

Título del proyecto: *MIRAMAR*. Monitoring cumulative Impact to guide mitigation and Restoration in the Mediterranean Region



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Abstract: Humans are placing increasing strain on ecosystems exposing them to multiple, concurrent stressors. The Mediterranean region is a biodiversity hotspot hosting almost half of all the plant species, about a third of all the vertebrate species on our planet and an exceptional number of species found nowhere else in the world. This biodiversity, however, is heavily exposed to stressors like legacy and emerging contaminants, marine litter including microplastics, noise, habitat destruction from ever-increasing human activities, exacerbated by climate change, resulting in long term impacts on ecosystem stability. These stressors are often tackled in isolation. The urgency to address these threats and the cumulative impact of multiple stressors requires cohesive, transnational efforts that combine fragmented knowledge to develop a new, integrated approach. In response to these challenges, the MIRAMAR project has identified three ecologically significant ecosystems in the Euro-Mediterranean region: seagrass meadows, wetlands, and habitats of endangered species. Seagrass meadows serve as crucial breeding, feeding, and sheltering grounds for numerous species, are vital for oxygen production and as blue carbon sinks. Wetlands are biodiverse transition ecosystems containing river deltas, brackish waters, salt lakes, and marshes, supporting a variety of flora and fauna, that play a critical role in maintaining ecological balance.

Healthy endangered species habitats, including those of seabirds, cetaceans and wetland birds, are vital for the survival of these vulnerable populations. MIRAMAR's 8 partners represent 6 countries across the Euro-Med region (Albania, Croatia, France, Greece, Italy, and Spain), and come from academia (UNISI), research institutes (CSIC, HCMR, SZN, RBI), NGO networks (MIO-ECSDE), as well as regional (OEC) and national authorities (MTE). Thanks to this transnational collaboration, MIRAMAR aims to develop an innovative harmonized methodology to monitor cumulative impact of selected stressors in 9 pilot areas in the three identified habitats. Drawing support and upscaling previous project results (INTERREG, ADRION, LIFE, H2020) MIRAMAR will design, test, and validate a new holistic monitoring method to identify suitable nature-based mitigation and restoration solutions. By aligning with national monitoring strategies and the management plans of parks and protected areas, MIRAMAR will address the common challenge of preventing, mitigating and restoring environmental degradation of these ecosystems. MIRAMAR is committed to aligning with key environmental initiatives and programs such as, Zero Pollution Action Plan of the European Green Deal, EU Biodiversity Strategy for 2030, EU Marine Strategy Framework Directive, Barcelona Convention's Integrated Monitoring and Assessment Programme, Union for the Mediterranean, UN Environment Programme/Mediterranean Action Plan, Ramsar Convention on Wetlands, among others. These frameworks emphasize the interconnected nature of climate change, biodiversity loss, land and sea degradation, stressing the importance of addressing these challenges in a

coherent, synergetic, and holistic manner based on best available scientific knowledge. By engaging with these international agreements and frameworks, MIRAMAR will contribute to global efforts to tackle environmental issues and promote sustainable development practices. MIRAMAR's collaborative approach and focus on stakeholder engagement, benefitting from Living Labs, underscores our commitment to harnessing collective expertise and fostering innovative solutions to address the complex challenges facing the Euro-Mediterranean region.

The *aim* of the MIRAMAR project is to develop a joint approach to improve our understanding of, and response to, the combined effects of different environmental pressures on three vital ecosystems in the Euro-Mediterranean region: seagrass meadows, wetlands and habitats of endangered species.

Pilot areas:

- Secche della Meloria Marine Protected Area – Tuscany, Italy (seagrass meadows and marine protected habitats)
- European Special Protection Area (SPA) – Tuscany, Italy (coastal habitats for protected bird species)
- Aeolian Islands (Vulcano, Panarea) and Capo Peloro Lagoon / Lago di Faro – Sicily, Italy (island marine habitats and coastal lagoons)
- Lavezzi Island, Bonifacio Strait Natural Reserve – Corsica, France (rocky reef ecosystems and sensitive marine zones)
- Amvrakikos Wetlands National Park – Greece (wetlands and estuarine ecosystems)
- Western Istria Coast – Croatia (coastal marine systems and nearshore biodiversity hotspots)
- Vjosa River Delta – Albania (river–marine transition zone and coastal wetlands)
- Bay of Pollença – Balearic Islands, Spain (seagrass meadows, particularly *Posidonia oceanica*)
- Parco di Migliarino, San Rossore, Massaciuccoli – Tuscany, Italy (coastal lagoons and wetland)

Keywords/Palabras clave: biodiversidad marina, contaminación marina, gestión costera, impacto ambiental

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