

TAKING ACTION FOR PRESERVING POSIDONIA BEACH-DUNE SYSTEMS AND INCREASING COASTAL RESILIENCE IN THE MEDITERRANEAN

A policy brief for public authorities

Current threats and issues on sandy coastlines with *Posidonia* seagrass:

1. **Increase of erosion** mostly due to the impact of the rigid structures built in the last decades (e.g. breakwaters), intensity of storms, sea level rise and climate variability.
2. **Increased pressure** on beaches, dunes and marine areas with seagrass meadows due to growing population and visitor numbers.
3. **Negative stakeholder concern** (e.g. communities, businesses and beachgoers) about *Posidonia* banquettes on beaches, *Posidonia* wrack disposal/temporary storage sites and diverse beach management issues.

Mediterranean coasts are a **dynamic and unique natural asset** that support much of the region's economy and socioeconomic wellbeing. Beach environments range from natural to semi-urban and urban and the region and the endemic marine seagrass *Posidonia oceanica* is found throughout nearly the entire Mediterranean basin. This flowering plant forms vast meadows that can reach depths of 40-45m and provide a wide array of key ecosystem services, including reducing the speed and strength of waves arriving to the shoreline.

Posidonia oceanica meadows:

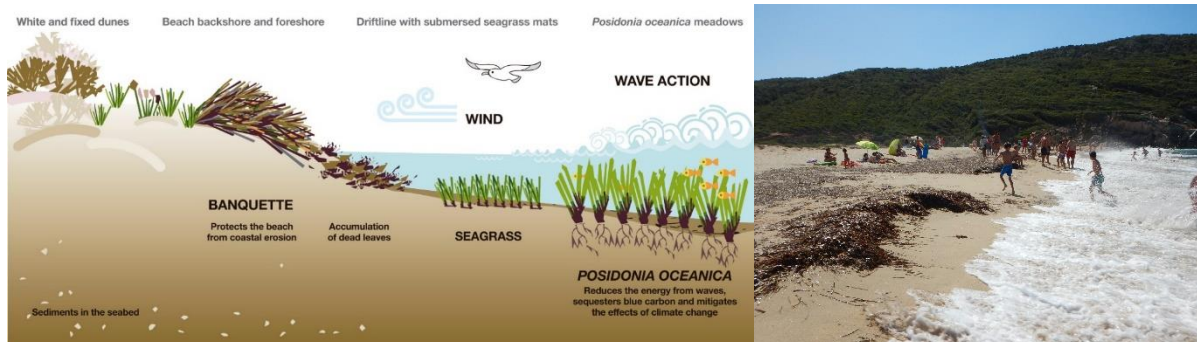
- Buffer wave energy and protect the coastline from erosion, particularly during storms
- Provide habitats and spawning groups for many plant, invertebrate and fish species (including commercial ones)
- Regulate CO₂ absorption in the sea while storing it, mostly below the matte layer
- Indicate good water quality



Along many Mediterranean shores, it is possible to observe *Posidonia* **banquettes** made of drifting plant material (leaves, rhizomes and stems) that have been washed ashore and mixed with sand, forming wedge-shaped structures that can be up to 1-2 m thick and 20 m wide. These solid and natural structures can protect the shoreline from erosion caused by prolonged wave action or swells, particularly during heavy storms.

Posidonia oceanica banquettes:

- Can be temporary or permanent in nature
- Are often inhabited by a rich macrofauna, including molluscs and crustaceans
- Play an important role in the continuous formation of sand dunes and the creation of dune vegetation



The Mediterranean region is considered the world’s leading tourism destination in terms of both international and domestic tourism. In 2019, the Mediterranean region attracted over 400 million national and international tourists, generating over €370 billion to the regional economy (15% of its GDP)¹. Over half of Mediterranean tourism takes places in coastal areas, contributing to approximately 70% of total economic revenue earned².



The removal of *Posidonia oceanica* banquettes from beaches has been an established practice for many decades, aiming to improve the recreational use of beaches and to meet the perceived demands from the tourism sector. This is often done with heavy machinery and the removed organic material is take to landfills, which in many cases has resulted in **sand loss** and the **alteration of the beach profile**, increasing its **vulnerability to storms and climate change**.

Management actions in *Posidonia* beach-dune zones need to be responsive to the changing conditions on these dynamic environments, manage erosion risks, biodiversity loss and tourism growth to achieve positive net impact. This needs creative solutions such as using nature-based solutions and increasing efforts on knowledge, communication, coordination and the developent of good policies and practices.



Local administrations and beach managers have a key role in managing the Mediterranean coastline and *Posidonia* beach-dune systems.

KEY RECOMMENDATIONS

- **No active intervention:** No changes with respect to the existing situation within the beach and marine zone. Natural processes are allowed to take place and only monitoring and

¹ Fosse, J., Klarwein, S., Kosmas, I., Gonzalez, A. (2021). Ecosystem Approach for a Better Environmental Management of Coastal and Maritime Tourism in the Mediterranean region (Version 1). Zenodo, <https://doi.org/10.5281/zenodo.5137940>.

² Fosse J., Kosmas I., Gonzalez A. (2021b). Regional Governance, Environmental Management and Sustainable Recovery of Mediterranean Coastal and Maritime Tourism. Eco-union.

some management actions (e.g. realignment of footpaths, litter cleaning) are considered. The protection of natural processes such as Posidonia banquette formation and beach-dune sediment exchanges are the basis for the overall coastal response and resilience.

- **Limited interventions to accommodate:** Adaptive approach where areas continue to be used by people, while behaviours and infrastructure are changed to reduce the consequences of some climate hazards such as erosion (e.g. increasing resilience through retrofitting banquettes). This approach considers the use of regenerative adaptation options that usually mimic natural processes and design, which accompany natural processes of shoreline mobility.
- **Interventions to maintain or hold the current shoreline:** Approach that includes measures which reinstate some natural processes (e.g. beach-dune sediment exchanges) and the use of nature-based options (e.g. Posidonia banquette retrofitting, seagrass and dune restoration) to protect the shoreline from coastal storms and to support natural processes in reducing flood hazards and erosion. Nature-based options are the preferred method where possible, while the combination with hybrid integrated solutions using (existing) grey infrastructure are sometimes the adequate coastal management solution.
- **Interventions to retreat (or manage realignment):** This approach builds on the withdrawal, relocation or abandonment of areas due to protection designation or because they are areas prone to erosion (or other climate) hazards. Under this approach, infrastructures in beach or coastal areas are moved away or relocated. Managed retreat allows greater space for natural buffers, recovery and reduces exposure to natural hazards.



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