



Scalable full-cycle marine litter remediation in the Mediterranean: Robotic and participatory solutions

SeaClear2.0

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Title: SeaClear2.0 stakeholder workshops

Co-design Activities for Tackling Marine Litter - Stakeholder Workshop on Skyros Island, Greece

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The SeaClear2.0 stakeholder workshops

Understanding local circumstances and collaboratively designing targeted, site-specific solutions are central to the SeaClear2.0 approach for tackling marine litter across Europe and the Mediterranean. Through the DeCyDe-4 decision support methodology, workshops are conducted with stakeholders in multiple countries and islands to identify problems, prioritise challenges, and co-design feasible interventions that reflect the local context.

The sixth workshop: Skyros, Greece

The Skyros stakeholder workshop brought together a diverse group of participants representing public authorities, civil society organisations, academia and research institutions, and local businesses linked to tourism and maritime activities. In total, 19 stakeholders attended the workshop, sharing their views and insights. The group reflected the complexity of marine litter issues on Skyros, capturing perspectives from environmental actors, local authorities – including the Mayor and Deputy Mayor of Skyros – tourism professionals, and specialists familiar with the ecological characteristics of the island.

Local Insights: Marine Litter Challenges on Skyros

Participants worked together to identify the main problems driving marine litter on the island. Their contributions highlighted the intertwined influences of natural processes, human activities and tourism pressures:

1. Marine litter from passing ships: Stakeholders noted that waste discharged or lost from vessels passing near Skyros contributes to litter accumulation on local shores. Although this is not the dominant source of litter, it remains a visible and recurring issue.
2. Waste entering the sea through streams and ravines: Participants explained that rainfall events wash land-based waste through the island's ravines directly into the sea, especially during the winter months. Insufficient capture points and limited prevention measures exacerbate the issue.
3. Microplastics: One of the top concerns of the participants was microplastics. They stressed that microplastics are increasingly detected on beaches and in nearshore waters, posing ecological risks and affecting tourism. They highlighted that this pollution is both locally generated and externally transported.
4. Single-use plastics: The continued reliance on single-use plastic items was identified as a persistent challenge across households, tourism facilities, and the food service sector.

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5. Lack of citizen information and awareness: Participants acknowledged that while awareness improved over the recent years, ongoing engagement is necessary to maintain and strengthen good practices.
6. Lack of collection points for fishing nets and sea-based litter: This problem reflects the absence of dedicated infrastructure for storing and recovering used fishing nets, ropes, or litter collected during fishing and diving activities. Without such facilities, marine litter coming from sea-based sources is left unmanaged.
7. Limited access to remote beaches for litter collection: Some beaches are difficult to reach, making cleanup activities challenging. Stakeholders noted that these remote sites can accumulate significant quantities of litter.
8. High tourism pressure relative to available infrastructure: Participants pointed to the imbalance between the seasonal influx of visitors and the island's limited waste management infrastructure. This mismatch strains existing systems and contributes to marine litter, especially in peak season.
9. Violation of anchoring distance regulations: This issue arises from vessels anchoring too close to sensitive coastal zones, disturbing habitats, and sometimes contributing to marine litter.
10. Lack of a sustainable tourism model: Stakeholders highlighted the absence of a long-term, environmentally responsible tourism strategy. They stressed that current practices place considerable pressure on the island's ecosystems and waste systems.
11. Fishing lines in the harbour seabed: Participants mentioned that abandoned fishing lines still accumulate in the harbour, requiring periodic cleanup.
12. Limited coordination among local actors for implementing holistic actions: This problem points to the need for stronger collaboration between municipalities, tourism businesses, NGOs, and community groups to design and carry out comprehensive management strategies.

After discussion, participants selected the two highest-priority problems for deeper analysis: (i) microplastics, and (ii) lack of a sustainable tourism model. The participants then worked in groups to identify site-applicable and effective solutions to these two problems.

Addressing Microplastics

Stakeholders proposed a range of interventions targeting the sources and drivers of microplastic pollution:

- Improving the quality of tap water: Participants stressed that ensuring consistently high-quality drinking water would reduce reliance on bottled water, a key source of plastic waste. Reliable tap water quality could significantly decrease plastic consumption and, ultimately, microplastic generation.
- Providing targeted information to fishers and recreational boat operators: Awareness

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campaigns focusing on the impacts of plastic use and the importance of responsible waste management in maritime activities were proposed. Stakeholders emphasised that these groups are key actors who can influence the presence of plastics in the marine environment.

- Reducing the use of plastic bags and replacing single-use plastics with sustainable alternatives: Participants recommended promoting reusable items, encouraging environmentally friendly procurement in local businesses, and adopting local policies or incentives to reduce single-use plastic consumption.
- Implementing a cigarette butt collection system managed by local businesses: This was recognised as a practical measure to prevent a highly pervasive microplastic source from entering the environment.

Developing a Sustainable Tourism Model

The second priority topic focused on transforming the island's tourism sector into a driver of environmental responsibility rather than a pressure:

- Introducing and enforcing strict fines for polluters: Stakeholders argued that regulatory enforcement must be strengthened so that polluting activities, whether by visitors or businesses, carry meaningful consequences.
- Providing incentives for tourism enterprises to undergo a green transition: This includes financial or administrative support for adopting environmentally friendly infrastructure, energy-efficient practices, waste reduction measures, and eco-certification schemes.
- Promoting thematic forms of tourism: Stakeholders saw an opportunity to diversify the island's tourist offerings, such as nature-based tourism, cultural routes, and outdoor recreation activities that have lower environmental impact and spread tourist flows throughout the year.

Cross-cutting Reflections

Across discussions, participants emphasised that addressing marine litter requires collaboration among local actors, consistent communication, and education efforts targeting both residents and visitors. The island's environmental vulnerabilities, combined with seasonal tourism pressures, demand coordinated, long-term action supported by adequate infrastructure and governance.

Conclusion

The Skyros stakeholder workshop provided a detailed understanding of the island's most pressing marine litter challenges and the social, infrastructural, and environmental factors that shape them. The co-designed solutions offer a roadmap for reducing plastic pollution,

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strengthening sustainable tourism practices, and enhancing local capacity for marine environmental protection. These insights will contribute directly to the broader SeaClear2.0 policy work and the 2026 White Paper, ensuring that Skyros's experience helps inform scalable strategies across the Mediterranean.

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