Mediterranean Biodiversity and Marine Litter: AN INTERACTION KNOWLEDGE BASE

Brief update of the MedBioLitter database version (10) updated in January 2023
developed by the European Topic Centre on Spatial Analysis and Synthesis (ETC-UMA)

3 March, 2023

Context

The MedBioLitter knowledge base is an entry-point to the peer reviewed research evidence published on the impacts of marine litter on marine biota in the Mediterranean region. This knowledge base was created in 2017, under the Interreg-Med funded initiative PANACeA (2016-2019), and has been periodically updated every 6 months since then.

The MedBioLitter knowledge base reports on the increased evidence on marine litter sources, occurrence and impacts. Through its interactive dashboard, it helps users understand marine litter concerns and supports evidence-based decisions and actions to reduce pressures coming from marine litter and impacts on biodiversity and ecosystems in the Mediterranean region.

MedBioLitter is the basis for the assessment of main findings related to interactions between marine biodiversity and litter in the Mediterranean as it registers the spatial information of the impacts published in scientific literature. Litter interactions refer to encounters between marine species and litter items and are classified in four categories: 1) Ingestion; 2) entanglement, which affects mobility, often with fatal consequences; 3) colonisation, which occurs when certain species settle on floating litter; and 4) others, including different types of less frequent interactions namely breaks, crushing or impediment to normal growth when occupying natural substrate. Parameters referring to the geographical location of the interactions, relevant policies and directives, ongoing protection frameworks, species assessed, their habitats, and their conservation status as well as the interaction with marine litter registered per marine compartment (beach, sea surface, water column, seafloor) are available in MedBioLitter. Each database spatial registry of an interaction directs the user to the reference source and the authors of the peer reviewed article published.

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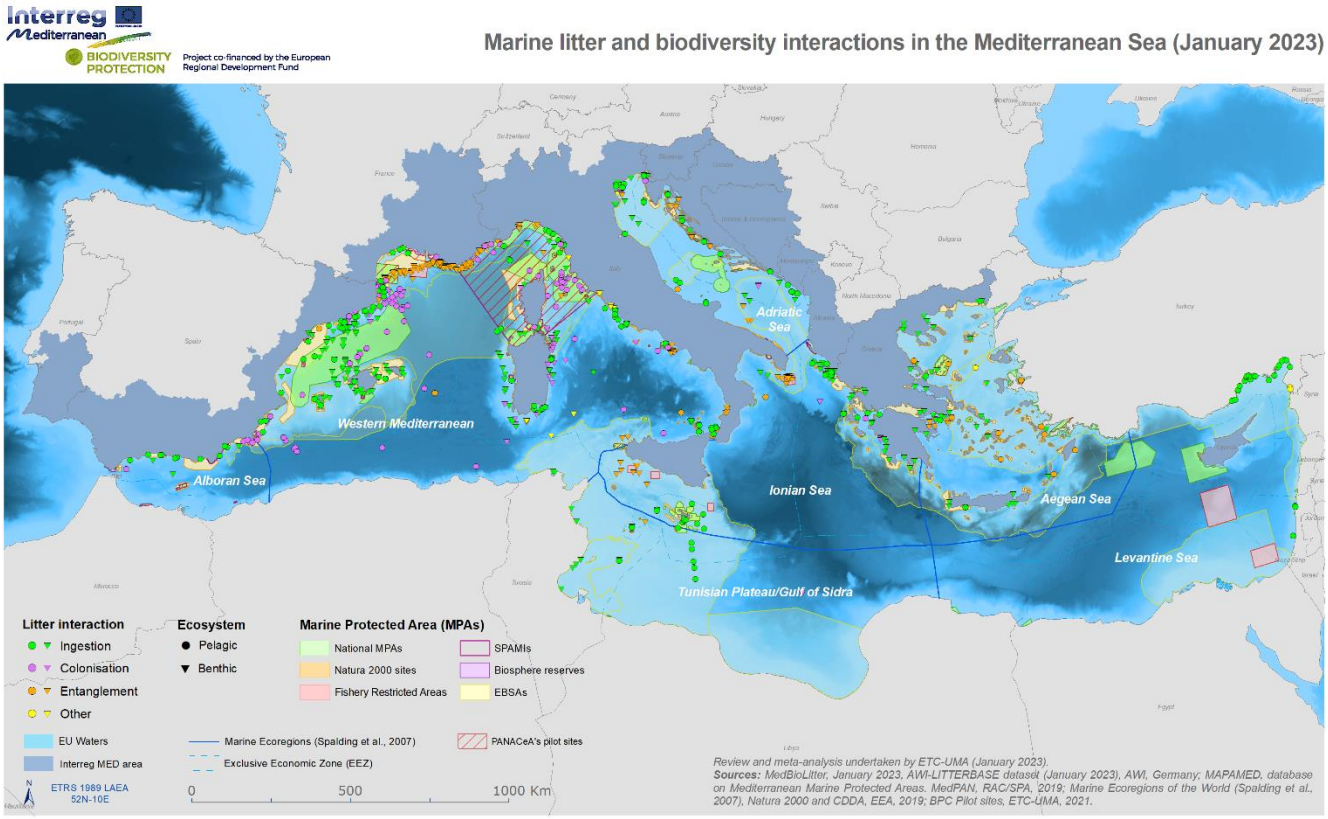
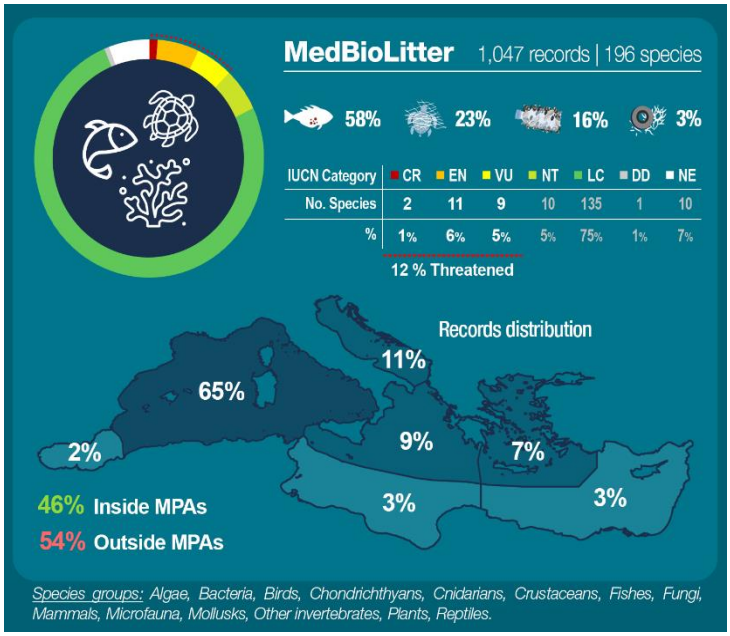


Map showing distribution of MedBioLitter records by type of interaction and ecosystem type (pelagic or benthic).

Key findings on species and marine litter interactions

MedBiolitter version 10 (updated in January 2023) includes 1047 records on litter interactions with 196 marine species, categorised under 14 taxonomic groups, 89% of which (175 marine species) are included in the IUCN Red List of Threatened species. The regional findings of MedBioLitter assessment show that the knowledge and spatial information published on the impacts of marine litter on marine species is registered inside (46%) as well as outside protected areas (54%) to a comparable extent when considering all records of the database. This finding suggests that marine protected areas are not capable, with the current management structures and used tools, to reduce the impacts of marine litter on the biodiversity they host.

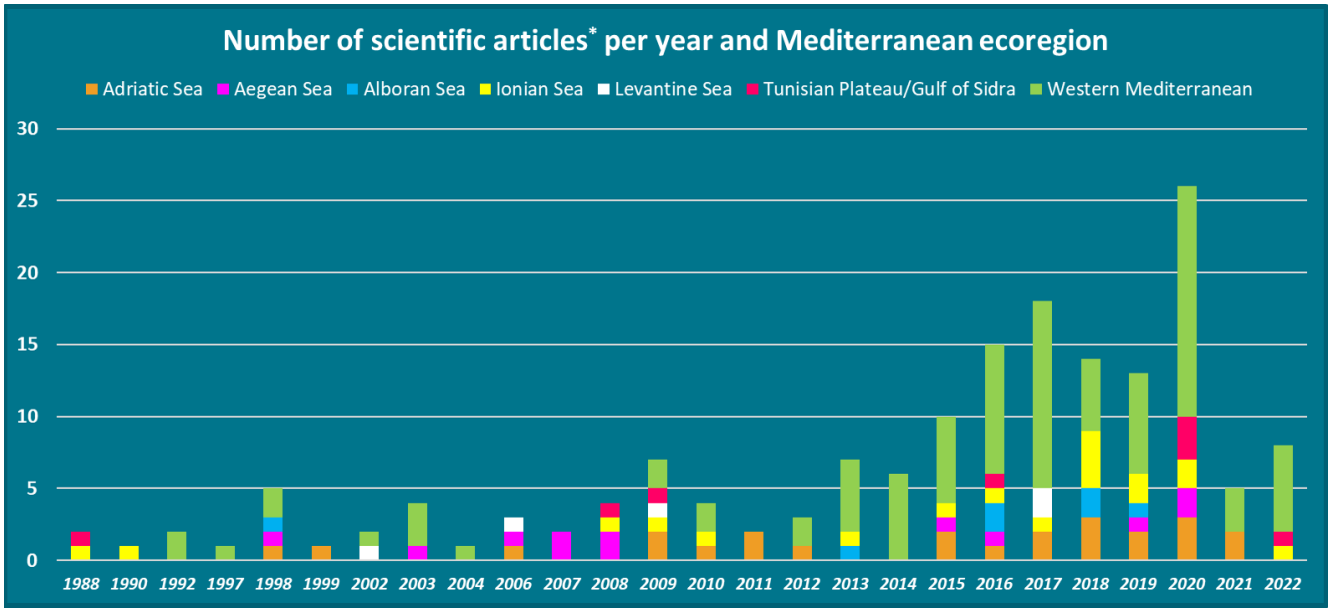


Summary of MedBioLitter data including statistics on the type of interaction distribution of records and red list categories.

Concerning the database of marine species, most records correspond to fishes and cnidarians (including jellyfish, sea anemones, and coral species among others), registering more than 50% of the entries. Other prominent taxonomic groups are crustaceans, reptiles (sea turtles species) and mammals (including cetaceans and phocids, the latter being represented by the Monk Seal). These represent 28% of the records; 79% including fishes and cnidarians. The remaining nine taxonomic groups show a considerably smaller number of records (21%), being mainly species of other invertebrates, bacteria and algae. Within these groups, chondrichthyans (including species of sharks and rays) and plants (including Posidonia Oceanica) stand out due to their high ecological relevance. Together these two groups only represent 24 records (2%).

The dominant impact from litter on all types of studied biota (58% of the records) is ingestion, followed by entanglement (23%) and colonisation (16%) in addition to other types of impact to a lesser level (3%). When differentiated by sea water column depth, pelagic species show greater impact by ingestion (73% of the cases studied) while the species assessed in benthic zones (near the sea bottom) show impacts somewhat more distributed between ingestion and entanglement, being 48% and 36% respectively.

MedBioLitter shows a great disparity in the distribution of research efforts on the impact of marine litter on biota in the Mediterranean region. The MedBioLitter assessment shows that most research refers to the Western Mediterranean region (65% of records), while systematic information lags in other regions with the Adriatic Sea registering 11%, followed by the Ionian Sea (9%), the Aegean Sea (7%), the Levantine Sea (3%), the Tunisian Plateau/Gulf of Sidra region (3%), and the Alboran Sea (2%). As for the temporal distribution of scientific articles, most of them are concentrated in the decade from the 2010s onwards (80%), especially from the year 2015 (65%), when the issue of marine litter takes on special relevance.



*Temporal distribution of scientific articles included in MedBioLitter per ecoregion. *The same paper may cover more than one ecoregion, so there may be a slight overcounting in some cases.*

Main conclusions from this spatial assessment

1. The distribution of knowledge across the Mediterranean region on the registered impacts of marine litter on marine biota and on their location is uneven, across sub-regions, across species, institutions and across time.

2. Analysing data on marine litter impacts on marine biota, using reliable sources, provides a solid reference for risk assessments allowing to better specify Mediterranean wide priority areas for biodiversity conservation.

3. Scientific collaboration and data integration are crucial across public and private institutions at local, national and regional level to understand and take measures to effectively reduce the impacts of marine litter in the Mediterranean.

4. The geographical disparity of the evidence on the impacts of marine litter on biota in the different Mediterranean ecoregions calls for a serious prioritisation of funding of under assessed ecoregion (namely, the Levantine Sea, the Tunisian Plateau/Gulf of Sidra region, and the Alboran Sea) as a solution to address this problem effectively ensuring filling remaining gaps in an equitable manner.

Additional material related to MedBioLitter

- Marine litter and biodiversity knowledge base – MedBioLitter interactive viewer
- Report on Marine megafauna and litter in the Mediterranean: Overview of impacts in MedBioLitter
- Report on Mapping the State of Knowledge on Marine Litter and Biodiversity Interactions in the Mediterranean Sea