

Tackling Marine Litter in the Mediterranean: Knowledge and Tools

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BIODIVERSITY MANAGEMENT AND PROTECTION

This factsheet has been developed in the framework of the Working Group #1 “Biodiversity Management and Protection” of the MED Biodiversity Protection Community featured by the PANACeA Project, an Interreg MED Programme’s initiative. The WG #1 is coordinated by MedCities, ETC-UMA and Plan Blue.

THE CHALLENGE: MARINE LITTER IN THE MEDITERRANEAN

The Mediterranean Sea is one of the most important biodiversity hotspots in the world; it represents less than 1% of the global ocean surface but hosts almost 20% of global marine biodiversity. Over 1,200 Marine Protected Areas (MPAs) and other forms of protected areas have been established in the Mediterranean to protect endangered and threatened habitats and species, including the associated ecosystem services and cultural values. They cover around 200,000 km², corresponding to about 7% of its surface, a proportion that is still below the Aichi Target 11 of 10% of coastal and marine waters to be protected by 2020.

The Mediterranean Sea is a semi-enclosed basin; for this reason, it is one of the areas in the world that is most affected by marine litter. Marine litter in the Mediterranean is largely composed of plastics (70-90% of the total). It originates mainly from land-based sources like tourism and recreational activities, poor waste management practices, discharges of untreated municipal waste, and industrial outfalls. Rivers are an important pathway through which a considerable quantity of marine litter enters into the coastal and marine environment. Additionally, sea-based activities such as maritime transport,

fisheries, and aquaculture can also contribute to the inputs of litter in specific contexts, especially through direct discharge of waste and through Abandoned, Lost, or otherwise Discarded Fishing Gears (ALDFG).

Marine litter is a major threat for marine living organisms. Over 260 species, including invertebrates, fishes, turtles, seabirds, and mammals, have been reported to ingest or become entangled in plastic debris worldwide. Moreover, marine litter may be colonised by microorganisms, and be used as a transport vector for non-native and invasive species, affecting marine ecosystems and their functioning. In parallel, there are increasing concerns among scientists, policy-makers, and society of the impacts of marine litter not only on key maritime economic sectors (like tourism) but also on human health, livelihood and wellbeing.

Several legal and policy frameworks have been established to tackle the issue of marine litter in the Mediterranean, like the EU Marine Strategy Framework Directive (MSFD), the EU Circular Economy Package and Plastics Strategy, and both the UNEP/MAP Regional Plan for Marine Litter Management and the Integrated Monitoring and Assessment Programme (IMAP). However, several problems still exist in relation to marine litter assessment and management in the Mediterranean (see the Box).

What is required to tackle this challenge?

- Need for increased, long-term information on marine litter and its impacts on biodiversity and humans for the whole Mediterranean
- Need for harmonised protocols to monitor and assess certain marine compartments, and the impacts on biodiversity
- Need to improve waste management practices, in keeping with the waste hierarchy, to prevent the leakage of litter into the environment
- Need to empower local managers (especially in MPAs) with the necessary tools and knowledge to tackle marine litter
- Need for clearly defined baselines and targets to measure trends and progress
- Need to ensure effective cross-border and cross-sector cooperation and coordination on a Mediterranean (especially non-EU) scale in the implementation of existing policies

THE INTERREG MED BIODIVERSITY PROTECTION COMMUNITY

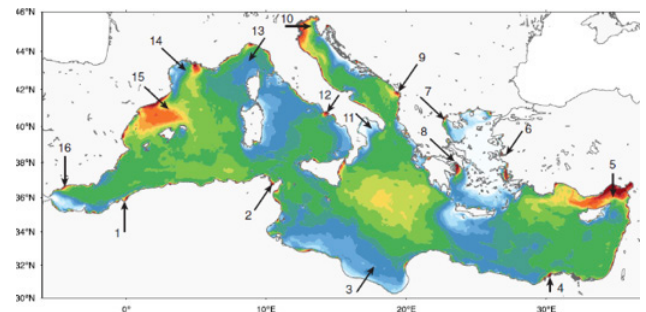
The Interreg MED Biodiversity Protection Community has been established for the purpose of engaging nature conservation stakeholders in the Mediterranean, by acting as a mainstreaming instrument to communicate and capitalise on the efforts of the Interreg MED projects, with a special focus on Marine Protected Areas (MPAs) as sentinels for monitoring environmental impacts in the Mediterranean Sea. Several projects within the Community devote efforts to address the current limitations in scientific knowledge and management practices on marine litter, and particularly, to enhance the capacity of MPA managers and stakeholders to address this pressure (see additional information on the projects at the end of the Factsheet). This factsheet briefly synthesises and showcases the contribution of these projects to developing

and/or refining marine litter assessment and management tools, giving special emphasis to the tools that can be applied in Mediterranean MPAs. Moreover, current gaps in knowledge and management are identified, and recommendations are advanced for further action at both the EU and Mediterranean level.

MAJOR ACHIEVEMENTS OF THE COMMUNITY

Increased knowledge of marine litter on beaches, floating on the surface, and in biota

Major findings of the Community projects:



Map of average sea surface plastic debris concentrations (g/km²) in the Mediterranean for the period 2013-2017.

- Plastic constitutes more than 80% of marine litter in all compartments, especially packaging, bags, wrappers, and fisheries-related objects.
- Marine litter on beaches accumulates more rapidly during the warmer seasons (spring and summer).
- There is a higher presence of floating litter during the warmer seasons, especially in the Ligurian Sea, Sardinian-Balearic basin, and Central Tyrrhenian Sea.
- Marine litter in the Mediterranean comes mainly from the largest coastal cities, rivers, and the most congested shipping lanes. Modelling of how floating marine litter drifts in the entire Mediterranean indicates that the most contaminated areas are the Cilician sub-basin, the Catalan Sea, the Po River Delta area, and the Venice Lagoon.
- Boomerang Effect: modelling of how floating marine litter drifts shows that the plastic pollution



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of almost every country is mainly caused by its own terrestrial sources.

- Marine litter was found in the stomach of 78% of the marine turtles and of 46% of the fish sampled.



- There is a high spatial overlap between the presence of marine litter and marine species (cetaceans and sea turtles), especially in spring and summer, and in the Sardinian-Sicily Channel and in the Adriatic Sea.

Refining current assessment protocols and methods

An enhancement of the existing protocols for monitoring floating macro-litter and ingested marine litter has been developed and tested. It includes a study of the main limitations, benefits, and opportunities to reduce the costs of existing monitoring techniques. This enhanced protocol has been included in the revision of the EU-JRC Guidance for monitoring marine litter in 2019.

Testing innovative tools to support marine litter assessment



Drone transects implemented to monitor beach marine litter in Malta as part of the AMAre project.

- The use of drones and other Unmanned Aerial Vehicles (UAVs) has been shown to be a promising and cost-effective tool for monitoring marine litter, especially in hotspot areas and for local management purposes.

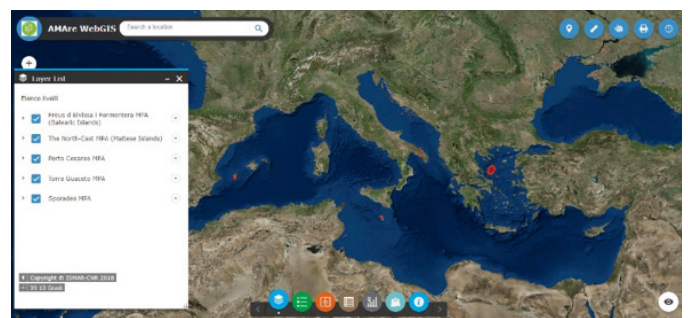
- The geo-spatial tools developed by the Interreg MED Biodiversity Protection Community are useful means for MPA managers to visualise and analyse the results of monitoring marine litter. In addition, the Biodiversity Protection Platform can be easily used to display existing knowledge and

ensure access and sharing of data and information on marine litter at the Mediterranean scale.

- Modelling tools have proven useful in understanding the fate of marine litter throughout the Mediterranean basin.

- The new indicator developed (the Marine Litter Beach Accumulation Index), and the investigation into the use of animal forests as indicators of entanglement, can help to establish clearer baselines and reduction targets in the context of both the EU MSFD and the UNEP/MAP IMAP.

Tools and measures for MPA managers



A screenshot of the WebGIS platform developed by the AMAre project.

- A comprehensive list of best practices to fight marine litter in Mediterranean MPAs has been compiled.

- Recommendations have been formulated on how to increase coordination between MPAs and other maritime sectors, centred on policy lobbying, waste reduction, and raising awareness.

- A Decision-Making Tool was developed to support MPA managers in identifying the most effective measures to tackle marine litter.

- Nine pioneering MPAs have developed MPA-specific Marine Litter Action Plans.

- These Action Plans form the backbone of a Joint Plan for Action that sets the baseline for a common urgent response by all other Mediterranean MPAs.

RECOMMENDATIONS FOR ACTION

The following recommendations are advanced for action at the EU policy level, and in relation to EU funding mechanisms.



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1. Marine litter data and information

- Further support the creation of a long-term knowledge base and information series that cover the whole Mediterranean basin;
- Support research to close current knowledge gaps on marine litter fluxes, on the impacts of marine litter on maritime socio-economic sectors, on the impacts of marine litter on biota and on human health, on the occurrence of Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG), and on the degradation mechanisms of marine litter in the environment (including “biodegradable” materials with enhanced degradation properties).

To capitalise on the efforts of the Community

- Reinforce and consolidate the Community participatory science initiatives (Marine Litter Watch Month and floating litter monitoring through sailing vessels) and strengthen the collaboration of the scientific community with MPA managers, Mediterranean NGOs and local communities, also in other Mediterranean MPAs.
- Promote the use of drones, wavegliders and other UAVs for marine litter data collection, especially in MPAs.
- Ensure that the Mediterranean marine litter knowledge base hosted in the Biodiversity Protection Knowledge Platform is regularly maintained and updated, and link it permanently to the UNEP/MAP Regional Cooperation Platform on Marine Litter and to the EMODnet platform.

2. Refining and improving assessment protocols

- Foster the adoption of the enhanced protocol for floating macro-litter and ingested litter, proposed by MEDSEALITTER and included into the revision of the EU-JRC Guidance on monitoring marine litter in 2019, at Mediterranean scale; and
- Further support the development of new Mediterranean-wide monitoring protocols for micro-litter, for the entanglement of marine

species, for the effect of litter colonization by small marine species, and for deep-sea areas.

3. Knowledge and tools for local managers

- Further support local authorities, MPA managers, and local communities with effective instruments to monitor and manage marine litter, by improving their administrative coordination, capacity building, and technical support, and prioritising upstream solutions in keeping with the waste management hierarchy.

To capitalise on the efforts of the Community

- Share the management tools developed for the pilot MPA managers (i.e. the list of measures, the DMT, the MPA-specific Action Plans, and the Joint Plan of Action) with other EU and non-EU Mediterranean MPAs by using MedPAN and the UNEP/MAP network.
- Train MPA personnel on using the geospatial tools developed by the Community projects.
- Ensure that funding mechanisms require the development of geospatial tools that are user-friendly and can be easily used in an effective way by MPA managers.

4. Clearly defined baselines and targets

- Further support scientific research towards a clear definition of baseline values and reduction targets against which to measure progress in tackling marine litter.

To capitalise on the efforts of the Community

- Consider the use of the new Marine Litter Beach Accumulation Index, and further investigate the use of animal forests as indicators of entanglement, to establish clearer baselines and reduction targets in the context of both the EU MSFD and the UNEP/MAP IMAP.



5. Cross-border cooperation (especially with non-EU countries)

- Further support cross-border cooperation and coordination in the Mediterranean by sharing the knowledge and tools developed by the projects, especially with partners from non-EU countries.

To capitalise on the efforts of the Community

- Share the management tools developed for the pilot MPA managers with other EU and non-EU Mediterranean MPAs by using MedPAN and the UNEP/MAP network.
- Consider extending the horizontal approach used to develop the Biodiversity Protection Community, to include other lines of EU funding for the Mediterranean (e.g. other Interreg, LIFE, or European Fisheries Fund projects) and streamline best practices and recommendations into management and policy instruments.

6. Cross-sector coordination

- Further support the coordination between marine conservation and maritime socio-economic sectors by including the consideration of Ecosystem-Based Management principles in other policies (especially in the Circular Economy Package and the Plastics Strategy), and by fostering a coordinated approach between MPAs, coastal and marine resource managers, and other maritime sectors.

7. Sea-based sources of marine litter

- Ensure a wider coverage of potential sources of marine litter by supporting projects that address

sea-based sources of marine litter like shipping, fishing, offshore installations, or dumping of refuse at sea.

8. Involve local stakeholders and civil society

- Further strengthen the connection between future projects and society at the local level by implementing actions that aim to raise the awareness of local communities and to involve local authorities, and also by developing participatory science initiatives on marine litter monitoring and assessment.

9. Sustainability of achievements





















- Guarantee the sustainability of the Interreg MED Biodiversity Protection Community's achievements by ensuring the creation of a permanent link between the Community outcomes and the existing, Mediterranean-wide knowledge platforms on marine litter, to foster the accessibility to available resources, the transferability of the knowledge and tools generated, and the replicability of the solutions tested.

To capitalise on the efforts of the Community

- Ensure that the Mediterranean Marine Litter Knowledge Base hosted in the Biodiversity Protection Knowledge Platform is regularly maintained and updated, and link it permanently to the UNEP/MAP Regional Cooperation Platform on Marine Litter.



THE INTERREG MED BIODIVERSITY PROTECTION COMMUNITY FOR MARINE LITTER

Project	Title	Aim	
Biodiversity Protection Community featured by PANACeA	Streamlining Management Efforts in Protected Areas for Enhanced Nature Conservation in the Mediterranean	To engage nature conservation stakeholders in the Mediterranean, to communicate and capitalise on the efforts of the Interreg MED projects, with a special focus on Marine Protected Areas (MPAs)	    
ACT4LITTER	Joint measures to preserve natural ecosystems from marine litter in Mediterranean Protected Areas	To facilitate efforts to fight marine litter in Mediterranean MPAs through the development of effective and targeted measures	   
MEDSEALITTER	Developing Mediterranean-wide protocols to protect biodiversity from litter impact at basin and local MPAs scales	Network of representative MPAs, scientific organisations and environmental NGOs to develop, test and implement efficient, easy to apply and cost-effective protocols to monitor and manage floating litter and litter impact on biodiversity	  
PLASTIC BUSTERS MPAs	Plastic Busters: preserving biodiversity from plastics in Mediterranean Marine Protected Areas	To help maintain biodiversity and preserve natural ecosystems in pelagic and coastal MPAs by consolidating Mediterranean efforts to curb marine litter	  
AMAre	Actions for Marine Protected Areas	<ul style="list-style-type: none"> To develop shared methodologies and geospatial tools for multiple stressor assessment, coordinated environmental monitoring, multi-criteria analyses and stakeholder engagement. To develop concrete pilot actions and coordinated strategies in selected Marine Protected Areas (MPAs) to solve hot spots of conflicts affecting marine biodiversity and the services it provides 	 
PHAROS4MPAs	Blue Economy and Marine Conservation: Safeguarding Mediterranean MPAs to achieve Good Environmental Status	To produce recommendations on interactions between MPAs and 9 blue economy sectors related to energy, transport, tourism and fisheries	
BlueIslands*	Seasonal variation of waste as effect of tourism	To properly identify, address and mitigate the effects of the seasonal variation in waste generation on Mediterranean islands	  

* The project BlueIslands belongs to the Interreg MED Sustainable Tourism Community.

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