



From Knowledge to Action: Towards Sustainable Governance of Cruising and Recreational Boating in the Pelagos Sanctuary

Synthesis Note from the Adapt'Pelagos workshop
held on September 16, 2025, in Monaco

Introduction

Facing the intensification of maritime traffic in the Pelagos Sanctuary, particularly recreational boating and cruise activities, the challenges of preserving marine biodiversity, reducing emissions, and mitigating anthropogenic pressures have become major concerns for the coastal states of France, Monaco, and Italy. Created in 1999, the Pelagos Sanctuary constitutes a unique Marine Protected Area (MPA) due to its tripartite governance, its size, and its objective of protecting cetaceans in the northwestern Mediterranean. As the first Mediterranean sanctuary dedicated to the protection of marine mammals, it is distinguished by its significant ecological richness and harbors one of the most productive pelagic environments in the Mediterranean. However, despite its protected status, pressures related to underwater noise, pollution, collisions, and overcrowding continue to intensify. Between the mid-1990s and mid-2000s, maritime transit capacity in the Mediterranean increased by nearly 60%, while the average size of vessels grew by approximately 30% since 1997 (IMO, 2023). This traffic intensification notably results in a marked increase in collision risks: more than 80% of fatal collisions recorded between vessels and the Mediterranean fin whale population between 1971 and 2001 occurred in the northwestern Mediterranean (Panigada et al., 2006).

In this context, the [Adapt-Pelagos project](#), supported by the Prince Albert II of Monaco Foundation and ADEME and led by Plan Bleu, aims to strengthen the capacity for action of local stakeholders through regional cooperation and experience sharing. It is part of a dynamic of adaptation to climate change and sectoral pressures, supporting coastal states in integrating environmental issues into their public policies. This approach aligns with other Sanctuary initiatives, such as the Slow Tourism Initiative, which promotes a more sustainable and less impactful nautical tourism model for marine ecosystems, and Pelagos Against Pollution, an awareness and action program against maritime pollution. Together, these projects reflect a common desire to reconcile economic attractiveness, energy sobriety, and biodiversity preservation in the northwestern Mediterranean.

This synthesis note follows the workshop organized on September 16, 2025, in Monaco and offers an overview of existing tools (regulatory, scientific, incentive-based) and available knowledge to improve the consideration of environmental impacts from recreational boating and cruise activities in the national strategies of the Sanctuary's coastal countries. Building on local initiatives and feedback from local stakeholders, it aims to identify possible synergies between countries and local actors, priority areas for progress, and new indicators for better integrated and sustainable governance of tourism-related maritime traffic in the Mediterranean.



1 . Common Challenges for the Sanctuary's Coastal Countries

The Mediterranean, **the world's second-largest cruise destination**, welcomed more than 8 million passengers in 2017 and recorded over 31 million cruise passenger movements in 2019, an increase of 11.5% in one year (Plan Bleu, 2022). Simultaneously, recreational boating attracts a heterogeneous fleet dominated by small boats, but where the proportion of large yachts, representing about 70% of the world's megayachts, is growing rapidly. These dynamics accentuate common pressures that transcend national borders

The first pressure concerns **direct impacts on marine ecosystems**. Cruise and recreational boating activities generate atmospheric emissions of pollutants (sulfur dioxide, nitrogen oxides, fine particles) that affect human health and biodiversity. These emissions notably contribute to the acidification of marine environments, resulting in significant consequences for particularly vulnerable calcifying organisms such as corals and shellfish (OSPAR, 2023). The designation of the Mediterranean as a sulfur emission control area (Med SOx ECA), which entered into force on May 1, 2025, should enable a 79% reduction in SOx emissions and 24% in fine particles, thus preventing more than 1,100 premature deaths and 2,300 cases of childhood asthma each year (Plan Bleu, 2022). At sea, pressures also manifest through uncontrolled vessel anchoring that destroys

sensitive coastal habitats such as Posidonia seagrass beds, collisions with marine megafauna, and underwater noise that disturbs cetaceans. These cumulative effects directly threaten the ecological integrity that the Sanctuary is mandated to preserve.

A second major issue lies in the **fragmentation of environmental policies and maritime planning**. Although European and international regulatory frameworks, such as the Barcelona Convention or the Marine Strategy Framework Directive (MSFD), including the Maritime Spatial Planning (MSP) directive, define common objectives, their application varies greatly among states. Thus, France has had a Mediterranean Façade Strategic Document since 2022, establishing binding guidelines and zoning, while Italy only adopted its maritime spatial management plans in 2024, with highly regionalized implementation. For its part, Monaco, not subject to European directives, relies on its own legislation and cooperation frameworks such as RAMOGE or the Pelagos Agreement, whose control and sanction mechanisms differ according to French, Italian, and Monegasque jurisdictions. These timing, competency, and regulatory approach discrepancies illustrate fragmentation that persists within a common ecological space. The PAP/RAC initiatives, through the implementation of the Protocol on Integrated Coastal Zone Management (ICZM), and Plan Bleu's participatory Climagine methodology seek to mitigate these disparities, but their adoption remains uneven among states. Regulatory differences



between cruise ships, large yachts, and small boats also create supervision disparities, complicating the harmonization of practices. This heterogeneity hinders the effectiveness of conservation measures, limits the pooling of monitoring tools, and complicates the establishment of common sustainability standards.

Finally, the three countries must address **a cross-cutting governance challenge: the need for better articulation between local, national, and regional levels**. Maritime pressures concentrate in certain sensitive areas where local authorities, port managers, and marine protected areas are on the front line, but their capacity for action remains dependent on national policies and regional agreements. The absence of robust mechanisms to connect these scales prevents a coordinated response, even though the transboundary nature of maritime flows requires shared arrangements. This dynamic echoes the findings of researcher Mariantonia Lo Prete (Université Côte d'Opale) on the vulnerability of Mediterranean port cities. Her analysis of 47 legal disputes in France and Italy shows that weak coordination between different levels accentuates tensions between port and environmental development (Lo Prete, 2015). Cases of circumvention and externalization of formerly established cruise capital port-cities are emerging, such as the ports of Ravenna replacing Venice or Livorno replacing Genoa (Lo Prete, 2025), illustrating the difficulty of reconciling economic imperatives with ecological requirements. The emergence of these disputes reveals the importance of shared governance, harmonized indicators, and strengthened regional cooperation to overcome these compartmentalizations and ensure integrated management of the Pelagos Sanctuary.

2 . Overview of Presented Tools

In the context of the Pelagos Sanctuary, the mobilized instruments lie at the intersection of binding regulation, voluntary incentives, and scientific observation. Together, they create a toolbox that combines standards, economic signals, and monitoring mechanisms.

On the regulatory and incentive side, the designation of the **Med SOx ECA or SECA** zone constitutes a pivot for cruise ships, which represent 17% of global cruises. Effective from May 1, 2025, it requires vessels to use fuel with 0.10% m/m sulfur content, with expected gains in air quality and public health. The International Maritime Organization (IMO) and REMPEC RAC/UNEP/MAP specify the framework and timeline, from the measure's adoption to its application, confirming a scale change for the entire basin.

In the northwestern Mediterranean, the area's designation as a **« Particularly Sensitive Sea Area »** (PSSA) between Spain, France, Monaco, and Italy is accompanied by mitigation measures aimed at preventing collisions with large cetaceans. The IMO recommends a voluntary speed reduction between 10 and 13 knots when cetaceans are detected, a recommendation relayed by technical organizations and falling under PSSA classification (Ocean Care, 2023). This risk regulation tool, focused on speed, complements the ECA logic by targeting impacts on biodiversity, directly benefiting neighboring Natura 2000 sites and/or MPAs facing the same maritime flows.

At the national and local level, France has strengthened its regulatory arsenal to protect Posidonia seagrass beds: since 2020, **maritime prefect orders** regulate the anchoring of large vessels on Mediterranean coasts, and a body of **orders** and implementation documents specifies prohibited or restricted zones. These decisions reflect the rise of «fine» usage regulation, closest to sensitive habitats. These standards are complemented by commitments made within the framework of the **Sustainable Cruise Charter** of DIRM Méditerranée, which frames the use of marine fuels to limit the environmental impact of port calls. Since 2023, signatory cruise companies commit to using low-sulfur fuels, in line with atmospheric pollution reduction objectives carried by maritime authorities. During pollution episodes, companies also commit to adapting their activity, particularly through the use of even lower-emission fuels or the implementation of complementary technical solutions. The charter also encourages the use of alternative fuels, such as liquefied natural gas, in a logic of transition toward cleaner energy sources, while recognizing the need to control their indirect climate effects. This approach aims to anticipate the evolution of international and European regulatory frameworks, encouraging shipowners to adapt their practices now to environmental standards that will progressively become the norm.

Finally, the range of voluntary incentives contributes to raising standards ashore: the label **Pavillon Bleu** - Blue Flag - (carried by the Foundation for Environmental Education) sets demanding criteria for marinas and beaches regarding environmental management, safety, education, and water quality, offering communities and ports a reputation lever and continuous improvement. Similarly, the **«Clean Ports / Clean Ports Active in Biodiversity»** certification (ISO 18725 standard) structures the approaches of marina managers in France and Europe, with a recognized framework and a growing network of certified ports.

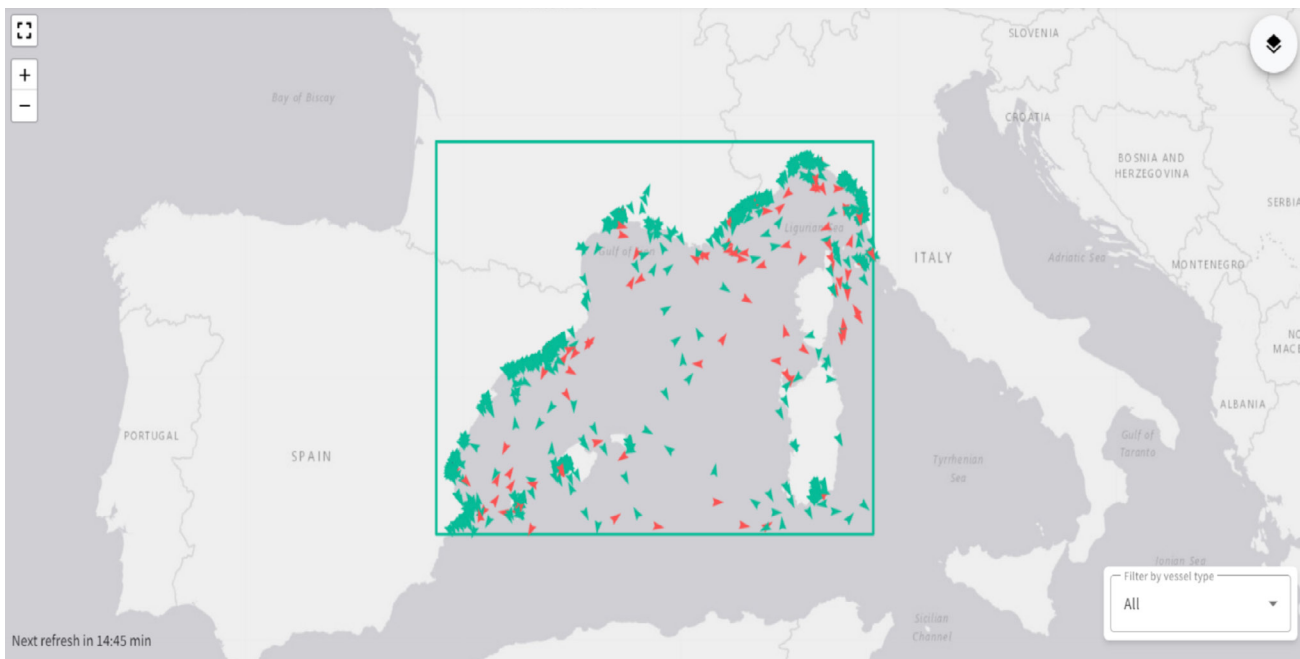


However, several criticisms highlight that the Blue Flag, despite its contributions, may be perceived more as a tourism label than a purely environmental one. For example, Surfrider Foundation criticizes the label for not covering certain pollution types (particularly chemical), limiting water quality monitoring to a fairly short period (June 15 - September 15 of the previous year), which leaves gaps on the actual experience throughout the year, particularly in the Mediterranean. Additionally, the application cost and multiplicity of criteria to meet can represent a barrier for some municipalities, especially smaller ones, while the label can be lost even if certain environmental indicators remain good, which can create contrast effects (for example, beaches without Blue Flag whose water is deemed «excellent» according to Regional Health Agencies - *Courrier des maires*, 2022).

Added to these are initiatives dedicated to the Pelagos Sanctuary, a transboundary maritime space for the protection of marine mammals established between France, Italy, and Monaco. **The Pelagos Charter** commits signatory coastal municipalities to deploy concrete actions for public awareness, training of nautical and tourism actors, and prevention of nuisances affecting marine fauna, particularly acoustic disturbance, colli-

sions, or chemical pollution. These actions translate into the dissemination of good practices to boaters and maritime operators, the implementation of cetacean monitoring and observation systems, and strengthened cooperation between communities, ports, and environmental associations. By consolidating this network of local commitments, the Pelagos Charter complements state and European standards by bringing a territorial and participatory dimension to marine environment preservation.

On the monitoring and governance tools side, the rise of observation and real-time data transforms management. The **NETCCOBAMS platform**, developed by ACCOBAMS (Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area), collects information useful for cetacean conservation at the Mediterranean scale and offers, with the VisiZone module, near real-time visualization of speeds from AIS on areas of interest, providing animated maps and dashboards to objectify speed compliance and target collision risk zones, particularly in the northwestern PSSA.



Presentation of ACCOBAMS' VisiZone Module during the first workshop © Simone Panigada



At the large recreational fleet scale, the **SEA Index** (carried by the Yacht Club de Monaco and the Superyacht Eco Association) establishes a CO₂ emissions assessment system for superyachts (over 24 meters). Adopted in a growing number of ports and integrated by regional actors, it serves as a comparative tool and signal to encourage fleet energy improvement. This sectoral metric complements European climate obligations by targeting a high unit-impact segment.

Additionally, usage governance and quality of wildlife interactions rely on certification systems and codes of conduct: the **High Quality Whale Watching®** label, developed by ACCOBAMS with the Pelagos Agreement, requires training, adherence to a code of good conduct, and contribution to knowledge, to reduce cetacean disturbance and align tourism offerings with conservation objectives. These frameworks, adopted by international organizations and scientific communities, facilitate operator adoption and authority control (ACCOBAMS, 2023).

Finally, these technical and normative building blocks make sense within a transboundary institutional architecture that remains the reference framework: the **Pelagos Agreement** aims at harmonizing protection measures, reducing pressures, and coordinating public and private actors, a necessary condition for the effectiveness of local action plans and alignment with European objectives (MSFD, EU Biodiversity Strategy for 2030).

Taken together, these instruments outline an action trajectory combining binding rules, economic signals, labels, and digital monitoring tools. Their effectiveness depends on three key factors: replicability within the Sanctuary and coherent application of speed and anchoring measures in sensitive zones; integration of GIS/AIS data and indicator monitoring in port and authority decision-making processes; and finally, articulation between carbon pricing, technical innovations, and labeling systems to drive all sectors (cruise and recreational boating) toward practices compatible with Sanctuary sustainability objectives.





3 . Country Case Studies (France,- Monaco, Italy)

In the three coastal countries of the Pelagos Sanctuary, implementation trajectories are distinguished by the type of tools prioritized, the degree of environmental cost internalization, and the depth of local governance mechanisms. These differences are particularly observed through three angles: usage regulation in coastal protected areas, incentives for large recreational boating decarbonization, and animation of Pelagos governance at the national level.

In Italy, the **Portofino MPA**, created in 1999 and pioneering in integrated coastal usage management, illustrates a fine management approach that combines **ecological zoning, anchoring prohibitions in sensitive habitats, and organized mooring fields** to avoid destructive effects on benthic bottoms. Zoning into three area types (A, B, C) is accompanied by anchoring prohibition in zones A and B and, in zone C, protection of identified sensitive bottoms, with substitution by dedicated moorings and buoys. Mooring authorization is conditional on compliance with annual regulations and payment of fees indexed to length and, importantly, to propulsion type, with a differential favoring sail and electric over thermal units. This differentiated pricing acts as a price signal analogous to an «eco-fee» benefiting low-emission modes. It now inspires other Italian marine protected areas such as Cinque Terre or Tavolara, which are also exploring the path of environmental taxation applied to maritime uses. In parallel, the municipal program **«Portofino Carbon Free» aims for a net-zero emission marina**, and buoy systems also serve to collect attendance data, facilitating mooring quota adjustments according to site ecological capacity. These measures confirm the contribution of zoning and reasoned development as transferable good practices to other Posidonia seagrass bed areas.

In **Monaco**, the strategy is distinguished by an exemplarity and sectoral engagement approach carried by the Superyacht Eco Association founded by the Yacht Club de Monaco. It has developed the **SEA Index®**, now used as a **measurement and comparison reference for superyacht CO₂ emissions**. Initially conceived as a technical tool, the index has become a true economic incentive through concrete advantages: 5% reduction in port dues for units rated 3 stars and 10% for those reaching 4 stars in Monegasque ports. The SEA Index's dissemination now extends beyond the Principality's borders. Several major Côte d'Azur ports (Port Vauban, Port Gallice, and Vieux Port de Golfe-Juan) have integrated it, in articulation with «Clean Ports» approaches already

deployed in Antibes. Its inclusion in Monaco's carbon neutrality strategy by 2050, adopted in 2021, also gives it a structuring dimension.

This dynamic is accompanied by investments in technical infrastructure that reinforce coherence between reducing atmospheric nuisances, improving coastal ecological status, and tourism attractiveness: shore power connections, renewable energy integration, or biohut installation (artificial nurseries). The system's credibility also relies on independent control by Lloyd's Register, mandated and funded by the Yacht Club de Monaco, ensuring both neutrality and methodological rigor. The approach continues to evolve: an adaptation of the SEA Index is underway for yachts under 24 meters, considerably expanding its scope of application. Scientific partnerships, particularly with AtmoSud, contribute to developing a specific air pollution index. Finally, the association is working on noise certification, based on the Noise Shipping Index's 18 indicators, as well as routing optimization solutions integrating weather forecasts. Through these initiatives, the association aims not only to promote good practices but also to help the sector anticipate and adapt to future regulations.

In **France**, **Port-Cros National Park** plays a pivotal role in animating the Pelagos Sanctuary on the French side, both as manager of emblematic MPAs and as operational arm of Pelagos governance serving municipalities signatory to the Charter. Its action combines several levers: supporting municipalities in adhesion or renewal to the Pelagos Charter, support for deploying the High Quality Whale Watching® label to cetacean observation operators, and coordination with the State for implementing local restrictions on anchoring or speed. The institutional Pelagos site highlights Port-Cros's support role on responsible observation practices, municipality mobilization, and conducting scientific studies. More than 120 coastal municipalities have now adhered to the Charter, with France concentrating the majority of these commitments, which reinforces the park's institutional role as local cooperation catalyst. The High Quality Whale Watching® label also benefits from growing recognition in the tourism sector, with some travel agencies using it as a commercial differentiation criterion. Simultaneously, France is developing innovative technological solutions, such as the REPCET acoustic detection system installed on ferries, allowing real-time alerts on cetacean presence and reducing collision risks. At the Sanctuary scale, recognition of the northwestern Mediterranean as PSSA reinforces recommendations to reduce speed in the presence of marine mammals and adapt navigation routes, consistent with the MSFD and voluntary instruments like the Pelagos

Charter or HQWW®. Finally, these orientations are implemented locally through marina networks engaged in «Clean Ports Active in Biodiversity» certifications, as well as in education and awareness policies carried by national parks.

These three cases reveal distinct strengths and limitations. Italy prioritizes sensitive habitat preservation through robust zoning and organized mooring solutions. Portofino MPA's «eco-differentiated fee» strengthens acceptability by substituting pure prohibition with an operational alternative, but would benefit from better articulation with emissions metrics to maximize environmental effect. Monaco succeeds in transforming a measurement tool into a price signal and collective movement, with rapid regional impacts, but generalization of score-conditioned port due reductions must be accompanied by third-party control and continuous transparency to maintain credibility and engagement effect. In France, the advantage is institutional: Port-Cros's animation and coordination capacity on the Pelagos Charter and HQWW® label creates a «network effect» while consolidating the local scale. The challenge consists in even more systematically connecting these behavioral approaches with new basin frameworks (PSSA, ECA) and real-time monitoring tools (AIS, speed dashboards) to make collision prevention and nuisance reduction measurable at the Sanctuary scale.

Operationally, it is relevant to «engage» three actor pairs to consolidate bridges between governance, metrics, and port practices. First, Portofino MPA to share zoning/anti-anchoring doctrine and document buoy field effects on habitats. Tariff and regulatory documents, as well as authorization management applications, facilitate replication and interoperability with Pelagos GIS. Next, Port-Cros National Park to capitalize on its role as Pelagos France animator and on HQWW® dissemination, strengthening speed traceability and expanding support to municipalities not yet signatory. Finally, Monaco Yacht Club with Port Hercule, to align SEA Index incentive with «Clean Ports» and «Clean Ports Active in Biodiversity» (PPAB) frameworks, to test articulation between yacht environmental, score, port call advantages, and port requirements. Already certified Clean Port/PPAB and SEA Index network member, Port Hercule offers an ideal experimentation ground for integrated governance between environmental performance, economic incentive, and port sustainability, in a cooperation logic between Monaco and Alpes-Maritimes.



Porto Fino © Ricardo Gomez Angel



4 . Recommendations for Enhanced Environmental Integration

Workshop exchanges and examination of existing initiatives in the three coastal countries of the Pelagos Sanctuary highlight several improvement paths to ensure better integration of the environmental dimension in national and local strategies for recreational boating and cruising. These recommendations lie at the interface between science, governance, and cross-border cooperation, and aim to strengthen the coherence and effectiveness of actions undertaken within the Sanctuary.

The first priority is to **strengthen bridges between scientific actors, managers, and decision-makers**. Researchers produce knowledge about pressures that often remain compartmentalized or difficult to access for port managers and communities. It is necessary to institutionalize knowledge transfer mechanisms, such as permanent scientific and technical committees, shared data platforms, and cross-training. The High Quality Whale Watching® label experience, which brings together scientists, NGOs, and operators, illustrates the added value of co-constructed approaches that both raise professional awareness and translate scientific knowledge into operational standards.

Second, **data and indicator harmonization** appears as an essential condition to objectify progress and guide public choices. During a dedicated workshop session, specifically devoted to indicators, we were able to identify and analyze different mobilized metrics, building on [Plan Bleu's Scoping Study](#) and applying the RACER method. The workshop revealed the diversity of mobilized metrics, from the SEA Index for superyachts to the NETCCOBAMS platform for collisions, including «Clean Ports» certifications or biodiversity indicators. While this diversity reflects innovation dynamics, it makes comparison and monitoring difficult. Aligning indicators with European objectives (MSFD, Green Deal, carbon neutrality objectives) and Mediterranean ones (Barcelona Convention, ACCOBAMS agreements) would ensure their compatibility and avoid multiplication of parallel frameworks.

In this perspective, several priority indicators were identified during the workshop, according to 5 categories to structure progress monitoring in the Pelagos Sanctuary.



Climate Indicators

Main identified indicators:

- **Regional maritime emissions (tons of CO₂ equivalent per year per vessel category)**, praised as a good tool to measure the overall trend of situation degradation or improvement.
- **GHG/passenger (tons of CO₂ equivalent)**, which complements this approach by integrating an energy efficiency dimension.
- **Percentage of fleet equipped with certified atmospheric emission reduction systems**, appears as a concrete lever for maritime transport ecological transition.



Biodiversity Indicators

Main identified indicators:

- **Percentage of habitat surfaces affected by vessel anchoring and/or transit in the Pelagos Sanctuary** was retained as a key indicator, both relevant and simple to measure, allowing direct evaluation of nautical activity impacts on sensitive coastal habitats.
- **Multi-year monitoring by species, of cetacean populations (abundance, distribution, health status and their exposure to identified threats)** constitutes another essential pillar of ecological assessment.
- **Analysis of benthic community composition and functional diversity evolution**, which informs ecosystem resilience to disturbances.
- **Integration of variables related to maritime traffic in the sampling zone (traffic volume, underwater noise and turbidity)** will enable establishing precise correlations between anthropogenic pressures and observed biological community dynamics.



Circular Economy Indicators

Main identified indicators:

The retained indicators reflect the territory's capacity to reduce waste and create local value with:

- **Number of established circular treatment chains and their recovery rate (composting, recycling, valorization),**
- **Number of jobs created in maritime circular economy value chains,**
- **Rate of maintenance, repair and reconditioning activities in blue economy sectors.**



Socio-economic Indicators

Main identified indicators:

- **Percentage of effective implementation of visitor-related regulations or quota systems,**
- **Annual growth rate of blue economy-related sectors (including sustainable fishing, responsible maritime tourism and marine energy),**
- **Total annual maritime traffic volume, in number of vessels and tonnage, in the Pelagos zone.**



Governance Indicators

Main identified indicators:

- **Evolution of stakeholder engagement and contribution within the Sanctuary's multi-party governance framework.**
- **Effectiveness rate of management measures implemented in the Sanctuary marine protected area (implementation, financing and monitoring of management plans).**

Thus, the Pelagos Sanctuary, through its transboundary dimension and laboratory role, offers a privileged framework to test these different harmonized indicators before their dissemination at the Mediterranean basin scale.

Finally, it is essential to support coordinated cross-border approaches. Current fragmentation between local, national, and regional levels limits measure effectiveness, while pressures are inherently transnational. Good practices observed in Portofino MPA, Port Hercule, or Port-Cros National Park show the interest of local experimentation, but these would benefit from being pooled within a common framework. This requires strengthening cooperation mechanisms, expanding Pelagos Charter scope, and supporting coastal communities in adopting joint tools (zoning, quotas, common indicators). Port manager and cruise company

involvement must also be consolidated, through incentive mechanisms but also through coordinated regulatory obligations among the three states.

These recommendations directly open to the next workshop work, scheduled for February 2026 and dedicated to sustainable tourism, climate change adaptation, and integrated coastal zone management. Lessons from this first workshop on cruises and recreational boating will serve as a foundation to address interactions between maritime and terrestrial pressures, and to reflect on articulation between sectoral and territorial policies. By strengthening continuity between workshops, the Adapt-Pelagos project will thus foster the emergence of ecosystem and cross-border governance, capable of reconciling tourism attractiveness, biodiversity protection, and climate change resilience.



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Funded by



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PRINCE ALBERT II
DE MONACO



PLAN BLEU

Regional Activity Centre of UN Environment/MAP
Marseille, France

planbleu@planbleu.org - www.planbleu.org

Publishing Director: **Robin Degron** Author: **Sophie Bayle & Chloé Martin**

Contributors: **Antoine Lafitte & Arnaud Terrisse**

Graphic Design : **Christelle El Selfani & Saif Salmi**

Legal deposit : **N° ISSN 2606 61 06**