a clear opportunity to embed the project's tools, methods, and findings into policy updates. MSP4BIO outcomes should also be leveraged to support the implementation of the EU Ocean Pact, contribute to the development of the Ocean Act, and inform post-2030 ocean governance frameworks, ensuring that biodiversity objectives remain central to Europe's maritime agenda.

To maximise impact, the EU should actively promote knowledge exchange and joint implementation strategies across Member States. Platforms such as the MSP Platform and the Community of Practice (CoP) model can play a vital role in fostering collaboration, sharing lessons learned, and scaling good practices. A coordinated regional approach, supported through Regional Sea Conventions, can play a pivotal role in harmonising efforts between EU and non-EU countries to mainstream biodiversity in MSP and advance collectively towards achieving GES. Moreover, results from MSP4BIO and other Horizon Europe projects should be integrated into formal governance processes, encouraging the wider uptake of tested tools and approaches at both national and regional levels.

6. Background information: Understanding the Foundations - From Challenge to Action

The **MSP4BIO ESE Framework** is a key component of the MSP4BIO project, which provides a structured step-by-step approach to integrate ecological considerations into decision-making processes, ensuring sustainable use of marine and coastal resources. The framework is composed of three modules comprising different tools that guide users through data collection, analysis, scenario development, and impact assessment. These tools—such as Tools4MSP, PlanWise4Blue, Participatory mapping – trade-off scenario development etc, in addition to the EU-wide data base and policy coherence solutions—enable planners and stakeholders to evaluate trade-offs, assess cumulative impacts, and optimize spatial plans in line with conservation goals. These actionable tools were co-developed and validated with test-site specific stakeholders (CoPs), in each of the MSP4BIO test sites.



6.1 Ecological Toolkit – ESE module 1⁸

The **MSP4BIO Ecological Toolkit** is a practical decision-support resource designed to help marine planners and policymakers identify, prioritise, and connect ecologically valuable areas for protection and restoration. It enables the application of robust, science-based ecological criteria—such as integrity, representativity, and resilience—directly into Maritime Spatial Planning and MPA network design. By supporting strategic conservation decisions in line with the EU Biodiversity Strategy and 30x30 targets, the toolkit empowers national authorities, regional planners, and environmental agencies to make spatial choices that safeguard biodiversity while supporting long-term marine sustainability.

6.1.1 Portfolio of improved ecological criteria⁹

The MSP4BIO portfolio of improved ecological indicators for systemic biodiversity protection and restoration offers a scientifically grounded set of indicators to evaluate and prioritise marine areas for protection, based on ecological value, connectivity, resilience, and vulnerability. It is designed to support marine spatial planners, MPA managers, and policymakers in making more informed, transparent, and biodiversity-aligned spatial decisions.

6.1.2 Climate smart MPAs guidance¹⁰

The MSP4BIO Climate-Smart MPAs Guidance offers tools to incorporate climate change in biodiversity and planning strategies and provides a structured approach for integrating climate change scenarios into the design, planning, and management of marine protected areas. It supports planners and conservation authorities in making MPAs more adaptive and resilient by anticipating climate-driven shifts in species, habitats, and ecosystem dynamics.

6.1.3 Decision-support tools (DSTs)

The MSP4BIO Decision Support Tools (DSTs) are a set of spatial and analytical tools that support evidence-based marine spatial planning and biodiversity-focused decision-making. These tools are designed to help planners and environmental authorities assess cumulative impacts, ecological value and connectivity, for ecosystem-based MSP, balancing between reaching 30x30 conservation targets and blue economy uses.

⁸ [Deliverable 3.4 Ecological toolkit \(ESE 1\) for MPAs prioritization and networking](#)

⁹ [Deliverable 3.1 Critical review on multilevel ecological processes to improve systemic biodiversity protection and restoration strategies in Europe](#)

¹⁰ [Deliverable 3.3 Guidance for building climate change scenarios for protection strategies](#)



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This digital toolbox for MPA prioritization includes:

Prioritisation Tools:

Area-based Conservation Planner (ABC Planner) – a tool fully developed under MSP4BIO project, designed to facilitate flexible and effective conservation planning by allowing users to input various parameters and data, which are then used to generate optimized conservation strategies.

Cumulative Impact Assessment tools:

Tools4MSP Geoplatform – also a climate change impact assessment tool. Tools4MSP is a collaborative, open-source system built on GeoNode that enables efficient management, visualization, and sharing of geospatial data for marine spatial planning. Developed by CNR-ISMAR, it integrates powerful mapping tools, metadata management, and the Tools4MSP modelling framework to support data-driven, participatory decision-making for sustainable marine and coastal development.

PlanWise4Blue – also a climate change impact assessment tool. It is a powerful, user-friendly, open-access, web-based decision support platform developed to bridge science and policy in marine spatial planning. It enables users to assess the cumulative impacts of human activities on marine ecosystems using advanced modelling, machine learning, and spatial analysis—empowering evidence-based, sustainable development across European seas. It was originally developed by the University of Tartu for Estonia and now extended to broader Baltic Sea planning and beyond.

HELCOM SPIA tool - enables detailed spatial assessments of cumulative pressures and impacts in the Baltic Sea. It allows users to customize sensitivity scores, perform targeted analyses, and generate key indices—such as the Spatial Impact Index (SII) and Spatial Pressure Index (SPI)—to support informed, data-driven marine management and planning. High potential for transferability to other EU marine regions.

Dispersion and Connectivity Modelling Tool – The Pressure assessment of MARine activities (PMAR) tool – also an operational integration to the Tools4MSP CEA framework. PMAR enhances marine spatial planning by simulating the spread of anthropogenic pressures using Lagrangian particle tracking, enabling broader and more flexible cumulative effects assessments within the Tools4MSP framework. Fully integrated into the Tools4MSP Geoplatform, PMAR supports 3D simulations, scenario analysis, and customisation of particle behaviour, making it a powerful tool for data-driven decision-making in marine management.



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Together, these tools empower MSP authorities, MPA managers, and regional stakeholders to make spatially explicit, transparent, and biodiversity-aligned decisions that integrate conservation, climate adaptation, and sustainable use.

6.2 Socio-economic criteria – ESE module 2¹¹

MSP4BIO developed a methodology to define socio-economic and governance criteria for prioritising proposals concerning new marine protected areas, boundary modifications, area relocations, and ecological corridors within marine management strategies. It also explored the identification of ecosystem services (ES) that reflect the social dimensions of different spatial management approaches in the marine environment. By quantifying the value of nature to human communities, this approach helps bridge the gap between human activities and the benefits ecosystems provide. This helped establish key socio-economic and governance criteria, link them to relevant ecosystem services, and assess their societal importance within the broader socio-ecological system—ultimately supporting more effective marine management processes such as MPA and MSP.

6.3 Participatory mapping and trade-offs – ESE module 3¹²

Participatory mapping in MSP4BIO involves engaging local stakeholders, including communities, businesses, and policymakers, to collaboratively identify and visualize spatial uses and values of marine and coastal areas. MSP4BIO provided a portfolio of mapping tools, focusing mainly on training and application of [SeaSketch](#), an interactive online mapping tool, to facilitate this process by allowing participants to contribute data and insights in an accessible, user-friendly platform. This approach ensures that diverse perspectives and traditional knowledge are integrated into the marine spatial planning process. By involving stakeholders directly, participatory mapping helps build trust and promotes transparent decision-making. Trade-offs arise when competing interests or uses conflict, requiring careful evaluation of the benefits and costs to different sectors and communities. MSP4BIO emphasizes identifying these trade-off scenarios clearly to support balanced, informed choices that optimize environmental, economic, and social outcomes, fostering collaborative solutions that align marine conservation goals with sustainable development.

¹¹ [Deliverable 4.1 Criteria for the representation of the social and economic dimension of MPAs](#)

¹² [Deliverable 4.3 Trade-offs method for protection and restoration in MSP – ESE3](#)



6.4 Nature inclusive design of blue economy sectors – ESE module 3¹³

MSP4BIO approach to Nature-Inclusive Operations of blue economy sectors focuses on practical strategies to implement sustainable practices within five pre-selected sectors. It outlines guidelines and tools to reduce negative environmental impacts while enhancing ecosystem services in industries like fisheries, aquaculture, renewables, non-living resources and tourism. The deliverable emphasizes integrating biodiversity conservation into operational decisions to promote resilient and sustainable marine activities and offers a catalogue of Good Management Practices as examples per each of the sectors.

6.5 MPA/MSP integration guide

Practical integration of MPAs and MSP is a complex process that requires careful consideration of different aspects, including legal, social and ecological. Within the MSP4BIO assessment⁵ conducted in the preparation of the MPA/MSP integration guide, four MPA-MSP key integration levels were identified, ranging from conservation as a driver for MSP, to conservation as a layer in MSP. These integration levels reflect varying degrees of legal alignment, stakeholder engagement, and ecological considerations.

In all stages of planning in an MSP process, stakeholder involvement and adaptive monitoring are critical components of successful integration. Effective stakeholder engagement ensures that diverse interests are considered in planning processes, while adaptive monitoring allows for flexible decision-making based on evolving environmental conditions and new scientific data. Furthermore, the considerations of ecological connectivity and climate resilience play an important role, emphasizing the need to address habitat fragmentation and incorporate measures to mitigate the impacts of climate change.

MSP4BIO MPA/MSP integration model establishes a systematic approach to integrating MPAs into MSP across three phases: preplanning, planning, and implementation.

Key to this initiative is the development of a detailed checklist featuring 93 criteria spanning four critical areas: Environmental, Socioeconomic, Policy and Governance, and Planning Process. By identifying the top 25% most frequently used criteria for area (Coastal Zone, Offshore Areas, High Seas), this guide highlights priority areas for achieving effective MPA-MSP synergy. This work represents a call to action for policymakers, planners, and practitioners, providing a structured pathway for MPA-MSP integration ensures that marine biodiversity is prioritised within broader spatial planning

¹³ [Deliverable 4.2 Guideline for the strategic and spatial measures for the nature-inclusive operation of blue economy sectors - ESE3](#)



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processes. The insights gained from its analysis of EU practices and others' perspectives create a robust, scalable framework for both regional and global application (Figure 3).



Figure 3 MSP4BIO MPA/MSP integration model.

Policy coherence solutions and recommendations

While MSP holds promise as a tool for biodiversity mainstreaming, its full potential remains underutilized. Many EU Member States emphasize biodiversity in their MSP legislation, yet the practical impact of MSP on biodiversity mainstreaming remains limited. In practice, the level of ambition in spatial plans is often lower than what the legislation implies. Moreover, since MSP does not have authority over sectoral decisions, such as those in fisheries, energy, or transport, its capacity to influence biodiversity outcomes is inherently constrained. In some countries, the strategic and non-binding nature of MSP may further reduce its effectiveness in delivering concrete biodiversity results.

6.6 Site specific solutions¹⁴

Good Practices from European Sea Basins

MSP4BIO's Site-Specific Solutions showcase a collection of good practices drawn from different European sea basins, illustrating effective approaches to marine spatial planning

¹⁴ [Deliverable 5.3 Site specific solutions for accelerating biodiversity protection and restoration](#)



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tailored to local ecological, social, and economic contexts. These solutions highlight how different challenges can be addressed through adaptive, collaborative planning methods that integrate biodiversity conservation with sustainable blue economy development. By sharing practical examples and lessons learned, MSP4BIO promotes knowledge exchange and encourages the replication of successful strategies across diverse marine environments. This initiative supports more resilient and nature-inclusive marine management aligned with the unique needs of each sea basin.

Several of the ESE framework digital tools and assessment methods were applied across the test sites to enable a deeper understanding of ecosystem functioning, mapping of pressures, and modelling of trade-offs between conservation and human uses, and can help design and implement more informed and balanced marine plans. In the Baltic Sea, the HELCOM SPIA tool was used to assess ecosystem pressures within MPAs⁸. Belgium applied the ABC Planner to optimise conservation areas, balancing ecological value and human impact⁸. In Graciosa Island, utilisation of SeaSketch participatory mapping tool (D 4.3) enabled a deeper understanding of ecosystem functioning, mapping of pressures, and modelling of trade-offs between conservation and human uses, so to help design more informed and balanced marine plans on reconciling economic and biodiversity goals. The Gulf of Cádiz highlighted adaptive planning and SME involvement to address socio-ecological challenges. The NW Mediterranean emphasised protecting cetaceans and vulnerable ecosystems from maritime impacts. Finally, in the western Black Sea, Bulgaria and Romania combined cumulative impact assessment, participatory mapping, and trade-off analysis to support coherent and cross-border MSP-MPA alignment, particularly for mobile species protection.

Together, these examples demonstrate that effective MSP-MPA integration benefits from legal clarity, spatial and cross-sectoral planning, adaptive strategies, and robust cross-border and regional cooperation, supported with early stakeholder engagement and the application of robust scientific tools. They offer valuable models for effectively integrating MPAs into MSP processes, providing a foundation for replicating and scaling good practices across Europe and beyond.

6.7 Stakeholder engagement

The MSP4BIO project showcases several good practices for integrating MSP and MPAs, particularly through participatory, science-based, and cross-scale approaches. A key strength of the project was the early and continuous involvement of local and national stakeholders in each of the six test sites across European sea basins via Communities of Practice (CoPs), which included MSP planners, MPA managers, sectoral regulators,



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NGOs, and other actors. These CoPs were instrumental in developing locally tailored solutions, reflecting on-the-ground needs and knowledge.¹⁵

¹⁵ Deliverable 5.5 Report on the participatory process in test sites (under review)



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7. Annexes

Annex I Useful links

MSP4BIO Publications: <https://msp4bio.eu/publications/>

ESE Framework: <https://msp4bio.eu/ese-management-framework/>

MSP4BIO test site story maps: <https://msp4bio.eu/pilots/>



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Annex II Designed policy brief for dissemination



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Annex III Baltic policy brief