REVIEWING AND EVALUATING THE MONITORING AND ASSESSMENT OF MARITIME SPATIAL PLANNING

ReMAP

D5.3. ROADMAP FOR APPLICATION OF PROJECT OUTPUTS

Document	D5.3. Roadmap for application of project outputs		
Date	October 2025		
Version	1		
Author(s)	Pol Fontanet, Marta Ballesteros, Jose L. Santiago, Yolanda Irawan, (CETMAR) Daniele Brigolin, Alessandra Fudoli, Fabio Carella (IUAV); Stefano Menegon, Sara Sottoriva, Alessandro Mulazzani, Alessandro Sarretta (CNR); Andrej Abramic, Luz Marina Pulido Santiago, Yaiza Fernández-Palacios (ULPGC); Deborah Shinoda, Joni Kaitaranta, Andzej Milos (HELCOM); Bastien Fouque, Emilie Delaroche, Yannick Leroy (Shom)		
Reviewed by	Andrej Abramic (ULPGC)	Date	30.Oct.2025
		Date	
Final approval		Date	

This project has received funding from the European Maritime, Fisheries and Aquaculture Fund (EMFAF) under Grant Agreement No 101081304. This report reflects only the authors' view and the Commission is not responsible for any use that may be made of the information it contains.

LIST OF ACRONYMS

ARIMA – Autoregressive Integrated Moving Average
CIA – Cumulative Impact Assessment
CICES – Common International Classification of Ecosystem Services
DG MARE – Directorate-General for Maritime Affairs and Fisheries
DTO – Digital Twin of the Ocean
EBA – Ecosystem-Based Approach
EDA – Exploratory Data Analysis
EMFAF – European Maritime, Fisheries and Aquaculture Fund
EMFF – European Maritime and Fisheries Fund
EMODnet – European Marine Observation and Data Network
EUNIS – European Nature Information System
EU – European Union
FAIR – Findable, Accessible, Interoperable and Reusable
GES – Good Environmental Status
GIS – Geographic Information System
GVA – Gross Value Added
HELCOM – Helsinki Commission (Baltic Marine Environment Protection Commission)
HILUCS – Hierarchical INSPIRE Land Use Classification System
HOLAS – Holistic Assessment (HELCOM)
INSPIRE – Infrastructure for Spatial Information in Europe
IOC – Intergovernmental Oceanographic Commission
IUCN – International Union for Conservation of Nature
MSFD – Marine Strategy Framework Directive
MRU – Marine Reporting Unit
MPA – Marine Protected Area
MSP – Maritime Spatial Planning
MSPD – Maritime Spatial Planning Directive
MSPdF – Maritime Spatial Planning Data Framework
MSP-GOV – Maritime Spatial Planning Governance (tool)
MSP-SEC – Maritime Spatial Planning Socio-economic (tool)
MSEG – Member States Expert Group
NACE – Statistical Classification of Economic Activities in the European Community

R&I – Research and Innovation

SDQF – Spatial Data Quality Framework

SPIA – Spatial Pressures and Impact Assessment

TEG – Technical Expert Group

UNESCO – United Nations Educational, Scientific and Cultural Organization

WFD – Water Framework Directive

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1 Executive Summary

The ReMAP Roadmap provides practical guidance for applying the project's outputs to strengthen the implementation, monitoring, and revision of Maritime Spatial Planning in line with Directive 2014/89/EU and more recent developments like the Ocean Pact.

ReMAP has delivered a comprehensive analytical framework built upon harmonised MSP data models, interoperable infrastructures, and a suite of ten thematic tools addressing key MSP challenges, ranging from data quality and cross-policy coherence to socio-economic assessment, governance, navigation safety, and land–sea interactions. Together, these tools operationalise the science–policy interface, enabling evidence-based decision-making and improving coordination across sectors and governance levels.

The Roadmap explains how each tool can support specific MSP phases, from data preparation and assessment to plan development, implementation, and evaluation, and identifies the stakeholder groups that can benefit most from their use and how. It emphasises transparency, comparability, and reproducibility, fostering innovation and knowledge exchange across Member States and sea basins.

Additionally, policy recommendations derived from a review of over 200 existing proposals, stakeholder consultations and the experience gained along the project, highlight three strategic directions:

- Transition from data-effective to data-efficient MSP, optimising data use and interoperability.
- Make the human dimension operational, integrating socio-economic and institutional analyses into planning.
- Explore the establishment of an EU-level MSP agency to enhance coherence and capacity for cross-border governance.

Grounded in technical excellence, stakeholder participation, and literature review, this Roadmap offers a practical bridge between science and policy. It aims to support MSP stakeholders in implementing adaptive, data-based, and inclusive MSP, advancing the objectives of the EU Green Deal, the Sustainable Blue Economy Strategy, and the Ocean Pact.

2 INTRODUCTION

The ReMAP project was conceived to support the effective implementation of the EU Maritime Spatial Planning (MSP) Directive (2014/89/EU), with a particular focus on the monitoring, evaluation and revision of adopted maritime spatial plans. Building on the progress achieved across Member States, the project develops an innovative technical framework that combines harmonised MSP data models, interoperable infrastructures, and analytical modules analytical tools synthesised in a set of thematic tools.

This deliverable (D5.3) presents a roadmap for the practical application of ReMAP's outputs, showing how the different tools can be embedded in real-world planning processes and governance frameworks. In section 4 each tool is presented. In addition to describing their technical features, the roadmap emphasises why they are relevant in addressing MSP challenges and needs and how the tools can concretely support MSP phases. It also identifies who can benefit from these outputs, from decision-makers and practitioners to researchers, civil society, and industry, outlining the different ways in which the tools can inform planning certainty, conflict mitigation, and innovation opportunities.

Additionally, Section 5 presents some policy recommendations that suggest actions for advancing effective MSP, as envisioned in the Directive. These recommendations are also aligned with broader initiatives on sustainable development and ocean governance, with particular relevance to the recently launched Ocean Pact.

Acknowledging that each group of users may be interested in specific tools, the roadmap has been designed for ease of navigation. In this regard, the "How to use this Roadmap" section, provides a brief explanation on how each reader, depending on their interest and role within the MSP community, can select the parts of the document of higher relevance to them.

The roadmap is grounded in a methodology that integrates the technical expertise of project partners, evidence gathered through participatory engagement with key stakeholders, and a systematic review of grey and academic literature. This multi-source and iterative approach enhances the scientific rigor and technical validity of the outputs, while ensuring their operational relevance and adaptability to varying maritime planning and governance frameworks.

Finally, the roadmap presents conclusions on the practical use of the project outputs.

3HOW TO USE THIS ROADMAP

The project has delivered significant achievements across several dimensions which crystallise into ReMAP's 10 tools (Table 1). The tools build on conceptual modules and harmonised datasets to provide users with practical decision-support instruments for different stages of MSP.

Table 1 ReMAP's Tool overview

Tool	Description
Input Data	Executes an exploratory analysis resulting in a report on the data used for the MSP process. It tells which data needs to be updated, unlocked or considered in the next phase of MSP process.
Output Data	Conducts an exploratory data analysis on spatial representation of the EU MSP plans summarizing the main features and identifying spatial patterns.
MSP & MSFD Links	Provides the status data associated to specific planned uses of the sea assessing the relationships between Marine Strategy Framework Directive and MSP.
Cumulative Impact Assessment	Represents the pressures and impact distribution of the cumulative burden that multiple and simultaneous activities may impose on the environment.
Conservation (in)compatibility	Analyses MSP and Marine Protected Areas (MPAs), highlighting areas of potential conflict, compatibility or uncertainty in relation with planned marine uses. following IUCN recommendations
Socioeconomic Assessment	Quantifies the sectors included in the MSP such as maritime transport or fisheries in terms of value, gross value, added value and employment.
Governance Assessment	Shows through a *Coordination Index* whether the coordination mechanisms in place hamper, enable or enhance the MSP implementation.

Tool	Description
Navigation Safety	Computes in a gradient map how high or low are the potential risks of implementing an activity at sea, enhancing maritime safety.
Ecosystem Services	Assesses the capacity of marine ecosystems to provide services, mapping cultural, regulation and provisioning services for entire Europe
Land-Sea Interactions	It combines data of coastal and maritime activities, identifying potential conflicts or compatibilities of the coastal land use and aquaculture, conservation and offshore wind energy.

The tools developed within ReMAP reflect different starting points, characteristics, and levels of maturity, which naturally results in a diversity of functionalities and potential applications. From the outset, their design philosophy has been to address complex maritime planning challenges through simple, accessible, and modular solutions. Each tool can operate independently or be combined with others to analyse a given area or issue from multiple perspectives, enhancing the overall analytical capacity. This modular and scalable architecture transforms simplicity into strength, enabling users to tackle complex spatial and governance problems with flexible and fit-for-purpose instruments. Rather than being static products, the tools are conceived as evolving prototypes, continually refined through testing and feedback to ensure both scientific robustness and practical usability. To guide users, Table 2 provides a comparative overview of the main attributes of each tool: scale, type of tool, type of data and analyses, and level of expertise required, helping readers understand what each output can realistically offer and how it can best be applied in practice.

Table 2 -ReMAP's tools characteristics

Module	Scale	Tool type	Spatial analyses	EU MSP data layer	User data / Scenario anal.	Level of technical expertise
Input Data	Any	Web tool / self-assessment	No / questionnaire	No	No	Low/Medium
Output Data	EU Sea basin National	Web tool	Yes	Yes	No	Low
MSP & MSFD Links	EU, Sea basin, National	Web tool	Yes	Yes	No	Low
Cumulative Impact Assessment	Sea basin, National, Regional	ArcGIS add-in	Yes	No	Yes	High
Conservation (in)compatibility	EU, Sea basin, National, Regional	Web tool	Yes	Yes	Yes	Low/Medium
Socioeconomic Assessment	National	Web tool	Yes	Yes	No	Low
Governance Assessment	National	Web tool / self-assessment	No / questionnaire	No	No	Low/Medium
Navigation Safety	Any	Web tool	Yes	Yes	Yes	High
Ecosystem Services	EU, Sea basin, National, Regional	Web tool	Yes	Yes	No / Yes	Low/Medium
Land-Sea Interactions	EU, Sea basin, National, Regional	Web tool	Yes	No	No / Yes	Low/Medium

Given the diversity of potential readers in terms of background and involvement in MSP processes, the document is structured to facilitate access to the information most relevant to different user profiles. A consistent format is applied across all tools. Each section begins with a brief description and general applications (*What*), followed by an explanation of the tool's relevance to MSP legislation and ongoing political processes at both EU and national levels (*What for*). The corresponding MSP phases in which the tool can provide support are then identified (see Table 3) (*When*), together with an overview of how the main stakeholder groups, decision-makers and practitioners, the research and technology community, civil society and local communities, and the industry and private sector, may use the tool (*Who*). The document can therefore be navigated by theme, MSP phase, or stakeholder type. Additionally, the summary tables below offer an overview of the contents, supporting quick identification of sections for further consultation.

Table 3- MSP phases according to IOC and EU 2021 MSPglobal international guide on marine/maritime spatial planning

N°	Phase	Short description
1	Setting the scene	institutional and legal framework, funding, identifying drivers for MSP
2	Designing the planning process	MSP team and workplan, defining planning boundaries and timeline, defining principles, vision, and goals
3	Assessment for planning	analysing existing and future conditions, and developing public information systems
4	Developing the plan	the spatial plan and management actions, evaluating, endorsing, and approving the marine spatial plan
5	Enabling implementation of the plan	establishing mechanisms to implement the plan, capacity building and training, compliance, and enforcement of MSP
6	Monitoring, evaluation, and adaptation of the process and the plan	evaluating the planning process, stakeholder engagement, implementation of the plan, and the results of MSP

Additionally, the following summary tables link the tools to the main phases in which they can be useful (Table 4) and to how they can support different stakeholder groups (Table 5). These tables offer readers a first overview before exploring the detailed descriptions in the document.

Table 4- Tools and MSP phases matrix

ReMAP Tools	MSP Phases					
	1- Setting the scene	2- Designing the planning process	3- Assessment for planning	4- Developing the plan	5- Enabling implementation of the plan	6- Monitoring, evaluation, and adaptation
Input data						
Output data						
MSP & MSFD						
Cumulative impact assessment						
Conservation (in)compatibility						
Socio-economic						
Governance assessment						
Navigation safety						
Ecosystem services						
Land-sea interactions						

Table 5- Tools and Stakeholders (Potential users) matrix

ReMAP Tools	Stakeholders (Potential users)			
	Decision-makers and practitioners	**Research and technology community**	**Civil society and local communities**	**Industry and private sector**
Input data	• Provides a structured overview - report of MSP data collection strengths and weaknesses. • Enhances transparency and coordination in data collection and survey management	• Provides a structured report of MSP data collection • Assess how input data integrity can impact final MSP -Tests interoperability and spatial data quality. • Supports harmonisation across MSP projects.	• Improves transparency and access to FAIR data. • Builds public trust in MSP processes.	• Provides reliable, standardised data for planning. • Reduces administrative burden and uncertainty.
Output data	• Enables comparison and analysis of spatial plans. • Supports coherence and cross-border coordination.	• Offers a reference model for developing standards and analytical methods.	• Makes plans more accessible through clear visual outputs. • Facilitates informed participation.	• Provides harmonised zoning and co-use information. • Enhances investment confidence.
MSP & MSFD	• Assess alignment of MSP and MSFD objectives. • Identifies zones needing protection or mitigation.	• Enables analysis of human–environment interactions. • Tests spatial coherence indicators.	• Visualises environmental implications of planning choices.	• Anticipates environmental constraints. • Supports risk assessment and sustainable operations.

ReMAP Tools	Stakeholders (Potential users)			
	Decision-makers and practitioners	**Research and technology community**	**Civil society and local communities**	**Industry and private sector**
Cumulative impact assessment	• Provides evidence on cumulative pressures. • Helps prioritise mitigation and monitoring actions.	• Open, modular environment for developing methods. • Facilitates comparison of impact models.	• Displays cumulative impacts visually. • Enhances transparency and awareness.	• Identifies high- and low-pressure zones. • Supports sustainable investment planning.
Conservation (in)compatibility	• Integrates marine conservation in MSP. • Helps to prevent conflicts with conservation policies.	• Enables advanced spatial modelling and comparative assessments • Supports innovation in conservation planning.	• Visualises overlapping regulations and uses. • Empowers local involvement in conservation.	• Clarifies constraints and opportunities. • Reduces uncertainty and fosters coexistence.
Socio-economic	• Shows spatial distribution of economic activities. • Supports policy design and impact evaluation.	• Combines input–output and spatial analyses. • Enables replication of methodologies.	• Makes socio-economic information understandable through visuals. • Fosters inclusive participation.	• Identifies economic drivers of GVA and jobs. • Aids investment and conflict mitigation.
Governance assessment	• Detects coordination gaps and governance weaknesses. • Supports implementation improvements.	• Empirical framework for analysing governance coherence. • MSP-GOV allows comparative analysis across governance systems, supporting	• Increases transparency of institutional roles and participation mechanisms.	

ReMAP Tools	Stakeholders (Potential users)			
	Decision-makers and practitioners	**Research and technology community**	**Civil society and local communities**	**Industry and private sector**
		theoretical and empirical research.		
Navigation safety	• Identifies risk-prone areas. • Supports safer maritime planning and regulation.	• Enables analysis and testing of navigation risk models and indicators. • Translates scientific knowledge into planning-relevant outputs.	• Improves understanding of navigation risks.	• Helps optimise routes and infrastructure siting. • Reduces accident and liability risks.
Ecosystem services	• Links MSP decisions to ecosystem service provision. • Supports sustainability assessments.	• Framework for quantifying and mapping marine ecosystem services.	• Highlights local ecosystem benefits. • Encourages community engagement.	• Identifies dependencies and impacts. • Supports nature-positive strategies.
Land-sea interactions	• Integrates coastal land use and MSP planning data. • Supports coherent cross-boundary planning.	• Provides a harmonised, data-driven method to analyse and compare land–sea interactions.	• Reveals coastal–marine interdependencies. • Encourages integrated participation.	• Clarifies spatial connections affecting ports, energy, and tourism. • Supports integrated coastal development.

ReMAP Tools	Stakeholders (Potential users)			
	Decision-makers and practitioners	**Research and technology community**	**Civil society and local communities**	**Industry and private sector**
		• Supports research on ecosystem-based management and coastal–marine connectivity.		

This practical implementation represents an important achievement of the project and a key element to support and guide stakeholders interested in applying the outputs in their own contexts

4 ReMAP's Outputs

4.1. Input Data

What

The Input Data tool provides a conceptual and practical framework to assess the data foundations underpinning Maritime Spatial Planning (MSP). It addresses a core challenge in MSP implementation: ensuring the availability, quality, and fitness-for-use of data. Its main objective is to offer a structured and systematic approach to identifying, organizing, and evaluating the datasets required for effective MSP, both at national and cross-border levels.

The Input Data module builds upon the Maritime Spatial Planning Data Framework (MSPdF), developed by the EU Technical Expert Group (TEG) on Data for MSP. This framework structures MSP-relevant information into seven thematic clusters: (i) marine and coastal environment, (ii) marine and coastal conservation, (iii) oceanographic and climate characteristics, (iv) coastal land use and planning,(v) maritime activities, (vi) socio-economic information, and (vii) governance.

While the MSPdF defines the key data themes and parameters relevant to MSP, the Input Data tool complements it with a systematic evaluation methodology based on four assessment topics:

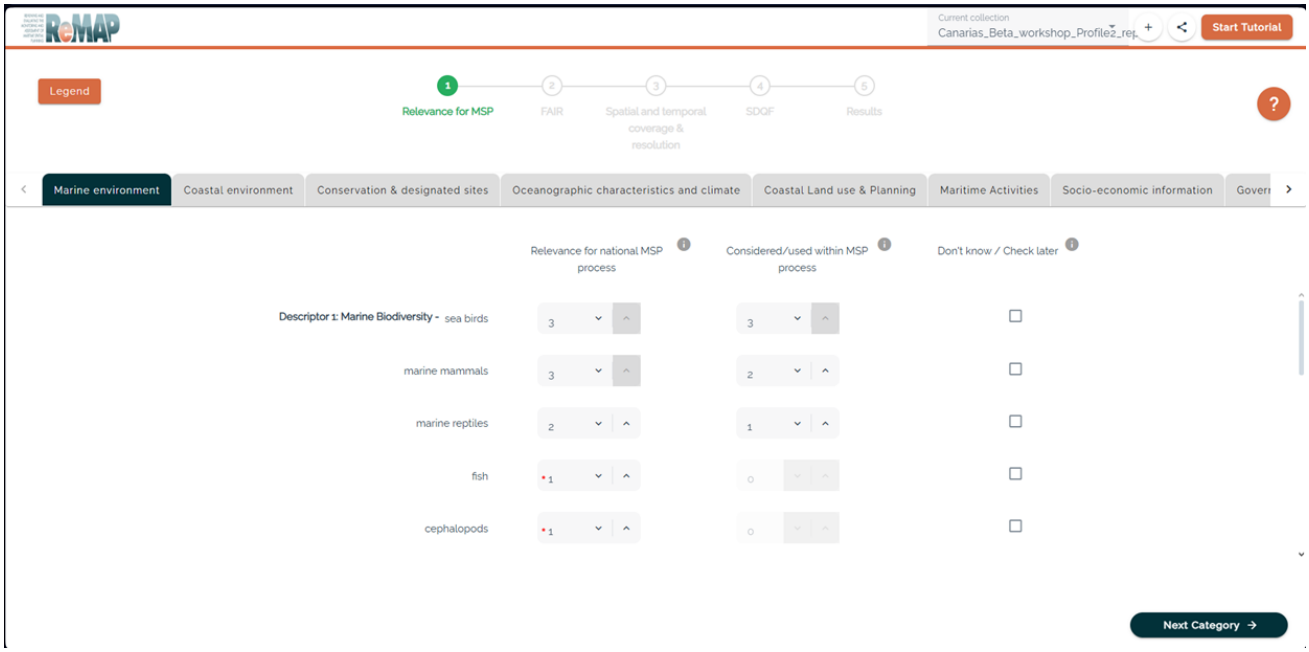
- Relevance for MSP decision-making;
- Transparency and accessibility following the FAIR principles (Findable, Accessible, Interoperable, Reusable);
- Spatial and temporal resolution and coverage;
- Data quality, in accordance with the Spatial Data Quality Framework (SDQF).

The module operates through a structured self-assessment questionnaire, enabling planners, project teams, and data managers to evaluate whether existing datasets are relevant, interoperable, and reliable, and to what extent they influence planning outcomes. Each thematic cluster can be analysed in detail to determine how well the available data support MSP needs in terms of completeness, consistency, and documentation.

The resulting report provides graphical and numerical indices for each dataset, cluster, and for the overall data collection. This allows users to identify well-suited datasets, detect data gaps, and highlight

datasets requiring updates or improvement in quality or coverage. By presenting the results in a standardized format aligned with the MSPdF, the IDM ensures comparability across regions and initiatives, enhances transparency, and supports the Monitoring and Evaluation cycle of MSP by revealing where missing or inadequate data may hinder future plan revisions.

Figure 1- Snapshot of the input data tool



Examples of policy and planning questions the tool can help address

Which thematic areas show the lowest data completeness for the current MSP cycle?

Which types of spatial information (e.g. oceanographic, socio-economic, governance) are missing or outdated?

Are the datasets used in the national MSP consistent with FAIR principles and SDQF standards?

How do data gaps or low-quality datasets affect the reliability of current MSP analyses or plan monitoring?

Are the available datasets harmonised with international standards (e.g. EMODnet, Copernicus, INSPIRE)?

Do existing data sources provide adequate spatial and temporal coverage for the national or regional MSP scale?

Box SEQ Box * ARABIC 1 – Questions the Input Data tool can help address

WHAT FOR / RELEVANCE

Accurate, complete, and interoperable data are mentioned as a requirement of MSP. In this regard, Article 10 of the 2014 MSP Directive explicitly calls for the use of best available data and information sharing mechanisms to support consistent and evidence-based decision-making. Similarly, both the 2022 Commission Report on MSP Implementation (EU, 2022) and the Joint MSP Roadmap (IOC-UNESCO/EC, 2022) identify "Knowledge Support" and "Data for MSP" as priority areas to accelerate effective planning.

In particular, Action I of the updated Joint MSP Roadmap (IOC-UNESCO/EC, 2022) emphasises that many countries still face challenges in finding and structuring data for MSP. The Input Data Module directly responds to this by providing a harmonised checklist to evaluate data accessibility and quality, aligned with FAIR standards. It operationalises the Directive's requirement to base maritime spatial plans on reliable information and promotes consistency across sea basins and governance levels.

Moreover, under the European Green Deal (EC, 2019) and as MSP enters a new cycle with the Ocean Pact (EC, 2025), the need for robust monitoring and adaptive management becomes even more critical. The Input Data Module thus plays a strategic role in strengthening the data foundations for climate-smart, ecosystem-based, and cross-sectoral MSP, in line with the Directive's Articles 1, 5 and 14 and the Joint MSP Roadmap (IOC-UNESCO/EC, 2022) first priority area on "Knowledge Support".

Additionally, the tool helps address several key recommendations on MSP data management identified in the recent literature, particularly those related to data harmonisation, accessibility, reliability, and knowledge sharing. By providing a structured and standardised framework for organising and assessing datasets in line with the MSPdF, the tool contributes to establishing common protocols and comparable methods for data collection across countries.

Its evaluation criteria, based on FAIR principles and the SDQF, directly support recommendations to enhance data accessibility and ensure reliability through verified and accurate sources. The tool also identifies gaps in spatial and temporal coverage, helping planners make better use of the best available data and tools in MSP and strengthening evidence-based decision-making.

Furthermore, by generating standardised reports and indices, the IDM fosters knowledge sharing and coordination among policymakers and administrations, thereby supporting recommendations to improve collaboration and consistency across governance levels. Finally, its alignment with the INSPIRE Directive (EU, 2007) and compatibility with other EU frameworks (e.g., MSFD, WFD, RED III) contribute to the broader goal of harmonising data systems and supporting integrated monitoring frameworks.

When

The Input Data Module can be used throughout the entire MSP process, but it is particularly relevant in three key phases (see Table CC): *1. Setting the scene, 3. Assessment for planning, 6. Monitoring, evaluation, and adaptation*

In the **Setting the scene** phase, the Input Data Module supports the identification and organisation of existing data sources relevant to MSP, clarifying institutional responsibilities and assessing the consistency of data standards. By structuring information according to the MSP Data Framework and applying common quality and FAIR criteria, it contributes to establishing coherent data-sharing mechanisms and ensuring interoperability across sectors and governance levels.

In the **Assessment for planning** phase, the module provides a systematic approach to evaluate the completeness, accuracy, and reliability of spatial and thematic datasets. This helps planners determine whether available information is fit for purpose, identify data gaps that may affect sectoral assessments, and enhance transparency and consistency in evidence-based planning.

In the **Monitoring, evaluation, and adaptation** phase, the tool enables periodic reviews of data relevance and quality, supporting the assessment of whether the information used in previous planning cycles remains valid. By identifying outdated or missing datasets, it helps refine data collection protocols and facilitates adaptive updates of MSP plans in response to evolving environmental, socio-economic, and governance conditions. Additionally, by integrating this self-assessment at the beginning and end of the MSP cycle, planners can create a continuous feedback loop that ensures data quality and transparency improve over time.

Who

- **Decision-makers and practitioners:**
  Decision-makers and practitioners are the group that can benefit from this tool the most main by obtaining a structured and comprehensive overview of the strengths and weaknesses of the datasets underpinning their MSP processes. This enables evidence-based prioritisation of updates, investments, and monitoring efforts. The visual indices and standardised checklists produced by the tool facilitate clear communication between planning authorities, data providers, and other governmental bodies, ensuring that decisions on data management are transparent, traceable, and consistent across governance levels.

- **Research and technology community:**
  The research and technology community can use the methodology as a benchmarking and analytical framework to assess data quality, interoperability, and fitness-for-use. It provides a common reference to compare data collection efforts across regions and to test methodological consistency. The approach can also inform the design and improvement of digital infrastructures such as EMODnet, Copernicus, or national marine data portals, ensuring that future developments align with FAIR principles and MSP data requirements.

- **Civil society and local communities:**
  Civil society and local communities benefit indirectly through enhanced transparency and accessibility of information. The Input data tool promotes the use of FAIR-compliant and openly available data, which strengthens public understanding of the evidence base supporting MSP decisions and contributes to greater trust and accountability in spatial planning processes. By making data sources more visible and understandable, it supports more informed participation in consultations and stakeholder dialogues.

- **Industry and private sector:**
  Industry and private sector actors can potentially benefit from improved reliability and standardisation of data, which increases regulatory certainty and reduces administrative burdens when engaging with licensing, reporting, or environmental assessment procedures. Access to harmonised and high-quality data facilitates collaboration in monitoring and planning initiatives, supports innovation, and provides a more predictable framework for sustainable maritime investment.

4.2. Output Data

What

The MSP Output Data (MSP-out) module and tool provides a systematic and harmonised framework for analysing the spatial outputs of Maritime Spatial Plans (MSPs) across EU Member States. Its main objective is to conduct exploratory data analysis (EDA) on the spatial representations of MSPs, summarising their key characteristics, identifying spatial patterns, and examining relationships between

planned marine uses. This supports a comprehensive understanding of the spatial allocation of maritime activities, contributing to more informed decision-making during the planning, revision, and updating stages of MSP processes.

The MSP-out conceptual model defines its inputs, analytical methods, and outputs, following the specifications of the EMODnet MSP Data Model and the recommendations of the EU Technical Expert Group on Data for MSP. It enables users to explore, compare, and interpret MSP zoning elements in a harmonised way, ensuring coherence and interoperability between national and transboundary datasets.

The tool integrates authoritative European geospatial data sources, such as EMODnet and EMSA, through automated pipelines that ensure data harmonization and interoperability. The system can also be configured to incorporate national MSP plans that are not yet published on EMODnet, provided they are structured according to the same standardized MSP data model.

MSP-out operates across multiple geographical scales—from EU marine regions and sea basins to transnational areas and national waters—accommodating the diversity of planning contexts within Europe. Its analytical components include statistical summaries, spatial overlays, multi-use and co-use assessments, transboundary coherence checks, and diagnostic visualisations.

The results are presented through interactive dashboards and maps, allowing planners, decision-makers, and stakeholders to easily interpret spatial information and assess coherence between plans.

Figure 2- Snapshot of the Output Data tool

Examples of policy and planning questions the tool can help address

How coherent are the spatial allocations of uses within national MSPs, and do they reflect the objectives and priorities defined in the planning process?

Are there overlaps or conflicts between designated uses that may hinder plan implementation or create inefficiencies in maritime space allocation?

Which areas present potential for multi-use or co-location of activities, and how can these synergies be spatially identified and quantified?

How consistent are zoning categories and planning measures across neighbouring Member States, and what degree of transboundary coherence exists between adjacent maritime plans?

To what extent do national and regional MSPs align with EU-wide data standards (e.g. EMODnet MSP Data Model) and ensure interoperability of spatial outputs?

Are the current MSP outputs adequate to support monitoring and evaluation of spatial objectives over time (e.g. assessing progress or changes between planning cycles)?

What spatial patterns emerge from cross-sectoral overlays (e.g. between energy, transport, fisheries, and conservation), and how do they inform future planning or policy coordination?

How do differences in planning approaches or zoning typologies across Member States affect the comparability and harmonisation of maritime spatial plans at basin or EU level?

WHAT FOR / RELEVANCE

In accordance with Directive 2014/89/EU, Member States must ensure that maritime spatial plans are consistent, transparent, and based on the best available data. Article 4(8) of the Directive explicitly states that plans should cover the full cycle of implementation, revision, and monitoring, a process that requires reliable and harmonised spatial information.

The MSP-out module directly supports these requirements by enabling a structured review of existing plans and helping authorities to evaluate their coherence, internal consistency, and cross-border alignment. It also responds to the MSP Implementation Report (EU, 2022), which highlights the need for improved tools to analyse the spatial and temporal distribution of maritime uses, and aligns with the MSP Global roadmap 2022–2027 (IOC-UNESCO/EC, 2022) priority on “Knowledge support” and “Co-development of new MSP tools” to strengthen the science-policy interface.

By providing comparative analyses across Member States, MSP-out enhances transparency, supports adaptive management, and fosters transboundary cooperation. It contributes to identifying areas of potential conflict or synergy among maritime uses and thus reinforces the ecosystem-based and evidence-based planning approach promoted by the EU and IOC-UNESCO.

Additionally, the tool directly contributes to several of the data-related recommendations identified in the literature, particularly those aiming to enhance data comparability, reliability, and integration across maritime spatial plans.

First, MSP-out supports the harmonisation and interoperability of MSP across EU Member States by adopting the EMODnet MSP Data Model and the standards proposed by the EU Technical Expert Group on Data for MSP (TEG). This directly addresses recommendations calling for common protocols and consistent data structures for MSP information at national and transnational levels. By using a unified schema for spatial zoning elements, the tool facilitates cross-country comparisons and ensures that outputs from different planning processes can be interpreted coherently.

Second, the tool contributes to data accessibility and transparency by integrating information from authoritative European sources (e.g. EMODnet, EMSA) and enabling users to visualise and explore MSP zoning data through interactive dashboards and maps. This operationalises the recommendation to make data more accessible and user-friendly, ensuring that planners, policymakers, and stakeholders can efficiently retrieve, interpret, and use spatial information in decision-making.

Third, by providing analytical functionalities such as spatial overlays, co-use assessments, and transboundary coherence analyses, MSP-out strengthens data reliability and accountability in MSP implementation. These analyses help detect inconsistencies or overlaps between uses and jurisdictions, contributing to recommendations focused on ensuring data accuracy and supporting coordinated planning across governance levels.

Furthermore, MSP-out promotes the integration of existing datasets into centralised systems and enhances knowledge exchange across policies by adhering to open data standards and interoperable web services. This aligns with recommendations encouraging the use of the best available data and tools, the development of shared data platforms, and harmonised indicators across EU directives (e.g. MSFD, WFD, RED III). The module's structure allows data from multiple policy domains to be analysed jointly, improving coherence between sectoral and environmental objectives.

Finally, the tool also supports the monitoring and evaluation of MSP performance and contributes to the expansion of the knowledge base on climate-sensitive and high-value maritime uses. Its capacity to assess spatial patterns and temporal updates in planned uses facilitates the identification of areas most

exposed to change and supports adaptive management, in line with recommendations to increase the knowledge base on climate impacts and to develop integrated monitoring frameworks.

When

The MSP Output Data Module can be applied throughout the entire MSP process, but it is particularly relevant in four key phases: *3. Assessment for planning, 4. Developing the plan, 5. Implementation of the plan, and 6. Monitoring, evaluation, and adaptation*.

In the **Assessment for planning phase**, the module supports the analysis of spatial baselines and reference conditions, ensuring consistency between input datasets and the spatial structure of intended plan outputs. It helps planners to explore the current distribution of maritime uses, identify spatial conflicts or compatibilities, and establish a coherent foundation for spatial allocation decisions.

In the **Developing the plan phase**, MSP-out becomes a core analytical tool for designing or revising draft plans. It allows planners to assess zoning coherence, detect overlaps between uses or designations, and visualise opportunities for multi-use areas. By enabling exploratory spatial analysis and generating interactive maps and graphs, it facilitates evidence-based decision-making and improves the internal consistency of plan proposals.

In the **Implementation of the plan phase**, the module helps establish monitoring mechanisms based on harmonised geospatial layers and indicators. It supports the creation of shared, transparent outputs that can be used by competent authorities and stakeholders to ensure alignment between planning objectives and actual spatial implementation.

In the **Monitoring, evaluation, and adaptation phase**, the tool enables comparative analyses of existing MSPs at national and transboundary scales, allowing for the evaluation of coherence between neighbouring plans and for updates based on new data or revised policy objectives. By maintaining compatibility with the EMODnet MSP Data Model, MSP-out ensures that monitoring and revision processes are traceable, interoperable, and aligned with EU-wide data standards.

Who

- **Decision-makers and practitioners:**

Decision-makers and practitioners are the primary users of the MSP-out module, as it enables them to analyse, interpret, and compare the spatial outputs of maritime spatial plans in a harmonised

manner. Through its analytical functions, such as zoning elements, sea uses and functions analysis, co-use and transboundary assessments, the tool provides planners with evidence-based insights on how marine uses are allocated and how do they interact. The visual dashboards and map interfaces facilitate clear communication of planning outcomes among competent authorities, neighbouring countries, and other governance levels, supporting transparent and coordinated decision-making.

- **Research and technology community:**

The research and technology community can use MSP-out as an analytical framework for testing spatial planning methodologies and interoperability between MSP outputs. The module's adherence to the EMODnet MSP Data Model and EU data standards provides a robust reference for developing or refining digital infrastructures, geospatial platforms, and analytical models. It can also serve as a testbed for innovations in spatial analytics, decision-support systems, or cross-border data integration.

- **Civil society and local communities:**

Civil society and local communities may benefit from MSP-out through improved accessibility and visualisation of spatial plans. The module's open, map-based outputs can make more accessible for non-technical audiences the understanding of the allocation of maritime space, how different uses coexist, and where conflicts or synergies may arise. This can, thus, enable more informed participation in consultations and local discussions about maritime development and conservation priorities.

- **Industry and private sector:**

The module offers reliable, harmonised information on zoning decisions and co-use opportunities, helping businesses assess regulatory constraints, investment risks, and potential cooperation areas. By supporting consistent interpretation of MSP outputs across regions, it contributes to greater predictability and transparency in maritime spatial planning, facilitating private sector involvement in sustainable blue economy initiatives.

4.3. MSP & MSFD Links

What

The MSFD & MSP Links tool analyses and visualises the relationships between the Marine Strategy Framework Directive (MSFD) and the Maritime Spatial Planning Directive (MSPD), ensuring that maritime spatial planning processes are informed by environmental evidence.

The two directives are inherently interconnected. The MSFD aims to achieve or maintain Good Environmental Status (GES) of marine waters through a set of measures, many of them spatial in nature, while the MSPD focuses on organising and optimising maritime uses in a way that integrates and supports those environmental measures. The tool functions as an analytical bridge between these two policy frameworks, allowing users to connect spatial data from MSP plans with environmental status data (associated to features, criteria, elements and parameters), produced under the MSFD reporting cycles.

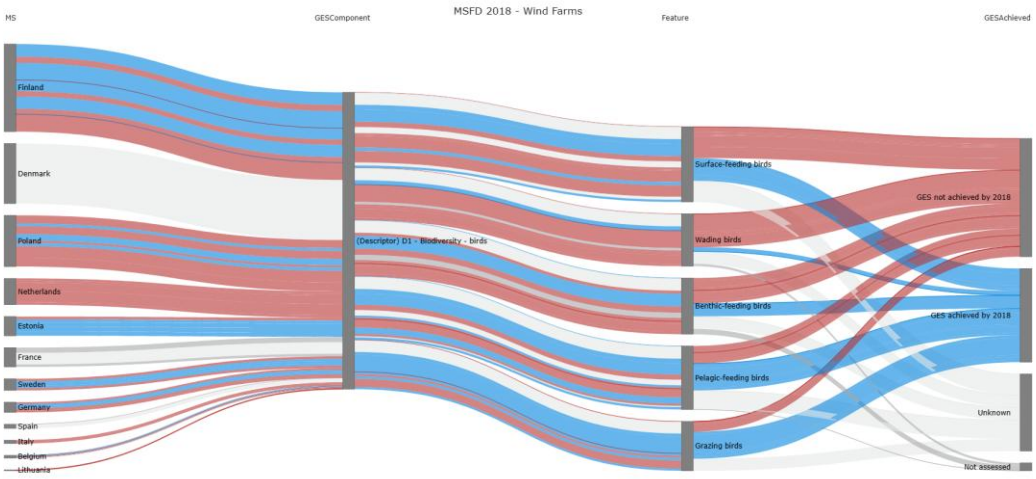
The tool operates through a multiscale analytical framework, encompassing regional seas, subregions, and Marine Reporting Units (MRUs). This enables planners, environmental authorities, and technical experts to assess how the spatial allocation of maritime activities relates to the environmental conditions, pressures, and impacts identified through the MSFD reporting system.

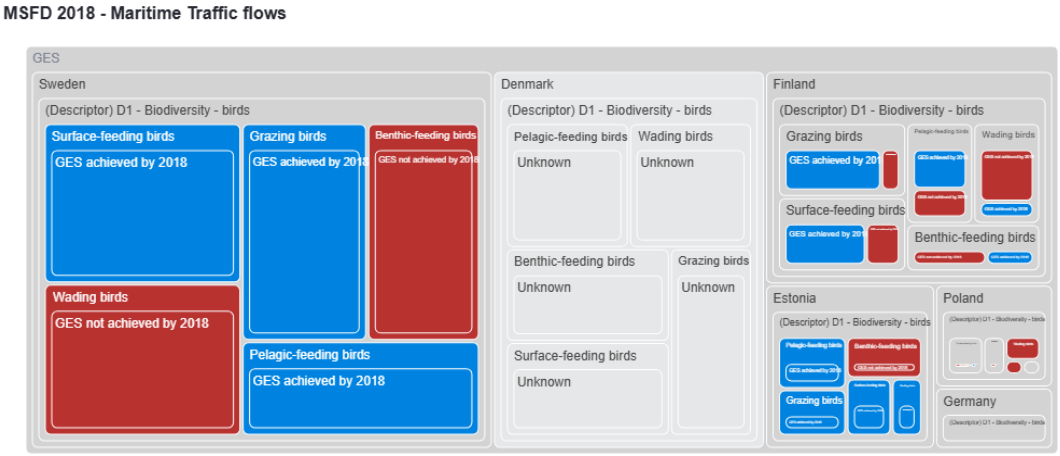
Its main functionalities include:

- **Overlaying MSP zoning elements with MSFD environmental status data**, allowing spatial comparisons between planned uses and ecological conditions;
- **Calculating spatial coherence indicators** to quantify the degree of alignment or potential mismatch between MSP allocations and the achievement of GES;
- **Producing geospatial maps** showing the MSFD assessment results associated to selected uses;
- **Supporting bidirectional analysis**, enabling both the assessment of how MSFD findings can inform MSP decisions and how planning measures can reinforce MSFD environmental objectives.

The module draws on official European data sources, including EMODnet (for MSP zoning datasets) and the WISE Marine Gateway and Repornet (for MSFD assessment data from 2018 and 2024, respectively). By integrating these datasets into a common analytical environment, the tool facilitates evidence-based coordination and information exchange between environmental and spatial planning authorities. In

doing so, it supports the review and update of maritime spatial plans, strengthens the integration of environmental considerations into planning, and enhances the overall coherence between MSFD and MSP implementation at regional, subregional, and national levels.





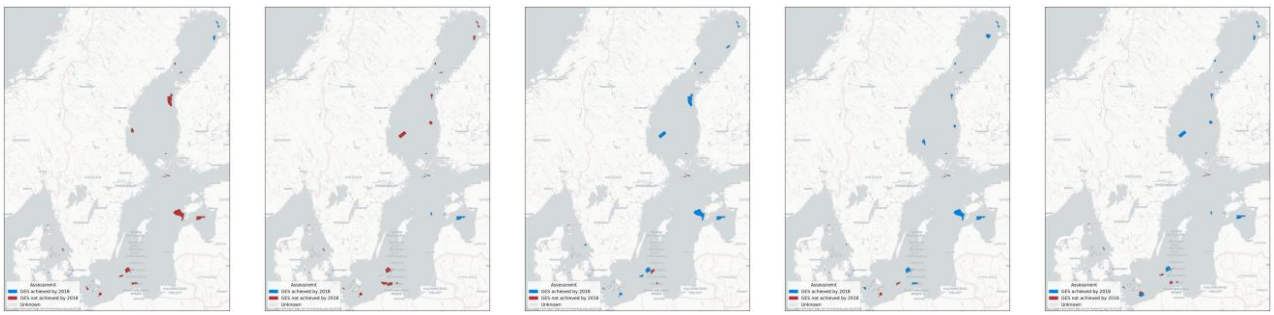


Figure 3 - Snapshot of MSP & MSFD data tool: Examples of outputs from the MSP & MSFD Links module: a Sankey diagram illustrating the overall GES assessment for five categories of birds in areas designated for wind farms across the EU (top); a tree map showing the surface areas of three Member States with differing overall assessment results for birds (centre); and maps displaying the distribution of overall assessments for bird subgroups in offshore wind farm planning areas in the Baltic Sea (bottom).

Examples of policy and planning questions the tool can help address

What are the status values of a given descriptor within areas designated for a specific planned use?
Which planned uses overlap with areas where Good Environmental Status has not been achieved?
How coherent are national maritime spatial plans with MSFD regional environmental targets?
Are there cross-border zones where pressures exceed GES thresholds due to cumulative maritime uses?
How have environmental conditions evolved in areas designated for specific uses (e.g. aquaculture, renewable energy)?
Which Marine Reporting Units show the highest spatial mismatch between planning and environmental objectives?

WHAT FOR / RELEVANCE

Both the MSF Directive (EU, 2008) and the MSP Directive (eu, 2014) constitute the environmental and spatial pillars of the EU Integrated Maritime Policy. The 2014 Directive explicitly calls for an ecosystem-based approach and for MSP to make "use of relevant instruments and tools, including those already available under the MSFD" (Art. 10.3).

The 2022 Commission Implementation Report (EC,2022)further stresses that integrating MSFD data in MSP processes is key to applying an ecosystem-based approach, promoting coherence between policies, and improving the sustainability of blue economy development. The report also identifies the use of best available data and data sharing as a legal and practical obligation.

At the global scale, the Joint MSP Roadmap (IOC-UNESCO/EC, 2022) reinforces this need under its *Knowledge Support* and *Climate-smart MSP* priorities, calling for the co-development of MSP tools that integrate environmental data and cumulative pressure analyses, and for the use of harmonised data infrastructures such as EMODnet and WISE Marine.

The tool directly can also be instrumental to address some of the recommendations identified in the recent literature on MSP. Particularly, it can contribute to improving the coherence, mutual reinforcement, and operational integration between environmental protection and spatial planning objectives as required under the MSFD and MSPD. By linking spatial planning outputs with

environmental assessment data, the tool enables authorities to evaluate whether planned maritime uses are consistent with GES targets and with broader ecosystem-based management goals.

Through the overlay of MSP zoning elements and MSFD environmental status data, the tool supports the identification of areas where human uses exert pressures on vulnerable ecosystems and where management measures, such as Marine Protected Areas (MPAs) or restrictions on activities, may need to be strengthened. It allows environmental and planning authorities to quantify spatial coherence between planned uses and environmental conditions, providing concrete evidence to guide adaptive management and spatial prioritisation in line with GES descriptors.

The tool also supports integration of ecosystem-based and socio-economic considerations by enabling spatial analyses that show how ecological characteristics intersect with economic or cultural uses of the sea. This capacity helps ensure that spatial measures derived from the MSFD are reflected in MSPs, while also allowing MSP decisions to contribute to MSFD objectives—such as pollution reduction, biodiversity protection, or the avoidance of cumulative impacts from human activities.

Moreover, by operating across regional seas, subregions, and Marine Reporting Units (MRUs), the tool strengthens transboundary and cross-sectoral coordination, facilitating a shared evidence base that can support joint environmental assessments, the design of coherent MPAs, and the alignment of restoration or pollution mitigation measures. It thus provides a practical mechanism to harmonise policy implementation, ensuring that MSFD and MSP processes remain mutually supportive, science-based, and consistent across governance levels.

WHEN

The MSP & MSFD Links tool can support several MSP phases, but it is particularly relevant in three key phases: *3. Assessment for planning, 4. Developing the plan, and 6. Monitoring, evaluation, and adaptation.*

In the **Assessment for planning phase**, the module supports the identification and visualisation of environmental conditions and pressures affecting marine waters prior to the design or revision of spatial plans. By overlaying MSFD status data (including overall GES, criteria, element and parameter status) with existing or proposed MSP uses, it enables planners to establish robust environmental baselines and identify sensitive or high-value ecological areas that should inform spatial allocation decisions. This ensures that planning starts from an accurate understanding of the ecological context and the cumulative pressures acting on marine ecosystems.

In the **Developing the plan phase**, the tool helps evaluate the spatial compatibility between planned uses and environmental objectives, ensuring that designated zones, infrastructure developments, and maritime activities remain consistent with the achievement or maintenance of Good Environmental Status (GES). It supports planners in identifying areas where environmental constraints, mitigation actions, or protection measures are needed and helps visualise opportunities for multi-use zones that align economic activities with ecosystem conservation goals.

In the **Monitoring, evaluation, and adaptation phase**, the module provides a systematic mechanism to track spatial coherence between MSP and MSFD reporting cycles. By comparing updated environmental assessments with existing maritime zoning, it allows authorities to detect areas where environmental conditions have deteriorated or improved, informing adaptive revisions of maritime spatial plans. This continuous link between environmental status data and planning outputs strengthens the feedback loop between MSFD and MSP implementation, promoting adaptive, evidence-based, and environmentally coherent maritime governance.

WHO

- **Decision-makers and practitioners:**
  Decision-makers and practitioners can use the MSFD–MSP Links Tool to evaluate how spatial plans align with environmental objectives under the MSFD. By visualising overlaps between maritime uses and environmental status areas, the tool supports evidence-based planning, helps identify zones requiring protection or mitigation, and ensures that GES targets are integrated into MSP processes and revisions.

- **Research and technology community:**
  The research and technology community can use the tool as a reference framework for analysing human–environment interactions and testing spatial coherence indicators. Its integration of harmonised datasets from EMODnet and MSFD reporting systems provides a robust base for developing methodologies, validating environmental models, and improving tools for ecosystem-based maritime management.

- **Civil society and local communities:**
  Although not the main target users, civil society and local communities can also benefit from the tool's transparent visual outputs, which show how planning decisions relate to environmental

conditions. By improving access to clear, map-based information on maritime uses and ecosystem status, the tool enhances public understanding and participation in planning processes and fosters trust in the coherence between development and environmental protection.

- **Industry and private sector:**
  The industry and private sector can use the insights provided by the tool to anticipate environmental constraints and adapt business or investment strategies accordingly. By clarifying where maritime activities intersect with areas of high environmental sensitivity or GES targets, the tool supports risk assessment, compliance planning, and the development of more sustainable and spatially compatible operations within the Blue Economy framework.

4.3. Cumulative Impact Assessment

What

The Cumulative Impact Assessment (CIA) tool provides a spatially explicit methodology to identify, quantify, and visualise the cumulative pressures that multiple human activities exert on marine ecosystems. It builds upon the Spatial Pressures and Impact Assessment (SPIA) framework developed by HELCOM and refined within the ReMAP project, incorporating the methodological advances achieved through successive HELCOM holistic assessments (HOLAS 1–3, 2010–2023) and the conceptual foundations of Halpern et al. (2008).

The CIA module outlines the methodological structure, data requirements, and geoprocessing steps needed to apply the SPIA framework in a replicable and harmonised way. Its primary goal is to simplify and standardise the assessment of cumulative impacts by automating the creation of intermediate input layers such as datasets representing human pressures, ecosystem components, and their sensitivity relationships. These intermediate layers are generated through the CIA tool which preprocesses and harmonises raw spatial data from different marine areas into compatible raster layers (1x1 km resolution) ready for analysis.

The tool links datasets on human uses, environmental pressures, and ecosystem components through a system of sensitivity scores, reflecting the vulnerability of each ecosystem element to specific pressures. The resulting impact maps allow users to visualise and quantify the cumulative effects of multiple

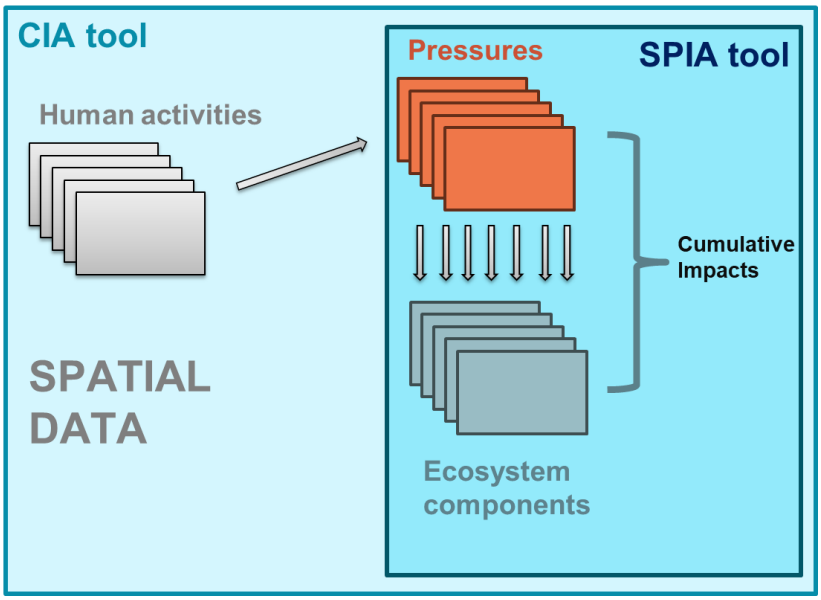
human activities, highlighting areas of high environmental pressure and supporting ecosystem-based and spatially informed decision-making in MSP.

To ensure reliability and replicability, the tool also includes a data validation and harmonisation feature that supports dataset collection and preparation for the analysis. This component informs data providers about the required attributes and code structures, validates dataset completeness and format, and automatically converts different input formats into the standardised structure used by the SPIA Intermediate Layers Tool. This online validation environment forms the basis of the input data structure for cumulative impact analysis and facilitates consistent implementation across different geographical contexts.

The development of the CIA tool required a systematic revision of geoprocessing workflows to address challenges related to data availability, documentation gaps, and regional differences. This process involved refining existing pressure layers, incorporating additional environmental and human-use datasets, and creating a dedicated ArcGIS Pro Python toolbox to automate and document all geoprocessing steps. The resulting toolset ensures methodological consistency and transparency, allowing users to reproduce the analysis and adapt it to new contexts.

Designed to be modular, adaptable, and transferable, the CIA tool has been tested and implemented across three case studies of varying scales: Galicia (subnational), the Northwest Mediterranean (transboundary), and the Baltic Sea Region (regional). Although initial configurations were based on Baltic data, the tools standardised data templates and configurable parameters make it adaptable to other regions by integrating local ecological features such as species and habitats.

The CIA Tool can be executed within ArcGIS Pro through a Python-based interface and is publicly available via GitHub, including full documentation, configuration files, and example datasets.



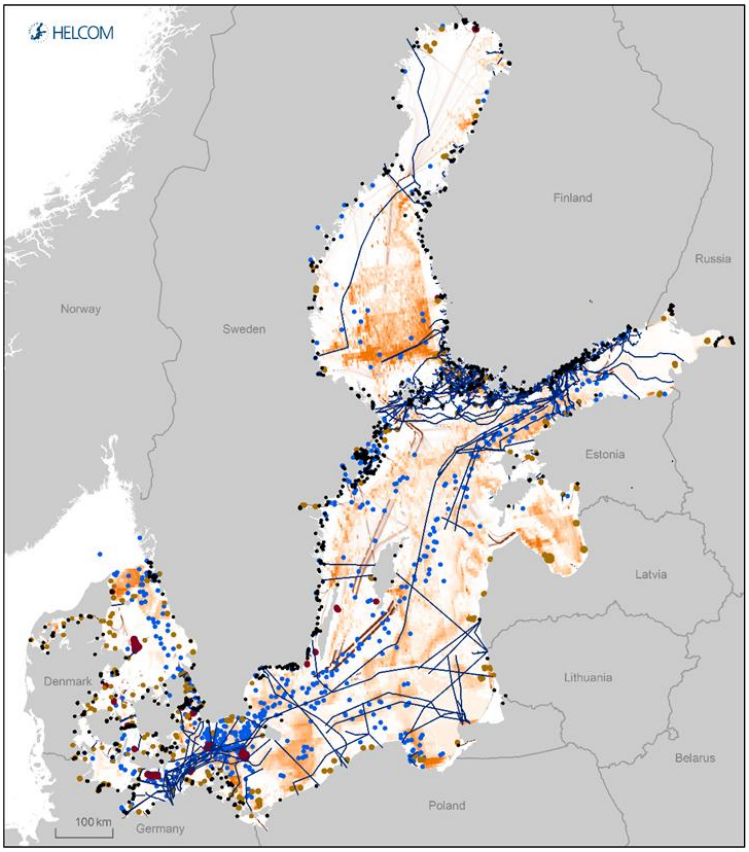


Figure 4 - Snapshot of the CIA too with example of datasets on human activities

Examples of policy and planning questions the tool can help address

Which areas are subject to the highest cumulative pressures in the planning region?
How would introducing offshore wind farms affect overall ecosystem stress levels?
Which pressures contribute most significantly to total cumulative impact in a given basin?
How do cumulative impacts change under different planning or climate scenarios?
Are transboundary pressures aligned or divergent across neighbouring plans?
Where are the key ecological or biodiversity hotspots that require strengthened protection or buffer zones?
Which human activities overlap most with sensitive habitats or species migration routes?
How to address the challenges and needs pointed out in relevant policy and scientific recommendations on strengthening the ecosystem-based approach?

WHAT FOR / RELEVANCE

The 2014 MSP Directive establishes the need for an ecosystem-based approach to ensure that pressures of human activities remain within environmentally sustainable levels, while enabling the long-term use of marine resources. For this, being able to assess the cumulative impacts of these activities is critical. This requirement directly links to the need for systematic tools capable of evaluating combined impacts, as recognised in the 2022 MSP Implementation Report, which emphasises the importance of evidence-based, cross-sectoral decision-making for sustainable blue growth.

Aligned with the MSP Global Roadmap 2022–2027 (IOC-UNESCO/EC, 2022) priority areas, particularly *Knowledge Support* and *Climate-Smart MSP*, the CIA tool exemplifies the co-development of new analytical instruments bridging scientific evidence and planning needs. By combining geospatial data, ecosystem sensitivity, and human use layers, it operationalises the science–policy interface that underpins both the MSP Directive (EU, 2014) and the UN Ocean Decade objectives for sustainable ocean management.

Additionally, the tool can contribute to address several of the challenges and needs pointed out in relevant policy and scientific recommendations on strengthening the ecosystem-based approach and cross-sectoral integration of maritime spatial planning. In this regard, by providing a spatially explicit and standardised methodology to quantify the combined effects of multiple maritime activities on marine ecosystems, the tool supports a systematic evaluation of human pressures and ecosystem vulnerability. This enables planners and environmental authorities to identify areas under high cumulative stress, guiding biodiversity conservation, pollution reduction, and spatial management

measures in line with the objectives of the MSFD, Habitats and Birds Directives, and Marine Protected Areas (MPAs) frameworks.

The tool also enhances the integration of ecological, social, and economic dimensions into MSP decision-making, responding to the recommendation to adopt ecosystem-based and cumulative effects assessments across sectors. By linking datasets on human uses, pressures, and ecosystem components through sensitivity scores, the tool provides an evidence base for aligning spatial planning with GES (Good Environmental Status) targets, identifying trade-offs, and prioritising sustainable uses.

Furthermore, the harmonised data structure and validation functions of the tool support the standardisation and comparability of environmental assessments across regions and sea basins. This contributes to recommendations calling for common methodologies, interoperable data systems, and integrated monitoring frameworks between directives such as the MSFD (EU, 2008), MSPD (EU, 2014), and WFD (EU, 2000). The tool's capacity to be applied at multiple scales—from local to regional—also facilitates cross-border cooperation and consistency in assessing pressures that transcend administrative boundaries.

Finally, highlighting hotspots of cumulative pressure and areas of potential synergies, the CIA tool helps authorities target mitigation and restoration measures and assess the effectiveness of spatial protection efforts such as MPAs or OECMs. It also supports adaptive planning and revision cycles, enabling planners to test alternative scenarios and update zoning measures based on evolving pressures or environmental feedback.

WHEN

The Cumulative Impact Assessment tool can be applied throughout the MSP process, but it is particularly relevant in four key phases: *3. Assessment for planning, 4. Developing the plan, 5. Enabling implementation of the plan, and 6. Monitoring, evaluation, and adaptation.*

In the **Assessment for planning** phase, the tool provides a comprehensive spatial diagnosis of cumulative pressures, allowing planners to identify ecosystem vulnerabilities, high-pressure areas, and existing data gaps. By integrating information on human uses, environmental pressures, and ecosystem components through sensitivity scores, it helps establish robust environmental baselines and supports the preparation of evidence-based assessments for spatial planning.

In the **Developing the plan** phase, the tool enables comparative analysis of alternative spatial scenarios, helping planners to evaluate how different configurations of maritime uses may affect ecosystem health.

This functionality allows for the minimisation of cumulative pressures, the identification of coexistence or multi-use opportunities, and the design of planning measures that balance economic development and ecological protection.

In the **Enabling implementation of the plan** phase, the tool supports the definition of mitigation and monitoring measures in areas of high cumulative impact. By identifying zones where multiple pressures converge, it helps authorities prioritise management actions, restoration efforts, and preventive measures that strengthen the ecosystem-based implementation of MSP.

In the **Monitoring, evaluation, and adaptation** phase, the tool allows authorities to track changes in cumulative pressures over time, comparing successive assessments to evaluate the effectiveness of planning and policy measures. This iterative approach ensures that maritime spatial plans remain responsive to evolving environmental conditions and contributes to a continuous feedback loop for adaptive and science-based maritime governance.

WHO

- **Decision-makers and practitioners:**
  The CIA tool provides planners, MSP authorities, and environmental agencies with a harmonised and transparent framework to assess and visualise the cumulative effects of human activities on marine ecosystems. By offering spatially explicit impact maps and standardised workflows, it supports evidence-based policy design, spatial zoning, and adaptive management. Decision-makers can use the tool to identify high-pressure areas, evaluate alternative planning scenarios, prioritise mitigation actions, and ensure coherence between MSP and environmental legislation such as the Marine Strategy Framework Directive (MSFD).

- **Research and technology community:**
  For researchers, modellers, and data scientists, the CIA tool offers a robust methodological framework and an open-source environment (available via GitHub) to explore and refine cumulative impact assessment methods. Its modular and Python-based design allows integration with other analytical models and adaptation to new datasets or ecological contexts. The harmonised data structure and validation functionalities facilitate comparative studies, methodological innovation, and the development of improved sensitivity matrices or regional applications.

- **Civil society and local communities:**
  The tool enhances transparency and public understanding of how multiple human pressures affect the marine environment. By visualising cumulative impacts through clear spatial outputs, it helps citizens, NGOs, and local communities engage more meaningfully in MSP processes, advocating for the protection of ecologically sensitive areas and sustainable management of shared marine resources. It can also serve as an educational and participatory tool to strengthen awareness and trust in marine planning decisions.

- **Industry and private sector:**
  For maritime industries (e.g., fisheries, shipping, aquaculture, offshore energy), the tool offers valuable insights into the spatial distribution of environmental pressures and ecosystem sensitivities. It supports risk assessment and strategic planning by identifying zones where new developments may face environmental constraints or where synergies with other uses could be enhanced. By anticipating potential conflicts and environmental impacts, the tool helps businesses align with sustainability targets and streamline permitting and licensing processes within ecosystem-based MSP frameworks.

4.4. Conservation (in)compatibility

What

The Conservation (in)compatibility tool allows the evaluation of how marine conservation areas, particularly Marine Protected Areas (MPAs), interact spatially with the maritime activities and uses established in Maritime Spatial Plans (MSPs). Its main objective is to identify where conservation goals align or conflict with maritime development, supporting the coherent and balanced integration of MPAs into MSP processes across spatial and governance scales. By embedding biodiversity protection and ecosystem-based management into MSP, the tool provides planners, conservation authorities and policymakers with an operational framework to assess trade-offs, promote synergies and ensure that marine spatial plans are environmentally sound and aligned with European and international conservation targets.

The module builds on two key EU data standards: the MSP Data Model (for maritime uses and zoning) and the INSPIRE Protected Sites Data Model (for MPAs). It harmonises these datasets using the

extended HILUCS classification of maritime activities and the IUCN management categories (Ia–VI) for protected areas. Through spatial overlay analysis, it classifies the relationships between conservation zones and human uses as *compatible, variable, incompatible, or uncertain*. This assessment follows the IUCN guidelines on acceptable activities within different protection categories, ensuring consistency with international conservation standards.

In practice, the module overlays MSP zoning polygons, each encoded with its sea-use function (Priority, Reserved, Potential, Allowed, Restricted, or Forbidden), with MPA polygons encoded according to their IUCN category. This spatial intersection produces four analytical outputs:

- Areas where planned maritime uses conflict with conservation objectives;
- Areas where uses may conflict, depending on management measures;
- Areas where uses are compatible with MPA objectives;
- Areas requiring further research to clarify compatibility.

Beyond simple overlay, the module includes a conceptual framework that allows planners to differentiate among management regimes and uses. For instance, it distinguishes between surface, water column, seabed, and subsoil activities—acknowledging that certain overlaps may not represent physical conflict. Although vertical zoning is not yet systematically applied, this capacity is anticipated for future development.

The analytical workflow involves defining spatial layers, encoding attributes, conducting overlay analysis, and categorising results based on the IUCN matrix of maritime activities. Outputs are produced as interoperable geospatial datasets and maps, displaying conflict and compatibility zones between maritime sectors and conservation areas. These results can be integrated directly into MSP reviews and updates, providing a clear visual and data-based reference for adjusting plans, resolving conflicts, or identifying opportunities where maritime sectors can strengthen conservation outcomes.

The module's design prioritises reusability and harmonisation. It is compatible with datasets shared through EMODnet, BASEMAPS, or the MSP INSPIRE model, ensuring that Member States can apply it consistently across sea basins. By aligning conservation and planning data within a common analytical structure, it enables cross-border comparability and supports EU-level reporting obligations.

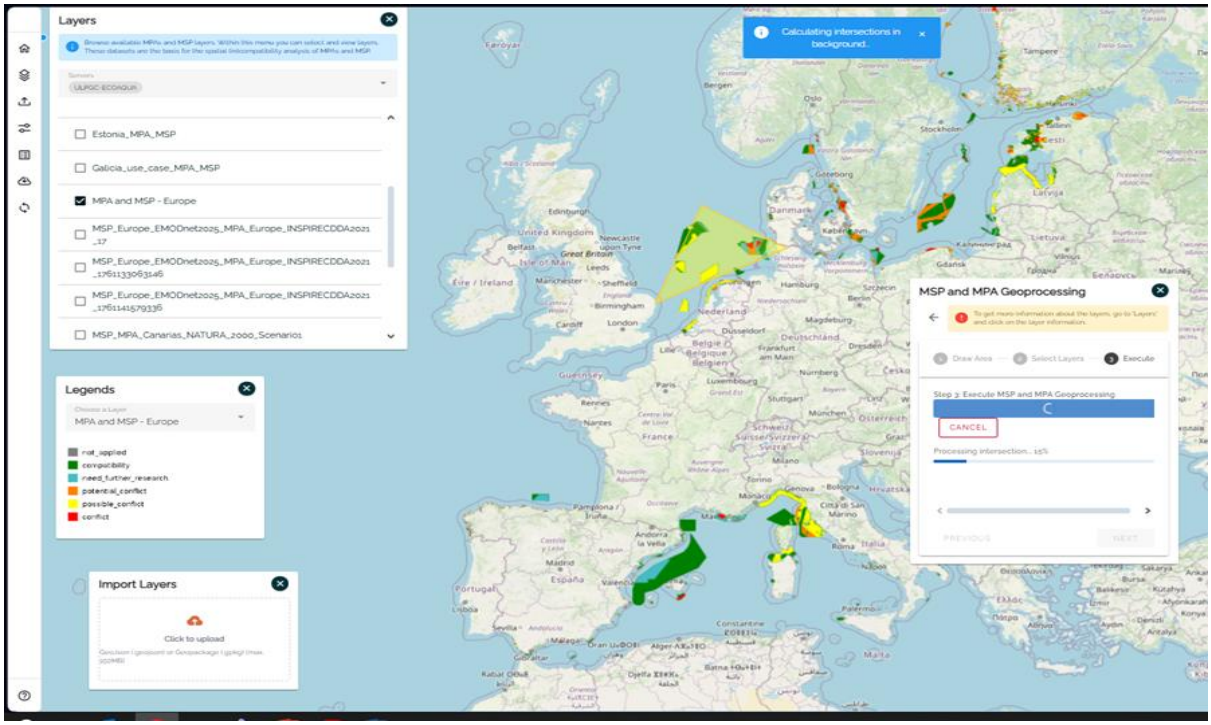


Figure 5 - Snapshot of the Conservation (in)compatibility tool

Examples of policy and planning questions the tool can help address

What is the level of compatibility of new introduced MPAs with current MSP

What would be the implications of increasing the conservation level of existing MPAs (according to their IUCN category), and how compatible would such changes be with current MSP designations?

How compatible would newly introduce marine uses be with existing conservation objectives and designations?

How can MSP revisions strengthen ecological connectivity between protected areas?

What proportion of MPA area overlaps with maritime uses considered “variable” or “conditionally compatible”?

Where are the most significant spatial conflicts between planned maritime developments and areas of high ecological value, and what management measures could mitigate them?

WHAT FOR / RELEVANCE

The *Conservation (in)compatibility tool* directly supports the implementation of the ecosystem-based approach (EBA) mandated by the 2014 MSP Directive (Art. 1(3)) and reinforced by the MSFD (EU, 2008). As highlighted in the 2022 MSP Implementation Report (EC, 2022), conservation and ecosystem protection are core dimensions of MSP that ensure that "the collective pressure of human activities remains within levels compatible with good environmental status."

By operationalising this principle, the tool helps planners and authorities ensure that the integration of MPAs within MSPs respects ecological limits while identifying opportunities for co-benefits with the blue economy (e.g. low-impact tourism, scientific uses, traditional fisheries).

The 2022–2027 MSP Global Roadmap (IOC-UNESCO/EC, 2022) further emphasises "marine protection and restoration" as one of its six global priority areas, underlining the need to develop practical tools to address coexistence and trade-offs between conservation and maritime sectors. The *Conservation (in)compatibility module* responds precisely to this demand by providing an evidence-based mechanism for assessing spatial coherence between MPAs and other uses, in line with the goals of the European Green Deal (EC, 2019), the EU Biodiversity Strategy (EC, 2020), and the Sustainable Blue Economy Communication (EC, 2021).

Additionally, The Conservation (in)compatibility tool provides an evidence-based mechanism to operationalise many of the key recommendations identified in the literature on ecosystem and biodiversity conservation within the field of Maritime Spatial Planning. By systematically assessing spatial relationships between Marine Protected Areas (MPAs) and maritime activities, the tool helps planners align MSP objectives with the MSFD (EU, 2008) and the ecosystem-based approach, ensuring coherence between spatial planning and environmental protection goals. It does this by identifying where uses of the sea may threaten biodiversity conservation targets, and conversely, where synergies exist between economic activities and ecosystem resilience. This capacity directly supports the integration of Good Environmental Status (GES) objectives into MSP and the design of spatial measures that contribute to achieving them.

The tool also advances the recommendation to promote updated, data-driven understanding of spatial-temporal and environmental patterns. By overlaying harmonised spatial data on conservation areas (classified according to IUCN categories) and maritime activities (following the extended HILUCS classification), it generates clear, reproducible maps of compatibility and conflict. These analytical outputs improve the quality of environmental baselines and facilitate adaptive and long-term scenario planning, enabling authorities to anticipate pressures on ecosystems and to design mitigation or

restoration measures within MSP. Moreover, by making this analysis transparent and interoperable with data sources such as EMODnet and INSPIRE, the tool supports the broader recommendation for harmonised environmental assessment methodologies and shared data infrastructures among Member States.

In terms of policy coherence, the Conservation (in)compatibility tool contributes to strengthening the legal and practical alignment between the MSPD, MSFD, WFD, Habitats, and Birds Directives. It provides a spatial framework for integrating biodiversity criteria into sectoral planning decisions, such as the siting of offshore energy infrastructure or the delineation of aquaculture zones, helping to prevent conflicts with conservation areas and to uphold the precautionary and non-deterioration principles of EU environmental law. This directly responds to calls for stronger enforcement of environmental obligations, reduced use of exemptions, for the mainstreaming of restoration targets into MSP processes.

The tool also supports the participatory and knowledge-inclusive dimension of ecosystem-based MSP. By producing intuitive visualisations and categorised results (compatible, variable, incompatible, or uncertain), it facilitates communication between planners, scientists, local communities, and industry actors. This helps incorporate local ecological knowledge and stakeholder perspectives into decision-making, fostering shared ownership and collaboration in the management of MPAs. In this sense, it operationalises recommendations to actively involve stakeholders in conservation planning and to bridge scientific data with societal understanding of marine ecosystems.

Finally, the Conservation (in)compatibility tool contributes to the recommendation of ensuring more effective and resilient marine protection networks. Through the integration of IUCN management categories and compatibility matrices, it provides a consistent, transparent framework for evaluating the adequacy and coherence of MPA designations within MSP. This approach supports the establishment of robust and connected conservation areas, guides strategic spatial choices—such as identifying “no-go” zones for high-impact activities, and helps the European Commission and Member States move towards a more integrated, enforceable, and result-based implementation of marine biodiversity and restoration objectives.

When

The Conservation (in)compatibility tool can support several phases of the MSP process, but it is particularly relevant in three key phases: *3. Assessment for planning, 4. Developing the plan, and 6. Monitoring, evaluation, and adaptation.*

In the **Assessment for planning** phase, the tool helps analyse and visualise how existing and proposed maritime activities interact spatially with Marine Protected Areas (MPAs) and other conservation zones. By overlaying MSP zoning polygons with IUCN-classified protection categories, it enables planners to identify where conservation objectives may be compromised by planned uses or where potential synergies exist. This spatial analysis supports the creation of robust environmental baselines and the integration of conservation priorities into early planning assessments, ensuring that spatial allocation decisions consider ecological sensitivity and biodiversity protection needs.

During the **Developing the plan** phase, the tool provides a clear analytical basis for integrating conservation requirements into zoning and management decisions. It allows planners to test different configurations of maritime uses, evaluate compatibility scenarios, and identify areas that should be prioritised for protection, restoration, or sustainable use. The resulting conflict and opportunity maps can guide adjustments to maritime plans, helping to balance sectoral development with conservation targets and to ensure coherence with the MSFD and ecosystem-based management principles.

In the **Monitoring, evaluation, and adaptation** phase, the Conservation (in)compatibility tool supports the ongoing review of how spatial planning measures perform in relation to conservation goals. By regularly updating its analyses with new data on maritime activities and protected areas, it helps assess whether MSP implementation remains aligned with biodiversity objectives and whether management actions have reduced conflicts or improved ecological conditions. This iterative use makes the tool a valuable instrument for adaptive planning, enabling evidence-based revisions and supporting the long-term effectiveness of marine conservation within MSP frameworks.

1.1.1 Who

- **Decision-makers and practitioners:**
  For planners and public authorities, the Conservation (in)compatibility tool provides a practical framework to integrate biodiversity protection into MSP. By identifying spatial overlaps between marine uses and protected areas, it supports evidence-based zoning decisions, helps prevent

conflicts, and ensures coherence with the MSFD, Habitats, and Birds Directives. Its harmonised datasets also enhance coordination across governance levels and promote cross-border cooperation in marine conservation.

- **Research and technology community:**
  For researchers and technical experts, the tool offers a framework to analyse how maritime activities interact with conservation areas. It operationalises the integration of IUCN protection categories and extended HILUCS codes, enabling advanced spatial modelling and comparative assessments. Its interoperable data structure supports innovation in ecosystem-based management, conflict analysis, and adaptive conservation planning.

- **Civil society and local communities:**
  For local communities and NGOs, the tool improves transparency and participation by visualising areas where maritime activities may support or threaten conservation goals. Guided by experts, the tool can help make spatial information more accessible, empowering citizens to engage in MSP discussions and contribute local ecological knowledge, thus fostering shared responsibility in marine resource management.

- **Industry and private sector:**
  For maritime sectors such as energy, aquaculture, fisheries, and transport, the tool offers valuable insights for planning and risk management. By identifying where conservation constraints may apply, it helps reduce regulatory uncertainty, prevent costly conflicts, and highlight opportunities for sustainable multi-use. This supports business strategies that align with environmental regulations and long-term blue economy objectives.

4.5. Socio-economic Assessment

What

The Socio-economic Analytical Module and tool assesses the economic and social dimensions of maritime activities regulated by Maritime Spatial Planning, providing a comprehensive understanding of how the Blue Economy contributes to regional and national development. While environmental assessments have traditionally received greater attention, this module fills a key gap by quantifying the

socio-economic impacts of MSP-related sectors, helping to ensure that spatial planning decisions are not only environmentally sustainable but also economically and socially balanced.

Unlike other modules, no pre-existing information was available for this component. Therefore, ReMAP developed new socioeconomic data and indicators tailored to the different sea uses represented in the maritime spatial plans addressed within the project. The module evaluates key indicators such as production value, gross value added (GVA), and employment, linking them to the spatial distribution of activities in maritime plans. It integrates official economic statistics to capture how planning measures influence different maritime sectors, including fisheries, aquaculture, maritime transport, and coastal tourism, among others. Using Input–Output modelling, it estimates both the direct effects of these activities and their indirect and induced impacts across the wider economy, revealing the ripple effects of sectoral changes on employment and production.

Methodologically, the module follows a structured and replicable process: identification of relevant sectors within MSP plans, collection and harmonisation of economic data (based on NACE classifications), spatial disaggregation of activities, and estimation of socio-economic variables. It builds primarily on official sources such as Eurostat, national statistical institutes, and the European Commission's Data Collection Framework, complementing data gaps with expert input and validated proxies. Standardised procedures—including the use of GDP deflators, ARIMA-based projections, and comparability across time and geography—ensure analytical robustness and consistency across Member States.

The results are presented both statistically and spatially. Through a GIS-based viewer, users can explore the socio-economic footprint of maritime sectors across regions or basins, identifying areas of high dependency or potential vulnerability. This visualisation capability is particularly useful for analysing scenarios involving shared uses or sectoral trade-offs, such as the potential redistribution of fishing effort due to offshore energy developments. The tool's flexibility also allows adaptation to different spatial levels—regional, national, or cross-basin—depending on data availability.

Beyond current impact assessment, the module supports scenario-based analysis, enabling users to test how future changes—such as sectoral growth, policy shifts, or spatial reallocation—could affect the economy and employment. By combining quantitative rigour with stakeholder validation (through workshops and expert consultations), the MSP-SEC provides an operational and evidence-based tool to monitor the socio-economic added value of MSP implementation. Ultimately, it strengthens the capacity of decision-makers to evaluate trade-offs, design adaptive management measures, and link maritime planning decisions to tangible economic and social outcomes.

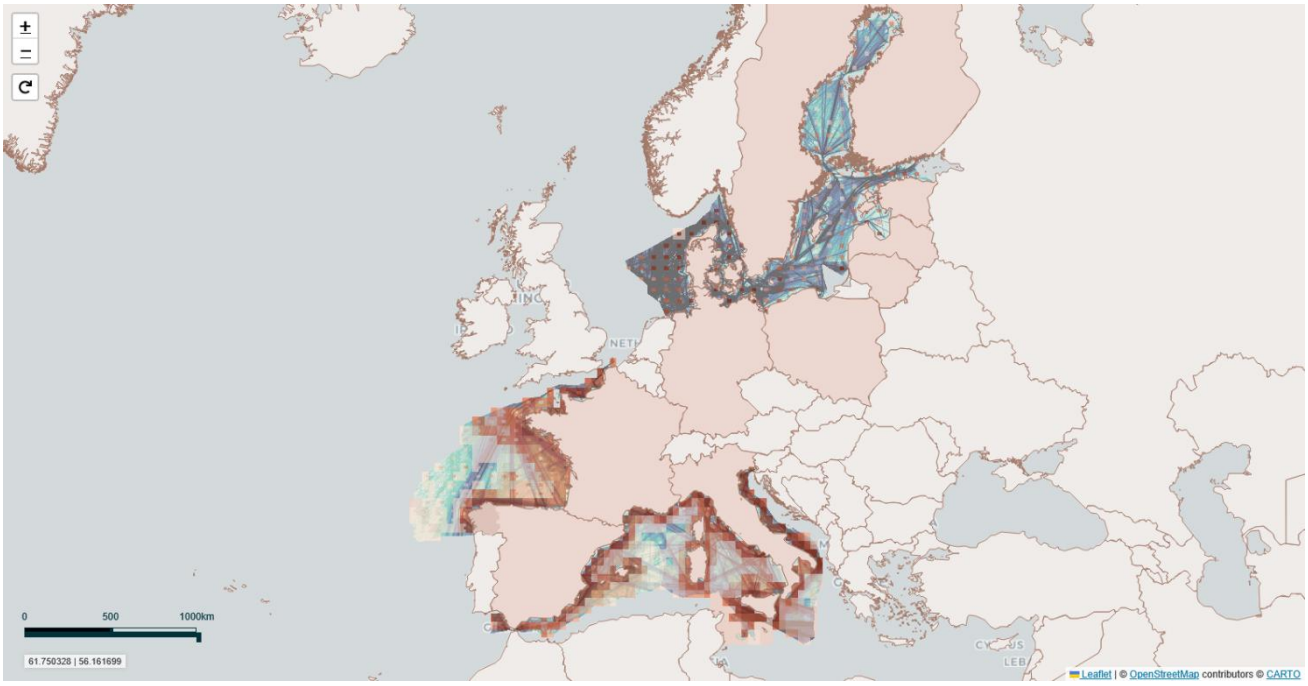


Figure 6 - Snapshot of the socioeconomic tool

Examples of policy and planning questions the tool can help address

Which maritime sectors contribute most to national and regional economies in terms of employment, production value, and gross value added, and how are these benefits spatially distributed across the marine area?

How do spatial planning decisions (e.g. new offshore renewable zones, fishing restrictions, or port developments) affect economic performance and job creation across different maritime sectors?

How can socio-economic evidence be used to anticipate and manage trade-offs between economic activities (e.g. fisheries vs. energy production) and to identify opportunities for multi-use or co-location?

Where are the areas most economically dependent on specific maritime sectors, and how could changes in spatial allocation or regulation impact local livelihoods and resilience?

How can socio-economic indicators be incorporated into MSP monitoring frameworks to evaluate whether maritime plans are delivering on their sustainability and blue growth objectives?

What proportion of national or regional GDP can be attributed to the blue economy, and how do maritime sectors contribute directly, indirectly, and through induced effects to overall economic performance?

Which indirect and induced sectors (e.g. manufacturing, logistics, tourism, research, or technology services) derive the greatest benefits from maritime activities, and what are the top five contributors in terms of GVA or employment linked to MSP-related sectors?

WHAT FOR/ RELEVANCE

The 2014 MSP Directive (EU, 2014) requires that national maritime spatial plans integrate social and economic aspects alongside environmental information, applying an ecosystem-based approach in which socio-economic evidence is key. In this context, the Socio-economic tool serves to support MSP implementation by providing georeferenced socio-economic indicators and scenario-based analyses. It quantifies key variable, such as employment, production value, and gross value added, linking them to MSP zoning elements to show how maritime sectors contribute to local and regional economies.

The module directly responds to the 2022 European Commission Report on the Implementation of the MSP Directive (EC, 2022), which stresses the need for stronger integration of economic and social evidence into planning and monitoring. By transforming official statistics into spatially explicit insights, the tool enables Member States to assess the socio-economic impact of maritime sectors and evaluate trade-offs between uses. Through Input–Output modelling, it also estimates indirect and induced effects, offering a more comprehensive view of how MSP decisions affect the wider economy.

Aligned with both the MSP Directive and the European Ocean Pact (EC, 2025), the module supports the EUs goal of promoting sustainable blue growth. Its outputs can inform policy strategies such as the Industrial Maritime Strategy, EU Ports Strategy, and Sustainable Tourism Strategy, providing the data needed to design coherent, forward-looking actions that balance economic development with environmental sustainability.

Additionally, the socio-economic assessment tool can also contribute and be instrumental in addressing the key recommendations identified in the literature on strengthening the socio-economic dimension of Maritime Spatial Planning.

A first group of recommendations highlights the need to bridge socio-economic data gaps and improve the spatial representation of maritime sectors. The MSP-SEC contributes directly to this goal by compiling and harmonising data from official statistical sources such as Eurostat, national statistical institutes, and the European Commission's Data Collection Framework. It integrates these datasets into a GIS environment using standardised NACE codes and INSPIRE-compatible data structures, allowing the precise mapping of economic activities and their impacts across marine space. This not only improves the comparability of socio-economic assessments across countries and sea basins but also aligns with EU efforts to expand data platforms like EMODnet to better incorporate socio-economic information.

Another key set of recommendations calls for cumulative socio-economic assessments and value-chain analyses to support evidence-based and adaptive decision-making. The module applies Input–Output

modelling to estimate direct, indirect, and induced economic effects, offering a systemic view of how changes in one maritime sector—such as transport, aquaculture, coastal tourism or fisheries—cascade through the wider economy. These capabilities allow policymakers to evaluate trade-offs, anticipate long-term trends, and design measures that maximise synergies between sectors while mitigating adverse impacts. In doing so, the tool provides the analytical foundation for assessing aggregate effects across sea basins, as recommended in the literature.

A third group of recommendations stresses the importance of integrating social and economic objectives within an ecosystem-based approach. The MSP-SEC helps achieve this by linking socio-economic indicators to spatial planning layers, enabling the simultaneous consideration of environmental, social, and economic aspects. This alignment supports MSP's role in mediating between competing uses while maintaining ecosystem integrity and social well-being. The tool also facilitates scenario analysis, helping planners test how different spatial allocations or policy options may affect regional economies, employment, and community resilience, particularly in the context of climate change.

Finally, several recommendations emphasise stakeholder engagement and equitable benefit-sharing within MSP. The MSP-SEC incorporates participatory validation through workshops and consultations, ensuring that quantitative results are grounded in local knowledge and sectoral experience. This helps reveal who benefits and who bears the costs of maritime activities, supporting more inclusive and transparent policy design. By combining quantitative rigour with participatory processes, the module enables the kind of adaptive, socially informed, and economically coherent planning that the literature identifies as essential for the next generation of MSP in Europe.

WHEN

The socio-economic tool can be used in several of the MSP planning phases mentioned in table 3. Although it could be potentially useful in other phases, the ones where it can play a more prominent role are in the *1. Setting the scene, 3. Assessment for planning*, *4. Developing the plan* and *6. Monitoring and evaluation*.

In the **assessments for planning** phase the identification of existing conditions is conducted to map and diagnose socio-economic parameters. As described above, ReMAP's Socio-economic tool provides key georeferenced information related to the economic and social aspects for the key blue economy sectors in terms of direct indirect and induced impacts on a graphical support enabling a comprehensive and cross-sectoral analysis.

The socio-economic tool provides support during the **development of the plan** by helping planners compare scenarios, evaluate trade-offs, and guide spatial allocation of uses. By highlighting where dependencies on activities like fishing are stronger or weaker, the tool informs zoning and management actions, ensuring that the plan balances economic growth with sustainable use.

In the **monitoring and evaluation phase,** the module offers a set of quantifiable socio-economic indicators that allow planners to track how activities contribute to employment and value added over time. Its scenario-testing capacity enables forward-looking assessments and supports adaptive management, ensuring that results are regularly measured, compared with objectives, and used to adjust or improve the plan.

WHO

- **Decision-makers and practitioners:**
  The tool provides an innovative approach providing socio-economic data with a spatial perspective. As described above, this proves useful in different stages and processes of marine spatial planning that experts need to carry out. Some of the main advantages for decision-makers and practitioners are the possibility of, on the one hand, understanding the extended impact of changes in one specific sector, and on the other hand, the possibility to visually represent this allowing decision-makers without sound technical expertise, to grasp the key information to make relevant and evidence-based decisions.

- **Research and technology community:**
  The selected approach sets forth an innovative methodology which brings together the macro-economic perspective that the input-output framework provides with the specific impact of blue economy sectors and the geographical distribution of this economic and social information. Thus, researchers on this topic can benefit from this new approach and the possibility to replicate it in similar or complementary contexts. For technology developers, the viewer serves as an example of how to deal with information that does not have a straightforward geographical representation.

- **Civil society and local communities:**
  The tool makes socio-economic impacts of key blue economy sectors easier to grasp at local and regional levels. By using the GIS viewer and color-coded maps, citizens can quickly see which

activities contribute most to employment and value added in their area. For civil society organizations, this evidence clarifies the issues at stake and how spatial planning decisions may directly affect their communities or members. In this way, the tool empowers stakeholders to participate more effectively in MSP processes, ensuring that debates and decisions are more transparent and better informed.

- **Industry and private sector:**
  For businesses, the module provides data on their economic and social footprint as well as on the wider ripple effects of their activities. This evidence increases planning certainty by showing how sectors contribute to employment and value added, while also helping anticipate and mitigate conflicts with other users. At the same time, it can highlight innovation opportunities—such as synergies between blue economy sectors—supporting more strategic investment decisions and strengthening the sector's role in MSP negotiations

4.6. Governance Assessment

What

The MSP Governance tool is designed to evaluate how effectively governance systems support the implementation of Maritime Spatial Plans. It focuses on the governance dimension of MSP, specifically on coordination, which is understood as the backbone of government and a prerequisite for addressing complex cross-sectoral and cross-border challenges. Often, many different governmental departments and agencies are responsible for managing ocean activities. They need to work together to ensure the effective implementation of marine spatial plans, avoiding overlapping, conflicts and gaps. Coordination provides ways to share information, align goals and develop joint actions within and across borders. Effective coordination among institutions, spatial, and jurisdictional scales, and maritime sectors is essential to ensure that plans are implemented as intended.

The tool assesses governance systems' capacity to coordinate by analysing both the formal and informal mechanisms that link administrative units, clarify roles and responsibilities, and align actions across national, regional, and transboundary levels. It builds upon internationally recognised governance frameworks and combines qualitative self-assessment surveys with expert evaluation to generate an evidence-based picture of how coordination structures enable or hinder plan implementation. The tool relies on two types of data: institutional and regulatory information, such as competent authorities, legal

instruments, and coordination mechanisms, and spatial data representing the geometry of MSP plans and administrative boundaries.

The main output is the Coordination Assessment Index, a composite indicator that synthesises multiple governance dimensions into a single, easy-to-interpret metric. This index highlights whether coordination mechanisms act as enablers, bottlenecks, or neutral factors in the execution of MSPs. Results are presented through dashboards and maps that visualise the strength and distribution of coordination mechanisms within and across countries. While the index simplifies interpretation, it is not intended to measure plan "conformance", that is, whether policy objectives have been achieved, but rather the system's performance and readiness to deliver those objectives effectively.

The Coordination Index is integrated by 56 indicators structured in 3 pillars: design, performance and assessment. It provides a general index as well as specific indexes addressing horizontal coordination (across units and departments responsible for different sectors), vertical coordination (across local, regional, national and international levels), spatial coordination (across coastal, terrestrial and urban planning), resources and communication.

The tool can be applied at national, subnational, and transboundary scales, providing valuable insights for improving both vertical and horizontal coordination. It also incorporates a temporal dimension, distinguishing between mechanisms that are fully implemented, partially developed, or still under design. This helps track governance progress over time and identify where further institutional or procedural improvements are needed. Because governance is complex and context-dependent, the tool is not meant to be used in isolation; its interpretation requires expert input and contextual understanding. Ultimately, the MSP Governance tool offers decision-makers a structured, transparent way to diagnose governance performance, promote institutional learning, and strengthen the collaborative foundations necessary for effective and adaptive maritime spatial planning.

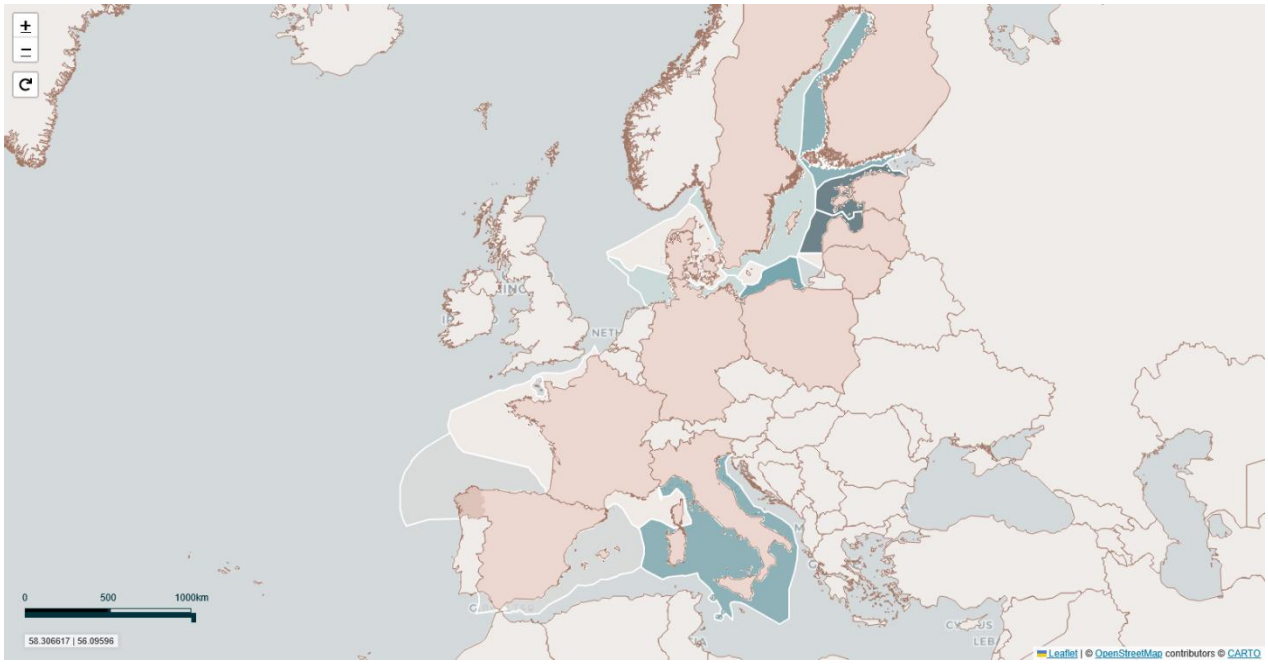


Figure 7 - Snapshot of the MSP-GOV tool

Examples of policy and planning questions the tool can help address

Which institutions and coordination mechanisms are in place to implement national or regional maritime spatial plans, and how effectively do they function?

Are existing governance arrangements sufficient to ensure vertical coordination between national, regional, and local authorities involved in MSP?

Where do overlaps or gaps exist between sectoral responsibilities that could hinder the implementation of maritime spatial plans?

How consistent and coherent are the coordination mechanisms across neighbouring countries sharing the same sea basin?

To what extent do current governance frameworks enable cross-sectoral collaboration (e.g. between energy, fisheries, and environmental authorities)?

How have coordination structures evolved since the approval of the plan, and are they being adapted to new policy or environmental priorities?

Which aspects of the governance system act as enablers or bottlenecks for achieving the objectives of the MSP?

How can the performance of governance mechanisms be strengthened to ensure long-term, transparent, and participatory implementation of maritime spatial planning?

WHAT FOR / RELEVANCE

Coordination consistently emerges as a critical factor in MSP—identified both as a problem and a solution. Reviewing recent MSP policy briefs (see annex 1), coordination is always included in the policy recommendations.

Understanding how effective the coordination mechanisms are in supporting the implementation of the MSP plan helps governments guide actions and improvements. The assessment provides an overarching view, allowing also to understand common trends across separate indicators, digest information and facilitate public action. For instance, the performance of a coordination body could be improved by including arbitration processes for preventing and resolving policy and management conflicts.

MSP-GOV acknowledges that governance systems are dynamic. Coordination mechanisms— such as common information-sharing platforms — may be absent, under development, planned, partially, or fully implemented. Each stage requires a different response to improve performance, and the assessment tool helps tailor actions to the system's current status.

Beyond the diagnostic approach, MSP-GOV has multiple applications. For instance, it can be used to identify priority areas for operational cooperation across Member States by highlighting bordering areas with the same planned priority use (combining sea uses, sea functions and cooperation criteria). In doing so, it provides paths to move from collaboration and cooperation to actual coordination. Using the Off-shore Wind Farms projects as an illustrative example, it could support the development of joint planning and implementation: from the most ambitious coordination of national expansion plans and commonly funded and operated projects to the practical offshore grid and interconnectors investment and/or operation. Within a MS MSP, the MSP-GOV can also be employed to select areas with multiple overlapping uses to identify where coordination efforts should be prioritised for public intervention

Effective governance is essential for achieving the objectives of the 2014 MSP Directive (EU, 2014), which defines MSP as a *"public process of analysing and organising human activities"* and emphasises cooperation among Member States, stakeholder participation, and use of best available data.

Moreover, the 2022 MSP Implementation Report (EC,2022) stresses that the success of MSP depends on functional coordination structures among ministries and agencies, cross-border cooperation mechanisms, and stakeholder engagement platforms. Weak governance capacity remains a recurrent challenge, affecting plan coherence and adaptability and being able to identify and characterise its causes is instrumental in addressing it.

At the global level, the Joint MSP Roadmap (IOC-UNESCO/EC, 2022) highlights governance and capacity development as cross-cutting priorities to accelerate MSP implementation, promoting peer learning, transparency, and participatory approaches.

Additionally, the Governance tool can be instrumental in addressing some of the challenges and needs in terms of governance and cross-border cooperation recommendations identified in recent policy literature. A central theme of these recommendations is the need to enhance policy coherence, strengthen coordination mechanisms, and promote adaptive, multi-level, and participatory governance in Maritime Spatial Planning. The tool contributes to these objectives by providing a structured methodology to assess how effectively governance systems function across institutions, sectors, and scales, helping authorities to identify coordination gaps, institutional bottlenecks, and opportunities for improvement.

One of the key recommendations is to improve horizontal and vertical coherence, that is, alignment across sectors, and between different levels of governance. The Governance tool operationalises this through its analysis of coordination mechanisms, linking institutional data with spatial information to visualise how well national, regional, and local authorities cooperate in MSP implementation. By producing a Coordination Assessment Index and mapping where coordination structures exist or are lacking, the tool supports evidence-based adjustments to enhance vertical alignment between national objectives and local implementation, and to reduce policy fragmentation across sectors such as energy, fisheries, environment, and transport.

A second group of recommendations emphasises the need to strengthen institutional capacity, long-term coordination, and adaptive planning. The Governance tool contributes to these goals by helping authorities diagnose whether coordination mechanisms are functional, under development, or absent, thereby providing a baseline for capacity-building and institutional learning. Its structured self-assessment process also fosters reflection among practitioners, promoting continuous improvement and adaptive management. By integrating temporal aspects of governance, the tool enables the monitoring of institutional progress and helps ensure that coordination systems remain responsive to new policy priorities, emerging sectors, or environmental challenges.

Finally, the tool responds to the growing call for cross-border and regional sea-basin cooperation in MSP. By allowing comparison of coordination performance across countries and identifying areas where cooperation mechanisms are strong or weak, it provides an analytical foundation for enhancing transnational governance. The tool's spatially explicit outputs can inform regional sea conventions, bilateral dialogues, and macro-regional strategies, supporting harmonised approaches to shared maritime challenges. In this way, the Governance tool not only helps implement good governance

principles at the national level but also strengthens Europe's capacity for coherent, collaborative, and adaptive management of its shared marine space.

When

The MSP Governance tool can support several stages of the MSP process, but it is particularly relevant in four main phases: 1. *Setting the scene*, 2. *Designing the planning process*, 5. *Enabling implementation of the plan, and* 6. *Monitoring, evaluation, and adaptation.*

In the **Setting the scene** phase, the tool helps identify and analyse the institutional, legal, and organisational frameworks that define how MSP is governed in each country or region. By mapping competent authorities, existing coordination mechanisms, and legal instruments, it supports the establishment of a clear governance baseline. This enables planners and policymakers to understand which institutions are responsible for specific tasks, how they interact, and where coordination gaps or overlaps may exist.

During the **Designing the planning process** phase, the Governance tool contributes to defining effective coordination arrangements between different levels of administration and across sectors. It helps determine how responsibilities should be distributed, which mechanisms (formal or informal) should be strengthened, and how communication and decision-making processes can be improved to ensure a coherent, inclusive, and transparent planning framework.

The tool becomes especially valuable in the **Enabling implementation of the plan** phase, where it assesses the functionality and effectiveness of governance mechanisms responsible for implementing the MSP. Through its Coordination Assessment Index, it provides insights into whether existing coordination structures facilitate or hinder implementation, supporting targeted improvements in institutional cooperation, capacity building, and stakeholder engagement.

Finally, in the **Monitoring, evaluation, and adaptation** phase, the Governance tool allows authorities to track how coordination mechanisms evolve over time. By identifying whether governance arrangements are fully operational, partially implemented, or still under development, it provides evidence for adaptive management and continuous institutional learning. This ensures that governance systems remain effective, responsive, and aligned with changing policy, environmental, and socio-economic conditions.

WHO

- **Decision-makers and practitioners:**
  For planners, policymakers, and competent authorities, the MSP Governance tool provides a structured framework to evaluate how effectively coordination mechanisms support the implementation of maritime spatial plans. It helps them understand where governance systems function well and where gaps or overlaps exist between institutions, sectors, or governance levels. By visualising coordination structures and delivering a Coordination Assessment Index, the tool facilitates evidence-based improvements in administrative processes, enhances inter-ministerial cooperation, and supports the design of more coherent and efficient governance frameworks for MSP implementation. It needs to be clear though that governance experts need to be involved in the process.

- **Research and technology community:**
  For researchers and technical experts, the tool offers a robust methodological framework for analysing governance performance in complex multi-level systems. It combines qualitative self-assessment, expert interpretation, and spatial data analysis, providing a valuable dataset to study institutional effectiveness, coordination models, and cross-border governance dynamics. The tool also serves as a practical example of how to operationalise governance indicators, supporting comparative research and innovation in policy evaluation and adaptive management. The tool is the first attempt to use a data approach to MSP governance, opening a new research line within the governance topics and in collaboration with other MSP dimensions. In particular, it provides the baseline to analyse and measure other governance goals beyond effectiveness such as participation or resilience.
  Also, MSP-GOV allows comparative analysis across governance systems, supporting theoretical and empirical research.

- **Civil society and local communities**:
  For NGOs, local organisations, and community stakeholders, the Governance tool enhances transparency in MSP processes by clarifying who is responsible for what and how coordination across sectors and governance levels takes place. It allows civil society to better understand decision-making structures and to identify entry points for participation and dialogue. This increased visibility of governance mechanisms helps build trust, promote accountability, and encourage more inclusive and collaborative approaches to maritime planning and management.

4.7. Navigation Safety

What

The NaviSafe tool integrates the dimension of maritime navigation safety into Maritime Spatial Planning MSP, responding to the requirements of Article 6 of the MSP Directive to ensure that the safety of navigation is taken into account when analysing and allocating maritime space. It provides a harmonised and data-driven approach to understanding how physical conditions, maritime traffic, and human uses interact spatially, and how these interactions may generate potential risks for navigation.

At its core, NaviSafe applies a spatial risk assessment methodology that combines multiple layers of geospatial information into a single analytical environment. Physical parameters such as bathymetry, seabed morphology, tidal regimes, and current velocity are integrated with maritime traffic density maps, shipping routes, offshore infrastructures, and other planned or existing uses from MSP datasets. The tool merges these datasets through a predefined risk matrix that quantifies the probability and potential consequences of navigation hazards. The result is a series of dynamic risk "heatmaps" showing a regular gradient from low to high risk, allowing users to visualise how various factors interact to shape overall navigational safety.

The tool's flexibility allows it to accommodate diverse data sources and formats (e.g. shapefiles, geopackages, WFS/WMS streams), ensuring interoperability with national and European marine data infrastructures such as EMODnet and the MSP Data Framework. Each analysis includes a full traceability record of the data used and the parameters applied, guaranteeing transparency, reproducibility, and explainability of results—an essential feature for decision-making in safety-sensitive contexts.

The tool's analytical outputs can inform multiple governance levels—from local port and coastal authorities to national and basin-scale planners—providing a clear, visual basis for dialogue between the navigation sector and other maritime users. By transforming hydrographic, environmental, and human-use information into accessible spatial risk analyses, NaviSafe strengthens evidence-based and precautionary planning, promotes interoperability among data sources, and ensures that navigation safety is systematically embedded in the design and revision of maritime spatial plans.

In a context of increasing competition for marine space, the tool thus contributes to reducing the risk of accidents, improving coexistence between maritime sectors, and safeguarding essential maritime corridors. Ultimately, it enhances the coherence and safety of European maritime spatial planning by

ensuring that growth in sea uses is compatible with the secure and sustainable movement of vessels across Europe's seas and coastal waters.

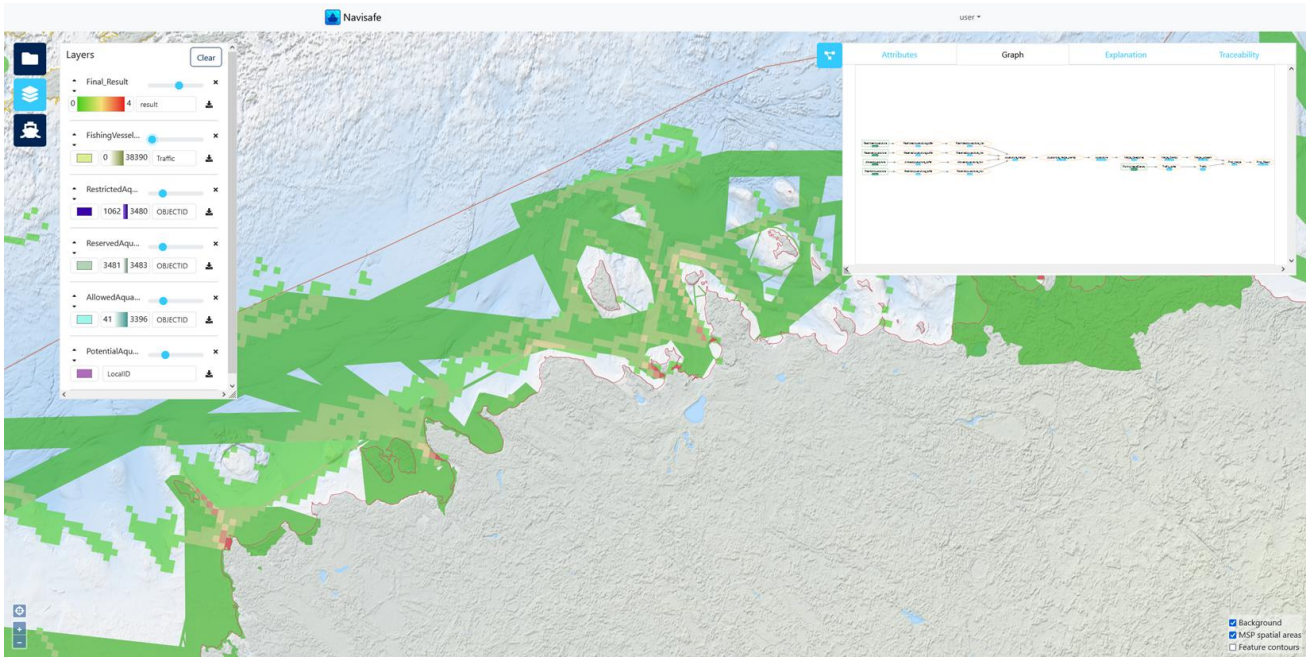


Figure 8 - NaviSafe results presenting conflict between main navigation traffic and new potential aquaculture farms implantation in MSP Baltic Spatial plan

Examples of policy and planning questions the tool can help address

- Which areas present the highest navigation risks due to the concentration of maritime traffic and overlapping marine uses?
- How do proposed offshore energy developments or aquaculture sites interact spatially with existing shipping routes and navigation corridors?
- Where are the main conflict zones between maritime transport and other sectors that require regulatory or spatial adjustments?
- Are there cross-border areas where navigation safety concerns require coordinated management between neighbouring countries?
- How can navigation safety data be integrated into the revision of maritime spatial plans to prevent future conflicts?
- How can navigation safety considerations support multi-use planning and ensure the coexistence of maritime sectors within shared sea areas?

WHAT FOR/ RELEVANCE

The MSP Directive (EU, 2014) establishes safe navigation as a key planning objective within its ecosystem-based approach. It requires that plans "take into account environmental, economic, social and safety aspects" and ensure "coherence between land-sea interactions and cross-border uses." Safe and efficient navigation is thus essential to the sustainable use of maritime space.

The 2022 MSP Implementation Report (EC, 2022) underlines navigation safety as one of the dimensions to be integrated into MSP to avoid conflicts between shipping routes and emerging uses, and calls for interoperable risk-assessment tools among Member States.

In line with the Joint MSP Roadmap (IOC-UNESCO/EC, 2022), the tool contributes to the *knowledge support* and *co-development of new MSP tools* priorities by strengthening the science–policy interface and improving the technical basis for decision-making on maritime safety.

The tool also can contribute address directly addresses several key recommendations identified through a literature review on cross-sectoral and multi-use approaches in Maritime Spatial Planning (MSP). By embedding navigation safety considerations within spatial planning decisions, it contributes to the integration of maritime transport, offshore energy, conservation, and environmental protection objectives in line with the MSP and MSFD Directives.

Moreover, a central contribution of the tool is its ability to identify spatial overlaps and potential conflicts between navigation routes and other maritime uses. By combining hydrographic, environmental, and activity-based datasets into a unified analytical framework, it generates transparent, data-driven risk maps that help planners visualise how different sectors interact spatially. This functionality responds to the recommendation of developing structured frameworks to map sectoral interests, conflicts, and synergies, enabling evidence-based and proactive conflict management within MSP processes.

The tool also aligns with recommendations to strengthen data accessibility and interoperability by creating shared environmental information systems. NaviSafe ensures traceability and explainability in its analyses, facilitating the integration of safety data with broader environmental and planning datasets. This contributes to a more transparent and collaborative decision-making environment across institutions and jurisdictions.

Finally, the tool answers to the call for developing analytical instruments and scenario-based tools to support multi-use planning. Through its capacity to model and visualise navigation risks, it helps planners evaluate coexistence between maritime sectors, reduce conflicts, and promote the efficient and secure use of marine space.

WHEN

The NaviSafe tool can support several stages of the MSP process, but it is particularly relevant in three key phases: *3. Assessment for planning, 4. Developing the plan, and 6. Monitoring, evaluation, and adaptation (see Table above)*.

In the **Assessment for planning phase**, the tool helps identify and evaluate existing navigation conditions and potential safety risks arising from human uses and environmental factors. By combining data on maritime traffic, physical parameters, and planned uses, the tool produces risk maps that inform the spatial analysis of constraints and opportunities for future development. This contributes to a more comprehensive understanding of navigational dynamics and supports evidence-based assessments prior to plan formulation.

During the **Developing the plan phase**, the tool provides an operational basis for integrating safety criteria into zoning and management decisions. Its capacity to visualise risk gradients allows planners to test different spatial configurations, identify conflict zones between navigation and other maritime sectors, and evaluate alternative scenarios. This ensures that new developments—such as offshore renewable energy areas or aquaculture zones are located in ways that minimise navigational risks and maintain safe access routes.

Finally, in the **Monitoring, evaluation, and adaptation phase**, NaviSafe can be used to track changes in navigational risk over time, particularly as new activities are introduced or maritime traffic patterns evolve. By updating its analyses with recent datasets, it enables continuous evaluation of safety conditions and supports adaptive revisions of the spatial plan. This ongoing use ensures that maritime safety remains an integral and dynamic component of MSP implementation, contributing to safer and more resilient maritime spaces.

WHO

- **Decision-makers and practitioners:**
  For public authorities, planners and maritime administrations, the tool provides a practical decision support system that helps integrate navigation safety into all stages of Maritime Spatial Planning (MSP). By visualising areas of navigational risk and identifying overlaps between shipping routes and other maritime uses, it supports evidence-based decisions when designating zones, developing new infrastructures or revising spatial plans. It also facilitates coordination

between different sectors such as transport, energy, fisheries and conservation, helping to minimise conflicts and ensure coherence with MSP and MSFD requirements.

- **Research and technology community:**
  For researchers and technical experts, NaviSafe offers a structured and transparent framework to analyse and quantify navigation related risks. Its spatial risk assessment model and interoperability with various data formats (for example shapefiles or WFS and WMS services) make it a valuable tool for testing methodologies, validating models and developing innovative risk indicators. The tool also contributes to strengthening the science- policy interface by providing an operational platform where scientific knowledge on maritime safety, oceanography and human activities can be translated into planning relevant outputs.

- **Civil society and local communities:**
  For local communities and maritime users, the tool enhances transparency and stakeholder participation by making navigational risks visible and understandable. Its outputs such as intuitive risk maps and visual scenarios can support public consultations by showing how proposed maritime developments might affect navigation routes, access to coastal areas or local safety conditions. This can contribute to enhance communication between authorities and communities, increases trust in MSP processes and fosters awareness of how maritime safety contributes to broader sustainability goals.

- **Industry and private sector:**
  For maritime industries, particularly shipping, ports, offshore energy and aquaculture, the tool provides critical information for investment and operational planning. By identifying safe zones for navigation and highlighting potential risk areas, the tool helps reduce operational uncertainty, improve route optimisation and anticipate regulatory constraints. It also supports collaborative planning between sectors, helping industry actors participate proactively in MSP dialogues and identify synergies with other maritime uses within a shared and secure spatial framework.

4.8. Ecosystem Services

What

The Ecosystem Services analytical module and tool assess the capacity of marine ecosystems to provide multiple ecosystem services, the ecological "supply side" of the benefits that sustain human well-being and the Blue Economy. By quantifying the potential, capacity, and condition of benthic habitats as service-providing units, it identifies the marine areas with the highest ability to deliver key ecological functions such as carbon sequestration, nutrient cycling, and coastal protection, while highlighting where these capacities may be at risk from cumulative pressures. Through this harmonised, spatially explicit framework, the tool enables planners and policymakers to integrate ecosystem-based management principles into Maritime Spatial Planning, linking biodiversity, ecosystem functioning, and human welfare to support sustainable decisions that balance economic development with the long-term resilience and ecological capacity of marine environments.

Conceptually, the module builds upon the cascade model of ecosystem services (Potschin & Haines-Young, 2011), operationalised for MSP through the Marine Ecosystem Capacity for Service Supply Assessment (MECSA) framework (Culhane et al., 2019). It analyses the links between service-providing units (SPUs)—in this case, benthic habitats—and the ecosystem services they support, using the EUNIS habitat classification (2007, revised 2012 & 2019) and the CICES V5.1 typology for standardised mapping and assessment.

The analysis focuses on three core components:

- **Potential**, the theoretical ability of a habitat to provide a given service;
- **Capacity**, its relative importance or spatial extent in delivering that service; and
- **Condition**, the ecological integrity or conservation status of the habitat, which can be informed by EU directives such as the MSFD, WFD, and Habitats Directive.

By combining these dimensions, the tool produces spatial indicators and maps showing areas with higher or lower theoretical capacity to supply ecosystem services. These outputs highlight where key ecological functions, such as carbon sequestration, nutrient cycling, or coastal protection, are strongest, and where human pressures may compromise them. The assessment can also be coupled with the Cumulative Impact Assessment (CIA) tool to analyse how human activities affect service provision and, ultimately, human well-being.

The tool uses harmonised spatial datasets and interoperable data models to ensure consistency across scales and jurisdictions. Habitat data follow a simplified INSPIRE-compliant data model based on the EUNIS classification, while maritime uses can be imported through MSP Data Model standards such as EMODnet, BASEMAPS, or MSP INSPIRE. This structure allows integration of biophysical, ecological, and spatial data within a single framework, supporting EU-level comparability and reuse across sea basins.

The outputs include statistical indicators, summary tables, and maps identifying marine areas with high ecosystem service supply potential, as well as services considered rare or vulnerable due to their dependence on specific habitats. These results inform both the designation of conservation areas and the spatial allocation of maritime activities, helping to maximise socioeconomic benefits while maintaining ecosystem functionality.

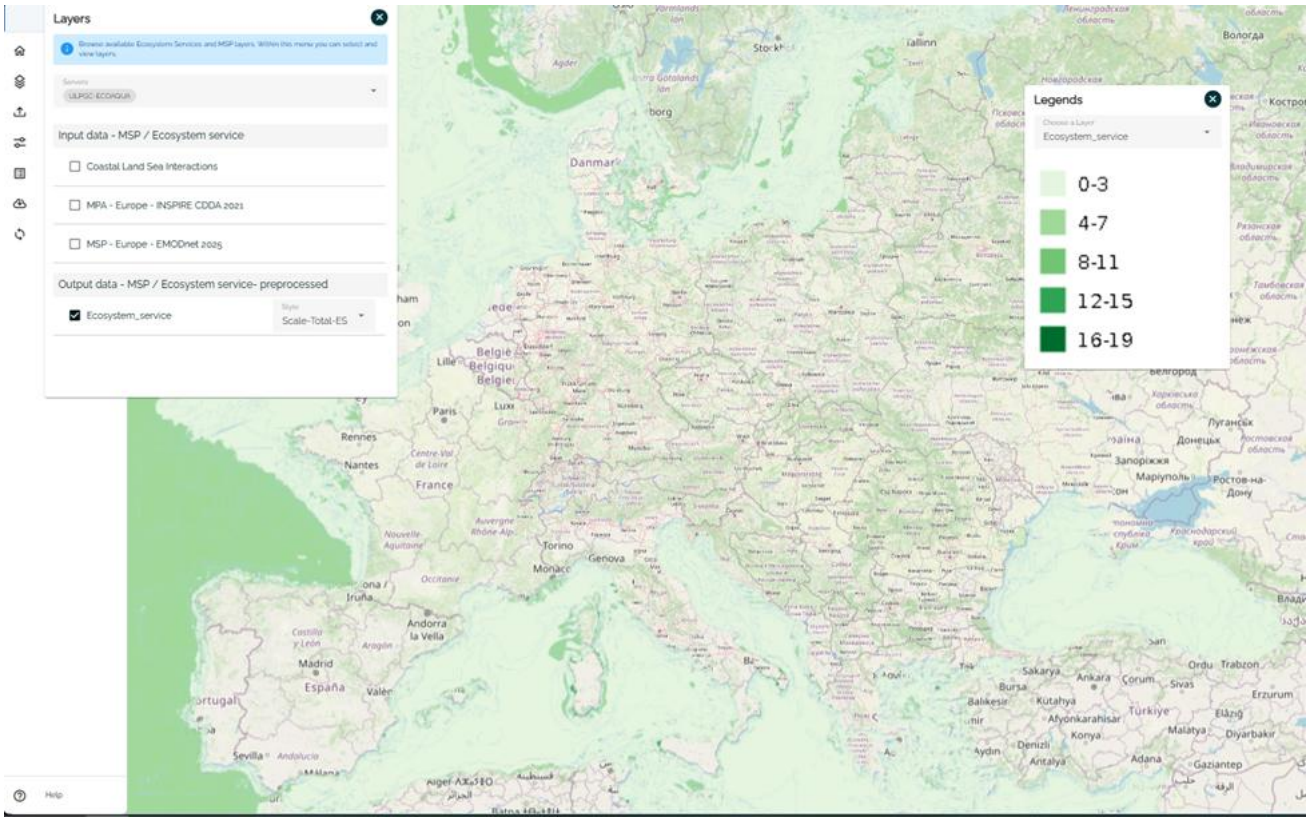


Figure 9 - Snapshot of the Ecosystem Services tool

1

Examples of policy and planning questions the tool can help address

Which marine areas have the highest ecological capacity to provide essential ecosystem services such as carbon sequestration, nutrient cycling, or coastal protection?
How do cumulative human pressures and planned maritime activities affect the potential and condition of habitats that supply key ecosystem services?
Where do opportunities exist to align maritime development (e.g. renewable energy, aquaculture) with areas that maintain or enhance ecosystem service provision?
How can the integration of ecosystem service assessments improve zoning decisions and support the designation of conservation or restoration areas?
Which habitats or regions show declining service capacity over time, and what management measures are needed to maintain their ecological and economic value?
How can ecosystem service indicators be used to evaluate trade-offs and synergies between Blue Economy sectors and ecosystem-based management objectives in MSP?

WHAT FOR/ RELEVANCE

The 2014 MSP Directive (EC, 2014) establishes that maritime spatial planning must apply an ecosystem-based approach ensuring that "the collective pressure of human activities is kept within levels compatible with the achievement of good environmental status" (Art. 1.3). This requires an explicit understanding of ecosystem functions and services, as they are the foundation of sustainable use and long-term resilience.

The 2022 Implementation Report (EC, 2022) stresses that Member States must better integrate environmental, economic and social aspects, and that ecosystem services can act as a bridging concept between environmental protection and socio-economic development. It highlights the need for *evidence-based decisions* and *adaptive monitoring* supported by indicators linking ecosystem condition and human benefits.

Also, the MSP Global Roadmap 2022-2027 (IOC-UNESCO/EC, 2022) further positions ecosystem services at the core of climate-smart and ecosystem-based MSP. Within its thematic pillars ("Marine protection & restoration" and "Knowledge support"), it calls for tools that can co-develop knowledge on ecosystem functions and service capacity to guide spatial allocation and to promote the sustainable Blue Economy.

Additionally, The Ecosystem Services analytical tool directly supports several of the key recommendations from the recent literature on ecosystem and biodiversity conservation within Maritime

Spatial Planning. First, it contributes to the call for aligning MSP objectives with the Marine Strategy Framework Directive and the broader ecosystem-based approach by offering a structured method to assess the ecological capacity of marine systems to sustain human activities. By mapping where different habitats contribute to ecosystem service provision, the tool allows planners to integrate environmental, social, and economic objectives coherently and ensure that MSP decisions contribute to the achievement and maintenance of Good Environmental Status. In this way, it operationalises the principle that sustainable maritime development must be based on the natural capacity of ecosystems to support uses without degrading their ecological functions.

The tool also responds to recommendations for improving the understanding of spatial-temporal and ecological patterns through harmonised data and modelling. Using standardised frameworks such as the EUNIS habitat classification and CICES ecosystem service typology, it provides comparable, spatially explicit information on where and how marine habitats supply key ecosystem services, including carbon sequestration, nutrient cycling, and coastal protection. This helps fill existing knowledge gaps, supports scenario-based planning, and facilitates adaptive management strategies that can anticipate long-term environmental change. By making these outputs accessible and interoperable across sea basins, the module advances the recommendation to harmonise environmental assessment methodologies and promote shared data repositories among Member States.

Another set of recommendations emphasises the need to integrate biodiversity and ecosystem service assessments early in MSP processes and to strengthen links among environmental directives (MSFD, WFD, Habitats, Birds, and the Nature Restoration Regulation). The tool contributes to this integration by quantifying the ecological foundations of human well-being, thereby supporting more consistent implementation of EU environmental law. Its capacity to identify areas of high ecological value or limited resilience provides a sound evidence base for siting decisions, such as defining “go-to” and “no-go” areas for offshore wind energy, ensuring that new developments avoid biodiversity hotspots and align with restoration and conservation targets.

Finally, the tool supports the recommendation to combine ecological evidence with stakeholder and societal knowledge. By translating complex ecological processes into intuitive maps and indicators, it enables engagement of non-experts, from local communities to industry actors, in understanding how ecosystem functions underpin social and economic benefits. This facilitates more transparent and participatory MSP, where planning decisions reflect both scientific knowledge and local perspectives on ecosystem use and conservation. In doing so, the Ecosystem Services tool strengthens the science–policy–society interface, helping transform environmental data into actionable guidance for sustainable and biodiversity-conscious maritime spatial planning.

WHEN

The Ecosystem Services tool can support several phases of the MSP process, but it is particularly relevant in four key phases: *2. Designing the planning process*, *3. Assessment for planning*, *4. Developing the plan*, *and 6. Monitoring, evaluation, and adaptation*.

In the **Designing the planning process** phase, the tool helps define planning objectives and principles consistent with the ecosystem-based approach. By identifying the types of ecosystem services that sustain human well-being and maritime activities, it supports the establishment of environmental and socio-economic priorities that guide the MSP vision and goals.

During the **Assessment for planning** phase, the tool can provide critical baseline information on the ecological capacity of marine ecosystems. It identifies where different habitats contribute to the supply of key ecosystem services, such as carbon sequestration, nutrient regulation, and coastal protection, and highlights areas where these functions are most at risk. This evidence allows planners to assess trade-offs and determine where specific management or protection measures may be needed before designing spatial allocations.

In the **Developing the plan** phase, the tool informs spatial planning decisions by linking ecosystem service supply with maritime uses. It supports the identification of zones that can accommodate new activities without compromising ecological integrity, helps locate areas suitable for restoration, and facilitates the integration of nature-based solutions into spatial management. By providing spatially explicit information on ecosystem value and resilience, the tool ensures that planning measures align with both environmental and socio-economic objectives.

Finally, in the **Monitoring, evaluation, and adaptation** phase, the tool contributes to assessing how planning measures affect the capacity of marine ecosystems to provide services over time. Periodic updates of habitat condition and service supply indicators allow planners to evaluate whether MSP implementation maintains or enhances ecosystem functionality, informing adaptive revisions of the plan and ensuring long-term sustainability and coherence with Good Environmental Status objectives.

WHO

- **Decision-makers and practitioners:**
  For planners, public administrations, and competent authorities, the Ecosystem Services tool provides an evidence-based framework to integrate the ecosystem-based approach into

Maritime Spatial Planning. By identifying where marine ecosystems deliver key services, such as carbon sequestration, nutrient cycling, or coastal protection, it supports balanced decisions that account for both ecological and socio-economic priorities. The tool helps visualise trade-offs among sectors, guide zoning, and ensure coherence between MSP objectives and environmental targets established under directives such as the MSFD and the Habitats Directive.

- **Research and technology community:**
  For scientists, data managers, and developers, the tool offers a structured and transparent methodology for assessing the ecological capacity of marine ecosystems. It applies standardised frameworks such as the MECSA approach, the EUNIS habitat classification, and the CICES typology, providing a consistent basis for comparative analyses and model validation. The tool facilitates cross-disciplinary research on ecosystem functioning, supports the development of new indicators for ecosystem health and service provision, and strengthens the link between scientific knowledge and applied marine governance.

- **Civil society and local communities:**
  For local communities, NGOs, and other social actors, the tool improves access to ecological information and promotes awareness of how marine ecosystems sustain livelihoods and quality of life. Through intuitive maps and spatial outputs, it makes complex ecological relationships understandable, helping communities engage in MSP discussions and support sustainable management initiatives. This contributes to greater transparency and participation in decision-making, fostering shared responsibility for marine resource conservation and sustainable coastal development.

- **Industry and private sector:**
  For sectors such as offshore energy, fisheries, aquaculture, and tourism, the tool provides valuable insights into the environmental context of maritime operations. By identifying areas with high or low ecosystem service capacity, it helps businesses anticipate ecological constraints, reduce operational risks, and align project development with sustainability principles. The tool also highlights opportunities for nature-based solutions and multi-use synergies, enabling the private sector to contribute proactively to sustainable blue growth while minimising environmental impacts.

4.9. Land-Sea Interactions

What

The Land-Sea Interactions tool is designed to help understand and manage the spatial relationships between coastal land uses and maritime activities. It examines how land-based infrastructure, industries, and settlements influence activities at sea, such as aquaculture, offshore wind energy, conservation, and transport, and how these, in turn, affect coastal areas. By identifying areas of potential conflict and compatibility, the tool supports a more integrated approach to maritime and coastal planning, ensuring that decisions made on land are coherent with those at sea.

Built on harmonised European data models, the tool uses the Hierarchical INSPIRE Land Use Classification System (HILUCS) for coastal activities and the MSP Data Framework and EMODnet MSP data layer for maritime uses. It overlays these datasets to map where interactions occur, distinguishing between "near-field" and "far-field" zones of influence. This allows users to visualise where infrastructure such as ports, tourism facilities, or energy installations may interact spatially or functionally with marine uses. The results are displayed through clear, standardised maps highlighting areas of synergy, where land and sea uses can coexist, and areas where planning coordination is required to prevent conflicts.

Conceptually, the tool provides a bridge between Integrated Coastal Zone Management (ICZM) and Maritime Spatial Planning (MSP), in line with the EU MSP Directives requirement to consider land-sea interactions. It also incorporates guidance from scientific and technical literature to define buffer distances, thresholds, and spatial relationships for key sectors. By quantifying and visualising these interactions, the LSI tool offers policymakers and planners a practical framework to align coastal development with sustainable maritime spatial planning, promoting policy coherence, ecosystem-based management, and more resilient coastal-marine governance.

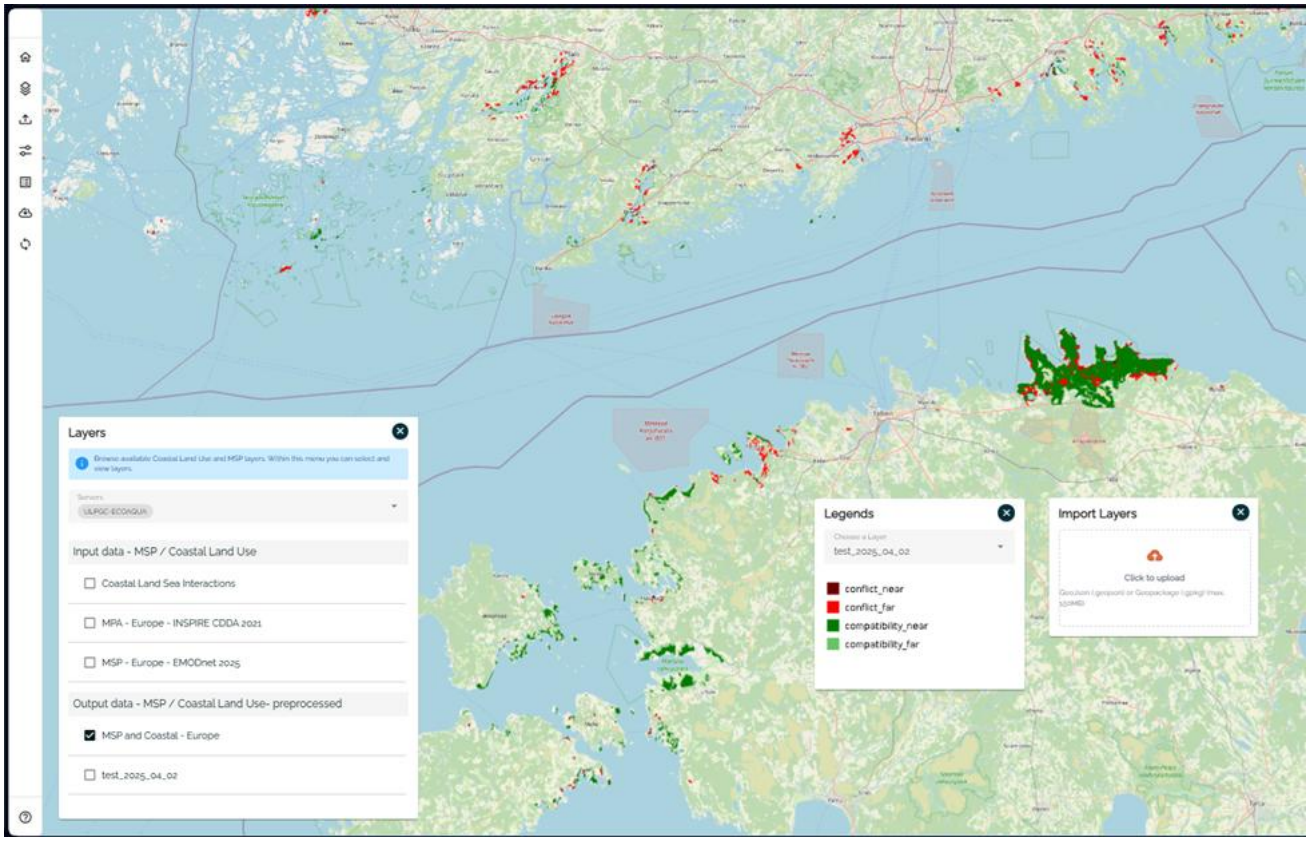


Figure 10 - Snapshot of the LSI tool

Examples of policy and planning questions the tool can help address

Which coastal land uses and maritime activities most frequently overlap, and where are these spatial interactions concentrated?

How do terrestrial developments (e.g. ports, tourism, agriculture, industry) influence marine uses and ecosystem conditions within the planning area?

Where do conflicts or compatibilities occur between coastal and maritime sectors, and how can planning measures address them?

How well are terrestrial and marine planning instruments (e.g. RBMPs, ICZM strategies, MSPs) aligned in terms of objectives and spatial scope?

Which coastal areas exert the greatest land-based pressures (e.g. nutrient loads, runoff, infrastructure) on adjacent marine zones?

Where can synergies be promoted between land and maritime uses, for example, between tourism, ports, aquaculture, and renewable energy?

How can LSI analysis inform the identification of buffer zones, transition areas, or joint management zones at the land-sea interface?

WHAT FOR / RELEVANCE

The 2014 MSP Directive (EU, 2014) explicitly requires Member States to take land-sea interactions into account, recognising that many pressures and drivers of change in the marine environment originate on land. In line with Recital 9, the Directive calls for maritime spatial planning processes to consider land-sea interactions and promote cross-border and cross-sectoral cooperation, ensuring that maritime and terrestrial policies are coherent and mutually supportive.

The 2022 MSP Implementation Report (EC, 2022) reinforces this need, highlighting that addressing LSI remains a key challenge for Member States and a precondition for integrated coastal and marine management. It stresses the importance of linking MSP with terrestrial planning systems to manage cumulative impacts and avoid inconsistencies between coastal infrastructure and maritime development.

Similarly, the Joint MSP Roadmap (IOC-UNESCO/EC, 2022) identifies "knowledge support" and "transboundary cooperation" as cross-cutting priorities for accelerating MSP worldwide. Action I on "Data for MSP" and Action II on "Co-develop new MSP tools" underline the importance of analytical instruments such as the LSI tool to integrate coastal data and inform spatial decisions that reflect both ecological connectivity and socio-economic dependencies between land and sea.

Additionally, the Land-Sea Interactions tool can be useful to address some of the recommendations identified in the literature on integrating coastal and marine management within Maritime Spatial Planning.

A first group of recommendations calls for better policy coherence and procedural integration between terrestrial and marine planning frameworks. The tool addresses this by systematically linking coastal land-use data (classified under the INSPIRE HILUCS system) with maritime activities from the MSP Data Framework and EMODnet. This connection allows planners to identify where terrestrial and marine activities overlap spatially or functionally, such as ports, tourism facilities, aquaculture, or offshore wind zones, and to assess whether those interactions generate conflicts or synergies. These insights help improve the alignment between Maritime Spatial Plans, River Basin Management Plans (RBMPs), and other land-based planning instruments, strengthening coherence across key EU policies like the MSFD, WFD, and Nitrates Directive.

Another set of recommendations highlights the importance of improving data collection, analysis, and knowledge integration to support concrete LSI assessments. The LSI tool operationalises this by using harmonised classification systems and spatial datasets to generate comparable analyses across regions

and countries. Its outputs, maps and indicators of conflict or compatibility, provide a clear evidence base for decision-making, enabling authorities to visualise how land-based pressures, such as nutrient loads or infrastructure development, affect the marine environment. This supports more effective and transparent decision-making and contributes to achieving Good Environmental Status (GES) targets by linking land-based pressures directly to spatial planning outcomes.

The literature also calls for stronger coordination and cooperation across governance levels and borders. The LSI tool facilitates this by providing a common analytical language and standardised methodology that can be applied consistently across national, regional, and transboundary contexts. By allowing for the integration of datasets and results across jurisdictions, it supports joint analysis and dialogue between neighbouring countries, helping to identify shared challenges, promote best practices, and design joint solutions for connected coastal and marine systems, such as those in the Adriatic or Baltic regions.

Finally, several recommendations underline the importance of stakeholder engagement and inclusion of inland perspectives in MSP processes. By translating complex spatial data into accessible visual outputs, the tool serves as a practical communication and engagement instrument. It helps demonstrate to local communities and inland stakeholders how terrestrial activities, like agriculture, urban development, or industrial discharges, can impact marine ecosystems and maritime sectors, encouraging greater participation and shared ownership of planning outcomes. In this way, the tool contributes to a more integrated, participatory, and ecosystem-based approach to managing Europe's land–sea interface.

WHEN

The Land-Sea Interactions tool can contribute to several phases of the MSP process, but it is particularly relevant in three key phases: *1. Setting the scene, 3. Assessment for planning, and 4. Developing the plan*.

In the **Setting the scene phase**, the tool helps establish the institutional and analytical foundations needed to address land-sea interactions in MSP. It supports the identification of relevant authorities, policies, and datasets across the terrestrial and marine domains, clarifying how coastal and marine planning instruments connect. This early integration ensures that land-based drivers such as infrastructure development, tourism, agriculture, and pollution sources are considered from the outset when defining planning objectives and governance arrangements.

During the **Assessment for planning phase**, the tool plays a central role by analysing spatial relationships between coastal land uses and maritime activities. Using harmonised data models such as INSPIRE HILUCS for land uses and the MSP Data Framework for maritime sectors, it identifies where interactions occur and whether they result in conflicts or compatibilities. The resulting maps and indicators help planners visualise how land-based pressures, such as nutrient loads or industrial activities, influence marine ecosystems and uses, supporting evidence-based assessments and informing zoning decisions.

In the **Developing the plan phase**, the LSI tool provides practical guidance for integrating the results of land-sea analyses into spatial planning and management actions. It helps define compatible areas for coastal and maritime activities, informs buffer zones and cross-sectoral measures, and supports the alignment of terrestrial and marine planning instruments such as River Basin Management Plans and coastal management strategies. By making land-sea linkages visible and quantifiable, the tool enables planners to design spatial plans that promote policy coherence, sustainable development, and ecosystem-based management across the coastal and marine continuum.

4.9.1. WHO

- **Decision-makers and practitioners:**
  For planners, coastal managers, and public authorities, the Land-Sea Interactions tool provides a practical framework to understand how land-based and maritime activities influence one another. By identifying areas of conflict and compatibility between coastal and marine uses, it supports evidence-based policy design and spatial planning decisions that align terrestrial and marine objectives. The tool helps improve coordination between land-use and maritime planning instruments, such as River Basin Management Plans and Maritime Spatial Plans, thus enhancing policy coherence and integrated coastal governance.

- **Research and technology community:**
  For researchers and technical experts, the LSI tool offers a harmonised and data-driven methodology to analyse and model land-sea interactions. Built upon the INSPIRE HILUCS and MSP Data Framework standards, it allows for reproducible spatial analyses and cross-country comparisons. The tool also contributes to advancing research on ecosystem-based management and coastal-marine connectivity by providing a platform for testing methodologies, integrating datasets, and developing new indicators for LSI assessment.

- **Civil society and local communities:**

For NGOs, coastal communities, and other social actors, the tool increases transparency and awareness of how decisions on land affect marine ecosystems and livelihoods, and vice versa. Through visual maps and accessible outputs, it helps illustrate the interdependence between terrestrial activities (e.g. agriculture, tourism, infrastructure) and marine uses (e.g. fisheries, conservation, renewable energy). This understanding supports community engagement and participatory planning processes, ensuring that local knowledge and perspectives are incorporated into MSP.

- **Industry and private sector:**
  For maritime and coastal sectors such as ports, tourism, aquaculture, and renewable energy, the tool provides valuable insights into spatial relationships that influence business operations. It helps identify suitable areas for development, anticipate potential conflicts with other land or sea uses, and assess environmental or regulatory constraints. By improving predictability and coordination between land-based and marine planning frameworks, the tool supports more efficient investment decisions and fosters the development of sustainable, well-integrated coastal and maritime economic activities.

5 Policy Recommendations

5.1. Background

In the last decade, ongoing efforts by institutions, researchers, and practitioners have advanced MSP improving its capacity to manage ocean and sea uses through an ecosystem-based approach. These efforts have led to a substantial number of policy documents containing recommendations on multiple aspects of MSP. At ReMAP, we systematically analyzed these recommendations to gain a clear understanding of what has been proposed, by whom, and how often. This, in turn, has allowed us to avoid redundancy in recommendations and, building on existing insights, to formulate additional ones.

Methodologically, this was carried out through a triangular approach combining literature review, expert knowledge, and stakeholder interaction. The literature review began with an extensive search of existing documents which was then refined to thirteen strategic sources (see Table 7). Recommendations from these documents were extracted and classified according to the relevance to ReMAPs goals and their level of detail (see Annex I for further details). Building on this selection, a participatory process was conducted with stakeholders -including policymakers, practitioners, and researchers -, during which MSP needs and gaps were discussed in the context of existing recommendations. This process culminated in the formulation of the three recommendations. For each of them, the potential contribution of ReMAP's outputs has been identified

Table 6 - Summary of selected policy documents by type of source

Research projects	EU Level
• Cross-gov PB1: Coherent and Cross-compliant Ocean Governance for Delivering the Green Deal for European Seas • Cross-gov PB2: Coherence in Policy Landscapes and Design • Cross-gov PB3: Coherence among planning systems established under three Directives • Cross-gov PB4: Policy brief on challenges and opportunities to strengthen Science Policy-Society interfaces (SPSI) • Cross-gov PB6: Strengthening policy coherence in EU coastal and marine governance: Key recommendations • Cross-gov PB7: Embedding policy coherence in the Ocean Pact and future Ocean Act: A strategic blueprint	• Maritime Spatial Planning Through the Years: Insights of a Decade of EMFF and EMFAF Funded Projects (2024) • Monitoring report Implementation MSP (2022) • ESPON: Maritime Spatial Planning and Land Sea interaction
	International organizations
	• MSPglobal Policy Brief: Climate Change and Marine Spatial Planning (2021) • MSPglobal Policy Brief: Ocean Governance and Marine Spatial Planning (2021)

- Joint Policy Brief: A European Oceans Pact to enhance Ocean Governance
- Permagov policy briefs: D3.3 Policy brief on institutional barriers

Table 7 -Summary of recommendations per MSP topic

MSP Topic	Number of recommendations
Capacity building and stakeholder engagement	44
Cross-border cooperation	12
Cross-sectoral approach in MSP	32
Data management	15
Ecosystem and biodiversity conservation	51
Governance	95
Land-sea interactions	14
Monitoring and Evaluation	19
Multi-use	11
Socio-economic dimension in MSP	14
Total	**307**

*The total number of compiled and reviewed recommendations in 211. Some of the recommendations are relevant for more than one category.

5.2. POLICY RECOMMENDATIONS

1. ADVANCE FROM DATA EFFECTIVE TO DATA SMART MSP.

Maritime Spatial Planning (MSP) data needs evolve along the different stages of the planning cycle. The early phases are typically data-intensive, requiring the gathering, harmonisation, and synthesis of information from multiple sources to support evidence-based plan development. As plans move towards implementation, monitoring, and evaluation, the nature of data demands changes — calling for continuity, comparability, and automation rather than volume.

Over the past decade of MSP implementation across Europe, substantial experience and good practices have been developed regarding data collection, harmonisation, and use. However, the growing complexity of maritime activities and the rapid progress in digital capabilities — such as machine learning, AI-assisted quality control, and the emergence of digital twins of the oceans — require a shift in approach.

ReMAP recommends **evolving from a data-effective model — focused on data availability and completeness — to a data-smart model, centred on strategic, efficient, and purpose-driven data management**. Being "data smart" means making the most of existing MSP data, using them for multiple objectives, improving data processes (e.g. defining which datasets are essential vs. desirable), and optimising data flows for sharing and re-use in a cost-effective and interoperable manner.

What - Key recommended actions include:

- **Auditing data use and value chains**, identifying redundant, low-value, or underused datasets and mapping where critical data gaps remain.
- **Assessing data needs according to the planning stage**, and reviewing critical architectural and infrastructural requirements to ensure scalability and interoperability.
- **Optimising data processes** through standardisation, metadata alignment, and integration into common data spaces (e.g. EMODnet, Copernicus, European Marine Observation frameworks).
- **Automating data flows** using machine learning and AI-assisted quality assurance tools to streamline data updating, validation, and reporting.
- **Improving data discoverability and accessibility** through open data principles, FAIR (Findable, Accessible, Interoperable, Reusable) standards, and harmonised cataloguing.
- **Developing MSP data governance frameworks** that define clear roles, responsibilities, and data-sharing protocols among institutions and across borders.
- **Establishing indicators of data efficiency**, linking data use directly to planning effectiveness and policy relevance.
- **Promoting capacity building and digital literacy**, ensuring that planners and decision-makers can fully exploit advanced data tools and analytical methods; this includes developing skills in translating data-driven insights into actionable recommendations to support decision-making
- **Encouraging cross-sectoral integration**, connecting MSP data with socio-economic, environmental, and climate datasets to enhance holistic assessments.
- **Piloting digital twins or spatial decision-support systems** that demonstrate the operational benefits of a data-smart approach.

When

Short term (1–3 years)

These actions should be initiated promptly to be in place for the new MSP Directive and aligned with upcoming EU digital and data governance frameworks (e.g. European Data Strategy, Green Deal Data Space, and EMODnet).

How - Implementation pathways

To transition from data-effective to data-smart MSP, coordinated actions should be promoted across governance, technical, and capacity-building levels:

Governance and coordination

- Use the Technical Expert Group on MSP Data (TEG) to perform targeted assessments based on evidence from existing MSP plans, research projects, and EMODnet use cases.
- Establish joint data task forces between national competent authorities and regional sea conventions to foster consistency in data collection and processing.
- Encourage cross-border cooperation through data-sharing agreements and pilot projects that demonstrate interoperability and joint assessments.
- Integrate *data-smart* objectives into the Member States Expert Group on MSP (MSEG MSP) work programme, including thematic sessions on optimisation and automation.

Funding and support mechanisms

- Mobilise funding through the MSP Platform (DG MARE), Horizon Europe, and Digital Europe programmes to support data assessments, pilot actions, and tool development.
- Facilitate co-funding for data infrastructure upgrades, especially for small or less digitally advanced maritime administrations.
- Link MSP data initiatives to the European Green Deal Data Space and the Common European Data Space for the Ocean, ensuring alignment and sustainability.

Knowledge exchange and dissemination

- Showcase best practices and results through EMODnet, ensuring visibility and uptake by practitioners and policy-makers.
- Promote peer-learning workshops and regional knowledge hubs to exchange lessons on data governance, quality assurance, and automation.
- Develop guidelines and blueprints for data-smart MSP, including checklists and evaluation templates for Member States.

Capacity building and innovation

- Support training programmes and technical assistance for planners, analysts, and IT staff to strengthen digital literacy and understanding of advanced analytics.
- Encourage innovation partnerships with research institutions and technology providers to co-develop data-smart solutions (e.g. digital twins, AI validation tools, interoperability pilots).
- Include data-smart MSP modules in future education or professional training curricula related to marine planning and data management.

Useful ReMAP outputs

The suite of tools developed within ReMAP collectively represents a significant step towards a new generation of data-smart MSP

Each module addresses a specific dimension of the MSP process—ranging from data foundations and spatial outputs to environmental coherence, socio-economic assessment, governance, and land–sea integration—while together they form a coherent analytical ecosystem that enhances data quality, interoperability, and practical usability.

ReMAP tools operationalise the principles of FAIR data (Findable, Accessible, Interoperable, Reusable) and translate them into concrete methodologies and instruments for evidence-based planning, monitoring, and adaptive management. By enabling planners to extract meaningful insights from diverse data sources, they strengthen the science–policy interface and promote cost-effective, interoperable, and cross-sectoral data use.

From Data to Knowledge

- **The MSP-Input Data Tool** establishes the foundation of *data-smart MSP* by assessing the availability, quality, and fitness-for-use of datasets across thematic domains. It supports authorities identify gaps, redundancies, and priorities, ensuring that data collection efforts are strategic and proportionate to planning needs.
- **The MSP-Output Data Tool** extends this logic to the spatial dimension of MSP, harmonising plan outputs under the EMODnet MSP Data Model. It enables automated integration and comparison of plans across borders, demonstrating how smart data architecture supports transparency, coherence, and iterative learning.

Integration and Cross-Sectoral Coherence

- **The MSP & MSFD Links Tool** connects environmental and planning data, bridging policy frameworks and supporting the ecosystem-based approach. It exemplifies how smart data flows can ensure consistency between spatial allocations and Good Environmental Status (GES) objectives.
- **The Cumulative Impact Assessment Tool** applies standardised geoprocessing and validation methods to integrate datasets on human uses, environmental pressures, and ecosystem components. By automating and harmonising workflows, it sets a model for AI-ready, cost-effective environmental analytics.
- **The Ecosystem Services Tool** translates ecological complexity into spatially explicit indicators of service supply, capacity, and condition, linking environmental knowledge with socio-economic and spatial decision-making.

Socio-Economic and Governance Intelligence

- **The Socio-economic tool (MSP-SEC)** expands MSP's analytical scope by quantifying how maritime sectors contribute to employment, production value, and GVA. It integrates economic data with spatial information to capture direct, indirect, and induced effects—bridging blue economy evidence with spatial planning needs.
- **The Governance Tool (MSP-GOV)** introduces a data-based approach to evaluating coordination effectiveness. By combining institutional and spatial information, it generates indicators of governance performance and coherence, supporting continuous improvement and adaptive governance.

Spatial Integration and Safety

- **The Conservation (In)compatibility Tool** ensures that biodiversity and protection objectives are embedded in MSP by identifying spatial overlaps and compatibilities between maritime uses and Marine Protected Areas (MPAs).
- **The Navigation Safety Tool (NaviSafe)** provides a harmonised spatial risk assessment framework that integrates hydrographic, traffic, and use data, ensuring that safety of navigation is systematically considered in spatial planning.
- **The Land–Sea Interactions Tool** bridges the terrestrial and marine domains, identifying functional linkages and dependencies between coastal and maritime activities, and promoting integrated land–sea governance.

2. EXPLORE THE POTENTIAL CREATION OF A EUROPEAN MSP AGENCY

Maritime Spatial Planning (MSP) plays a central role within the EU's ocean governance framework. Its cross-cutting nature makes it not only a tool for organising maritime uses but also an enabling mechanism for achieving broader European policy objectives — including environmental protection, renewable energy deployment, sustainable blue economy growth, and climate resilience.

Over the past decade, EU Member States have made significant progress in MSP implementation, supported by common directives, technical groups, and platforms such as EMODnet, the MSP Platform, and the Member States Expert Group (MSEG). However, as MSP evolves into a mature and data-driven policy area, institutional fragmentation and permanent structures at EU level hinder its long-term continuity, knowledge capitalisation, and cross-sectoral coordination.

ReMAP recommends exploring the creation of a dedicated European body or agency to strengthen MSP governance, coherence, and institutional capacity. Such a structure could ensure continuity, provide technical support to Member States, identify emerging needs, and promote integrated action across environmental, economic, and spatial planning policies.

What — Key Recommended Actions

- **Assessment of existing coordination gaps** between Member States, EU bodies, and sea-basin initiatives to identify where stronger institutional mechanisms are required.
- **Identification of potential functions and mandates** for a European MSP Agency, including data integration, knowledge management, capacity building, and coordination of cross-border projects.
- **Analysis of existing institutional models** in other policy domains (e.g. EMSA for maritime safety, EEA for environment, ACER for energy) to identify transferable governance best practices.
- **Stakeholder consultations** with Member States, EU institutions, regional sea conventions, and sectoral organisations to define possible governance scenarios and operational structures.
- **Pilot assessment** of costs, benefits, and added value of an MSP Agency, focusing on efficiency, policy coherence, and support for Member State implementation.
- **Review of legal and financial feasibility** under existing EU frameworks, including potential synergies with the Common European Data Space for the Ocean and the Green Deal governance mechanisms.

When

Short to mid term (1–5 years)

A **phased approach** is recommended: beginning with a **pilot study** assessing institutional gaps and opportunities (1–2 years), followed by consultations and feasibility assessments leading to a proposal

or concept note for an MSP Agency (3–5 years). This timeline aligns with the upcoming **revision of the MSP Directive** and ongoing work on EU ocean governance reform.

How — Implementation Pathways

Governance and coordination

- Propose a **study** to evaluate institutional options, building on evidence from existing coordination bodies and sea-basin strategies.
- Use the **Member States Expert Group on MSP (MSEG MSP)** and the **Technical Expert Group on MSP Data (TEG)** as key consultation fora to assess governance needs and collect stakeholder input.
- Establish a **multi-level working group** including regional sea conventions, sea basin strategies and initiatives, agencies, and DGs (e.g. ENV, ENER, CLIMA, MOVE) to define potential roles, interfaces, and shared functions.
- Promote **cross-sectoral governance pilots**, for example linking MSP with offshore renewables, ecosystem restoration, and nature-based solutions, to test the benefits of a more permanent coordination structure.

Knowledge exchange and capacity building

- Maintain and enhance the **knowledge hub "European Maritime Spatial Planning Platform"** under the proposed agency to centralise data and lessons learned from EU, national and local MSP practices.
- Developing a tool to integrate the outputs of ReMAP and other related projects into a **unified multi-toolkit environment**, enhancing interoperability and promoting the coordinated use of analytical instruments to support comprehensive maritime spatial planning.
- Organise **peer-learning workshops and regional training** to strengthen institutional capacity and share methodologies for integrated ocean governance.
- Promote **joint monitoring and reporting** mechanisms across directives and Regulaments (e.g. MSFD, MSPD, CFP, WFD) to enhance coherence and reduce administrative burden.

Analytical and technical foundations

- Conduct **cost–benefit and feasibility analyses** of different governance models (e.g. agency, coordination unit, extended MSP Platform).
- Use ReMAP analytical tools (see below) to **identify coordination needs, governance gaps, and cross-sectoral linkages** that could guide the design of the agency's functions.
- Align potential institutional roles with **EU data and knowledge infrastructures** (e.g. EMODnet, Copernicus, WISE-Marine) to ensure complementarity and avoid duplication.

Useful ReMAP Outputs

ReMAP provides a rich portfolio of analytical and governance tools that collectively demonstrate how a coordinated, European-level approach to Maritime Spatial Planning (MSP) could operate in practice. The project's outputs reveal how shared methodologies, interoperable data systems, and cross-sectoral tools can strengthen the institutional and technical foundations necessary for a potential MSP Agency. Together, these instruments illustrate how **evidence-based, data-driven, and multi-level coordination** can be achieved, supporting the transition from fragmented implementation to a more coherent and integrated European MSP framework.

- **MSP Governance Tool (MSP-GOV)** – provides a structured framework to assess coordination effectiveness across institutions, sectors, and governance levels. It identifies where cooperation mechanisms are strong or weak, supporting the diagnosis of institutional gaps that a future MSP Agency could address.
- **MSP & MSFD Links Tool** – exemplifies cross-policy coordination, showing how MSP and environmental frameworks can be operationally connected through shared data and analytical processes. This integration model could guide the agency's role in aligning planning with environmental objectives and regulatory compliance.
- **Conservation (In)compatibility Tool** – offers a transparent mechanism to analyse interactions between maritime uses and protected areas, reinforcing the need for an institutional body capable of ensuring coherence between economic development and biodiversity goals.
- **MSP-Input and MSP-Output Data Tools** – provide harmonised frameworks for assessing the quality, completeness, and interoperability of MSP data, offering a model for centralised data management and reporting at EU level. These tools demonstrate how an MSP Agency could maintain shared standards and ensure data comparability across Member States and sea basins.
- **Socio-economic Tool (MSP-SEC)** – delivers spatially explicit socio-economic indicators (employment, GVA, production value), enabling assessment of how maritime sectors contribute to the blue economy. Such capacity could inform the agency's mandate to monitor socio-economic performance and ensure balanced, inclusive maritime development.
- **Cumulative Impact Assessment (CIA) and Ecosystem Services Tools** – provide complementary frameworks to quantify and visualise cumulative pressures, ecosystem service capacity, and trade-offs between uses. Their methodologies could be standardised and integrated under an agency-led approach to improve environmental assessment coherence across Europe.

The development of a **multi-toolkit integration environment**, linking ReMAP outputs with other EU-funded MSP and marine data projects, would be a natural next step. Such an integrated platform could

serve as the **technical backbone** for a future MSP Agency, ensuring interoperability between analytical systems, facilitating joint planning, and promoting the consistent use of data and tools across sea basins and governance levels.

3. MAKE THE MSP HUMAN DIMENSION OPERATIONAL

The Maritime Spatial Planning (MSP) Directive mandates the application of an ecosystem-based approach, which requires integrating environmental, economic, social, and cultural dimensions into planning and management. While significant progress has been achieved in environmental and sectoral (economic) aspects, the broader human dimension — encompassing how people, communities, and institutions interact with maritime space — remains only partially operationalised.

To ensure that MSP contributes to sustainable blue growth and to the well-being and resilience of coastal societies, planners must be able to measure, analyse, and visualise how maritime activities affect and depend on human systems. This includes understanding the economic performance, social dynamics, cultural heritage, and institutional capacity that shape marine space governance.

ReMAP recommends advancing the development of analytical tools and datasets that make the human dimension of MSP — including the economy — operational, enabling more inclusive, evidence-based, and adaptive maritime planning across Europe.

What — Key Recommended Actions

The human dimension of MSP encompasses the social, economic, cultural, and institutional factors that determine how maritime space is used, governed, and valued. Making this dimension operational requires moving from abstract consideration to measurable, evidence-based analysis capable of informing planning decisions and monitoring societal outcomes.

- **Expanding the scope of MSP data frameworks** to systematically include social and economic variables such as employment, income distribution, gender balance, cultural heritage, and local dependency on maritime sectors. This ensures that MSP outcomes reflect both economic performance and social well-being.
- **Identifying and refining indicators** that capture not only economic growth but also blue justice such as equity, inclusiveness, and resilience — for example, indicators of coastal community vulnerability, access to maritime resources, or the distribution of Blue Economy benefits across regions.
- **Integrating social sciences and humanities** into the MSP evidence base by incorporating qualitative and participatory data alongside quantitative indicators. Understanding perceptions,

values, and cultural identities linked to the sea is essential for designing socially accepted and context-sensitive plans.

- **Enhancing the geographical representation of this information**, ensuring that socio-economic, cultural, and institutional data are not only collected but also visualised through spatial layers and maps. This spatialisation of human-dimension data allows planners to detect patterns of dependency, inequality, and opportunity across maritime and coastal regions, and to translate complex interactions into actionable spatial intelligence.
- **Leveraging technological innovations** — including Artificial Intelligence, machine learning, and Digital Twins — to simulate socio-economic and cultural dynamics, anticipate spatial trade-offs, and assess cumulative social impacts of planning decisions.
- **Making use of georeferenced socio-economic information** to reveal spatial patterns of dependency and opportunity, connecting maritime activities with land-based livelihoods, port economies, and service industries. This spatialisation of social and economic data transforms them into actionable intelligence for planners and decision-makers.
- **Encouraging participatory and co-creation approaches**, where local and coastal communities, sectoral representatives, and civil society contribute to data collection, validation, and interpretation. This helps ensure that MSP reflects the diversity of societal interests and values connected to the marine environment.
- **Using existing dissemination platforms** (e.g. the EU MSP Platform, EMODnet, EU Blue Economy Observatory) to maximise visibility, foster collaboration, and ensure continuous feedback between data providers, planners, and end users. Use the platforms to facilitate and support participatory processes and structured dialogues about the present and future goals for the marine and maritime spaces.
- **Ensuring alignment with EU strategies** such as the European Green Deal, the Sustainable Blue Economy Strategy, and the EU Pillar of Social Rights — so that MSP becomes a driver for equitable, inclusive, and resilient maritime development.

When

Short term (1–3 years)

A continued and iterative process is recommended, adaptable to emerging needs and technological progress. Early actions should align with **EU initiatives on the Digital Ocean, the Blue Economy Observatory, and the European Data Spaces**, ensuring coherence between social, economic, and environmental data flows.

How — Implementation Pathways

Governance and Coordination

- Activate and expand the **Technical Expert Group (TEG) Subgroups on Digital Twins and Socio-Economics** to guide coordinated development of human-dimension tools and indicators.
- Foster collaboration between **MSP authorities, statistical agencies, social scientists, and blue economy experts** to harmonise data and methodologies across Member States.
- Promote inter-basin cooperation and peer learning on how to integrate social, economic, and institutional indicators into MSP monitoring frameworks.
- Create connections with existing scientific and advisory products (e.g. Ecosystem Overviews from the International Council for the Exploration of the Sea)

Funding and Support Mechanisms

- Mobilise **dedicated funding** under Horizon Europe, EMFAF, and Digital Europe to develop and test new socio-economic and cultural assessment tools.
- Support **pilot projects** that analyse local dependencies on maritime sectors, socio-economic vulnerabilities, and community adaptation to spatial changes.
- Expand **EMODnet Human Activities** with new datasets on employment, income, tourism, cultural heritage, and recreation, reinforcing the evidence base for the human and economic dimensions of MSP.

Knowledge Exchange and Dissemination

- Integrate ReMAP outputs and methodologies into broader EU knowledge frameworks using **open repositories** and the **EU MSP Platform**.
- Promote **participatory approaches** and **stakeholder validation**, ensuring that social and economic indicators reflect lived realities and sectoral experiences.
- Develop **capacity-building materials and training** to strengthen planners' ability to analyse socio-economic data and translate them into actionable MSP decisions.

Useful ReMAP Outputs

ReMAP provides a comprehensive set of tools that collectively contribute to making the **human dimension of MSP — including its economic, social, cultural, and institutional components — operational**. Each module, while addressing a specific aspect of maritime planning, feeds into a wider framework that links people, economy, governance, and environment in a coherent, evidence-based, and spatially explicit way. Further developments on the human dimension could be addressed through these tools, in particular:

Understanding Human and Economic Dimensions

- **Socio-Economic Tool (MSP-SEC)** – the cornerstone of the human dimension, this tool quantifies the economic and social contributions of maritime sectors to regional and national development. It estimates direct, indirect, and induced effects on employment, production value, and Gross

Value Added (GVA), providing spatially explicit insights into how the Blue Economy supports communities and livelihoods. It also helps visualise where economic dependencies are strongest, offering evidence for socially balanced and inclusive MSP decisions.

- **Ecosystem Services Tool** – complements socio-economic assessments by linking ecological capacity to human well-being and economic benefit. It identifies where marine ecosystems provide key services such as carbon sequestration or coastal protection, thus highlighting the environmental foundations of societal and economic resilience.
- **Cumulative Impact Assessment (CIA)** – supports understanding of how multiple human activities collectively affect both ecosystems and the socio-economic systems that depend on them. It enables planners to evaluate trade-offs between uses and to design management measures that minimise socio-environmental risks to coastal communities and maritime sectors.

Governance, Participation and Institutional Capacity

- **Governance Assessment Tool (MSP-GOV)** – directly addresses the institutional and governance dimension of MSP, evaluating coordination effectiveness across administrative levels, sectors, and borders. It provides indicators on how well governance structures support inclusive participation, policy coherence, and multi-level decision-making — all fundamental to a socially responsive and adaptive MSP framework.
- **MSP & MSFD Links Tool** – strengthens the connection between environmental policy and human objectives by aligning MSP decisions with Good Environmental Status (GES) targets. By visualising the spatial relationship between human uses and environmental quality, it allows for evidence-based assessment of how planning choices affect both ecological integrity and socio-economic sustainability.
- **Conservation (In)compatibility Tool** – provides a data-driven framework to balance marine protection and human use. By identifying spatial overlaps and compatibilities between maritime activities and Marine Protected Areas (MPAs), it ensures that conservation policies remain socially and economically viable while maintaining ecosystem integrity.

Spatial Integration and Human Connectivity

- **Land–Sea Interactions (LSI) Tool** – bridges terrestrial and marine systems, revealing the social, cultural, and economic dependencies that connect coastal communities to maritime activities. It allows visualising how decisions made at sea influence coastal livelihoods, tourism, or port economies, making it a key enabler for understanding the geographical and functional interdependencies at the core of the human dimension.
- **Navigation Safety Tool (NaviSafe)** – addresses the human dimension of safety, one of the most tangible social concerns in maritime areas. By identifying zones of navigational risk and potential

conflicts between uses, it contributes to safer working environments and more resilient maritime operations, directly benefiting people and industries dependent on maritime mobility.

- **MSP-Input and MSP-Output Data Tools** – provide the analytical backbone for integrating all these human-related datasets. The MSP-Input tool ensures that data used in socio-economic, cultural, and governance analyses are high-quality, interoperable, and fit-for-purpose, while the MSP-Output tool harmonises spatial representations of plans across Member States, allowing for consistent monitoring and comparison of human and economic impacts.

5. CONCLUSIONS

ReMAP demonstrates how harmonised data, interoperable infrastructures, and analytical tools can strengthen the implementation and revision of Maritime Spatial Planning (MSP) across Europe. By linking scientific evidence with practical needs, it contributes to more transparent, coordinated, and informed planning processes.

The ten tools developed under ReMAP are already operational and provide concrete support for analysing environmental, socio-economic, and governance dimensions of MSP. At the same time, they offer a solid basis for further development as new data, methods, and policy priorities emerge.

From Data-Effective to Data-Smart MSP

ReMAP tools show how MSP can evolve from being data-intensive to truly **data-smart**, transforming information into actionable intelligence. The **MSP-Input** and **MSP-Output** tools establish robust data foundations and harmonise plan outputs across Member States, while the **Cumulative Impact Assessment**, **Ecosystem Services**, and **MSP & MSFD Links** modules exemplify how standardised and AI-ready workflows can support interoperability, comparability, and automation. Together, they demonstrate how digital infrastructures can enhance efficiency, scalability, and transparency in MSP implementation.

Building Institutional Coherence and Governance Capacity

The project's tools reinforce the **governance and institutional dimensions** of MSP. The **MSP-GOV Tool** offers a structured framework to evaluate coordination and policy coherence across sectors and governance levels, supporting more effective plan implementation. Complementary tools such as **Conservation (In)compatibility** and **MSP & MSFD Links** illustrate the need for stronger alignment

between environmental and spatial planning objectives, fostering policy coherence, accountability, and cross-border collaboration across Europe's marine regions.

Operationalising the Human Dimension

ReMAP operationalises the **human dimension of MSP** by integrating social, economic, cultural, and institutional perspectives into spatial decision-making. The **Socio-Economic Tool (MSP-SEC)** quantifies how maritime sectors contribute to employment, income, and Gross Value Added (GVA), while the **Land–Sea Interactions** and **Navigation Safety** tools reveal how maritime activities influence coastal livelihoods, safety, and development. The **Ecosystem Services** and **CIA** tools link human well-being with ecosystem integrity, ensuring that MSP remains both socially inclusive and environmentally sound.

Integrated Impact

Together, the ReMAP tools:

- Promote **interoperability and standardisation** across Member States and sea basins, ensuring comparability and coherence.
- Bridge **data, governance, and society**, connecting environmental, socio-economic, and institutional evidence into a unified analytical ecosystem.
- Enable **multi-purpose and multi-scale analyses**, allowing planners to evaluate trade-offs, synergies, and spatial dependencies across sectors.
- Foster **transparency, participation, and accessibility**, turning complex data into clear, actionable insights for policymakers and stakeholders.
- Provide the methodological basis for **adaptive, human-centred, and ecosystem-based MSP**, where knowledge flows across governance levels and informs iterative decision-making.

By turning complex information into accessible knowledge, the ReMAP Roadmap promotes more efficient and evidence-based decision-making. It helps reduce uncertainty, supports cross-border cooperation, and fosters coherence between environmental, social, and economic objectives.

The outcomes of ReMAP mark a step forward in **data-driven and adaptive maritime governance**. Building on this foundation through continued collaboration, standardisation, and capacity building will

be key to ensuring lasting impact and to advancing more coherent and sustainable MSP practice in Europe.

As a synthesis of the project's main outputs, this deliverable provides a practical reference for how the ReMAP tools can be applied and combined in real planning contexts. It illustrates their potential to inform decision-making, support monitoring and evaluation, and encourage the continued exchange of methods and experiences among Member States — ensuring that the progress achieved through ReMAP can be consolidated and expanded in future MSP cycles.

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7. ANNEXES

7.1. ANNEX I : COMPILATION OF POLICY RECOMMENDATIONS

The literature review conducted in the field of Maritime Spatial Planning (MSP) resulted in the compilation of **211 recommendations**. These recommendations were classified according to two main criteria: (i) their relevance to the project's topics and objectives, and (ii) their level of detail, with level 1 representing the highest and level 3 the lowest degree of specificity.

7.1.1. RECOMMENDATIONS REGARDING DATA MANAGEMENT

Num.	Relevance	Recommendations on data management
1	1	Establish common protocols and sharing methods for data collection across countries to ensure consistency, comparability, and interoperability of MSP-related information at both national and international levels
2	1	Enhance accessibility through user-friendly databases and multilingual metadata to enable planners, policymakers, and stakeholders to efficiently retrieve and use relevant data in decision-making processes
3	1	Ensure data reliability through accuracy measures and verified sources to strengthen accountability in MSP analyses
4	1	Improve data management through knowledge sharing and collaboration among policymakers and maritime administrations to foster coordinated approaches, mutual learning, and the effective use of existing information across governance levels
5	1	Strengthen the implementation of MSP data recommendations by engaging expert groups, such as CINEA and DG MARE's Technical Expert Group (TEG), to address specific research needs and support harmonised practices
6	1	Utilise the best available data and tools in MSP by organising and integrating existing datasets into centralised systems, ensuring transparency on data sources, adopting relevant EU instruments such as the INSPIRE Directive, and incorporating both expert and local, stakeholder-derived information to support informed, place- and time-sensitive decision-making
7	1	Integrate land-based nutrient load data into spatial allocation within the MSP processes. While the MSP may acknowledge the importance of nutrient reduction for marine environmental objectives, the direct integration of land-based nutrient load data into site selection or spatial allocation decisions is generally lacking.
8	1	Strengthening the role of one existing local agency to act as a central coordinating body, addressing the overlapping responsibilities and coordination challenges between institutions. This could be complemented by measures such as harmonizing reporting requirements and establishing a unified environmental monitoring platform to improve data integration. In addition, clarifying the distribution of funding responsibilities among competent authorities would enable a single point of contact to address sectoral policy issues, such as environmentally harmful subsidies.

Num.	Relevance	Recommendations on data management
9	1	Develop shared data platforms and harmonized indicators across directives (e.g., MSFD, WFD, RED III).
10	1	Lack of access to relevant data and poor data-sharing procedures is hampering the effective implementation of a range of marine policies. Data producers should be mandated to make their data open and accessible. This commitment should be extended beyond Member States' competent authorities and include, for example, wind farm developers who collect a vast array of data to comply with Environmental Impact Assessment (EIA) commitments but are not obliged to share these data. The European Marine Observation and Data Network provides an excellent platform for data sharing.
11	1	Increase the knowledge base on climate change impacts by collecting and analysing data on marine uses that are most vulnerable to climate-induced changes and that hold high socio-economic value for specific regions, while integrating considerations of their potential spatial relocation into the development of MSP scenarios to ensure adaptive and informed planning
12	2	Align coastal-marine eutrophication indicators and objectives.
13	2	Data & knowledge: Support the development of knowledge practices across policies, e.g. knowledge catalogues for the sharing of data, across policies at the national and EU level.
14	2	Develop mutually supportive indicators and integrated monitoring frameworks to support coherent assessments.
15	3	Improve the use of scientific data in fisheries decision-making.

7.1.2. Recommendations regarding governance

Num.	Relevance	Recommendations on governance
1	1	Promote adaptive planning processes by developing methods for long-term planning that can adapt to changing conditions, adopting adaptive planning approaches, and regularly updating mapping protocols to effectively respond to evolving environmental challenges
2	1	An evaluation of horizontal coherence may help identifying excessive burdens, overlaps, gaps, inconsistencies, implementation problems, and/or obsolete measures. An evaluation may also help identifying potential synergies across policies and policy areas that could be strengthened. This can improve the overall performance of policies.
3	1	Evaluate vertical coherence to assess how well policies are aligned between different governance levels. This may involve evaluating whether national policies are in line with the objectives of the European Green Deal, or whether certain national policies are consistent with the overarching environmental goals from the EU Climate Law, the proposed Nature Restoration Regulation, or the EU Directives. Vertical coherence can also be

Num.	Relevance	Recommendations on governance
		assessed at lower levels of governance, for example between municipality regulations and national policies.
4	1	Explore how exactly coherence across objectives and measures in design and implementation, and other factors, affects cross-compliance and how can the positive effects be amplified.
5	1	To ensure functionality of such a system for offshore wind power development would require maritime spatial plans to be legally binding with the capacity to integrate sectoral (energy, biodiversity) interests and with legal force to steer energy development away from biodiversity hot spots. Moreover, it would require making the Good Environmental Status objective of the MSFD legally binding.
6	1	Strengthen the role of the Oslofjord Council in ensuring representation among sectors and governance levels, and in increasing societal awareness by promoting understanding that coordinated action across the entire catchment is necessary to restore the fjord
7	1	Strengthening collaboration with local authorities, building local capacity through targeted training and knowledge-sharing, optimizing internal workflows, streamlining administrative procedures for project approval and funding, and forming public/private partnerships to supplement the workforce, are some of the actions that can address insufficient staffing levels.
8	1	A continuous system of funding is needed to ensure stable human resources and to fund research and capacity building. Ad hoc projects and initiatives are not enough to offer capacity-building activities and trainings to improve the competence framework of national and local authorities, but also more long-term institutional funds
9	1	Strengthening the role of one existing local agency to act as a central coordinating body, addressing the overlapping responsibilities and coordination challenges between institutions. This could be complemented by measures such as harmonizing reporting requirements and establishing a unified environmental monitoring platform to improve data integration. In addition, clarifying the distribution of funding responsibilities among competent authorities would enable a single point of contact to address sectoral policy issues, such as environmentally harmful subsidies.
10	1	Make the achievement of GES in the MSFD an obligation of result and introduce provisions in MSFD about new activities not undermining GES, as a parallel to the non-deterioration provision in the Water Framework Directive.
11	1	Mandate coherence assessments in national marine spatial plans using structured methodologies such as the CrossGov Policy Coherence Framework.
12	1	Shift policy implementation from payments for management practices to result-based approaches that reward performance in biodiversity improvement and pollution reduction.

Num.	Relevance	Recommendations on governance
13	1	Ensure equitable collaboration by enhancing representation, fostering learning and reflection, providing conflict-resolution procedures, and allocating resources for capacity building.
14	1	Fragmentation and mismatches between governance mechanisms and environmental issues are long-standing marine governance challenges. These challenges are likely to be exacerbated by Blue Growth and marine conservation and restoration commitments. To overcome them, the EU and Member States should seek to develop nested and multi-level marine governance arrangements, in full cooperation with regional and local actors. The Regional Seas Conventions are good examples of multi-level arrangements but are limited in focus. The introduction of regional seas marine spatial planning presents an opportunity to build multi-level governance institutions that encompass the full range of marine activities. A nested approach to Marine Spatial Planning should include regional sea coordination, national planning and the development of plans for intensely used marine areas (see for example, the sub-national marine plans being developed in Ireland). Ensuring coherence across the various scales of marine governance will reduce the likelihood of barriers arising from fragmentation and scalar mismatches
15	1	Foster new behaviours and social norms within local communities to enhance knowledge and skills on opportunities for sustainable mitigation and adaptation options, intensify sharing of good practice approaches and contribute to more active involvement in co-management actions
16	1	Analyse governance challenges and associated enablers in a systemic and context-specific way to enhance coherence and integration in ocean governance while promoting informed decision-making across sectors and planning authorities
17	1	Establish clear mandates and assess capacity needs by determining the human, financial, and institutional resources required, identifying appropriate integrative forums, processes, and advisory bodies, and ensuring alignment with institutional and geographical specificities
18	1	Develop a communication strategy by combining formal and informal channels, establishing clear feedback mechanisms, and ensuring that stakeholders understand how their contributions are considered throughout MSP planning and implementation to ensure a transparent planning process
19	1	Strengthen engagement strategies by considering the different roles and needs of stakeholders, enabling knowledge co-creation and social learning, and clearly defining when and how each stakeholder can participate in planning and decision-making
20	1	Utilise existing regional and international institutional frameworks as starting points and potential nodes to support cross-basin cooperation, enabling structured engagement and coordination among relevant authorities

Num.	Relevance	Recommendations on governance
21	1	Promote collaboration focused on specific tasks or common agreed problems to strengthen collective capacity, encourage institutional interaction, and build shared learning mechanisms for addressing governance challenges
22	1	Design and support collaborative projects that enhance institutional connectivity, promote capacity-building, and create sustained opportunities for joint learning to effectively tackle increasingly complex issues in marine governance
23	1	Foster long-term cross-border MSP frameworks such as the Common Future Vision for the German–Polish Interaction Area – Horizon 2030, which demonstrate how shared objectives for tourism, energy, and economic clusters can strengthen land–sea integration and coordinated blue growth across borders.
24	1	Encourage joint MSP structures between neighbouring states to ensure that planning and licensing decisions on both sides of the border are coherent, avoiding fragmented development in connected marine spaces like the Baltic Sea.
25	1	Institutionalize vertical coordination mechanisms between national authorities and local stakeholders (municipalities, port authorities, mariculture, tourism, conservation actors) to ensure that local priorities inform national MSP objectives and vice versa.
26	1	Sustain participatory governance beyond project cycles by turning temporary dialogue platforms (like those in Shape, Adriplan, and SUPREME) into permanent arenas for cooperation, preserving institutional learning and engagement capacity.
27	1	Adopt destination-specific management of cruise tourism — as in Dubrovnik's visitor limits — to protect heritage sites and maintain quality of life for residents, demonstrating how MSP can integrate tourism carrying capacity considerations.
28	2	Ensure policy coherence by aligning MSP plans and legal requirements among countries, empowering sea basin strategies, and aligning MSP plans with existing assessments and policies
29	2	Encourage collaboration by promoting coordination across and within sea basins, establishing inclusive governance mechanisms, and simplifying licensing processes
30	2	Promote coherence between MSP and other relevant policies and planning processes by aligning maritime spatial plans with integrated coastal management practices, EU and national regulations, and regional sea conventions, and by considering administrative simplifications where applicable
31	2	Stronger steering from the Commission towards more effective and coherent implementation of fragmented legislation on marine biodiversity protection: The Commission must use enforcement action on substantive legal aspects of the Directive and intervene more firmly on the excessive use of exemptions for both MSFD and WFD

Num.	Relevance	Recommendations on governance
32	2	Continued effort is needed to strengthen the effect of EU legislation on mitigating agricultural nutrient pollution, including enforcement action: The Commission should follow up on the Nitrate Directive enforcement, beginning with insufficient measures taken by Member States, and take decisive action on the WFD and the MSFD.
33	2	More support for the establishment of protected areas and ensuring their effectiveness: the Commission should be more involved in the process of shaping joint recommendations with the aim of avoiding rejection without risking weak restrictions.
34	2	Application of the Polluter Pays Principle through a result-based approach in the implementation of CAP: the Commission should restrain CAP funds from being used to finance what should be paid by the polluter, especially in areas where water bodies are failing to achieve good status due to nutrient loading.
35	2	Strengthening the role of the MSFD in offshore wind power development: use maritime spatial planning to establish 'go to' and 'no go' areas for wind power and to conduct biophysical impact assessments to match these designations
36	2	To meet the objectives of the European Green Deal, the European Commission must strengthen coherence between environmental and sectoral policies, especially through better enforcement and integration of directives such as the MSFD, WFD, CAP and CFP. This will be essential for protecting marine biodiversity, reducing pollution, and fostering sustainable growth. By focusing on strategic enforcement, aligning sectoral policies, and promoting result-based approaches, the EU can advance toward its 2030 and 2050 goals.
37	2	Linking RBMP and MAs helps to address marine nutrient reduction.
38	2	There are synergistic objectives in the RBMPs and IOMP (MSFD).
39	2	Establish coordinating agencies (e.g. ISPRA, ARPAs) responsible for integrating MSFD, WFD, and MSP governance.
40	2	Create a consultative governance body for the French Mediterranean coast to support synergies in the operational implementation of the WFD, the MSFD, and the MSPD
41	2	Assign ELY Centres a central role in freshwater management (RBMP) and as key regional actors in marine strategy implementation (MaS).
42	2	Strengthen interactions across the land-sea interface between the WFD and MSFD through clearer legal requirements, alignment of management units and institutional cooperation.
43	2	Establish inter-agency coordination platforms for joint planning and permitting.
44	2	Apply coherence-sensitive criteria in EMFAF funding allocations.
45	2	Establish joint governance platforms between fisheries and environmental authorities.

Num.	Relevance	Recommendations on governance
46	2	Encourage integrated national strategies, as seen in France's alignment of its biodiversity, blue economy, and other ambitions in its spatial plan.
47	2	Align CAP conditionalities with the environmental objectives of the WFD and MSFD. Strengthen enforcement and spatial coverage of the Nitrates Directive to reduce nutrient pollution from agriculture.
48	2	Improve cross-compliance mechanisms to ensure that agricultural subsidies do not undermine environmental goals.
49	2	Integrate binding restoration targets from the Nature Restoration Regulation into MSFD Programmes of Measures and marine spatial plans.
50	2	Align planning and reporting cycles across directives to reduce administrative burdens and improve coordination.
51	2	Support integrated land–sea planning and cross-sectoral coordination at regional and local levels.
52	2	Introduce coherence criteria into EU funding instruments to reward integrated, sustainability-oriented projects.
53	2	Align fisheries and agricultural subsidies with marine environmental objectives and coherence goals.
54	2	Establish interministerial and interagency coordination platforms to align sectoral interests and resolve spatial conflicts.
55	2	Support long-term science–policy–society interfaces to facilitate knowledge co development, integration into policies, and mutual learning.
56	2	Fund interdisciplinary research on coherence analysis and governance innovation
57	2	Demonstrate coherence-sensitive policy reform through the Ocean Act and revisions of the MSFD, MSPD and CFP.
58	2	Promote best practices in coherence through regional sea conventions (e.g., HELCOM, OSPAR, UNEP-MAP).
59	2	Strengthen coherence between environmental and sectoral economic policies, especially by improving enforcement and integration of the MSFD, WFD, CAP, and CFP.
60	2	Apply the polluter pays principle consistently across the Oceans Pact framework.
61	2	Promote inclusive participation throughout the decision-making process, from problem framing to co-creation of solutions.
62	2	Increase use of foresight tools to establish a clear and shared sense of direction.
63	2	Expand the use of digital tools to improve understanding of marine issues, participation, and decision-making.
64	2	Support inter- and transdisciplinary research and ensure continued funding for such projects.
65	2	Establish permanent platforms for exchanging knowledge between disciplines and societal actors.

Num.	Relevance	Recommendations on governance
66	2	Facilitate the establishment of interdisciplinary MSP networks that bring together diverse expertise to develop climate-smart and nature-inclusive design frameworks for ocean planning
67	2	Implement practical adaptation and mitigation strategies at appropriate spatial and operational scales using fit-for-purpose, spatially explicit, and operationally mature nature-based solutions
68	2	Conduct a governance assessment early in the MSP process to provide an overview of current governance arrangements, highlight suitability for participatory planning, and identify where strengthening is needed to support effective planning and implementation
69	3	Foster inter-level cooperation by prioritising strategic resolutions, proactively addressing conflicts, strengthening social participation, and supporting consensus-building in MSP decision-making
70	3	Enhance the effectiveness and resilience of MSP initiatives by setting clear objectives, maintaining resources, and adopting a forward-thinking approach to MSP planning
71	3	Ensure complementarity between WFD and MSFD objectives.
72	3	Align WFD and MSFD objectives, mainly regarding biodiversity.
73	3	Integrate WFD and MSFD objectives within the MSP framework
74	3	There is a mandatory alignment between the Façade Strategic Document (MSFD + MSPD) measures and the SDAGE (RBMP) objectives
75	3	Develop a single strategic framework aligning the requirements of MSFD and MSP.
76	3	Establish a single strategic framework aligning the requirements of MSFD and MSP.
77	3	Transpose WFD and MSFD into Finnish legislation within the same act.
78	3	Implement integrated coastal and marine monitoring.
79	3	Use the Oslofjord Plan as a positive example of institutional layering that enhances coherence across planning instruments.
80	3	Promote multidisciplinary expertise in freshwater and marine domains among Water Agencies (RBMP) civil servants.
81	3	Ensure national coordination for WFD and IOMP (MSFD*) under the responsibility of the same governmental organization
82	3	Engage environmental agencies (e.g. ARPA and ISPRA), together with universities and research institutions, acting not only as knowledge providers and policy advisors but also as knowledge brokers and boundary organizations
83	3	Funding & resources: Ensure institutional long-term funds to SPS actors and fund specific research projects to improve SPS functioning (e.g. through Horizon Europe).
84	3	Strengthen legal interactions between the Habitats Directive, Birds Directive, MSFD, WFD, NRR and MSPD.
85	3	Embed restoration targets from the NRR into marine spatial planning and MSFD objectives and Programmes of Measures.

Num.	Relevance	Recommendations on governance
86	3	Enhance coordination between national and sub-national coastal and marine authorities.
87	3	Improve coordination between freshwater and marine authorities to reduce duplication and enhance implementation efficiency.
88	3	Strengthen the design and enforcement of MPAs and Other Effective Area-Based Conservation Measures (OECMs), such as Fisheries Restricted Areas, and improve engagement of the fishery sector in their co-management.
89	3	Ensure that biodiversity areas (MPAs, Natura 2000 etc.) are integrated into the marine spatial plan.
90	3	Use coherence as a benchmark in international negotiations and partnerships, reinforcing the EU's role as a global leader in integrated ocean governance
91	3	Reduce or eliminate excessive use of exemptions in directives protecting marine biodiversity.
92	3	Establish coordination mechanisms and platforms to enhance collaboration.
93	3	Build mutual trust, understanding, and shared commitment among actors as the foundation for effective collaboration.
94	3	Secure strategic investments that allow the achievement of long-term visions reflected in climate-smart and nature-inclusive spatial plans

7.1.3. Recommendations regarding Ecosystem and biodiversity conservation

Num.	Relevance	Recommendations on ecosystem and biodiversity conservation
1	1	Promote understanding of spatial-temporal and environmental patterns through updated ecosystem component maps and advanced modelling approaches to support long-term planning, scenario analysis, and adaptive management strategies in MSP
2	1	Establish consistent global definitions and standards for Marine Protected Areas (MPAs) while tailoring protection levels to regional conservation objectives to strengthen the resilience and effectiveness of marine biodiversity protection measures
3	1	Promote comprehensive environmental assessments, including Cumulative Effects Assessment (CEA) and evaluation of Ecosystem Services (ES), supported by centralised data repositories, expert inputs, and integrated analyses to better predict long-term impacts and inform sustainable maritime activities
4	1	Continued effort is needed to strengthen the effect of EU legislation on mitigating agricultural nutrient pollution, including enforcement action: The Commission should follow up on the Nitrate Directive

Num.	Relevance	Recommendations on ecosystem and biodiversity conservation
		enforcement, beginning with insufficient measures taken by Member States, and take decisive action on the WFD and the MSFD.
5	1	Application of the Polluter Pays Principle through a result-based approach in the implementation of CAP: the Commission should restrain CAP funds from being used to finance what should be paid by the polluter, especially in areas where water bodies are failing to achieve good status due to nutrient loading.
6	1	To ensure functionality of such a system for offshore wind power development would require maritime spatial plans to be legally binding with the capacity to integrate sectoral (energy, biodiversity) interests and with legal force to steer energy development away from biodiversity hot spots. Moreover, it would require making the Good Environmental Status objective of the MSFD legally binding.
7	1	Reinforce the obligation in MSPD to contribute to achieving Good Environmental Status as defined in MSFD. Environmental assessments towards that end, adapted to different types of marine spatial plans, should be required.
8	1	Make the Good Environmental Status (GES) objective enforceable by clarifying legal expectations for Member States and linking compliance to planning and authorization of offshore activities and land-based pollution sources.
9	1	Promote mechanisms to ensure timely and full implementation of marine biodiversity conservation and restoration obligations (e.g., completing the marine Natura 2000 network, establishing MPAs under the MSFD, implementing the Nature Restoration Law).
10	1	Balance economic and environmental goals by maintaining siting rules (e.g., minimum distances from the coast) that protect seascape quality and local tourism, showing how MSP can mediate between renewable energy expansion and coastal values.
11	1	Adopt destination-specific management of cruise tourism — as in Dubrovnik's visitor limits — to protect heritage sites and maintain quality of life for residents, demonstrating how MSP can integrate tourism carrying capacity considerations.
12	1	Apply value chain analysis to tourism sectors to reveal who benefits and who bears the costs of cruise activity, and use this insight to design policies that distribute economic gains more evenly while addressing environmental pressures (waste, air quality, congestion).
13	2	Integrate diverse forms of local and societal knowledge into MSP decision-making to enhance understanding and awareness of socio-ecological systems
14	2	Align MSP objectives with the MSFD and ecosystem-based approaches to ensure coherence between environmental protection goals and maritime spatial planning

Num.	Relevance	Recommendations on ecosystem and biodiversity conservation
15	2	Actively involve stakeholders in the designation and management of MPAs to foster community engagement, shared ownership, and collaboration in the implementation of conservation measures within MSP frameworks
16	2	Integrate an ecosystem-based approach in MSP by aligning environmental, social, and economic objectives, and by considering how ecosystem characteristics inform the design of sustainable activities within maritime spatial plans
17	2	Incorporate environmental, economic, social, and safety considerations into MSP by conducting strategic assessments, targeted impact analyses, and dedicated evaluations, ensuring that planning decisions integrate these dimensions
18	2	Stronger steering from the Commission towards more effective and coherent implementation of fragmented legislation on marine biodiversity protection: The Commission must use enforcement action on substantive legal aspects of the Directive and intervene more firmly on the excessive use of exemptions for both MSFD and WFD
19	2	More support for the establishment of protected areas and ensuring their effectiveness: the Commission should be more involved in the process of shaping joint recommendations with the aim of avoiding rejection without risking weak restrictions.
20	2	Strengthening the role of the MSFD in offshore wind power development: use maritime spatial planning to establish ‘go to’ and ‘no go’ areas for wind power and to conduct biophysical impact assessments to match these designations
21	2	Linking RBMP and MAs helps to address marine nutrient reduction.
22	2	Strengthen legal interactions between the Habitats Directive, Birds Directive, MSFD, WFD, NRR and MSPD.
23	2	Reinforce land-sea interactions in nitrogen management by incorporating requirements in the Nitrates Directive and WFD to consider nitrogen impacts on coastal waters.
24	2	Integrate biodiversity objectives early in marine spatial planning processes.
25	2	Avoid legal exemptions under RED III that bypass Environmental Impact Assessments in sensitive marine areas.
26	2	Embed biodiversity criteria into offshore wind energy tenders and promote nature-inclusive designs.
27	2	Harmonize environmental assessment methodologies across Member States.
28	2	Strengthen the design and enforcement of MPAs and Other Effective Area-Based Conservation Measures (OECMs), such as Fisheries Restricted Areas, and improve engagement of the fishery sector in their co-management.

Num.	Relevance	Recommendations on ecosystem and biodiversity conservation
29	2	Align CAP conditionalities with the environmental objectives of the WFD and MSFD. Strengthen enforcement and spatial coverage of the Nitrates Directive to reduce nutrient pollution from agriculture.
30	2	Make the achievement of GES in the MSFD an obligation of result and introduce provisions in MSFD about new activities not undermining GES, as a parallel to the non-deterioration provision in the Water Framework Directive.
31	2	Harmonize legal obligations across directives to ensure biodiversity and restoration goals are mainstreamed into sectoral policies, are enforceable, and carry equal legal weight.
32	2	Integrate binding restoration targets from the Nature Restoration Regulationinto MSFD Programmes of Measures and marine spatial plans.
33	2	Step up enforcement of key environmental directives to ensure protection of marine biodiversity and reduction of pollution.
34	2	Reduce or eliminate excessive use of exemptions in directives protecting marine biodiversity.
35	2	Shift policy implementation from payments for management practices to result-based approaches that reward performance in biodiversity improvement and pollution reduction.
36	2	Apply the polluter pays principle consistently across the Oceans Pact framework.
37	2	Combine understanding of environmental impacts with social and economic implications of climate change, particularly for communities highly dependent on marine resources for their livelihoods, to design adaptive, context-sensitive planning strategies
38	3	Ensure complementarity between WFD and MSFD objectives.
39	3	Align WFD and MSFD objectives, mainly regarding biodiversity.
40	3	Integrate WFD and MSFD objectives within the MSP framework
41	3	There is a mandatory alignment between the Façade Strategic Document (MSFD + MSPD) measures and the SDAGE (RBMP) objectives
42	3	There are synergistic objectives in the RBMPs and IOMP (MSFD).
43	3	Develop a single strategic framework aligning the requirements of MSFD and MSP.
44	3	Define measures taking into consideration environmental and economic interactions.
45	3	Define measures that consider both environmental and economic interactions.
46	3	Strengthen the legal and spatial alignment of the Nitrates Directive with marine and freshwater quality objectives.
47	3	Update the Nitrate Directive to include phosphorus discharges.
48	3	Align fisheries management plans with biodiversity conservation targets.

Num.	Relevance	Recommendations on ecosystem and biodiversity conservation
49	3	Promote agroecological practices and performance-based incentives in CAP to support biodiversity and water quality.
50	3	Sectoral policies should contribute to achieving the objectives of the MSFD, WFD and other environmental legislation.

7.1.4. Recommendations regarding Capacity building and stakeholder engagement

Num.	Relevance	Recommendations on Capacity building and stakeholder engagement
1	1	Enhance public awareness of MSP processes and outcomes by using diverse communication channels, presenting information in accessible language, sharing success stories and lessons learned, employing storytelling techniques, and maintaining online platforms to promote understanding and support
2	1	Invest in MSP capacity by allocating adequate human resources and information infrastructure at all governance levels, supporting reciprocal capacity-building efforts, professional training programs, upskilling initiatives, peer-to-peer knowledge sharing, and sustainable funding opportunities, while also implementing Decision Support Tools (DSTs)
3	1	Strengthen stakeholder engagement in MSP by establishing clear guidelines and reliable communication channels, focal points, and organising participatory activities that foster early involvement, transparency, trust, and the integration of diverse environmental, social, and economic perspectives into decision-making
4	1	Incorporate the temporal dimension into MSP by mapping both the spatial and temporal distribution of existing and future activities, analysing interactions among users and uses, and promoting multi-use approaches where appropriate
5	1	Promote early and inclusive stakeholder participation in MSP by engaging all relevant authorities, sector representatives, and the public from the earliest stages, using diverse participation methods, accommodating multiple interests and potential conflicts, and ensuring transparent access to finalised plans to strengthen legitimacy
6	1	Strengthening collaboration with local authorities, building local capacity through targeted training and knowledge-sharing, optimizing internal workflows, streamlining administrative procedures for project approval and funding, and forming publicprivate partnerships to supplement the workforce, are some of the actions that can address insufficient staffing levels.

Num.	Relevance	Recommendations on Capacity building and stakeholder engagement
7	1	Structured feedback channels, institutionalized mechanisms that systematically collect, process, and incorporate local input. For example, a regional maritime council with a formal process for reporting back to stakeholders on how their input shaped the final plan, digital platforms for submitting local concerns, and a reduction of administrative burden of policy and reporting for local stakeholders. These mechanisms would allow for continuous input, review, and adjustment of plans based on stakeholder feedback and new information. In addition, managers and people involved in the marine environments at the local level have emphasized the importance of strong political support, sufficient time, and open dialogue with civil society and businesses to ensure that the measures are accepted.
8	1	Stakeholder engagement can be deepened by involving more key NGOs. These organizations are often engaged in the MSFD and MSPD program of measure, bringing strong scientific expertise and maintaining good relationships with local populations. The role of key NGOs has been highlighted as essential in bridging the gap between state services which are often met with public scepticism, and local economic actors. NGOs also play a crucial role in raising awareness on the importance of environmental regulations.
9	1	Cross-cutting: Enhance a living practice of exchange of SPSI Best Practices and science-for-policy Ecosystems (e.g. through the establishment of a dedicated repository) and improve and further use the “Mission approach” (e.g. Mission Ocean) already existing to provide more digested results and recommendations from R&I projects for evidence-based policymaking.
10	1	Foster new behaviours and social norms within local communities to enhance knowledge and skills on opportunities for sustainable mitigation and adaptation options, intensify sharing of good practice approaches and contribute to more active involvement in co-management actions
11	1	Promote knowledge, awareness, and learning by linking science and policy, understanding what works and why through systems and process analyses, sharing lessons learnt, and fostering continuous learning via international conferences, forums, and global MSP networks
12	1	Conduct a governance assessment early in the MSP process to provide an overview of current governance arrangements, highlight suitability for participatory planning, and identify where strengthening is needed to support effective planning and implementation
13	1	Develop a communication strategy by combining formal and informal channels, establishing clear feedback mechanisms, and ensuring that stakeholders understand how their contributions are considered

Num.	Relevance	Recommendations on Capacity building and stakeholder engagement
		throughout MSP planning and implementation to ensure a transparent planning process
14	1	Strengthen engagement strategies by considering the different roles and needs of stakeholders, enabling knowledge co-creation and social learning, and clearly defining when and how each stakeholder can participate in planning and decision-making
15	1	Design and support collaborative projects that enhance institutional connectivity, promote capacity-building, and create sustained opportunities for joint learning to effectively tackle increasingly complex issues in marine governance
16	1	Institutionalize vertical coordination mechanisms between national authorities and local stakeholders (municipalities, port authorities, mariculture, tourism, conservation actors) to ensure that local priorities inform national MSP objectives and vice versa.
17	1	Sustain participatory governance beyond project cycles by turning temporary dialogue platforms (like those in Shape, Adriplan, and SUPREME) into permanent arenas for cooperation, preserving institutional learning and engagement capacity.
18	2	Promote multidisciplinary expertise in freshwater and marine domains among Water Agencies (RBMP) civil servants.
19	2	Assign ELY Centres a central role in freshwater management (RBMP) and as key regional actors in marine strategy implementation (MaS).
20	2	Engage environmental agencies (e.g. ARPA and ISPRA), together with universities and research institutions, acting not only as knowledge providers and policy advisors but also as knowledge brokers and boundary organizations
21	2	Coordinate consultation processes across different policies in a phased manner to establish an integrated stakeholder engagement framework. This will help support more holistic sea management i.e. land-sea interaction, and “source to sea” approach
22	2	SPSI Platforms: Support multi-actor SPSI Platforms and promote research boundary organisations, recognising their key role in knowledge translation and cross-sectoral dialogue and collaboration.
23	2	Competence framework: Encourage significance of engagement of researchers in science-for-policy activities (e.g. recognising a more active role in the policymaking process) and develop specific training and capacity-building activities with a focus on inter- and transdisciplinary knowledge and skills.
24	2	Support long-term science–policy–society interfaces to facilitate knowledge co development, integration into policies, and mutual learning.
25	2	Build capacity at individual and organizational levels to strengthen actors’ governance capabilities.

Num.	Relevance	Recommendations on Capacity building and stakeholder engagement
26	2	Develop competencies and skills of policy workers and other actors to move beyond business-as-usual and to adopt evidence-informed and participatory approaches.
27	2	Create guidelines and procedures that clearly define roles, responsibilities, and mandates of governance actors.
28	2	Invest in capacity building for key ocean governance capabilities at all governance levels to improve implementation of the EGD and Ocean Pact.
29	2	Use tools such as the PERMAGOV governance capabilities assessment to design capacity-building strategies.
30	2	Promote inclusive participation throughout the decision-making process, from problem framing to co-creation of solutions.
31	2	Ensure equitable collaboration by enhancing representation, fostering learning and reflection, providing conflict-resolution procedures, and allocating resources for capacity building.
32	2	Support inter- and transdisciplinary research and ensure continued funding for such projects.
33	2	Include competence and capacity building for scientists and societal actors in curricula, training, and research projects to strengthen the science–society–policy interface.
34	2	Raise awareness among stakeholders on the effects of climate change on marine ecosystems and maritime activities to support the development of a better-informed participatory planning process
35	2	Facilitate the establishment of interdisciplinary MSP networks that bring together diverse expertise to develop climate-smart and nature-inclusive design frameworks for ocean planning
36	3	Funding & resources: Ensure institutional long-term funds to SPS actors and fund specific research projects to improve SPS functioning (e.g. through Horizon Europe).
37	3	Provide technical guidance and capacity-building support for implementation that accounts for the need of coherence.
38	3	Aligning elements of the stakeholder consultation process across policies
39	3	Improve collaboration among actors across institutional levels and sectors to address the complexity of ocean governance.
40	3	Strengthen the capabilities of governmental and non-governmental actors to share diverse sustainability perspectives and deliberate joint actions.
41	3	Build mutual trust, understanding, and shared commitment among actors as the foundation for effective collaboration.
42	3	Enhance access to and sharing of knowledge to create a strong, evidence-based foundation for ocean governance.

Num.	Relevance	Recommendations on Capacity building and stakeholder engagement
43	3	Increase use of foresight tools to establish a clear and shared sense of direction.
44	3	Establish permanent platforms for exchanging knowledge between disciplines and societal actors.

7.1.5. Recommendations regarding Cross-sectoral approach in MSP

Num.	Relevance	Recommendations on Cross-sectoral approach in MSP
1	1	Develop national cross-sectoral coordination strategies to enhance horizontal coordination across sectoral policies and vertical alignment between governance levels, ensuring integration with relevant directives such as the MSPD and MSFD
2	1	Create matrices outlining sectoral interests and interactions to identify potential conflicts and synergies, providing a structured framework for proactively addressing the underlying complexities and informing decision-making
3	1	Establish cross-sectoral working groups and forums to facilitate dialogue, promote collaborative conflict resolution, integrate diverse sectoral perspectives, and foster holistic and sustainable ocean governance approaches
4	1	Dvelop cross-sector environmental data portals to support integrated planning by centralising environmental information, and enhancing transparency and accessibility for all stakeholders
5	1	Promote coherence between MSP and other relevant policies and planning processes by aligning maritime spatial plans with integrated coastal management practices, EU and national regulations, and regional sea conventions, and by considering administrative simplifications where applicable
6	1	Integrate land-sea interactions into MSP plans by providing dedicated analyses of these interactions, considering not only coastal defence but broader environmental, social, and economic aspects, and ensuring coherence with relevant legislation, such as the MSFD, WFD, and Nitrates Directive
7	1	To meet the objectives of the European Green Deal, the European Commission must strengthen coherence between environmental and sectoral policies, especially through better enforcement and integration of directives such as the MSFD, WFD, CAP and CFP. This will be essential for protecting marine biodiversity, reducing pollution, and fostering sustainable growth. By focusing on strategic enforcement, aligning sectoral policies, and promoting result-based approaches, the EU can advance toward its 2030 and 2050 goals.

Num.	Relevance	Recommendations on Cross-sectoral approach in MSP
8	1	Cross-cutting: Enhance a living practice of exchange of SPSI Best Practices and science-for-policy Ecosystems (e.g. through the establishment of a dedicated repository) and improve and further use the "Mission approach" (e.g. Mission Ocean) already existing to provide more digested results and recommendations from R&I projects for evidence-based policymaking.
9	2	Strengthen the role of the Oslofjord Council in ensuring representation among sectors and governance levels, and in increasing societal awareness by promoting understanding that coordinated action across the entire catchment is necessary to restore the fjord
10	2	Coordinate consultation processes across different policies in a phased manner to establish an integrated stakeholder engagement framework. This will help support more holistic sea management i.e. land-sea interaction, and "source to sea" approach
11	2	Embed restoration targets from the NRR into marine spatial planning and MSFD objectives and Programmes of Measures.
12	2	Establish monitoring frameworks that account for coherence to track implementation across instruments.
13	3	Promote alignment of objectives and instruments across sectors.

7.1.6. Recommendations regarding Multi-use

Num.	Relevance	Recommendations on Multiuse
1	1	Integrate insights from diverse sectors into spatial planning and design layouts to ensure a comprehensive understanding of spatial demands and foster knowledge sharing across stakeholders, including through early-stage dialogues and cross-border consultation processes
2	1	Identify and designate predefined areas suitable for multi-use within national strategies, enabling coordinated development and supporting ecosystem-based approaches
3	1	Develop tools and conduct scenario analyses to proactively minimise conflicts and identify potential synergies among maritime sectors, ensuring effective conflict resolution and sustainable cohabitation between sectors
4	1	Adopt an integrated policy and regulatory framework that provides consistent licensing procedures and allocates space in alignment with sectoral interests, production requirements, and market dynamics
5	1	Invest in human and financial resources to support innovative technological solutions, knowledge exchange, training schemes, and workshops that strengthen the capacity and effectiveness of multi-use initiatives

Num.	Relevance	Recommendations on Multiuse
6	1	Produce an updated assessment guide that highlights interactions between objectives, instruments, and measures of different EU policies, rather than evaluating each in isolation.
7	1	Integrate strategic climate objectives into overall sustainable development and environmental policies addressing the marine domain by using climate-smart and nature-inclusive MSP as a common framework for setting up meaningful and effective actions across different regions
8	2	Enhance consultation and compensation mechanisms to promote stakeholder engagement, transparency, and fairness in multi-use development
9	2	Incorporate the temporal dimension into MSP by mapping both the spatial and temporal distribution of existing and future activities, analysing interactions among users and uses, and promoting multi-use approaches where appropriate
10	2	Strengthen coherence-sensitive monitoring frameworks to track ecological outcomes effectively; monitoring must capture the combined effects of multiple policies.
11	2	Promote nature-inclusive design and multi-use infrastructure in blue economy sectors to reduce spatial conflicts and enhance ecosystem services.
12	1	Integrate insights from diverse sectors into spatial planning and design layouts to ensure a comprehensive understanding of spatial demands and foster knowledge sharing across stakeholders, including through early-stage dialogues and cross-border consultation processes

7.1.7. Recommendations regarding Cross-border cooperation

Num.	Relevance	Recommendations on Cross-border cooperation
1	1	Establish coherent transboundary MSP frameworks by creating cross-sectoral platforms at the sea-basin level and adopting common planning criteria to promote harmonised decision-making across countries
2	1	Strengthen intergovernmental cooperation through bilateral dialogues, partnerships, and flexible integrated approaches that facilitate collaboration while respecting diverse legal systems and terminologies

Num.	Relevance	Recommendations on Cross-border cooperation
3	1	Organise cross-border workshops and MSP Communities of Practice (CoPs) to foster inclusive stakeholder engagement, transparency, trust, and continuous knowledge exchange in MSP processes
4	1	Standardise spatial data practices by harmonising data collection methodologies, symbology, aggregation, and interpretation techniques, and promoting collaboration among GIS specialists, data experts, and marine spatial planners to ensure consistent and reliable cross-border information exchange
5	1	Promote cross-border and sea-basin cooperation in MSP by coordinating planning processes among neighbouring Member States, engaging regional governance bodies, institutional networks, EU-funded and national projects, and formal consultation mechanisms, to identify potential issues early, address transboundary impacts, and support long-term sustainable management of maritime space
6	1	Promote cooperation with non-EU countries in MSP by fostering informal bilateral contacts, engaging in regional sea conventions, participating in EU Macro-Regional Strategies, and collaborating through EU-funded projects, as well as utilising other available mechanisms such as SEA Directive consultations, the Espoo Convention, and the European MSP Platform
7	1	Fragmentation and mismatches between governance mechanisms and environmental issues are long-standing marine governance challenges. These challenges are likely to be exacerbated by Blue Growth and marine conservation and restoration commitments. To overcome them, the EU and Member States should seek to develop nested and multi-level marine governance arrangements, in full cooperation with regional and local actors. The Regional Seas Conventions are good examples of multi-level arrangements but are limited in focus. The introduction of regional seas marine spatial planning presents an opportunity to build multi-level governance institutions that encompass the full range of marine activities. A nested approach to Marine Spatial Planning should include regional sea coordination, national planning and the development of plans for intensely used marine areas (see for example, the sub-national marine plans being developed in Ireland). Ensuring coherence across the various scales of marine governance will reduce the likelihood of barriers arising from fragmentation and scalar mismatches
8	1	Establish mechanisms that strengthen analysis and knowledge exchange at the regional and sea-basin level and facilitate communication among sectors and planning authorities to improve transboundary cooperation and support more coordinated MSP processes
9	2	Promote best practices in coherence through regional sea conventions (e.g., HELCOM, OSPAR, UNEP-MAP).

Num.	Relevance	Recommendations on Cross-border cooperation
10	2	Utilise existing regional and international institutional frameworks as starting points and potential nodes to support cross-basin cooperation, enabling structured engagement and coordination among relevant authorities

7.1.8. Recommendations regarding the Socio-economic dimension

Num.	Relevance	Recommendations on Socio-economic dimension
1	1	Bridge socio-economic data gaps by promoting collaboration among diverse data sources, updating INSPIRE specifications for MSP, expanding EMODnet portals to incorporate socio-economic factors, and aligning data policies with standard licensing practices
2	1	Advance accurate geographic definitions and GIS layers for socio-economic activities, enabling precise mapping, spatialisation, and analysis of sectors
3	1	Conduct cumulative socio-economic assessments and value-chain analyses to anticipate long-term trends, evaluate aggregate effects of activities, understand potential socio-economic impacts across sea basins, and support evidence-based and adaptive decision-making
4	1	Increase the knowledge base on climate change impacts by collecting and analysing data on marine uses that are most vulnerable to climate-induced changes and that hold high socio-economic value for specific regions, while integrating considerations of their potential spatial relocation into the development of MSP scenarios to ensure adaptive and informed planning
5	1	Combine understanding of environmental impacts with social and economic implications of climate change, particularly for communities highly dependent on marine resources for their livelihoods, to design adaptive, context-sensitive planning strategies
6	1	Integrate spatial and economic planning for offshore renewables by aligning national spatial development plans, licensing procedures, and grid connections; this helps reduce investor uncertainty and supports consistent offshore wind deployment.
7	1	Balance economic and environmental goals by maintaining siting rules (e.g., minimum distances from the coast) that protect seascape quality and local tourism, showing how MSP can mediate between renewable energy expansion and coastal values.
8	1	Apply value chain analysis to tourism sectors to reveal who benefits and who bears the costs of cruise activity and use this insight to design policies that distribute economic gains more evenly while addressing environmental pressures (waste, air quality, congestion).

Num.	Relevance	Recommendations on Socio-economic dimension
9	2	Foster multi-stakeholder collaboration to enhance collective decision-making, integrate social and economic dimensions into MSP, maximise local benefits, and promote sustainable and equitable management of marine resources
10	2	Integrate an ecosystem-based approach in MSP by aligning environmental, social, and economic objectives, and by considering how ecosystem characteristics inform the design of sustainable activities within maritime spatial plans
11	2	Incorporate environmental, economic, social, and safety considerations into MSP by conducting strategic assessments, targeted impact analyses, and dedicated evaluations, ensuring that planning decisions integrate these dimensions
12	2	Prioritize funding for social scientific research to strengthen social science input into ocean governance.
13	3	Define measures taking into consideration environmental and economic interactions.
14	3	Define measures that consider both environmental and economic interactions.

7.1.9. RECOMMENDATIONS REGARDING LAND-SEA INTERACTIONS

Num.	Relevance	Recommendations on Land-sea interactions
1	1	Ensure policy coherence and procedural improvements by holistically integrating land-sea interactions into MSP, coordinating coastal management instruments with marine plans, and planning across different spatial scales to achieve a comprehensive approach
2	1	Strengthen transboundary cooperation by establishing forums, common monitoring and evaluation frameworks, joint decision-making processes, and mechanisms for exchanging best practices among stakeholders across borders
3	1	Integrate land-sea interactions into MSP plans by providing dedicated analyses of these interactions, considering not only coastal defence but broader environmental, social, and economic aspects, and ensuring coherence with relevant legislation, such as the MSFD, WFD, and Nitrates Directive
4	1	Integrate land-based nutrient load data into spatial allocation within the MSP processes. While the MSP may acknowledge the importance of nutrient reduction for marine environmental objectives, the direct integration of land-based nutrient load data into site selection or spatial allocation decisions is generally lacking.
5	1	Make the Good Environmental Status (GES) objective enforceable by clarifying legal expectations for Member States and linking compliance

Num.	Relevance	Recommendations on Land-sea interactions
		to planning and authorization of offshore activities and land-based pollution sources.
6	2	Engage inland stakeholders and authorities to foster local collaborations, create synergies, and strengthen participation in MSP processes, ensuring that local perspectives are considered in marine planning
7	2	Improve data collection and analysis to support concrete LSI assessments, enabling informed decision-making and enhancing the effectiveness of MSP strategies
8	2	Improved alignment of objectives and measures between the RBMP and the MSP would help ensure that land-based actions under RBMP would positively impact the marine environment and the maritime uses planned under MSP.
9	2	Strengthen interactions across the land-sea interface between the WFD and MSFD through clearer legal requirements, alignment of management units and institutional cooperation.
10	2	Improve coordination between freshwater and marine authorities to reduce duplication and enhance implementation efficiency.
11	2	Advance integrated land–sea planning to address cumulative impacts across sectors and ecosystems.
12	2	Support integrated land–sea planning and cross-sectoral coordination at regional and local levels.
13	3	Ensure coordination of the Adriatic MSP with terrestrial planning instruments.
14	3	Reinforce land-sea interactions in nitrogen management by incorporating requirements in the Nitrates Directive and WFD to consider nitrogen impacts on coastal waters.

7.1.10. RECOMMENDATIONS REGARDING MONITORING AND EVALUATION

Num.	Relevance	Recommendations on Monitoring and Evaluation
1	1	Develop robust monitoring frameworks by fostering research and innovation on joint monitoring and management tools, designing clear and actionable indicators, and tailoring evaluation methodologies to the regional MSP context to capture policy interactions and impacts effectively
2	1	Incorporate Cumulative Impact Assessment (CIA) methodologies across borders to enhance transparency, support cross-border coordination, and strengthen accountability in MSP initiatives

Num.	Relevance	Recommendations on Monitoring and Evaluation
3	1	Structured feedback channels, institutionalized mechanisms that systematically collect, process, and incorporate local input. For example, a regional maritime council with a formal process for reporting back to stakeholders on how their input shaped the final plan, digital platforms for submitting local concerns, and a reduction of administrative burden of policy and reporting for local stakeholders. These mechanisms would allow for continuous input, review, and adjustment of plans based on stakeholder feedback and new information. In addition, managers and people involved in the marine environments at the local level have emphasized the importance of strong political support, sufficient time, and open dialogue with civil society and businesses to ensure that the measures are accepted.
4	1	Assessments: Enhance the preparation of a guideline for assessments to ensure their credibility, legitimacy and relevance, defining principles and features and recognising specificities.
5	1	Knowledge transfer models and mechanisms: Enhance the preparation of a guideline for the analysis and improvement of SPS governance (e.g. rules, procedures, actors and indicators); promote a continuous analysis of the system following this guideline to identify its strengths and weaknesses and support actions to raise society awareness on the added value and importance of SPS processes.
6	1	Develop mutually supportive indicators and integrated monitoring frameworks to support coherent assessments.
7	1	Strengthen coherence-sensitive monitoring frameworks to track ecological outcomes effectively; monitoring must capture the combined effects of multiple policies.
8	1	Develop shared data platforms and harmonized indicators across directives (e.g., MSFD, WFD, RED III).
9	1	Strengthen monitoring and evaluation frameworks by incorporating improved knowledge to inform future planning cycles and supporting adaptive MSP practices
10	2	Coordinate WFD, MSFD and MSP monitoring activities.
11	2	Coordinate WFD and MSFD monitoring activities.
12	2	Implement integrated coastal and marine monitoring.
13	2	Establish monitoring frameworks that account for coherence to track implementation across instruments.
14	2	Harmonize temporal planning and reporting cycles between the WFD, MSFD, and Nitrates Directive.
16	2	Harmonize environmental assessment methodologies across Member States.
17	2	Align planning and reporting cycles across directives to reduce administrative burdens and improve coordination.
18	3	Implement monitoring at various stages of the MSP process to assess progress and identify improvements

Num.	Relevance	Recommendations on Monitoring and Evaluation
19	3	Implement monitoring at various stages of the MSP process to assess progress, identify areas for improvement, and ensure adaptive management of maritime spatial plans