

Executive Summary

Sicily can position itself at the forefront of sustainable maritime transport in the Mediterranean by aligning regional action with the European Green Deal, the Mission Ocean and Waters objectives, and Italy's National Recovery and Resilience Plan (PNRR). The priority should be the systematic adoption of hybrid and low-noise propulsion technologies. Hybrid and electric modes of operation should become standard practice for approaches, departures, and routes near marine protected areas, supported by the expansion of onshore power supply infrastructure and bio-LNG bunkering in hub ports. For smaller islands, renewable-powered floating recharge units could secure energy autonomy, while in the longer term, the establishment of a hydrogen supply chain would integrate Sicily into the EU's wider decarbonisation and FuelEU Maritime pathway.

Equally critical is the introduction of quiet navigation corridors and speed management measures. Dedicated transport lanes, coupled with seasonal reductions in speed during biologically sensitive periods—such as whale migration (February–April) and turtle nesting (June–August)—would directly reduce collision risks and mitigate underwater noise pollution. Pilot initiatives along strategic corridors, notably Porto Empedocle–Lampedusa and Palermo–Ustica, should be deployed to generate comparative data on acoustic and CO₂ impacts between conventional and hybrid propulsion systems.

An integrated monitoring and data framework is indispensable to support evidence-based policy. Existing hydrophone networks, wildlife rescue centres, and strandings databases need to be consolidated into a unified Sicilian marine monitoring platform, in coherence with the PNRR ITINERIS project. This platform should combine acoustic records, AIS tracking, collision data, and citizen-science inputs into real-time, open-access systems, thereby enabling adaptive management and compliance with EU biodiversity strategies.

Given that a significant share of disturbance originates from private and recreational boating, targeted measures must be advanced. A coordinated awareness campaign, should establish clear codes of conduct on navigation speeds, approach distances, and the reporting of wildlife encounters or collisions. These efforts must be accompanied by mandatory pre-departure briefings in marinas and charter fleets, underpinned by Coast Guard advisories and enforcement mechanisms.

Finally, the ecological transition will require sustained financial mobilisation and stakeholder engagement. European funding streams—including LIFE, Horizon Europe, Interreg, and Mission Ocean—should be leveraged for pilot investments and integrated monitoring systems, while public–private partnerships and offset mechanisms could channel maritime revenues into biodiversity protection. Ensuring the participation of fishery communities and marine protected areas as co-managers of maritime space is essential to generate legitimacy, distribute benefits fairly, and embed conservation within local blue economy development.

KEY FINDINGS

Impact	Description
Collisions	Leading cause of mortality for turtles and cetaceans, with ~250 documented turtle collisions annually in Sicily, mostly from private leisure craft.
Underwater Noise	Dominant chronic stressor for cetaceans, reducing communication ranges by up to 50%, displacing animals from feeding and breeding grounds, and altering migration routes.

Pollution	Vessel emissions and waste contributes to bioaccumulation in top predators and degradation of coastal ecosystems; marine litter from improper waste disposal continues to affect turtles and seabirds.
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IMPACT - MITIGATION MATRIX

Impact	Mitigation
Collisions	Speed reduction; dedicated transport lanes; awareness campaigns for leisure boats.
Underwater Noise	Hybrid propulsion in electric mode; quiet transit corridors; acoustic monitoring.
CO₂ & Pollutants	Hybrid/LNG/bio-LNG fuels; OPS in ports; hydrogen roadmap.
Waste & Litter	Stricter enforcement in ports; recycling facilities; citizen engagement.

SPECIES MOST AFFECTED

- Cetaceans (sperm whales, fin whales, dolphins), sea turtles (*Caretta caretta* in particular),
- Impacts extend beyond flagship species: seabirds can be affected. Invertebrates and fish are also disrupted by acoustic masking of key reproductive and territorial signals.