2023 CALL FOR TECHNICAL AND SCIENTIFIC CONSULTANCY OF THE PELAGOS AGREEMENT

Final Administrative Report

June 2025

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General info:

Project title	Assessment of Maritime Traffic, Underwater Noise, and Ship Strike Risks in the Pelagos Sanctuary (Contract No. 2023-07)
Consultant(s)	Thomas Folegot Dominique Clorennec
Duration of the consultancy (beginning – end)	March 2024 – July 2025
List of the deliverables submitted (number of the deliverable, title and date of submission)	• QO.20231012.01.RAP.001.01A.PEL.Noise in Pelagos.Short Technical Report.pdf, submitted 24/03/2024 • QO.20231012.01.RAP.002.01A.PEL.Noise in Pelagos.Traffic analysis.pdf, submitted 03/07/2024 • QO.20231012.01.RAP.004.01A.PEL.Consultancy Service 2 - Noise in Pelagos-Final report.pdf, submitted 07/04/2025 • Seasonnal maps on commercila and recreational maritime traffic and anthorpogenic noise, submitted October 2024 to July 2025 • Short Interim Administrative Report, submitted 03/06/2024

Abstract:
Please report a short abstract (max 1-2 page(s)) summarizing the:

- Objective(s) of the consultancy
- Methodology applied / Activities carried out during the period
- Final results obtained
- Eventually possible next steps / improvement for a continuation of the consultancy

Objective(s) of the Consultancy

The consultancy, funded under the Pelagos Agreement Management Plan (2022–2027), aimed to provide a scientific basis for understanding anthropogenic pressures in the Pelagos Sanctuary. Specifically, it sought to:

Assess the distribution, characteristics, and seasonality of maritime traffic across the Sanctuary.

Provide an initial evaluation of underwater noise levels and their implications for priority cetacean species: the Fin whale (*Balaenoptera physalus*), Sperm whale (*Physeter macrocephalus*), Cuvier's beaked whale (*Ziphius cavirostris*), and the Bottlenose dolphin (*Tursiops truncatus*).

Deliver a first assessment of ship strike risks, focusing particularly on Fin and Sperm whales, which are highly vulnerable to lethal collisions.

Establish baseline metrics and spatial indicators to guide future management measures aimed at mitigating underwater noise and ship strike risks.

Methodology Applied / Activities Carried Out

The consultancy was based on a combination of shipping data analysis, acoustic modeling, and risk assessment methods, carried out over the 2019–2023 period.

Data sources

Automatic Identification System (AIS): ~23 million positions analyzed for 2019 and ~37 million positions for 2023, representing 34,000 and 60,000 unique vessels respectively.

Environmental data: bathymetry, seabed type, sound speed profiles, wind, waves, and tides integrated to model acoustic propagation.

Species distribution: Habitat models for Fin and Sperm whales developed in Consultancy Service 1 were used to contextualize risk.

Digital platforms and tools

OceanPlanner©: to characterize shipping activity (number of vessels, travelled distances, speeds) and derive risk indicators for ship strikes.

Quonops©: to model underwater noise distribution through parabolic equation propagation models, calibrated against in-situ hydrophone data.

Key metrics and indicators

Traffic: number of vessels, cumulative travelled distances, and speed distributions across 10 vessel categories.

Noise: Baseline Sound Pressure Levels (SPL), Excess Noise Levels (above natural background), species-specific disturbance thresholds, and masking effects on communication/echolocation.

Ship strikes:

Injury Weighted Travelled Distance (IWTD) – vessel behavior and speed-related risk.

Near Miss Events (NME) – probability of cetacean encounters with vessel tracks.

Theoretical Potential Mortality (TPM) – combined indicator of vessel trajectories, species distribution, and speed.

Final Results Obtained

Shipping dynamics (2019–2023):

Total number of vessels increased by +75%; travelled distance by +59%.

Largest increases: pleasure vessels (+101%), container ships (+50% vessels, +80% distance), passenger vessels (+53%), and Roll-on Roll-off ferries (+25% vessels, +49% distance).

Pleasure craft dominate in numbers but contribute less per vessel; conversely, Ro-Ro and passenger ferries represent the highest-risk categories due to speed (>15–20 knots) and structured routes overlapping cetacean habitats.

Underwater noise baseline:

Chronic high noise levels are present throughout the Sanctuary, with strong seasonal variability.

Summer months show the highest excess levels due to intense maritime activity.

Masking and disturbance risks:

Fin whales most impacted by low-frequency continuous noise (50–125 Hz).

Beaked whales, sperm whales, and dolphins are sensitive to mid- and high-frequency excess noise, particularly in shelf areas.

In summer 2023, up to 25–50% of the Sanctuary exceeded thresholds associated with significant masking of communication and echolocation.

Ship strike risks:

Seasonal hotspots identified, with risks peaking in summer due to overlap of dense traffic (Ro-Ro and passenger routes) and whale concentrations.

Roll-on Roll-off ferries and high-speed passenger vessels contribute most to dangerousness indices.

The Theoretical Potential Mortality index highlights critical areas along ferry corridors between mainland France/Italy and Corsica/Sardinia.

Possible Next Steps / Improvements for Continuation

Monitoring and coordination

Strengthen international coordination of underwater noise monitoring programs under the Marine Strategy Framework Directive (MSFD).

Expand long-term visual and acoustic cetacean monitoring, including observer programs on Ro-Ro and passenger ferries.

Mitigation and spatial planning

Prioritize mitigation for Fin whales, the most vulnerable to both underwater noise and collisions.

Integrate acoustic risk maps and ship strike indicators into marine spatial planning, traffic routing, and regulatory frameworks.

Evaluate and test speed reduction and rerouting scenarios to reduce both ship strike probability and noise emissions.

Governance and operational actions

Encourage harbors to become control points for noise management, supporting monitoring, incentives, and regulation of quieting technologies.

Use baseline indicators developed in this consultancy as reference points for future adaptive management and policy development at the Sanctuary scale.

In summary, this consultancy established a first integrated picture of shipping intensity, noise exposure, and ship strike risks in the Pelagos Sanctuary. The results underline the urgent need for targeted management actions, particularly speed reduction and spatial regulation of Ro-Ro and passenger traffic, to safeguard the Sanctuary's cetacean populations against increasing anthropogenic pressures.