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NEXT Black Sea Basin

EfxINNOs

Establishing and Operating an Innovative Marine Technology Transfer Network for Enhancing the Transition to a Sustainable Blue Economy in the Black Sea Basin

Policy recommendations for the BSB marine environment

8/2026

https://envrio.eu/efxinnos/

Executive Summary

The Black Sea Basin is a marine region of high ecological and socio-economic importance, hosting valuable benthic ecosystems, including seagrass meadows that support biodiversity, fisheries, carbon sequestration, and coastal resilience. These ecosystems are increasingly threatened by cumulative human pressures, including pollution, eutrophication, coastal development, unsustainable fishing, marine litter, and climate change. Without coordinated and evidence-based action, further degradation of benthic habitats will undermine both environmental objectives and sustainable economic activities in the region.

This Policy Recommendations document, developed by UBBSLA within the framework of the **EfxINNOs project**, provides strategic, science-based guidance to **EU, national, and regional authorities** in the Black Sea Basin. The project supports the protection, restoration, and sustainable management of benthic seagrass habitats through improved monitoring, policy integration, and regional cooperation. The recommendations are grounded in the seagrass mapping produced by the surveying with advanced, interoperable monitoring systems and harmonised data, which strengthen the knowledge base for informed decision-making.

The proposed actions are aligned with key European and regional frameworks, including the **EU Marine Strategy Framework Directive**, the **EU Biodiversity Strategy for 2030**, the **Marine Spatial Planning Directive**, the **EU Green Deal and Climate Action objectives**, and the **Strategic Research and Innovation Agenda for the Black Sea**. They promote ecosystem-based management and contribute to the coherent implementation of marine policies across national borders.

The document highlights priority policy actions to:

- Protect and restore benthic seagrass habitats and improve seafloor integrity;
- Reduce the impacts of human activities through spatial planning and adaptive management;
- Expand and strengthen marine protected areas;
- Enhance harmonised, cost-effective monitoring and data sharing;
- Support sustainable Blue Growth and the Blue Economy while respecting ecological limits.

By translating scientific knowledge into actionable policy guidance, EfxINNOs contributes to healthier marine ecosystems, stronger climate resilience, and a more sustainable and competitive Blue Economy in the Black Sea Basin.

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1. INTRODUCTION

1.1. Background and Context

Benthic habitats in the Black Sea Basin (BSB), including seagrass meadows dominated by ***Zostera marina*** and ***Cymodocea nodosa***, constitute key components of coastal and shelf ecosystems.

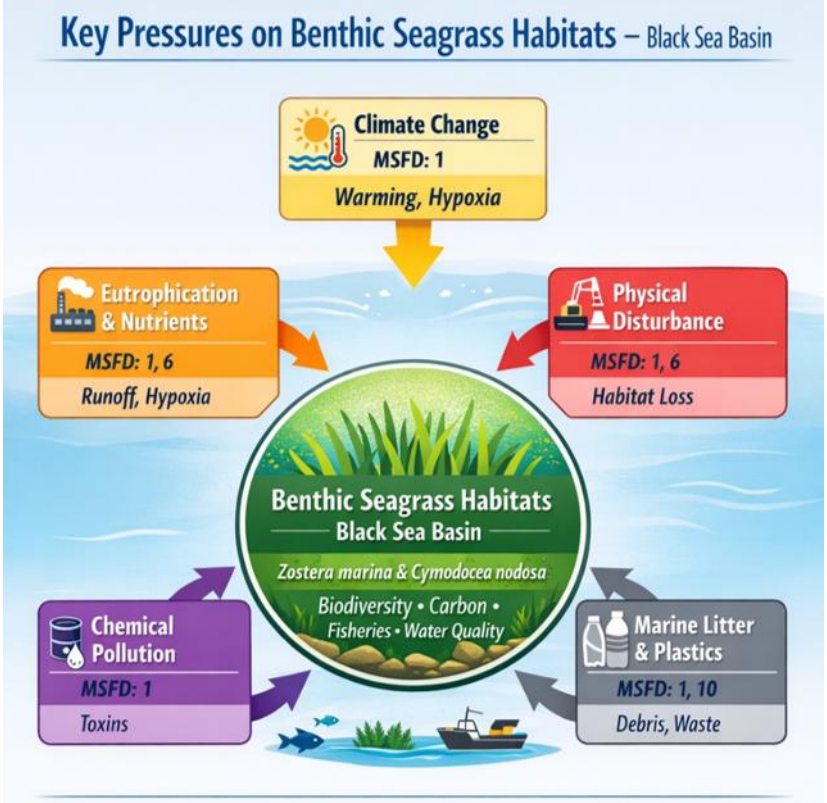


Figure 1. *Key pressures on benthic seagrass habitats in the Black Sea Basin. Source: UBBSLA team.*

These habitats provide essential ecosystem services, such as long-term carbon sequestration and storage (blue carbon), support for marine biodiversity, nursery and feeding grounds for commercially important fish species, and the stabilisation of sediments that contribute to improved water quality and coastal protection.

Their ecological functions directly underpin fisheries productivity, climate regulation, and the resilience of coastal socio-economic systems across the region.

Over recent decades, however, benthic seagrass habitats in the Black Sea Basin have undergone a significant decline in both extent and condition. Nutrient enrichment resulting from land-based sources, physical disturbance from coastal development, dredging and bottom-contact fishing, as well as chemical contamination and marine litter, have led to habitat degradation and loss. These pressures are further exacerbated by climate-related stressors, including increasing sea temperatures, deoxygenation, and extreme weather events. As a result, many areas of the Black Sea continue to show limited recovery potential and increasing vulnerability of benthic ecosystems.

Assessments conducted under the EU Marine Strategy Framework Directive (MSFD) indicate that several regions of the Black Sea Basin remain below Good Environmental Status (GES), particularly with respect to Descriptor 1 (Biological Diversity), Descriptor 6 (Seafloor Integrity), and Descriptor 10 (Marine Litter). Insufficient spatial and temporal coverage of monitoring data, combined with fragmented governance structures and limited coordination between national authorities, hinders comprehensive ecosystem assessments and the

effective implementation of management measures. Inconsistent data standards and restricted data sharing further limit the comparability of assessments at the basin scale, reducing the effectiveness of regional responses to transboundary pressures.

The EfxINNOs project addresses these challenges by fostering sustainable innovation through the development and operation of an advanced, interoperable network of marine monitoring platforms in the Black and the North Aegean Seas. By enhancing observation capacity, harmonising data collection methodologies, and promoting open and interoperable data flows, EfxINNOs strengthens the scientific basis for ecosystem assessments and supports evidence-based policymaking. The project contributes to improved understanding of benthic ecosystem status, trends, and pressures, while facilitating cooperation among Black Sea Basin countries and relevant stakeholders.

This policy document is situated within a broader European and regional strategic framework. It directly supports the objectives of the EU Marine Strategy Framework Directive, the EU Biodiversity Strategy for 2030, and the EU Green Deal, which collectively call for the restoration of degraded marine ecosystems, the protection of biodiversity, and the transition to climate-neutral and resilient societies. In addition, it aligns with the Strategic Research and Innovation Agenda (SRIA) for the Black Sea, which emphasises joint knowledge generation, enhanced ecosystem assessments, and the sustainable management of vulnerable marine ecosystems. By integrating EfxINNOs scientific outputs into this policy context, the document aims to contribute to more coherent, coordinated, and effective management of benthic habitats across the Black Sea Basin.

1.2. Objectives of this Policy Paper

Within this context, the present policy paper aims to translate the scientific outputs and technological advances of EfxINNOs into actionable, policy-relevant recommendations. It provides practical guidance to national, regional, and supra-national authorities to support the conservation, restoration, and sustainable use of benthic seagrass habitats, while enabling sustainable economic activities and blue growth. By aligning with the **EU Marine Strategy Framework Directive (MSFD)**, the **Marine Spatial Planning Directive (MSP)**, the **EU Green Deal**, and the **Strategic Research and Innovation Agenda (SRIA) for the Black Sea**, this document seeks to contribute to a more coherent, ecosystem-based, and forward-looking management of marine resources in the Black Sea Basin.

The specific objectives of this policy paper include:

- **Support evidence-based policymaking:** Provide clear, scientifically grounded recommendations to assist decision-makers in developing policies that protect and restore benthic ecosystems while balancing economic and social needs.
- **Strengthen transnational cooperation:** Facilitate collaboration among Black Sea Basin countries, fostering joint management strategies and harmonised monitoring approaches to address transboundary pressures.
- **Promote sustainable marine resource use:** Offer guidance to optimise human activities in coastal and nearshore areas, including fisheries, tourism, and maritime infrastructure, in alignment with **Marine Spatial Planning** principles.
- **Enhance monitoring and data integration:** Encourage harmonised, interoperable, and cost-effective data collection and sharing to improve assessments of benthic habitat health, focusing on MSFD Descriptors 1 (Biodiversity), 6 (Seafloor Integrity), and 10 (Marine Litter).
- **Support biodiversity and climate objectives:** Contribute to the achievement of **Good Environmental Status (GES)** and EU biodiversity targets by recommending measures to protect, restore, and enhance ecosystem resilience, including carbon sequestration and climate adaptation functions.

- **Facilitate sustainable Blue Economy growth:** Identify opportunities to align ecosystem conservation with economic development, promoting sustainable fisheries, aquaculture, tourism, and other marine-based economic activities that support the region's Blue Growth agenda.
- **Provide a framework for adaptive management:** Deliver a flexible set of recommendations that can be updated as new monitoring data and scientific knowledge emerge, ensuring continuous improvement in policy and management practices.

By achieving these objectives, this policy paper aims to bridge the gap between scientific knowledge and policy action, empowering stakeholders to take coordinated, informed, and effective steps to secure the long-term health, productivity, and sustainability of benthic seagrass habitats in the Black Sea Basin.

1.3. Scope and Target Audience

This policy paper focuses on the conservation, restoration, and sustainable management of **benthic seagrass habitats** in the **Black Sea Basin**, including key areas of ecological importance across participating countries: **Greece, Bulgaria, Romania, Türkiye,** and **Georgia**. While the primary emphasis is on seagrass meadows (*Zostera marina* and *Cymodocea nodosa*), the recommendations also address broader benthic ecosystems, including sedimentary habitats that support biodiversity and underpin essential ecosystem services.

The scope of the document includes:

- **Assessment of pressures and threats:** Identification of the main anthropogenic and climate-related factors impacting benthic ecosystems, including eutrophication, pollution, physical disturbance, marine litter, and climate change.
- **Policy and governance integration:** Guidance on aligning management and conservation measures with key European and regional frameworks, including the MSFD, Marine Spatial Planning Directive, EU Biodiversity Strategy 2030, EU Green Deal, and the Strategic Research and Innovation Agenda (SRIA) for the Black Sea.
- **Monitoring and data-driven management:** Recommendations for harmonised, interoperable, and cost-effective data collection, reporting, and assessment to support decision-making and adaptive management.
- **Sustainable Blue Economy considerations:** Measures to promote ecosystem-based management that enables responsible maritime economic activities, including fisheries, aquaculture, tourism, and other Blue Growth initiatives.

Target audience:

- **National authorities:** Ministries and agencies responsible for the environment, fisheries, maritime affairs, and coastal planning.
- **Regional and local authorities:** Agencies implementing marine protection measures, spatial planning, and local coastal management strategies.
- **Supranational bodies:** Black Sea Commission, regional coordination platforms, and EU institutions engaged in marine policy and cross-border environmental initiatives.
- **Research and monitoring institutions:** National marine research centres, universities, and organisations involved in ecosystem monitoring and policy support.
- **Stakeholders and Blue Economy actors:** Industry representatives, NGOs, and civil society organisations whose activities influence or depend on benthic ecosystem health.

By defining a clear scope and audience, this policy paper ensures that its recommendations are **actionable, targeted, and relevant** to the authorities and stakeholders responsible for preserving and sustainably managing the Black Sea's benthic habitats, while fostering regional cooperation and alignment with European environmental and climate objectives.

2. PROJECT OVERVIEW

The **EfxINNOs project** is a multi-country, territorial co-operation initiative designed to strengthen the **monitoring, assessment, and management of benthic ecosystems** in the Black and the North Aegean Seas. By deploying a technologically advanced network of monitoring platforms, EfxINNOs collects high-resolution environmental and seabed data and measures the impacts of human activities on marine habitats. This evidence-based approach provides a robust foundation for policy development, conservation strategies, and sustainable management of vulnerable benthic ecosystems.

2.1. Project Vision and Key Objectives

The overarching vision of EfxINNOs is to enhance the resilience and sustainable use of benthic ecosystems while supporting regional cooperation and fostering innovation in marine monitoring and management. The project objectives include:

- **Monitoring and assessment:** Establish an interoperable network of observation platforms consisting of buoys, ROVs, and mAUVs to record physical, chemical, and biological parameters relevant to benthic ecosystem health.
- **Impact evaluation:** Quantify and map the effects of anthropogenic pressures—such as eutrophication, pollution, fishing, and coastal development—on seagrass habitats and other benthic communities.
- **Data harmonisation and interoperability:** Develop standardised methods for data collection, processing, and sharing to facilitate cross-border assessments and integration with EU (CMEMS, and EMODnet platforms) and regional monitoring programs.
- **Capacity building and collaboration:** Promote knowledge transfer, training, and joint research initiatives among Black Sea Basin countries to enhance scientific and managerial capacities.
- **Policy support and innovation:** Translate scientific outputs into actionable recommendations that inform ecosystem-based management, marine spatial planning, and sustainable Blue Economy practices.

2.2. Monitoring Network and Technological Innovations

EfxINNOs employs state-of-the-art technologies to monitor benthic ecosystems effectively and cost-efficiently:

- **Autonomous and fixed monitoring platforms** that continuously record environmental conditions, including temperature, salinity, oxygen levels, nutrient concentrations, and sediment characteristics.
- **High-resolution benthic habitat mapping** using underwater imaging, sonar, and remote sensing techniques to track seagrass coverage and habitat integrity.
- **Interoperable data management systems** enabling real-time data sharing and integration with existing EU and Black Sea monitoring programs, ensuring transparency and comparability.
- **Decision-support tools** that combine monitoring data with predictive models to assess ecosystem health, forecast impacts, and support adaptive management strategies.

2.3. Relevance to the Black Sea and North Aegean Sea

EfxINNOs addresses key challenges faced by the Black Sea and North Aegean Sea, including habitat loss, ecosystem degradation, and pressures from human activities. By generating

harmonised, high-quality data, the project:

- Provides evidence for identifying priority areas for conservation and restoration.
- Supports expansion and effective management of marine protected areas (MPAs).
- Enhances regional coordination and transboundary management, in line with the Black Sea Integrated Monitoring and Assessment Programme (BSIMAP).
- Contributes directly to the MSFD objectives (Descriptors 1, 6, and 10) and to the EU Green Deal by linking ecosystem protection with climate mitigation and sustainable use.

Through these activities, EfxINNOs bridges the gap between scientific knowledge and policy action, providing decision-makers with the tools, evidence, and guidance needed to conserve benthic habitats, promote sustainable maritime activities, and strengthen the Blue Economy across the region.

3. POLICY AND STRATEGIC FRAMEWORK

Effective conservation and sustainable management of benthic seagrass habitats in the Black Sea Basin require alignment with **existing European and regional policy frameworks**. The EfxINNOs project supports the implementation of these frameworks by generating high-quality data, enhancing monitoring capacities, and providing science-based guidance for decision-making.

3.1. EU Marine Strategy Framework Directive (MSFD)

EfxINNOs activities and recommendations are closely linked to key EU policies and directives:

Marine Strategy Framework Directive (MSFD, 2008/56/EC):

- Focus on achieving **Good Environmental Status (GES)** for European marine waters.
- Particular relevance to **Descriptors 1 (Biodiversity), 6 (Seafloor Integrity), and 10 (Marine Litter)**, which directly relate to benthic seagrass health and habitat protection.
- EfxINNOs supports MSFD implementation by providing harmonised monitoring data and indicators for ecosystem assessments and management evaluation.

Marine Spatial Planning Directive (MSP, 2014/89/EU):

- Encourages strategic planning of human activities in marine areas to reduce environmental impacts and support sustainable Blue Economy development.
- EfxINNOs outputs inform spatial planning decisions by mapping seagrass habitats, identifying sensitive areas, and assessing anthropogenic pressures.
- **EU Biodiversity Strategy for 2030:**
  - Sets ambitious targets for the protection and restoration of ecosystems, including the expansion of **marine protected areas (MPAs)** to at least 30% of EU seas.
  - EfxINNOs data help identify priority habitats for protection and monitor ecosystem recovery.
- **EU Green Deal and Climate Action:**
  - Promotes ecosystem-based climate mitigation and adaptation, including the protection of carbon-sequestering habitats such as seagrass meadows.
  - EfxINNOs contributes to climate objectives by quantifying carbon stocks, evaluating habitat resilience, and supporting nature-based solutions.

3.2. Marine Spatial Planning Directive (MSP)

The **Marine Spatial Planning Directive (MSP)** establishes a framework for the coordinated planning of human activities in marine areas to achieve **sustainable use of the seas** while reducing environmental pressures. By promoting **integrated and ecosystem-based planning**, MSP helps reconcile the competing demands of maritime sectors, including fisheries, shipping, tourism, energy production, and aquaculture, with the need to protect marine biodiversity and ecosystem services.

Key Objectives of MSP Relevant to Benthic Ecosystems:

1. **Sustainable use of marine resources:**

   MSP encourages planning that ensures economic activities do not compromise ecosystem health. In the Black Sea Basin, this includes regulating bottom-contact

fishing, coastal development, and offshore infrastructure to reduce damage to seagrass meadows and other sensitive benthic habitats.

2. **Ecosystem-based management:**

   Spatial planning under MSP integrates ecological, social, and economic factors. Protected areas, restoration zones, and buffer areas can be defined based on the sensitivity of benthic ecosystems, supporting the maintenance of biodiversity and ecosystem services.

3. **Cross-sectoral coordination:**

   MSP fosters coordination among maritime sectors to avoid conflicts and cumulative impacts. For instance, it guides the placement of shipping lanes, aquaculture sites, and renewable energy installations in ways that minimise impacts on benthic habitats.

4. **Data-driven decision-making:**

   MSP relies on robust spatial data and ecosystem assessments. EfxINNOs contributes directly to this need by providing **high-resolution habitat maps, pressure assessments, and continuous monitoring of seagrass meadows**, enabling authorities to make informed spatial management decisions.

5. **Transboundary cooperation:**

   Given the Black Sea's enclosed nature, MSP promotes collaboration among coastal states to ensure coherent management across borders. EfxINNOs facilitates this through harmonised monitoring and data-sharing, providing a common knowledge base for regional planning.

Relevance of EfxINNOs to MSP Implementation:

- Provides spatially explicit data on seagrass extent, condition, and pressure hotspots.
- Supports the designation and management of **Marine Protected Areas (MPAs)** and other conservation zones.
- Enables authorities to **assess trade-offs** between economic development and ecosystem protection.
- Contributes to **adaptive management**, allowing MSP plans to evolve with new monitoring results and environmental changes.

By integrating MSP principles with the scientific outputs of EfxINNOs, policymakers can ensure that **coastal and offshore human activities are optimised** to protect benthic ecosystems while enabling sustainable Blue Economy growth in the Black Sea Basin.

3.3. EU Biodiversity Strategy for 2030

The **EU Biodiversity Strategy for 2030** is a central pillar of the **European Green Deal** and represents a major commitment by the European Union to halt biodiversity loss, restore degraded ecosystems, and enhance the resilience of natural habitats. The strategy provides clear targets and measures for both terrestrial and marine ecosystems, emphasizing the importance of **nature-based solutions** to address climate change, support carbon sequestration, and sustain economic activities dependent on healthy ecosystems.

Key Targets Relevant to Benthic Seagrass Habitats:

1. **Expansion of Protected Areas:**
   - At least **30% of EU marine areas** should be designated as Marine Protected Areas (MPAs), with **at least one-third under strict protection**.

- In the Black Sea Basin, this target highlights the importance of identifying priority benthic habitats, including seagrass meadows, for conservation and long-term monitoring.

2. **Restoration of Ecosystems:**
   - The strategy calls for the **restoration of degraded ecosystems**, including wetlands, coastal habitats, and marine benthic areas, to improve biodiversity and ecosystem functioning.
   - EfxINNOs monitoring data provide baseline information to track habitat degradation, identify restoration opportunities, and measure recovery success.
3. **Reduction of Pressures on Nature:**
   - Emphasis is placed on **reducing pollution, eutrophication, and overfishing**, which are major threats to benthic ecosystems.
   - By mapping anthropogenic pressures and quantifying their impacts, EfxINNOs supports targeted policy measures to reduce human-induced pressures.
4. **Ecosystem-Based Management and Knowledge-Based Policy:**
   - Decisions must be **evidence-based**, integrating ecological, social, and economic considerations.
   - EfxINNOs provides high-resolution spatial data, continuous monitoring, and harmonised indicators to guide adaptive and ecosystem-based management, supporting compliance with the Strategy.
5. **Integration with Climate and Blue Economy Policies:**
   - Recognizes that **healthy ecosystems contribute to climate mitigation and adaptation**, particularly carbon-sequestering habitats like seagrass meadows.
   - The strategy promotes sustainable maritime activities that balance economic growth with biodiversity protection, aligning directly with EfxINNOs objectives for the **Blue Economy and sustainable use of marine resources**.

Relevance of EfxINNOs to the Strategy:

- **Identification of priority habitats** for protection and restoration, supporting the 30% MPA target.
- **Monitoring and reporting** on the status of benthic ecosystems to inform EU and national biodiversity assessments.
- **Support for adaptive management**, enabling policymakers to refine conservation measures based on real-time scientific data.
- **Transnational coordination**, providing comparable data across Black Sea countries, which is essential for coherent regional implementation of biodiversity targets.

By linking its outputs to the EU Biodiversity Strategy 2030, EfxINNOs ensures that scientific evidence drives policy decisions, supports ecosystem restoration, and contributes to achieving the EU's biodiversity and climate objectives in the Black Sea Basin.

3.4. EU Green Deal and Climate Action

The **European Green Deal**, adopted in 2019, is the EU's flagship policy for achieving a **climate-neutral, sustainable, and resilient Europe by 2050**. It integrates environmental, social, and economic objectives and emphasizes the role of **healthy ecosystems** in

mitigating climate change, supporting biodiversity, and sustaining human well-being. Marine ecosystems, particularly **benthic habitats such as seagrass meadows**, play a critical role in the EU's climate and environmental strategy due to their capacity for **carbon sequestration**, **biodiversity support**, and **coastal protection**.

Key Objectives Relevant to Benthic Seagrass Habitats:

1. **Climate Mitigation through Nature-Based Solutions:**
   - The Green Deal recognizes natural ecosystems as **carbon sinks**, with seagrass meadows being highly efficient in storing "blue carbon."
   - Protecting and restoring benthic habitats contributes to **carbon sequestration targets** and supports EU climate neutrality goals.
2. **Climate Adaptation and Resilience:**
   - Healthy benthic ecosystems increase **coastal resilience** against storms, erosion, and sea-level rise.
   - Restoration of seagrass meadows and sedimentary habitats under the Green Deal framework enhances ecosystem capacity to buffer climate impacts, minimize incident wave energy, stabilise sediments, and reduce coastal erosion and the impacts of sea level rise.
3. **Pollution Reduction and Ecosystem Health:**
   - The Green Deal promotes the reduction of **nutrient loading, chemical pollution, and marine litter**, which are major threats to benthic habitats.
   - EfxINNOs monitoring provides data to track pollutant levels, assess habitat vulnerability, and inform targeted management.
4. **Sustainable Blue Economy:**
   - The Green Deal encourages **economic activities that are sustainable and low-impact**, including fisheries, aquaculture, and maritime transport.
   - By linking monitoring data to spatial planning and policy recommendations, EfxINNOs ensures that **Blue Economy growth does not compromise ecosystem health**.
5. **Evidence-Based Climate and Environmental Policies:**
   - The Green Deal relies on **robust scientific data** to guide interventions, investments, and regulatory measures.
   - EfxINNOs contributes high-resolution, real-time monitoring of seagrass habitats, mapping ecological pressures, and providing baseline information to measure policy effectiveness.

Relevance of EfxINNOs to the EU Green Deal and Climate Action:

- **Quantifying carbon stocks:** Monitoring seagrass meadows allows accurate estimation of their **carbon sequestration potential**.
- **Tracking ecosystem health:** Continuous environmental monitoring enables early detection of climate- and human-induced stressors.
- **Supporting adaptive management:** Policy measures can be adjusted dynamically based on EfxINNOs data, ensuring resilience in the face of climate change.
- **Integrating with EU biodiversity and MSP targets:** Links ecosystem protection to climate objectives, biodiversity restoration, and sustainable spatial planning.

By aligning benthic ecosystem conservation with the **EU Green Deal and climate action**

goals, EfxINNOs ensures that **marine policy and management decisions contribute simultaneously to biodiversity protection, climate mitigation, and sustainable economic development** in the Black Sea Basin.

3.5. Black Sea Integrated Monitoring and Assessment Programme (BSIMAP)

Black Sea Integrated Monitoring and Assessment Programme (BSIMAP):

- Provides a framework for basin-wide monitoring, reporting, and ecosystem assessment.
- EfxINNOs complements BSIMAP by introducing advanced, interoperable monitoring platforms and harmonised data collection.

3.6. Common Maritime Agenda for the Black Sea

The **Common Maritime Agenda for the Black Sea (CMA)** is a regional framework designed to **promote sustainable maritime governance, foster cooperation among Black Sea countries, and balance environmental protection with economic development**. Endorsed by all six Black Sea coastal states, the CMA serves as a platform for coordinating policies and initiatives on marine and coastal management, sustainable Blue Economy growth, and ecosystem conservation.

Key Objectives of the CMA Relevant to Benthic Ecosystems:

1. **Sustainable Use of Marine Resources:**
   - Encourages responsible maritime activities, including fisheries, aquaculture, shipping, and tourism, while ensuring that benthic habitats, particularly **seagrass meadows**, are protected from degradation.
2. **Ecosystem-Based Management:**
   - Promotes integrated planning and management of the Black Sea ecosystem, aligning economic activities with the conservation of vulnerable habitats.
   - Supports the implementation of **Marine Protected Areas (MPAs)** and spatial measures that reduce cumulative pressures on benthic ecosystems.
3. **Transboundary Cooperation:**
   - Facilitates **joint monitoring, data sharing, and coordinated management** across the Black Sea Basin.
   - Addresses the challenge of fragmented governance by providing a common framework for **harmonising policies, assessments, and management strategies**.
4. **Knowledge-Based Policy and Innovation:**
   - Encourages the use of scientific data, research, and technological innovations to inform policy decisions and adaptive management.
   - Initiatives like **EfxINNOs** directly contribute by providing high-resolution habitat maps, pressure assessments, and continuous monitoring of benthic ecosystems.
5. **Climate and Environmental Resilience:**
   - Aligns with broader EU climate and biodiversity targets, emphasizing the role of **healthy benthic habitats in carbon sequestration, coastal protection, and ecosystem resilience**.

Relevance of EfxINNOs to CMA Implementation:

- **Provides harmonised data:** EfxINNOs monitoring platforms generate **comparable, transboundary data** that support CMA objectives for shared ecosystem assessment.
- **Identifies priority areas for protection:** High-resolution mapping highlights **sensitive benthic habitats** that require conservation or restoration.
- **Supports adaptive and coordinated management:** EfxINNOs data enables CMA stakeholders to implement **evidence-based, ecosystem-oriented measures**.
- **Fosters regional collaboration:** The project strengthens **scientific and policy networks**, enhancing the effectiveness of CMA initiatives across the Black Sea Basin.

By aligning its outputs with the **Common Maritime Agenda**, EfxINNOs ensures that national and regional authorities have the **tools, evidence, and guidance** to implement sustainable, cooperative, and ecosystem-based maritime policies in the Black Sea. This alignment strengthens both **regional cohesion** and the integration of **EU directives** into local and national marine management practices.

3.7. Strategic Research and Innovation Agenda for the Black Sea (SRIA)

Strategic Research and Innovation Agenda (SRIA) for the Black Sea:

- Calls for integrated research, monitoring, and innovation to address knowledge gaps and support ecosystem-based management.
- EfxINNOs delivers high-resolution, harmonised data and advanced monitoring technologies to meet SRIA objectives and inform policy decisions.

The alignment of EfxINNOs outputs with these frameworks ensures that the policy recommendations in this document:

- Are **science-based and actionable**, supporting decision-makers at national, regional, and supra-national levels.
- Enable **ecosystem-based management**, integrating ecological, social, and economic considerations in marine policy.
- Promote **coherent transboundary policies**, addressing cumulative and cross-border pressures on benthic habitats.
- Support **adaptive management**, allowing authorities to update measures as new data and scientific insights emerge.

By situating EfxINNOs within this robust policy and strategic framework, the project strengthens the foundation for coordinated, effective, and long-term management of benthic seagrass habitats in the Black Sea Basin.

4.POLICY RECOMMENDATIONS

A. Protect and Restore Benthic Seagrass Habitats

- Develop and fund **Seagrass Restoration Programs** in the framework of nature-based solutions.
- Promote the replantation activities of seagrass meadows at selected areas with minimal human impact.
- Delineate seagrass meadows and promote **no-anchoring zones** and seagrass-friendly mooring systems.
- Establish **transboundary marine restoration networks** under the Black Sea Commission framework.

B. Minimize the Impact of Human Activities

- Introduce **spatial and seasonal restrictions** for high-impact activities (trawling, dredging) and use satellite systems to track the movement and fishing activities of fishing vessels in benthic-sensitive zones.
- Minimize wastewater effluents by constructing natural treatment systems, e.g., constructed wetlands and other natural systems.
- Implement **Eco-Design and Circular Economy** principles in coastal industries.
- Enforce **pollution reduction targets** for nutrients and plastics.

C. Expand Marine Protected Areas (MPAs)

- Enrich the EMODnet biodiversity and seagrass database.
- Delineate and identify priority conservation zones using harmonized habitat mapping tools.
- Aim to reach **30% protection by 2030**, in line with the EU Biodiversity Strategy.
- Integrate MPAs into **cross-border marine corridors** and ecological networks.

D. Optimize Coastal and Nearshore Human Activities (Marine Spatial Planning)

- Strengthen the implementation of the **Marine Spatial Planning (MSP) Directive**.
- Promote **multi-use coastal zones** (e.g., aquaculture + tourism + conservation) at sustainable levels, respecting the carrying capacity of each region.
- Align MSP with local socio-economic development strategies.

E. Enhance Monitoring and Data Harmonization

- Develop **interoperable data systems** for MSFD Descriptors 1, 6, and 10.
- Promote **open-access regional data platforms** (e.g., EMODnet, Copernicus Marine Service).
- Connect online sensor platforms (buoys, moorings, benthic labs, etc) to the CMEMS IN-SITU TAC, to improve local prognostic modeling.
- Establish **common indicators and methodologies** for ecosystem assessment.

F. Align with the EU Green Deal and Climate Action

- Encourage **carbon credit mechanisms** for seagrass conservation (“blue carbon”).

- Integrate **climate adaptation and mitigation** actions into marine policies.
- Support research on **ecosystem resilience and restoration under climate stress**.
- Assess carbon sequestration at the regional/local level.

G. Foster Blue Growth and the Blue Economy

- Support **eco-innovation and green entrepreneurship** in marine biotechnology, ecotourism, and sustainable fisheries.
- Develop **training and capacity-building programs** for coastal communities.
- Promote **public-private partnerships** for sustainable resource use and conservation.
- Advance marine technology and marine instrumentation across the BS basin.

5. IMPLEMENTATION ROADMAP

- **Short-term (1–2 years):** Policy alignment, data harmonization, stakeholder engagement.
- **Medium-term (3–5 years):** Restoration programs, MPA expansion, pilot monitoring projects.
- **Long-term (6–10 years):** Full integration of MSP, operational Blue Economy strategies, measurable ecosystem recovery.

6. STAKEHOLDER ENGAGEMENT AND GOVERNANCE

Effective implementation requires multi-level governance involving EU institutions, national authorities, research organizations, NGOs, and local communities. Participating countries should enhance coordination through the Black Sea Commission, promoting co-management, transparency, and participatory planning mechanisms.

- Role of regional authorities, research institutions, NGOs, and coastal communities.
- Mechanisms for stakeholder participation (consultation platforms, co-management bodies).
- Strengthening transnational collaboration under the **Black Sea Synergy Initiative** and **EfxINNOs framework**.

7. MONITORING, EVALUATION, AND REPORTING

Monitoring should follow MSFD standards and use common indicators for ecosystem health, governance performance, and socio-economic outcomes. Periodic reporting aligned with EU cycles will ensure accountability and adaptive management.

- Define **Key Performance Indicators (KPIs)** for ecosystem health, governance effectiveness, and socio-economic impact.
- Establish **periodic reporting mechanisms** compatible with MSFD cycles.

8. CONCLUSIONS AND WAY FORWARD

Protecting and restoring benthic ecosystems in the Black Sea Basin is essential for achieving a sustainable Blue Economy. The EfxINNOs project and its partners are committed to advancing joint scientific knowledge, ecosystem forecasting, and policy innovation across the region. Coordinated action under the proposed framework will secure a healthier, more resilient, and economically vibrant Black Sea for future generations.

- Reaffirm commitment to a **healthy, productive, and resilient Black Sea**.
- Highlight the importance of innovation, collaboration, and adaptive management.

9. References

European Commission (2020). EU Biodiversity Strategy for 2030.

European Commission (2008). Marine Strategy Framework Directive (2008/56/EC).

European Commission (2014). Marine Spatial Planning Directive (2014/89/EU).

European Green Deal (COM/2019/640).

Strategic Research and Innovation Agenda for the Black Sea (SRIA, 2019).

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