



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

SeaClear2.0

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SeaClear2.0 Stakeholder Workshops

Identifying site-specific issues and co-designing realistic, locally applicable solutions are essential steps in effectively tackling marine litter across Europe and the Mediterranean. As part of the SeaClear2.0 project, ISOTECH Ltd is implementing its DeCyDe-4 decision support method in a series of participatory workshops with stakeholders in eleven countries (including non-EU neighbours). These workshops aim to map local sources and drivers of marine litter and develop targeted, site-specific solutions to address this issue.

The Stakeholder Workshop in Venice, Italy

The stakeholder workshop in Venice took place on 29 May 2026, in the Venice Arsenal on the occasion of the International Venice Boat Show, and as part of the 6th International Workshop on Marine Litter Monitoring, Removal and Blue Circular Economy, organised by SeaClear2.0 partner, Venice Lagoon Plastic Free.

The workshop brought together 17 participants from the Venice area with direct experience in waste and marine litter management and/or responsibility to address marine litter. This included relevant public authorities such as Venice Port Authority and Gruppo Veritas – the body responsible for waste management and water services in Veneto – environmental consultancy companies, representatives of Venice hoteliers, representatives of research and academia working on the topics of waste management, marine litter and biodiversity conservation, and civil society organisations, including Venice Lagoon Plastic Free, the Gondolier Divers Association, which undertakes voluntary canal cleanups, and Venice Tap Water, which works on raising awareness about the importance of drinking tap water for plastic pollution.

Local Insights: Marine Litter Challenges in Venice

Participants collaboratively identified the main drivers of marine litter in Venice. These reflect a combination of tourism pressures, governance gaps, and behaviour patterns:

1. **Overtourism:** The Venice Province (Cittá Metropolitana di Venezia) receives nearly 40 million tourists per year, with the historic centre of the city receiving nearly 12-13 million of these tourists, with the numbers increasing every year. To put these figures into perspective, Venice Province has circa 834,000 inhabitants, around 48,000 of whom live in the historic centre of Venice. The stakeholders noted that this influx and concentration of tourists, particularly in the historic centre, places enormous pressure on the city's waste management infrastructure.

Since the spring of 2024, the city of Venice has been testing the application of a city access fee (Contributo di Accesso). The fee is applicable on selected days (mainly weekends and public holidays) and ranges from 5 to 10 euros per person. Visitors with an overnight stay in Venice are exempted from paying the fee. Therefore, the fee aims primarily to limit or mitigate the impact of day visitors. The workshop stakeholders noted that this has had no impact on the number of tourists in the historic centre, and that the fee merely acts as an additional income source for the Province.

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2. Excessive Use of Bottled Water: Another important issue identified by the stakeholders is directly linked to overtourism and concerns the use of bottled water. The stakeholders noted that, on average, 90 m³ of bottled water is used in Venice per day. This figure is an annual average; therefore, during the peak tourist season, daily bottled water consumption is much higher. At the same time, tap water is perfectly safe to drink, and Venice has nearly 200 public fountains that tourists can use for drinking and refilling their bottles. The stakeholders noted that there are two main barriers hindering the reduction of bottled water use. The first is that tourists are often unaware that tap water in Venice is safe to drink and tastes similar to bottled water. To overcome this issue, the NGO Venice Tap Water, which was present at the workshop, launched an awareness-raising campaign that includes a map of all public water fountains in Venice and its islands. The second barrier to tap water use is the condition of some public fountains, which are in need of renovation. It was noted, however, that some of these fountains are part of the city's cultural heritage and for this reason might be difficult to replace or refurbish.
3. Tyres in Venice Lagoon and its Canals: The representatives of the Gondolier Divers Association noted that tyres are an important marine litter item in Venice's lagoon and canals. These are used as fenders on vessels transporting merchandise around Venice, and they are accidentally lost into the canals once they break off. To demonstrate the severity of the problem, the Gondolier Divers noted that during 38 cleanups that they undertook, they collected over 40 tonnes of litter, including 2500 end-of-life tyres. The discussion highlighted a weakness in the relevant policy framework, the Regulation for the Coordination of Local Navigation in the Venetian Lagoon (Regolamento per la Navigazione Locale nella Laguna Veneta). The Regulation requires boat fenders to be buoyant (instead of being unsinkable) and does not explicitly ban the use of tyres as boat fenders. Many vessel operators take advantage of this regulatory loophole to use foam-filled tyres, which are buoyant, as fenders. Over time, the foam disintegrates or breaks off, in itself contributing to pollution. Once tyres eventually break off, as they all do at some point, they are no longer buoyant and sink in the canals.
4. End-of-Life Boats: Known as "Ghost Boats", these are abandoned recreational and small commercial vessels that sink or wash up along remote shorelines and sandbanks of the lagoon. Fibreglass and wooden vessels are scattered around the Venice Lagoon, the exact number of which is not known. The disintegration of the materials making up the vessels not only contributes to plastic and microplastic pollution but also leaches hazardous micro-pollutants into Venice's fragile lagoon ecosystem. There are several reasons which contribute to the dumping of vessels in the lagoon. The first is the high disposal costs related to dismantling and recycling of fibreglass vessels, which, depending on the size of the vessel, can cost several thousand euros. The second is the fact that, under Italian law, vessels below 10 metres do not require formal registration. This makes it very difficult to trace it back to the owner, once it is improperly disposed of. Importantly, there is neither a specific EU directive nor a national level provision for the end-of-life boat management, disposal and recycling.

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5. **Aquaculture Waste:** Shellfish farming is an important economic activity in Venice, with the Lagoon and its coastal waters being one of the most important shellfish hubs in the Mediterranean. Small tubular fishing nets (also known as sleeves or socks) are used to grow and transport mussels and other shellfish. These frequently end up as waste in the lagoon's coastal areas. While these nets can be accidentally lost in the lagoon, as breakages are not uncommon, their inappropriate disposal is also possible. While waste management services are available for end-of-life nets, the aquaculture facilities need to pay a collection and disposal fee for these, proportional to the volume of waste they need to dispose of. It was noted that this could act as a disincentive, leading to their inappropriate disposal.
6. **Insufficient Coordination Between Cleanup Organisers:** Over 40 associations and groups undertake beach and canal cleanups along the Venetian coasts, yet their activities are poorly coordinated. While a dedicated coordination unit exists within the Municipality of Venice's Department of Environment – responsible for overseeing cleanups, monitoring activities, and collecting related data – stakeholders noted that it does not always function effectively in practice. The consequences are twofold: cleanup efforts risk overlapping with established marine litter monitoring sites, compromising the integrity of scientific data; and, without territorial planning, volunteer efforts tend to concentrate in the same accessible locations rather than being distributed across the full extent of Venice's coastline and lagoon. Strengthening the role and operational capacity of the existing coordination unit would address both issues without requiring new institutional structures.

Taken together, the issues identified above point to a deeper, structural challenge: Venice has been exposed to multiple converging sources of marine litter for decades, and the cumulative legacy of this pollution is largely unaddressed. End-of-life tyres on the canal bed, fibreglass ghost boats decomposing on remote lagoon sandbanks, aquaculture nets on the shorelines, and microplastic contamination from tyre wear, foam materials and bottled water waste have all accumulated over time in the lagoon's sediments, marshes and coastal areas.

Proposed Solutions to Address Pressing Issues

During the workshop, the following solutions were discussed as means to address some of the most important marine litter issues faced by Venice and its unique and sensitive marine ecosystems.

- **Promote and Encourage the Consumption of Tap Water:** Awareness-raising efforts are ongoing, including by Venice Lagoon Plastic Free and Venice Tap Water, and should continue to inform visitors that tap water in Venice is safe to drink and to share information about public fountains, through dedicated maps and applications. The role of hotels and their associations is crucial in this respect, as they can inform and encourage their guests to consume tap water, both within their premises and when exploring the city. It is also important to ensure that awareness is raised among tourists on day visits. This could be done in collaboration with tour operators and train

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and bus companies, by sharing valuable information before visitors enter the city. Equally important is ensuring that public water fountains are well maintained so that tourists trust them as reliable sources of drinking water.

- **Ban the Use of Tyres as Boat Fenders:** Ongoing advocacy for the revision of the Regulation for the Coordination of Local Navigation in the Venetian Lagoon should continue and be intensified, supported by data and scientific evidence, to ensure that tyres, that are categorised as special waste, in line with the current national law are secured to specific disposal and recycling treatment. Importantly, for this measure to be successful, affordable and environmentally responsible alternatives should be promoted and included in the regulation. In the interim, cleanup efforts undertaken by the Gondolier Divers Association should continue to be encouraged and supported to ensure that this waste is removed from the canals.
- **Ghost Boats:** Addressing the issue of ghost boats should begin with the mapping of abandoned vessels, including through citizen science initiatives. As the practice of dumping vessels in the lagoon dates back to the 1950s, it is important to identify and document the locations where these vessels are situated. Efforts should be made to promote material repurposing and invest in the identification and development of solutions for safely treating, recycling, or recovering the hazardous components contained within vessel materials.

Conclusion

The stakeholder workshop provided a comprehensive overview of the most pressing marine litter and waste management challenges affecting Venice's lagoon ecosystem, while also highlighting practical, multi-actor solutions. The discussions underscored how interconnected pressures – particularly overtourism, consumption patterns, and regulatory gaps – continue to drive key sources of pollution, including bottled water waste, tyre pollution, abandoned vessels, and aquaculture-related litter. At the same time, the workshop demonstrated strong local engagement and existing initiatives that can be further scaled, from awareness campaigns on tap water consumption and public fountain use, to targeted policy revisions and improved waste governance systems. Overall, the outcomes reinforce the need for coordinated action across public authorities, private sector actors, and civil society, combining behavioural change, regulatory enforcement, and practical infrastructure improvements to protect Venice's fragile and unique aquatic environment.

The results from the Venice Stakeholder Workshop will be shared with the European Commission, within the framework of the policy recommendations that ISOTECH Ltd is preparing and the Policy White Paper that will be published towards the end of 2026.

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