

# Environmental Concerns in the Mediterranean Sea: Pollution and Climate Change

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## Introduction

The ecosystem in the Mediterranean is in grave danger of deterioration. Marine species quickly decline as their habitats are damaged daily due to persistent tourism, plastic and chemical pollution, unsustainable fishing, and fast-growing coastal human concentrations. Fish stocks are predicted to be overwhelmed by plastic debris in the sea by 2050 due to the daily dumping of 730 tonnes of trash into the Mediterranean Sea. Climate change and other concerns, such as pollution, pose severe risks to the region's ecological balance and environmental resilience. Only a tiny fraction (0.03%) of the Mediterranean Sea is safeguarded by protected areas, even though 9.68% of the region has been classified as marine protected areas (MPAs). No extractive operations are allowed in fully protected zones, sometimes called "no-take zones." On the other hand, partially protected zones permit or strictly limit specific kinds of usage or activity. The main aim of MPAs is to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

In light of this, the Mediterranean region's environment is not on track to meet the targets established in international frameworks like the 2030 Agenda for Sustainable Development and the United Nations Framework Convention on Climate Change (UNFCCC) or in regional frameworks like the Barcelona Convention and the 2016–2025 Mediterranean Strategy for Sustainable Development. Furthermore, the formulation of coordinated and harmonized marine environment protection standards is complicated by the presence of over 20 coastal States surrounding the Mediterranean Sea and the unequal socio-economic development amongst these States. The purpose of this piece is to analyze the effectiveness of the current legal regime in the Mediterranean region and whether it is serving its purpose of protecting the environment.

### **UNEP's Regional Seas Programme and the Development of the Legal Regime for Protecting the Mediterranean Sea**

The UNEP Mediterranean Action Plan (MAP) is one of the most creative and comprehensive of the 18 UNEP Regional Sea Programmes (RSPs). Also, it exemplifies a substantial degree of regional collaboration among twenty-two nations. The RSP was developed in response to the 1972 UN Conference on the Human Environment (UNCHE) and Principle 24 of the Stockholm Declaration, with the Mediterranean Sea being the first regional sea to be included. Regional Seas Conventions and Action Plans (RSCAP) form the backbone of the UNEP RSP. A conventional framework with corresponding implementation protocols is present in some RSPs but not all. With a framework convention and seven protocols, the Mediterranean Sea RSP is among the most advanced RSCAPs.

The MAP has been used since 1975, when Phase I was established to carry out the RSP's operations, and again in 1995, when Phase II was approved. The Convention for the Protection of the Mediterranean Sea against Pollution (the Barcelona Convention) and its Protocols provide the basis of the legal framework of the MAP. In 1976, the Barcelona Convention was adopted, establishing the Convention's overarching goals, duties, guiding principles, operational framework, and sector-specific implementing protocols. The Barcelona Convention was revised in 1995 and renamed the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean in response to the significant development of environmental legislation after the 1992 Earth Summit. The revised Convention incorporated critical new concepts and principles in environmental law introduced by the Rio Declaration and Agenda 21, such as the polluter pays principle, the precautionary principle, the use of environmental impact assessment, and the use of best available technologies.

Raftopoulos describes the historical development of the compliance system established by the Barcelona Convention. The first Phase was predicated on the general responsibility of the parties to fulfil their obligations (pacta de contrahendo). The Meeting of the Contracting Parties was given the authority to monitor compliance based on periodic reports by the parties in 1995 when the Barcelona Convention was revised. The formation of the Compliance Committee in 2008 marked the beginning of the third Phase, which may be described as the "institutionalization" of the compliance process. The

Contracting Parties have appointed seven individuals to serve on the Compliance Committee. At least once a year, the Compliance Committee comes together to discuss relevant issues. Finally, a final report reflects the research's conclusions and recommendations. Danovaro and Pusceddu emphasize the importance of the report in protecting the marine environment.

### **Marine Litter and Plastic Pollution in the Mediterranean Sea**

Plastic pollution is a relatively recent problem in the Mediterranean Sea. Although marine litter is a problem worldwide, it is especially severe in the Mediterranean due to the region's high tourist traffic. More than 730 tonnes of plastic enter the Mediterranean Sea every day. More than half of all marine litter is made up of plastic, and estimates put the percentage of marine trash at about 95%. It is mainly because around 210 million people live along the Mediterranean's coasts, making the sea an enclosed basin.

Furthermore, the Mediterranean nations see an average of 360 million tourists annually, making them the most popular tourist destination on the planet. Many significant rivers that travel through heavily populated areas also dump their trash into the Mediterranean Sea. Since more than 20% of all maritime travel in the world goes through the Mediterranean Sea, the issue of marine litter is exacerbated. As a result, the Mediterranean Sea is now one of the most afflicted regions for marine trash worldwide.

Approximately 183 million tonnes of municipal solid trash, or about one kilogramme per individual per day, was generated in Mediterranean nations in 2016, according to the 2020 MAP State of the Environment and Development in the Mediterranean (SoED) Report. While there have been some positive developments, Mediterranean nations' solid waste management capacity is still insufficient to deal with the ever-increasing waste volume. It is estimated that if no management measures are taken, the quantity of plastic thrown in the Mediterranean basin might increase by a factor of more than two by 2025.

The SoED Report links marine litter to inefficient water management, unsustainable consumption, and production trends. From 1950 to 2015, worldwide plastic manufacturing surged from 2 million to 380 million tonnes or 8.4 percent per year. This tremendous expansion is expected to continue. About 40% of plastic demand is for packaging, and 18% comes from the European Union.

The Barcelona Convention's Contracting Parties approved the Mediterranean Regional Plan for Managing Marine Litter from Land-Based Sources in 2013. (RPML). Among the 18 RSPs, this is the only one with any teeth in terms of law and addresses marine trash. In addition, most Mediterranean nations have undertaken national-level preventative measures to advance the RPML with assistance from the MAP Barcelona Convention System. In this way, the RPML may serve as an example of best practices for similar RSPs to follow. It is based on fundamental concepts that serve as guidelines for implementing the Contracting Parties. One of these ideas is "integration," which states that dealing with marine litter should be treated like dealing with any other kind of

garbage. In addition, the ecosystem-based approach, the concepts of public engagement and stakeholder involvement, and the principles of sustainable consumption and production are incorporated.

Contracting parties agree that by 2025, they will implement waste prevention and management policies that prioritize preventing waste, preparing waste for reuse, recycling, another recovery (such as energy recovery), and disposing of garbage in an ecologically responsible manner, in that order. In addition, Article 10 of the RPML stipulates that “[b]y the year 2019 [contracting parties are to] implement adequate waste reducing/reusing/recycling measures to reduce the fraction of plastic packaging waste that goes to landfill or incineration without energy recovery.”

The Specially Protected Areas and Specially Protected Areas of Mediterranean Importance (SPAMI) and the litter impacting endangered species listed in Annexes II and III of the SPA and Biodiversity Protocol are two examples of places where it is environmentally sound and cost-effective to remove existing accumulated litter. Certain sections indeed include qualifiers on the requirements, as “to the extent practicable,” or just compel the Parties to “investigate,” but these are exceptions. For instance, Article 10 mandates that Contracting Parties’ explore’ the identification of accumulations/hotspots of marine litter, the implementation of potential national programmes on their regular removal and sound disposal, and the adoption of cost recovery programmes for the use of port reception facilities, to name a few examples. However, the RPML lays out a clear plan of action and encourages the transition to sustainable consumption and production patterns; the removal of existing marine litter using environmentally sound practices such as fishing for litter; clean-up campaigns; port reception facilities; monitoring; assessment; reporting on the implementation of measures; and enforcement of national legislation. The RPML also actively encourages corporate collaboration, for example, by encouraging the creation of voluntary agreements with merchants and supermarkets to create objectives for reducing plastic bag usage and adopting plastic bag fees.

The MAP has played an essential role in facilitating a regionally coordinated strategy for monitoring and assessing the environmental state of the Mediterranean Sea. Concerning pollution and marine litter, biodiversity, non-indigenous species, coastal ecosystems, and hydrography, COP 19 approved the Integrated Monitoring and Assessment Programme (IMAP) in 2014. IMAP includes 11 Ecological Objectives and associated goals. Adopted at COP 21 in 2019, the Naples Declaration outlines lofty commitments made by the Mediterranean States and the EU to prevent and significantly reduce plastic leakage into the Mediterranean Sea, such as measures to boost the Green Economy and circular approaches and to “achieve 100 percent plastic waste collection and recycling by 2025.”

### **Effects of Climate Change**

Another pressing problem in the Mediterranean Sea area is climate change and its consequences on the marine ecosystem, a problem that is shared by regions all over the globe. Regarding climate change, the Mediterranean Basin is at the forefront of vulnerability and visibility. The average temperature in the area is around 1.5 degrees

Celsius, higher than the world average, and it is increasing at a rate that is 20% greater than the global average. Current policies are projected to result in a 2.2 °C rise in regional temperatures by 2040. In addition, the Mediterranean Sea is becoming warmer. As a result, climate change is projected to have severe consequences for the region's terrestrial, coastal, and marine ecosystems. Climate change has already increased the intensity and frequency of extreme events, including floods, fires, heat waves, and droughts, while forecasts predict a further 10–30% drop in precipitation. Forecasts place the amount of sea-level rise between 52 and 190 centimeters by 2100, with a median estimate of 152 centimeters. Also, marine life and ecosystems in the Mediterranean Sea are in danger due to ocean acidification. Research findings continually stress the need to take extra measures to safeguard Mediterranean marine ecosystems from the effects of climate change.

The 2008 ICZM Protocol, the 2016-2021 MTS, the 2022-2027 MTS, and the 2016-2025 MSSD reflect the newfound MAP's emphasis on climate change. Also, the Parties at the 19th Conference of the Parties to the UNEP MAP adopted the Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Areas, which aims to make the region more resilient to the adverse effects of climate variability and change by 2025 within the context of sustainable development. The 2022-2027 MTS places climate change front and center due to the First Mediterranean Assessment Report (MAR1).

The ICZM Protocol of 2008 is the only binding legislative instrument within the MAP framework to specifically address the effects of climate change on coastal regions. It cites explicitly Article 4(e) of the UNFCCC, which states that Parties must “cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods.” The Parties to the ICZM Protocol have vowed to establish “a unified framework for the integrated management of the Mediterranean coastal zone,” as is stated in Article 1 of the ICZM Protocol. Furthermore, one of the goals of Article 5 of the UNFCCC is to avoid or decrease the consequences of natural disasters, particularly climate change, which may be generated by natural or human activity. Therefore, it seems that this article would also address climate change. In this regard, the MAP supports efforts to revive coastal habitats, including seagrass and mangroves.

For the Mediterranean Sea, seagrass is shown prominently in MAR1—it is estimated that between 5% and 17% of the world's seagrass ecosystem is found in the Mediterranean Sea. This amounts to 1.35–5 million hectares. Approximately 5% of the Mediterranean's seagrass is lost annually. The ICZM Protocol perfectly applies to the ecosystem-based strategy of seagrass restoration in the Mediterranean Sea. Though the ICZM Protocol is not explicitly mentioned, MAR1 does support ecosystem-based management of coastal regions as part of the Mediterranean's adaptation strategy. The ICZM Protocol is founded on an ecosystem-based approach. In addition to mitigating the effects of climate change, ecosystem-based adaptation strategies may help people adapt to it by bolstering the

resilience of coastal and marine ecosystems and using natural carbon sequestration and coastal protection against sea level rise. However, the ICZM Protocol's potential to develop a uniform framework for the integrated management of the Mediterranean coastal zone, a significant aim under Article 1 of the ICZM Protocol, is hindered by the fact that only 12 of the 22 Parties to the Barcelona Convention have acceded to it. Reducing the negative effects of climate change in the Mediterranean via ecosystem-based techniques, such as the restoration and preservation of seagrass and other nature-based solutions, requires concerted and coordinated efforts.

The ICZM Protocol is limited in addressing the more significant concerns of climate change due to its exclusive emphasis on coastal area management. There is no silver bullet to mitigate climate change's negative effects on the marine ecosystem, and a single-themed legislative document cannot possibly cover such a vast and varied area as the Mediterranean Sea.

The Regional Climate Change Adaptation Framework for the Mediterranean Marine and Coastal Areas (Adaptation Framework) was accepted by the MAP in 2016. The Adaptation Framework is based on four primary goals, including but not limited to the following: raising public and stakeholder awareness; creating best practices for effective and sustainable adaptation to climate change impacts; providing access to existing and emerging international and domestic finance mechanisms; and enhancing decision-making through research and scientific cooperation to produce and utilize reliable data, information, and tools.

Thus, the MAP has adopted a multi-pronged approach to climate change, as this debate has shown. The groundwork is, therefore, solid; the real test will be in putting it into practice.

## **Concluding Reflections**

For several reasons, the UNEP RSP for the Mediterranean Sea stands apart from the others. Since its introduction in 1974, it has been the most well-established RSP and a solid legal framework for protecting the marine environment. The Rio Declaration of 1992 inspired new legal advancements included in this framework. The Contracting Parties have established innovative procedures and methods at the Barcelona Convention. Using the SPAMI Protocol, Member States can create jointly protected marine regions, even in international waters. The MAP is the first UNEP RSP to have established a legally enforceable document to address the issue of marine plastic and litter. It was also the first RSP to adopt a protocol for integrated coastal zone management with a specific roadmap for ecosystem-based management.

There are still threats to the marine environment from long-standing and more recent sources, such as marine litter and plastics, according to an evaluation of the overall MAP's framework, which includes several legal instruments, strategies, and programmes, such as the recent SoED and MAR1 reports. Aichi Target 11 calls for the conservation of at least 10 percent of coastal and marine areas, and while the SPAMI Protocol provides

an excellent legal framework for establishing MPAs, including in cooperation with other Parties, Member States of the MAP have barely achieved the quantitative target and are far below the qualitative requirements for effectively and equitably managed, ecologically representative, and well-connected systems of protected areas. Not all Member States have ratified the ICZM Protocol, despite its importance in offering an integrated regional strategy to coastal management based on the ecosystem concept and being the only document to make specific reference to tackling climate change. The ICZM Protocol cannot mitigate climate change's destructive effects, such as ocean acidification and heat, on its own. Additional procedures and initiatives are needed to counter climate change's potential negative effects. The MAP MTS for 2022-2027 is a significant initiative since it tackles climate change, biodiversity loss, and pollution. In addition, the absence of complete involvement under the ICZM Protocol may be mitigated if all Member States approve it since this would ensure a thorough regional implementation. In addition, strategic orientations are crucial in connecting local initiatives with international pledges.

Although a solid legal framework exists to protect the marine environment, the MAP Barcelona Convention System shows how difficult it may be to solve its many dangers. The good environmental status will remain unattainable without thorough implementation by all Contracting Parties. Twenty-one densely populated nations surround the Mediterranean Sea, and their combined activities put constant strain on the ecosystem. A well-functioning and proactive system of collaboration, which meets yearly via the COPs, is reflected in the construction of a legislative framework that keeps up with new and developing concerns like marine plastic litter and climate change. However, more political will is required to carry out pledges, and further assistance for capacity development and financial aid may be necessary for some instances.