



**Life
CONCEPTU
MARIS**

DELIVERABLE C2.1 & E2.2

Proposal for priority conservation
and mitigation measures
and new Natura 2000 sites
designation/expansion
in ES, FR and IT

info@lifeconceptu.eu
www.lifeconceptu.eu

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CONservation of CEtaceans and Pelagic
sea TUrtles in Med: Managing Actions
for their Recovery In Sustainability

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Credits

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Introduction

Mediterranean offshore ecosystems are critical habitats for numerous species and are undergoing significant transformations driven by anthropogenic pressures, further intensified by global warming. Cetaceans and Pelagic Sea Turtles species (hereafter CEPTU) are particularly vulnerable to these threats and are therefore listed as endangered species within biodiversity legislative frameworks at various governance levels.

Although CEPTU are recognized as species of high conservation priority under international and regional legal frameworks, their effective protection remains particularly complex due to a general lack of information and to their predominantly pelagic and transboundary distribution. This requires the adoption of integrated and coordinated management strategies, as well as the clear establishment of jurisdictional authority and legal competence for the relevant coastal and offshore waters.

At present, several treaty provisions are in place to ensure the protection of CEPTU species in the Mediterranean Sea; however certain issues, such as the identification of species' important areas, seasonal biological needs, areas at higher risk for specific threats (e.g., collisions with ships, underwater noise, ingestion of plastic litter and bycatch in fishing gear), still represent a menace for Mediterranean megafauna and lack dedicated management measures at the regional level.

CONCEPTU MARIS project aims to contribute to this global framework presenting an evaluation of the alignment between established CEPTU conservation strategies with the updated information delivered by the project on spatio-temporal ecological requirements, important areas, risk zones of key cetacean and sea turtles species in the Western Mediterranean (WMED) and Adriatic-Ionian (ADRION) subregions providing suggestion to prioritize and improve conservation and mitigation effort. This assessment does not intend to be exhaustive, as the information is considered complementary to other initiatives and can be refined with more detailed analyses derived from the large CONCEPTU dataset, or integrated with data and information from other projects, initiatives, and literature. It should be viewed as a living reference that requires continuous updates to account for ongoing environmental changes, particularly those driven by climate-related factors and other pressures, that may alter species abundance and distribution patterns, as already identified by CONCEPTU's main results.

Key reference documents: Annex I presents the detailed report on the '*Evaluation of the coherence and gaps between the Action Plan strategies and the identified important and risk areas and species needs*' (Milestone C2.1). The evaluation, based on the results described in [Deliverable C1](#), aims to identify both areas of policy coherence and existing gaps that may hinder the effective implementation of conservation measures across national jurisdictions, international waters, and within priority ecological corridors and habitats for CEPTU species. Suggestions from key stakeholders were incorporated mainly from [Deliverable C3](#) and Advisory Board meeting minutes.

Proposal for priority conservation and mitigation measures

Based on the comprehensive analyses of species distribution, habitat suitability, population trends, and anthropogenic pressures documented in Life CONCEPTU MARIS Deliverable C1, and informed by stakeholder feedback, the following priority conservation and mitigation measures are recommended for cetaceans and pelagic sea turtles (CEPTU species) in the Western Mediterranean (WMED) and Adriatic-Ionian (ADRION) marine regions.

I. General Recommendations

1. Adaptive, Seasonally Informed Management

- a. Conservation efforts should be tailored to seasonal shifts in habitat use and species-specific vulnerability.
- b. Management strategies must account for ecological requirements and exposure patterns of different species to maximize protection during critical periods (e.g., breeding, foraging, migration).

2. Integrated, Transboundary Strategies

- a. Promote collaboration across Mediterranean countries to ensure coordinated protection of key habitats that span national boundaries.
- b. Leverage project datasets alongside other monitoring initiatives to provide comprehensive temporal and spatial coverage.

3. Mitigation of Broader Environmental Stressors

- a. Address threats such as maritime traffic, marine litter, pollution, particularly in high-use foraging and breeding areas.
- b. Consider species-specific risks, including collision and exposure to Floating Marine Macro Litter (FMML).

4. Support Regional Coordination and Data Sharing

- a. Encourage standardized monitoring protocols, training programs for navigation staff and citizens, and integration of innovative methodologies (e.g., eDNA) across Mediterranean countries, including Southern Mediterranean states.
- b. Use shared datasets to improve IMAP reporting and inform policy-level decisions.

5. Monitoring of Shifting Habitats and Climate Drivers

- a. Promoting the long-term monitoring of CEPTU species, focusing on their distribution and habitat use, and encouraging the integration of environmental drivers into analyses to anticipate climate-driven changes and support the timely updating of conservation priorities.
- b. Integrate monitoring data into adaptive management frameworks to ensure timely responses to emerging threats and habitat shifts.

II. Where - Priority Conservation Areas (Ecological Hotspots)

Priority conservation areas should focus on consistently important ecological hotspots that support multiple species and often serve as crucial juvenile or foraging grounds.

- **Alboran Sea and Strait of Gibraltar Region:** Identified as a critical, year-round, multispecies hotspot. Core habitat for species such as *Delphinus delphis* and *Globicephala melas*. High conservation value throughout the year, with frequent observations of juveniles across multiple species. Consistently ranked as the most critical hotspot for exposure to maritime traffic for all CEPTU groups.
- **Pelagos Sanctuary** (Ligurian Sea): Key habitat and conservation priority. Supports the highest concentrations of *Balaenoptera physalus* and *Stenella coeruleoalba*. It hosts large group sizes of species including *Globicephala melas* and *Ziphius cavirostris*. Emerges as the most prominent and statistically robust hotspot for cetacean exposure to FMML.
- **Central Tyrrhenian Seas:** Critical year-round exposure zones for *Caretta caretta* to FMML.
- The **Adriatic Sea** is a vital coastal zone for *Tursiops truncatus* and *Caretta caretta*. The central-northern Adriatic represents the main risk zone for *Caretta caretta* exposure to maritime traffic and FMML.
- **High-priority adult *Caretta caretta* habitats** include the Northern Adriatic, Southern Tyrrhenian, and Algerian shelf waters.
- **Protection of Offshore Dynamic and Structural Features:** Conservation efforts should safeguard key foraging areas. Prioritize regions with structural complexity, such as seamounts, submarine canyons, and steep slopes, which are crucial for deep-diving species like *Ziphius cavirostris* and *Physeter macrocephalus*, and enhance prey availability through local oceanographic processes, attracting also dolphins and sea turtles. Protect upwelling zones and frontal systems that support krill aggregations, essential for *Balaenoptera physalus* foraging.

III. When - Priority Conservation Areas by season (Ecological Hotspots)

- **Year-round**, the Alboran-Gibraltar region maintains its high conservation value, consistently showing a high frequency of juveniles across multiple species. It also hosts *Ziphius cavirostris* in winter and *Globicephala melas* in autumn.
- In **WINTER**, high-vulnerability zones are concentrated in the western Mediterranean Sea, specifically the Pelagos Sanctuary and the Spanish Cetacean Migratory Corridor, which host *Physeter macrocephalus* and *Ziphius cavirostris* during this season.
- In **SPRING**, high-vulnerability zones expand across the western Mediterranean Sea, including the Spanish Cetacean Migratory Corridor, Pelagos Sanctuary, Northwestern Mediterranean, and the western Spanish slope and Sardinia-Sicilian channels.
- In **SUMMER** the highest overall vulnerability is found, particularly in the northwestern Mediterranean Sea and Pelagos Sanctuary, followed by the Sardinia-Sicilian channels, Tyrrhenian, and western Spanish slopes. High juvenile frequency is spread across five areas during this season.

- In **AUTUMN**, high vulnerability is again widespread in the western areas, though slightly less intense than in summer.

IV. Who - Priority for species

The results of LIFE CONCEPTU MARIS clearly show that all studied species benefit from the protection of specific topographic and deep offshore oceanographic features (e.g., canyons, seamounts), which are essential for maintaining and supporting key marine ecosystem functions, such as productivity, oxygen exchange, and other vital processes that sustain life. The protection of these structural components should therefore be considered a priority in spatially based conservation measures and in the identification of new protected areas. Key areas of particular importance for each species have been identified and are summarized below.

Table 1. Species-specific Policy considerations

Policy considerations:	<i>B.physalus</i>	<i>P.macropodus</i>	<i>Z.cavirostris</i>	<i>G.griseus</i>	<i>G.melas</i>	<i>S.coeruleopalba</i>	<i>D.delphis</i>	<i>T.truncatus</i>	<i>C.caretta</i>
Prioritize protection in deep, topographically complex areas supporting productivity (e.g., seamounts, submarine canyons, and steep slopes):	X	X	X	X	X	X	X	X	X
Prioritize target monitoring, protection and mitigation actions in:									
Alboran Sea - Gibraltar strait			X	X	X		X	X	
Spanish cetacean migration corridor	X	X	X		X				
Balearic islands								X	
Northern Balearic			X						
Balearic sea				X	X				
Northwestern Mediterranean	X	X			X	X			
Pelagos Sanctuary	X	X	X			X			
Ligurian Sea			X	X	X				
Central Tyrrhenian sea	X		X						
Tyrrhenian sea	X	X		X					X
Adriatic sea								X	X
Tunisian shelf								X	
Algerian Sea									X
Focus monitoring efforts on adult individual									X

V. What - Maritime Traffic and FMML Potential Impact Mitigation Proposal

Maritime traffic

CONCEPTU MARIS results have evidenced a strong overlap of CEPTU species distribution hot-spots with high maritime traffic areas, in both the core and the different replication areas. It is widely recognised that **collisions with vessels** are one of the principal human-induced causes of mortality for marine megafauna worldwide.

Different and specific tools are being tested and proposed worldwide, in restricted high risk areas, such as the area off Boston Harbour, as an example, where an integrated system of acoustic buoys to detect cetacean presence and a regime of voluntary/mandatory speed restriction rules have been implemented with the aim of minimizing the impact on the right whale population inhabiting the area.

The Mediterranean basin acts as an ideal laboratory to test large scale mitigation measures that could jointly act for several megafauna species. Specifically, the CONCEPTU MARIS project results highlighted that:

1. **Medium-sized cetaceans and sea turtles**, which are frequently excluded from collision risk assessments, are nonetheless vulnerable to vessel strikes and should be considered in all risk evaluation and mitigation strategies.
2. Collecting specific **data on vessel strikes and near-miss events** is essential to improve understanding of the issue.
3. The **identification of maritime traffic risk exposure areas and vessel strike risk hotspots** will help prioritize targeted conservation measures.
4. **Private and leisure yachting should be included** in mitigation strategies, as current measures have so far focused only on passenger and commercial vessels.

As a result of Action C3, which is specifically dedicated to assessing and mitigating the impact of collisions between passenger vessels and cetaceans, we propose a set of mitigation measures. These measures have been evaluated and agreed upon with key stakeholders from the maritime sector, taking into account their applicability, feasibility, and overall effectiveness in mitigating the potential impact of large vessels on marine species.

While slowing down in response to the presence of animals could reduce collision risk, it would also compromise vessel manoeuvrability. Active avoidance and route adjustments due to specific events (e.g., military activities) are already implemented. Speed reductions (i.e., to 16 knots at night, 18–19 knots during the day) comply with emission regulations and UNCLOS limits, but most new ferries cannot go below 16 knots due to engine constraints, limiting further speed-based mitigation. Therefore, more feasible and effective measures include the deployment of onboard observers and the implementation of dedicated training courses for navigation staff.

Onboard observers are considered particularly valuable, as they can both enhance data collection and support the crew in applying mitigation procedures. To ensure their effectiveness, clear definitions of their roles and responsibilities are required. **Real-time reporting** using **existing onboard instruments** should also be enhanced, though additional instrumentation may be necessary to ensure effective monitoring during night-time navigation.

Overall, the most effective measures are identified as: (1) onboard observers, (2) alteration of shipping routes, (3) real-time reporting, (4) crew training, and (5) seasonal rerouting. The least disruptive yet beneficial actions include (1) seasonal speed restrictions, (2) reactive slow-

downs, and (3) real-time reporting, combined with crew training. Measures that should be considered mandatory are the presence of onboard observers, completion of training courses for navigation personnel, and reactive avoidance procedures.

The main mitigation measures highlighted by the project results include:

5. **Include maritime traffic in anthropogenic activity assessments**, ensuring the presence of specialized MMO/PSO onboard along high-risk routes or during high-risk seasons (e.g., as required by national authorities for environmental assessments or by EU fisheries regulations for bycatch monitoring).
6. **Further develop and regularly provide training for command-deck crew** on marine megafauna, vessel strike risks, and assessing swimming direction of detected animals to enable reactive measures, considering high crew turnover and the need for updated knowledge.
 - 6.1. **Consider using the existing Life CONCEPTU MARIS e-learning course**, delivered asynchronously in Italian, English, French, and Spanish via the CIMA platform, to provide flexible training and support further development. The course has proven effective, with 93% of participants reporting useful knowledge and increased preparedness for potential collision events, and is recognized as highly valuable by the Spanish, French, and Italian ministries, as well as RAC-SPA.
 - 6.2. **Include modules on marine ecology and marine megafauna** in nautical school and nautical licensing courses.
7. **Incorporate the private and leisure maritime sector** into collision risk assessments for CEPTU species, evaluating the need for mandatory speed limits and additional certifications for captains demonstrating knowledge of CEPTU species' presence, distribution, and vessel strike risks.
8. **Support adaptive management** and the potential designation of PSSAs through an adaptive tool that identifies zones where navigation should be restricted or redirected.
9. **Identify seasonal or fixed areas, or specific portions of routes, for avoidance or where speed limitations should be applied**, based on CONCEPTU MARIS data and discussed with key stakeholders on a case-by-case basis, encouraging seasonal or permanent rerouting where feasible (e.g., Box 1).

Box 1: Main high risk areas for CEPTU exposure to Maritime traffic threat.

- **High Risk Exposure Areas to Maritime Traffic (MT):**
 - **Alboran Sea and Strait of Gibraltar:** Consistently emerge as the most critical and statistically significant high-risk exposure areas for all CEPTU groups year-round. Risk is focused here for species like *Delphinus delphis*, *Globicephala melas*, and *Grampus griseus*.
 - **Adriatic Sea** (Central-Northern): Strong exposure area, especially for sea turtles (*Caretta caretta*).
 - **Pelagos Sanctuary:** A seasonal hotspot, particularly during **spring and summer**, for several cetacean species.
- **Risk from Passenger Vessels only highlights slightly different priorities:**
 - **Pelagos Sanctuary, Tyrrhenian Sea, and Balearic ferry corridors:** Emerge as key exposure zones for several species (e.g., *P. macrocephalus*, *S. coeruleoalba*, *Z. cavirostris*, and *C. caretta*).
 - **Adriatic Sea:** Confirmed as a primary exposure area for *Caretta caretta* and *Tursiops truncatus*.
- **Higher Risk Exposure Areas by species:**
 - **All CEPTU:** Alboran Sea and Strait of Gibraltar (most critical, consistent high-risk year-round).
 - **All Cetaceans:** Southern Spanish Cetacean Migration Corridor, Pelagos Sanctuary (seasonal, spring/summer).
 - **Low-Density Cetaceans:** Alboran–Gibraltar region (primary). Pelagos Sanctuary, Savona, Bonifacio Strait (localized, seasonal).
 - **Caretta caretta:** Adriatic Sea (strongest), Gulf of Tunis (seasonal, autumn-winter).
 - **Passenger Vessels Only:** Reduced risk in Alboran Sea. Higher exposure in Pelagos Sanctuary, Tyrrhenian Sea, Balearic ferry corridors, Adriatic Sea (*Caretta caretta*, *Tursiops truncatus*).
- **Hotspots areas for Near Miss Events (NMEs) as proxy of collision risk:**
 - **Northwestern Mediterranean Sea:** Confirmed as the area where most species are threatened by NMEs, supporting the importance of the designated PSSA (Particularly Sensitive Sea Area). This includes the Ligurian Sea and the offshore Gulf of Lion.

New Areas Highlighted by NMEs: The **Gibraltar and Alboran Sea**, the **Balearic Ibiza Channel** (between Ibiza and mainland Spain), and the **Sicily Channel** are newly highlighted areas where large and medium cetaceans face risk, likely linked to high maritime traffic intensity.

Floating Marine Macro Litter (FMML)

Life CONCEPTU MARIS results have evidenced a strong overlap of cetaceans and pelagic sea turtle species distribution hot-spots with areas at high density of FMML, in both the core and the different replication areas. FMML can have a severe impact on megafauna, causing entanglement, or plastics being ingested. These impacts require effective management strategies that assess litter pressure based on risk, especially where and when marine megafauna are most vulnerable.

In general, **prevention of marine litter is the most effective mitigation measure** and is firmly embedded in EU legislative frameworks. The EU Circular Economy Action Plan sets overarching objectives, while the upcoming Circular Economy Act (2026) aims to double Europe's circularity rate from 12% to 24% by 2030. Regulation (EU) 2025/40 establishes harmonized rules for plastic packaging and strengthens Extended Producer Responsibility (EPR) schemes, and the Single-Use Plastics Directive (EU 2019/904) targets the most prevalent marine litter items through consumption reduction, product design standards, separate collection, and mandatory recycled content. Collectively, these instruments reinforce source-level prevention, ensuring measurable reductions in marine litter and advancing Europe's transition toward a circular, low-waste economy. Besides prevention, general mitigation measures include **targeted coastal cleanups**, prioritizing areas that intercept litter before it reaches offshore (e.g., Spain's INTEMARES "Clean Fishing Grounds" in Natura 2000 sites), and **river mouth interventions**, such as floating barriers or traps (e.g., Italy's "Salvamare" law, Article 6, Law No. 60/2022). In addition to these measures, several EU initiatives further contribute to preventing and managing macro litter flows, including the Zero Pollution Action Plan and the Marine Strategy Framework Directive (2008/56/EC), which set clear targets for achieving good environmental status by 2030. Cross-sectoral approaches are also promoted through the EU Mission "Restore our Ocean and Waters by 2030", integrating prevention, collection, and circular reuse pilots across sea basins, and through the Regional Sea Conventions (e.g., Barcelona and OSPAR), which ensure coordinated regional action plans on marine litter.

Based on the results of Life CONCEPTU MARIS, focus should be directed on the high-risk areas through dynamic, time-sensitive actions specifically directed to:

- **Alboran Sea.** A recurrent, **year-round exposure zone** for both **all cetaceans** and **low-density cetaceans**, with significant clusters in **winter, spring, and autumn**. It also shows **minor risk** for **sea turtles** (*Caretta caretta*), particularly in the northern sector.
- **Balearic Sea and Northwest Corsica.** Secondary but ecologically relevant hotspots occur here for **sea turtles** during **spring and summer**, suggesting potential migratory or foraging corridors that warrant targeted monitoring.
- **Ligurian-Provençal Basin.** The most prominent and statistically consistent hotspot for **all cetaceans**, showing high cumulative risk and strong seasonal overlap, particularly in **spring and summer**. Notable clusters for **low-density cetaceans** (*Ziphius cavirostris*, *Grampus griseus*, *Globicephala melas*) also occur here and off the **Gulf of Lion**, mainly in spring to autumn.
- **Tyrrhenian Sea.** Exposure is **persistent and high** across species. For **sea turtles**, risk is concentrated in the **central Tyrrhenian**, while for **all CEPTU species**, exposure peaks in **summer**, particularly in the **Sardinia Channel** and along the **Campania coast**. **Low-density cetaceans** also show seasonal hotspots off Palermo and the Campania region.
- **Sardinia and Sicily Channels.** Both areas show **seasonal hotspots**—notably for **low-density cetaceans** and **sea turtles** in spring and summer. For **all CEPTU species**, new hotspots emerge here in **spring/summer**, indicating shifting exposure linked to seasonal patterns and dynamic oceanographic features.

- **Adriatic Sea.** A **persistent high-risk area** for **sea turtles**, with stable exposure throughout the year and intensification in **spring and summer**. When considering **all CEPTU species**, the Adriatic Sea remains a consistent hotspot, especially in **winter and summer**, indicating its importance for multi-taxa mitigation efforts, namely *Caretta caretta* and *Tursiops truncatus* as other cetaceans species are rarer in this subregion.

The composition of FMML helps identify key litter sources and guide targeted mitigation for the specific sector. In particular:

- Over 90% of FMML is composed of **artificial polymers**, mainly single-use plastics (**SUPs**) such as plastic sheets, bags, and medium-sized fragments. Mitigation should align with the Single-Use Plastics Directive (EU 2019/904) and the Packaging and Packaging Waste Regulation (EU 2025/40). Regional focus: Western Mediterranean (MWE), where SUPs are most prevalent.
- Common litter items related to **fisheries and aquaculture** are especially found in the **Adriatic Sea**, supporting actions such: a) Promote eco-friendly materials and awareness (CFP Regulation (EU) No 1380/2013; MSFD Descriptor 10). b) Track and manage fishing-related waste (MARPOL Annex V; Directive 2000/59/EC). c) Replace polystyrene boxes, or mussel nets, with reusable or biodegradable alternatives. d) Increase use of biopolymers, recycling, and circular economy practices (EU Circular Economy Action Plan).
- To reduce sea-based FMML from **maritime traffic**, actions should focus on: (a) strengthening enforcement of MARPOL Annex V on port waste disposal, including passenger and crew waste, and (b) promoting awareness campaigns, particularly during the summer season and in touristic hotspots.

As a strategic measure, **continuous and integrated monitoring of FMML and vulnerable species** should be supported and implemented in the long term, particularly in offshore areas where the highest exposure for CEPTU species occur. This would allow early identification of high-risk areas and support alignment with MSFD Descriptor 10 and Commission Decision 2017/848/EU on criteria and methodological standards for Good Environmental Status (GES).

VI. National Reference Areas for Conservation

Tyrrhenian Sea and Sardinia-Sicilian Channels (Italy)

The Tyrrhenian Sea and Sardinia-Sicilian channels represent a **major ecological corridor** for several cetacean species and sea turtles. The Tuscan Archipelago and Northern Tyrrhenian Sea are year-round coastal hotspots for *Tursiops truncatus*, especially during spring and summer. The Central Tyrrhenian Sea represents a core area for *Balaenoptera physalus*, especially during summer, and deep-diving species, including *Physeter macrocephalus* and *Ziphius cavirostris* as confirmed by both visual and eDNA detections. **Conservation efforts should prioritize deep, structurally complex areas with steep slopes, canyons, and**

seamounts, which are essential for prey availability and the ecological needs of deep-divers.

The Southern Tyrrhenian Sea and Sardinia-Sicilian Channels are key habitats for *Caretta caretta*, especially adults during winter and autumn, even in correspondence with large seamounts (i.e., Marsili), reflecting predictable foraging or overwintering areas. High habitat suitability and recurrent sightings of *Caretta caretta* were identified around the Aeolian Islands, Ustica and the northern and western Sicilian coasts, extending through the Sicily and Sardinia Channels. The area shows **high exposure to maritime traffic and FMML, with seasonal peaks in turtle presence from spring to early autumn, suggesting the need for targeted mitigation actions.**

The region shows **marked seasonal use**, with the Tyrrhenian Sea and the Sicily-Sardinian Channels showing high-vulnerability during spring and summer, and the Tyrrhenian Sea exhibiting a high frequency of juveniles during autumn. **Management strategies must consider the high seasonal vulnerability with peak conservation importance during spring and summer.** Long-term analyses indicate a decline in *B. physalus*, and *P. macrocephalus* abundance after 2015, followed by partial local recovery in recent monitoring periods. **Continuous monitoring of these species is therefore recommended to identify potential drivers of their decline or shifts in distribution.**

High exposure risk is associated with dense **maritime traffic** along ferry and cargo routes connecting Sicily, Sardinia and the Italian mainland. The Sicily Channel in particular has emerged as a risk area based on the analysis of NMEs involving medium and large cetaceans (*Balaenoptera physalus*). Additionally, the Northern Tyrrhenian Sea (east of Corsica/Bonifacio Strait) represents a seasonal exposure area to passenger traffic for *B. physalus* and *P. macrocephalus*, with NME hotspots occurring for *B. physalus* and *Z. cavirostris*. This highlights the **need for targeted mitigation measures** of vessel traffic especially along the Sicily channel. The Central Tyrrhenian Sea is a critical year-round risk exposure area for loggerhead sea turtles (*Caretta caretta*) while **FMML** hotspots are pronounced especially in spring and summer in the southern-central Tyrrhenian Sea and Sardinia Channel, requiring **robust dynamic, time-sensitive mitigation strategies for the FMML threat.** Local risk reduction should focus on seasonal FMML hotspots affecting low-density cetaceans (*Ziphius cavirostris*, *Grampus griseus*, *Globicephala melas*) in the Sardinia Channel and off Palermo, while also addressing the summer intensification of combined CEPTU species risk in the Sardinia Channel and along the Campania coast.

Existing protected frameworks only partially overlap with the most suitable and high-risk zones. However a large number of MPAs and SPAMI sites cover most of the coastal areas of the Tyrrhenian and Sardinia-Sicily channels. These areas could be considered for integration of cetacean-focused measures in the future management plan revisions.

Adriatic Sea

Priority conservation efforts in the Adriatic Sea should focus on its role as a vital coastal and semi-enclosed habitat for key species, particularly *Caretta caretta* and *Tursiops truncatus*. The Northern and Central Adriatic Sea represent a consistently important core area for

Caretta caretta, maintaining a high and stable Area of Occupancy (AOO) of around 30–34% across all reporting periods. This region serves as a key habitat for adult turtles during winter and autumn, underscoring its importance for spatially consistent conservation planning. Coastal and shelf zones also provide highly suitable habitats for *Tursiops truncatus*, with the northern Adriatic Sea offering sheltered winter areas for resident populations. In contrast, the Southern Adriatic Sea plays an important role for pelagic species occurring at lower densities. The striped dolphin (*Stenella coeruleoalba*) is regularly detected here, showing stable presence across reporting periods, although at lower densities compared to the western Mediterranean. Occasional sightings of *Physeter macrocephalus* confirm its sporadic use of the deeper southern waters. **To enhance the conservation of both priority species, we recommend focusing on implementation and expansion of conservation efforts towards *Tursiops truncatus* along coastal and upper-shelf zones throughout the basin, with particular emphasis on the northern Adriatic cores evident in autumn and winter. For *Caretta caretta*, conservation actions should target the northern–central Adriatic shelf, a key adult core area during winter and autumn, while maintaining connectivity with adjacent shelf edges used in spring and summer.**

Overlapping pressure maps identify the Adriatic Sea as a **primary risk exposure area for vessel traffic**, which intersects the same high-use zones of both species. With the highest AIS route density (24.4 routes/km²) among MSFD subregions, the **Central–Northern Adriatic Sea shows the greatest risk for *Caretta caretta*, where mitigation measures for vessel traffic should be prioritized**. To maximize conservation efforts for both species and align them with ongoing management processes, we suggest to prioritize the northern–central Adriatic shelf where *Tursiops truncatus* coastal/upper-shelf use and *Caretta caretta* adult hotspots spatially coincide and where traffic exposures are recurrent, and to adopt a time-sensitive management (e.g., seasonal slow-down/routeing for passenger traffic; targeted port/at-sea litter controls synchronized with spring–summer dispersion). These proposals directly address the mapped ecology and pressures in C1 and support the existing N2000 network in the Adriatic Region.

The Adriatic Sea is a stable, high-density accumulation zone for **FMML**, posing year-round risks to all *CEPTU* species. For *Caretta caretta*, continuous mitigation is needed, particularly in the central and northern sectors where risk remains high throughout the year, while seasonal FMML hotspots in the northern Adriatic Sea require intensified monitoring and targeted mitigation efforts. *Tursiops truncatus* is also **persistently exposed to FMML in the northern–central Adriatic**, highlighting the need for localized improvements in coastal waste management to reduce these risks.

Pelagos & Ligurian-Provençal Basin (France-Italy)

The Pelagos Sanctuary remains a **key conservation area** and is recognized as one of the most critical priority zones for cetacean conservation in the Mediterranean Sea. It supports at least six cetacean species, ranking fourth in biodiversity hotspots identified through eDNA analyses, and hosts the highest concentrations of *Balaenoptera physalus* and *Stenella coeruleoalba*. Core habitats are also present for *Ziphius cavirostris*, *Physeter macrocephalus*, *Grampus griseus*, and *Globicephala melas*. *B. physalus* and *S. coeruleoalba* show stable or

increasing numbers while *Z. cavirostris* increasing, and *P. macrocephalus* remaining generally stable. The Sanctuary holds **high conservation value across all seasons, with peak vulnerability in summer**, and hosts the highest frequency of **juveniles in spring and autumn**. The Core-Ligurian-Provençal Basin is **particularly critical for *B. physalus* in summer**, and **suitable habitat for *Caretta caretta* expands here during spring and summer**. The Northwestern Mediterranean in particular is a key area and a corridor for large cetaceans, connecting the Pelagos Sanctuary to the Spanish Cetacean Migration Corridor, especially outside summer. **Conservation efforts must continue to sustain positive population trends, with particular attention to critical species such as *Grampus griseus*, *Ziphius cavirostris*, and *Globicephala melas*, for which this area represents one of the key sites for species conservation.**

The Pelagos Sanctuary and the Ligurian-Provençal Basin function as a continuous ecological unit, where **coordinated strategies and cross-border collaboration among France, Italy, and Spain are essential to maintain regional population stability, positive species trends, and effective threat mitigation.**

The Pelagos Sanctuary faces **high exposure to maritime traffic**, with the North-Western Mediterranean Sea consistently identified as the region where cetacean biodiversity is most at risk from collision according to the proxy indicator of NMEs. The newly designated **PSSA provides a critical framework for mitigating vessel strikes**, provided vessels adhere to its associated measures. Although specific **Associated Protective Measures for the PSSA** are under study to reduce vessel strike risks for large and medium cetaceans, they remain voluntary, with no binding regulations in place. Risk and NME maps produced under LIFE CONCEPTU MARIS highlight the urgent need for **mitigation measures within the PSSA, particularly near major harbors such as Toulon and Genoa, as well as in offshore zones**. High-risk zones for *Balaenoptera physalus* and *Ziphius cavirostris* include the Ligurian Sea and offshore Gulf of Lion, where vessel speeds during NMEs were significantly higher than during non-NME sightings, underscoring the need for targeted mitigation measures along core habitats. Seasonal passenger traffic, particularly in **spring and summer**, represents a major exposure source for multiple species, including *P. macrocephalus*, *S. coeruleoalba*, *Grampus griseus*, *T. truncatus*, *Z. cavirostris*, and *B. physalus*, indicating that policy measures should specifically address this traffic during peak periods.

The **Ligurian-Provençal Basin is a critical high-density accumulation zone for FMML** and represents **the most consistent hotspot for cetaceans exposed** to this threat, making it a **high-priority area for mitigation**. FMML exposure **intensifies during spring and summer**, necessitating dynamic strategies that include for example intensified clean-up efforts, awareness rising campaigns and improved waste management at sea and in ports during these warmer months. The Gulf of Lion and Ligurian Sea are also consistent FMML risk clusters for low-density species such as *Ziphius cavirostris*, *Globicephala melas*, and *Grampus griseus* throughout spring, summer, and autumn.

The Pelagos Sanctuary effectively encompasses core habitats for *Tursiops truncatus*, *Stenella coeruleoalba*, *Balaenoptera physalus*, and *Physeter macrocephalus*, and also covers predicted core areas of rarer species such as *Grampus griseus*, *Globicephala melas*, and *Ziphius cavirostris* in the Ligurian Sea (Annex I – Milestone C2.1). However, core areas for

Grampus griseus and *Globicephala melas* extend beyond the western limits of the Sanctuary, spanning the slope and offshore regions from Parc National de Port-Cros to Parc National des Calanques, supporting their inclusion within the North-Western Mediterranean Important Marine mammal Area (IMMA). Several protection measures are currently in place in this area. The Pelagos Sanctuary, designated as a SPAMI and fully encompassed within the North-Western PSSA, represents the central framework for cetacean conservation, complemented by the Bouches de Bonifacio PSSA. Additional scientific and area-based designations — including IMMAs, Natura 2000 sites, and national parks — further delineate key cetacean habitats within the Sanctuary. The North-Western Mediterranean IMMA, covering the Genoa Canyon system, together with the Caprera Canyon (proposed IMMA), includes highly suitable habitats for multiple cetacean species. The Parc National Marin du Cap Corse et de l'Agriate and adjacent Natura 2000 sites such as Agriates, Plateau du Cap Corse, and Grands dauphins de l'Agriates protect core habitats, while the Italian Natura 2000 site Tutela del *Tursiops truncatus* helps mitigate maritime traffic risks for this species. The western Ligurian continental shelf is important for all CEPTU species, and further south, the Bouches de Bonifacio benefits from overlapping protections as a Réserve Naturelle, SPAMI, and Natura 2000 site along the Corsican and Sardinian coasts. The Gulf of Lion shelf provides favorable summer habitat for *Tursiops truncatus*, notably within the Parc Naturel Marin du Golfe du Lion, included in the Natura 2000 site Grands dauphins du golfe du Lion (pSCI FR9102018), which overlaps with the IMMA for this species. Collectively, these spatial measures contribute significantly to cetacean and sea turtle conservation. However, **many existing national Marine Protected Areas do not fully cover the offshore distributions of most species**. In the southeastern part of the Sanctuary, the **northern Tyrrhenian Sea stands out as an important area for almost all species, supporting its current candidature as an Area of Interest for IMMA designation** and warranting strengthened conservation measures. In French waters, new sites could be identified within the “**Zone de protection Forte**” framework requested by the “Stratégie de façade”, or more globally the “**Strict protection areas**” under the Biodiversity Strategy, with the help of the Marine Spatial Planning actors. In that regard, the “**Parc Naturel Marin du Cap Corse et Agriates**” covering **core areas of favorable suitable habitat of many cetaceans species appears as a good candidate**.

The results of CONCEPTU MARIS in this area are especially robust due to the availability of long-term data, underscoring the importance of **maintaining large-scale, year-round long term continuous surveys**. Such monitoring ensures comprehensive area coverage and enables detailed analyses of species abundance, distribution, and long-term trends over decades. Globally the results provided by the Life CONCEPTU MARIS will greatly feed other processes that are ongoing or updates that are planned for soon, such as identification of important areas for Turtle (IMTAs), for cetaceans (IMMAs) and for risk areas (CCH).

Spanish waters

Efforts obtained through the monitoring of cetaceans and sea turtle species and reported on Deliverable C1 on the important and risk areas and species needs identified by CONCEPTU MARIS highlights the diversity in cetacean species of the Spanish Mediterranean waters, with the Alboran-Gibraltar region being the area with the highest diversity of all the Western

Mediterranean Sea, and the Spanish Cetacean Migratory Corridor emerging also as one of the most critical areas for cetacean conservation in the western Mediterranean Sea.

In Spain, key area-based conservation tools include marine protected areas classified under various national, regional, and international legal frameworks such as the EU Habitat Directives (through the Natura 2000 network), the Barcelona Convention, and the Convention on Biological Diversity (CBD). The Barcelona Convention lists 10 Specially Protected Areas of Mediterranean Importance (SPAMIs) for Spain, 6 of which are located in coastal areas (i.e., Cabo de Gata-Níjar Natural Park, Cap de Creus Natural Park, Mar Menor and Oriental Mediterranean zone of the Region of Murcia coast, Medes Islands, Sea Bottom of the Levante of Almería and Maro-Cerro Gordo Cliffs) and the remaining 4 cover offshore areas (i.e., Alboran Island, Columbretes Islands, Archipelago of Cabrera National Park and the Cetacean Migratory Corridor).

Existing SPAMIs in Spain only partially overlap with key areas for species and high-risk areas for maritime traffic and FMML. Thus, data obtained by CONCEPTU MARIS, suggest the need for: 1) an expansion on the Marine Protected Areas of the Alboran Island, including the northern areas of the Alboran Sea, 2) the coastal extension of the Spanish Cetacean Migratory Corridor, and 3) a protected marine space for the protection of the sperm whale breeding grounds north Minorca. Such proposed areas agree with current projects from the Ministry for the Ecological Transition and the Demographic Challenge (MITECO-SPAIN) for new Marine Protected Areas for the conservation of cetaceans in Mediterranean Spanish waters.

Alboran-Gibraltar region

The Alboran Sea and the adjacent Gibraltar region **stand out as the areas with the highest biodiversity in CEPTU species of all the Western Mediterranean Sea**, emerging as a critical area for the conservation of these species in the Mediterranean Sea. This area has the higher frequency of **juveniles** and higher encounter rates and group sizes of *Stenella coeruleoalba* and the **rare *Delphinus delphis***. It also hosts larger group sizes of *Tursiops truncatus*. It is also a core area for *Grampus griseus*, *Globicephala melas* and *Ziphius cavirostris* all year round, being **critically important for *G. melas*** during autumn when it serves as the species' almost exclusive refuge. Moreover, in winter this area becomes most critical for *Delphinus delphis*.

On the other hand, this area is an **important risk zone** related to anthropogenic pressures. FMML represents an important risk, particularly for low density cetaceans such as *Grampus griseus*, *Globicephala melas* and *Ziphius cavirostris*. Meanwhile, this area clearly stands out as the most critical high-risk exposure areas to maritime traffic for all CEPTU groups, both cetaceans (including rare species) and sea turtles (*Caretta caretta*). These areas show consistently high exposure levels throughout the year. **All these make the area a top conservation priority.**

Spanish Cetacean Migratory Corridor

The Spanish Cetacean Migratory Corridor is one of the most critical areas for cetacean conservation in the Mediterranean Sea, as it is one of the few areas that host high frequency

of juveniles. It also hosts among the highest abundance of *Stenella coeruleoalba*. This area shows peak importance in spring, followed by winter and autumn, mostly driven by the presence of rare species during those seasons: *Physeter macrocephalus* and *Ziphius cavirostris* in winter, and *Globicephala melas* in autumn. Moreover, this area seems to be a key spot for the distribution of the elusive species *Kogia breviceps* in the Mediterranean Sea. There is also a partial coherence between this marine protected area and species distribution models for *Caretta caretta*, suggesting that the area may support connectivity between western Mediterranean areas.

The coastal areas surrounding the Spanish Cetacean Migratory Corridor are important areas for *Tursiops truncatus*. Some of these areas are protected by sites of the Natura 2000 network, however other areas lack this protection, particularly the Gulf of Valencia and the northern coast of Ibiza and Mallorca. We suggest that it would be **beneficial to extend this SPAMI to cover these sites that lack protection**.

Specifically, the southern part of the Spanish Cetacean Migration Corridor (Ibiza Channel) presents an area of high-risk exposition to maritime traffic during spring-summer, which suggests that it would be interesting to **implement some measures to reduce this risk during these seasons**.

Northeast Balearic Islands

The northern area of the Spanish Cetacean Migratory Corridor, extending to the east to include the northeast region of the Balearic Islands, represent core areas in the Mediterranean Sea for *Balaenoptera physalus*, *Ziphius cavirostris* and, particularly, *Physeter macrocephalus*. Thus, data obtained from CONCEPTU MARIS **support the recommendation for the creation of a marine protected area for breeding grounds in the north of Minorca**.

Proposal for the Potential Enhancement of the Natura 2000 Network

Tyrrhenian Sea and Sardinia-Sicilian Channels (Italy)

Within the Tyrrhenian Sea and Sardinia-Sicilian Channels, most of the zones identified as important for *Tursiops truncatus* and *Caretta caretta* show good correspondence with existing Natura 2000 sites (see ANNEX I, Milestone C2.1), although some differences reflect the complementary ecological behaviours of the two species: *Tursiops truncatus* mainly occur in coastal waters where major coverage of N2000 is found, while *Caretta caretta* extend more offshore.

Specifically, for ***Tursiops truncatus***, the areas well covered by existing Natura 2000 sites include the northern and south-eastern coasts of Sardinia, such as “*La Maddalena and Tavolara-Molara*”, and “*Isola dei Cavoli, Serpentara, Punta Molentis e Campulongu*” as well as southern and insular sectors of Sicily, such as the Egadi Islands, Ustica, the Aeolian Islands and the western sites of “*Torre Salsa*” and “*Capo San Marco*”. In the Palermo area, the existing Natura 2000 sites “*Fondali di Capo Zafferano and Fondali di Isola delle Femmine*” also provide valuable coverage of a sector near the Port of Palermo, overlapping a zone where *Tursiops truncatus* is known to be highly exposed to maritime traffic and marine litter, thus offering an important framework for targeted management and mitigation measures. The transboundary Bonifacio Strait is also adequately represented through the French site “*Bouches de Bonifacio*” (FR9402015). It is worth reminding that all the north sector of Sardinia, including Bonifacio Strait, emerged as an area where the species is particularly exposed to the Maritime Traffic pressures.

For ***Caretta caretta***, coherence is good in several areas, notably in offshore sectors along the Lazio-Campania coast, around “*Ponza and Ventotene*”, across the central basin in correspondence of Vercelli and Palinuro Seamount, and around northern and western Sicily where they overlap to those sites also important for *Tursiops truncatus*, such as the “*Fondali dell’Arcipelago delle Isole Eolie*”, the “*Fondali dell’Arcipelago delle Isole Egadi*” and the “*Fondali dell’Isola di Ustica*”.

Moreover, several MPAs, including Egadi, Ustica, and Pelagie, overlap with *Caretta caretta* suitable habitats, highlighting the potential of a connected network of marine protected areas to provide integrated protection for the species.

Despite this overall coherence between the identified priority areas and the existing Natura 2000 network, some potential improvements could be considered to enhance coverage in future:

Along the Lazio-Campania coastline, model outputs from Deliverable C1 highlight highly suitable areas for *Tursiops truncatus*, particularly during the warmer months when the species also tends to expand offshore. Existing Natura 2000 Sites such as Ponza, Ventotene, Ischia and Capri already include the species, while several others zones, especially along the Lazio coast, remain unprotected despite the ecological relevance of their coastal and

estuarine habitats. Sites such as “Secche di Tor Paterno” and the offshore “Santa Marinella” grounds represent existing Natura 2000 areas where *Tursiops truncatus* is not yet listed in the Standard Data Forms (SDFs). It could be beneficial, in the future, to evaluate the possibility of extending some existing sites toward offshore sectors, while carefully considering potential implications for socio-economic uses of the area.

For the *Caretta caretta*, the central Tyrrhenian basin, identified as the main key area, is not yet covered by existing designated sites. However, the recent proposal for a new Site of Community Importance (SCI) in the central Tyrrhenian Sea, submitted by the Italian Ministry of Environment and Energy Security and currently under evaluation by the European Commission, represents a significant and timely step toward improving conservation coverage for this species in a key area. Model outputs from Deliverable C1 further support the proposed boundaries, indicating that the area functions as a persistent habitat across seasons and life stages.

Based on these findings, as future potential improvement in coordination with the competent authorities and relevant stakeholders it may be worth considering:

- (1) to review existing SDFs to assess the opportunity to explicitly include *Tursiops truncatus* and *Caretta caretta* in sites where modelled suitability and confirmed presence are high;
- (2) for *Tursiops truncatus* extending existing sites along the northern Lazio coast or, where appropriate, to consider additional coverage along the southwestern Sardinia shelf;
- (3) For *Caretta caretta*, the model outputs from Deliverable C1, including seasonal and ontogenetic variations in spatial patterns, as well as the species' high exposure risk to FMML, support the designation of the recently proposed SIC in the central Tyrrhenian Sea and its proposed boundaries. Future revisions could also include the southeastern area near the Marsili Seamount and the western Sardinian Channel, which have been highlighted as key areas for the species (Deliverable C1).

Adriatic Sea (Italy)

Several Natura 2000 sites already list *Tursiops truncatus* and/or *Caretta caretta* in their Standard Data Forms (SDF) (Table 2); however, most Adriatic sites are predominantly coastal, leaving portions of the offshore upper shelf currently unprotected.

Table 2. List of Italian Natura 2000 sites in the Adriatic Sea where *Tursiops truncatus* and/or *Caretta caretta* are listed in the Standard Data Form (SDF).

MS	CODE	SITE NAME	SPECIES	ADRIATIC SUB REGION
IT	IT3340006	Carso Triestino e Goriziano	<i>Tursiops truncatus</i>	Northern -Adriatic
IT	IT3330005	Foce dell'Isonzo - Isola della Cona	<i>Tursiops truncatus</i> , <i>Caretta caretta</i>	Northern -Adriatic
IT	IT3320037	Laguna di Marano e Grado	<i>Tursiops truncatus</i> , <i>Caretta caretta</i>	Northern - Adriatic

IT	IT3330009	Trezze San Pietro e Bardelli	<i>Tursiops truncatus</i> , <i>Caretta caretta</i>	Northern - Adriatic
IT	IT4060018	Adriatico settentrionale	<i>Tursiops truncatus</i> , <i>Caretta caretta</i>	Northern - Adriatic
IT	IT3270025	Delta del Po	<i>Tursiops truncatus</i> , <i>Caretta caretta</i>	Northern - Adriatic
IT	IT7120215	Torre del Cerrano	<i>Tursiops truncatus</i> , <i>Caretta caretta</i>	Central- Adriatic
IT	IT5340001	Litorale di Porto d'Ascoli	<i>Caretta caretta</i>	Central- Adriatic
IT	IT3250047	Tegnùe di Chioggia	<i>Tursiops truncatus</i> , <i>Caretta caretta</i>	Northern - Adriatic

The **northern Adriatic Sea (Trieste-Po Delta sector)** was identified as a persistent high-suitability area for both *Tursiops truncatus* (year-round) and *Caretta caretta* (winter–autumn concentration) (Deliverables C1 and C2.1). Here, several N2000 sites collectively form a continuous coastal-to-upper-shelf belt that already captures much of this core habitat, yet coverage remains largely nearshore. To complement existing protection it could be beneficial to review Site SDFs confirming both species (some list only *Tursiops truncatus*).

In the **Central Adriatic Sea (Marche–Abruzzo sector)**, high habitat suitability has been identified for both *Tursiops truncatus* and *Caretta caretta* along the central Adriatic shelf. Existing coastal Natura 2000 sites in this area are generally narrow and do not extend into the offshore areas used by these species. It could be beneficial, in the future, to evaluate the possibility of extending some existing sites toward offshore areas, to include the mid-shelf habitat (50–150 m) used by *Tursiops truncatus* and seasonally by *Caretta caretta*, while carefully considering potential implications for fishing activities and other socio-economic uses of the area. The existing site, such as “Torre del Cerrano” (IT7120215), may serve as strategic nuclei for future expansion of the network.

In the **southern Adriatic Sea**, persistent suitability hotspots for both species, and high-exposure zones to maritime traffic and FMML were highlighted, uncovered by binding instruments. Key areas currently lacking site coverage for *Tursiops truncatus* and/or *Caretta caretta* are mainly located in the central offshore shelf between Marche–Abruzzo and Gargano–Bari (approx. 42–43° N, 14–16° E). In this sub-region it may be worth considering integrating the existing Natura 2000 towards offshore areas, considering a possible updating of the boundary toward offshore sectors of some of the existing marine Sites actually confined in coastal areas, and reviewing SDFs, adding both *Caretta caretta* and *Tursiops truncatus* in sites not currently targeting these species, such as – “Isole Tremiti” (IT9110040), which extends into offshore waters and strongly overlaps with suitable habitats for both species.

Based on the previous findings, as future potential improvement in coordination with the competent authorities and relevant stakeholders, it may be worth considering:

- (1) In the northern and mid-southern Adriatic subregion: review existing SDFs to assess the opportunity to include *Tursiops truncatus* and *Caretta caretta* in sites where modelled suitability and confirmed presence are high;

- (2) In the central and mid-southern Adriatic subregion (for *Tursiops truncatus* and *Caretta caretta*): evaluate, where appropriate, updating existing boundaries towards offshore areas (e.g. “Torre del Cerrano” and “Litorale di Porto d'Ascoli”);
- (3) In the northern Adriatic subregion: implement existing conservation measures adding seasonal traffic/litter ones;
- (4) In the mid-southern Adriatic sub-region: prioritize management actions targeting FMML and maritime traffic impacts, and evaluate the possibility of jointly implementing the Natura 2000 network in collaboration with Croatia.

Other general suggestions for all the Adriatic SubRegion could include:

- Integrate dynamic management tools to specifically address threats from FMML, which have been found to be particularly severe in this subregion (see paragraph on FMML), and disturbances from MT. Measures could include seasonal regulation of vessel traffic, and litter-management strategies aligned with known exposure periods.
- Promote cross-border cooperation to ensure transboundary ecological continuity across the Adriatic Sea.

Pelagos Sanctuary (Italy)

Within the Italian part of the Pelagos Sanctuary, persistent hotspots with high habitat suitability, linked to resident units with strong site fidelity, are identified. Here, two large Natura 2000 sites specifically designated for ***Tursiops truncatus*** are present: “Tutela del *Tursiops truncatus*” (IT5160021) in Tuscany and “Tutela del Tursiope Mar Ligure” (IT1312392) in Liguria. Both sites show good alignment with the species’ predicted core areas, particularly reflecting its coastal distribution pattern.

However, several important areas remain insufficiently protected. In the Pelagos Sanctuary, Ligurian Sea, and Tuscan Archipelago, *Tursiops truncatus* habitats are primarily coastal in winter, but expand to deeper waters in spring, and extend across shelf and offshore areas with persistent hotspots in summer. **Future conservation efforts could focus on establishing new protected sites or expanding existing ones, particularly offshore.** Notably, the **southern part of the Tuscan Archipelago and the Tuscany coastline warrant consideration**, as they have been identified as key habitats for the species (Deliverable C1) but currently lack specific conservation measures. Similarly, the **northern coast of Sardinia** is important for *Tursiops truncatus*: although existing Natura 2000 sites record the species, it is not formally listed among designated species. These areas should be considered priority candidates for future revisions of their Standard Data Forms (SDF) to improve network-wide protection and coherence.

Most of the highest exposure risk hotspots for *Tursiops truncatus* from FMML during all the seasons fall within the Pelagos Sanctuary, underscoring the need to integrate targeted mitigation measures into Protected Area management plans and to assess potential cumulative impacts on the species within these areas.

Risk exposure to MT is primarily concentrated on the eastern side of the Sanctuary, with seasonal hotspots near ports and along the corridor between Tuscany and Corsica.

Collisions with large vessels do not currently appear to pose a significant threat, given the species' limited offshore distribution and the absence of recorded NMEs or reported collisions from crew observations. The main risk near ports is mitigated by vessel speed reductions during entry and exit maneuvers. However, these **coastal areas experience intense recreational boating**, including large yachts, indicating that this overlap merits further investigation and potential mitigation measures, such as localized speed restrictions, to reduce disturbance and collision risk.

Two large areas identified as Core Areas for ***Caretta caretta*** are present in the Italian part of the Pelagos Sanctuary: the **central offshore area of the Ligurian Sea and the northern Tyrrhenian Sea, off the eastern coasts of northern Sardinia especially for late juveniles and adults during warmer months**. Currently, no N2000 sites exist in these areas, so that potential areas could be considered to complement the existing ones (i.e., “*Grands dauphins de l'Agriate*” FR9402019). Although overall exposure to both FMML and MT is not particularly high in these areas, it should be noted that several likely collision events with sea turtles, confirmed by a significant number of crew members reported cases, indicating a potentially hidden threat to the species.

Pelagos and other French waters (France)

In French waters, *Tursiops truncatus* exhibit strong seasonality, with peaks in habitat suitability and encounter rates during summer and autumn in the Gulf of Lion and the Liguro-Provençal Basin. In the French part of the Pelagos Sanctuary and the northwestern Mediterranean Sea, there is generally good coherence between existing Natura 2000 sites and areas suitable for *Tursiops truncatus*. The sites “*Grands dauphins de l'Agriate*” (FR9402019) and “*Grands dauphins du golfe du Lion*” (pSCI FR9102018) effectively cover key core and suitable habitats for the species. Both sites are extensive, encompassing mainly coastal waters but also some pelagic zones, thus including diverse ecological habitats that support the species' seasonal movements and potential habitat shifts.

Tursiops truncatus is also listed among the target species in other Natura 2000 sites not specifically designated for it, such as “*Récifs des canyons Lacaze-Duthiers*” and “*Prunet et Bourcart*” in the Gulf of Lion, and “*Plateau du Cap Corse*” in Corsica. Overall, no major gaps in habitat suitability coverage appear within the French Natura 2000 network, as other favorable habitats are also included within other designated marine protected areas (National Parks, Marine Natural Parks).

Significant FMML hotspots are found within the French sector of the Pelagos Sanctuary and the northwestern Mediterranean Sea, particularly offshore east of Cap Corse and in the offshore Gulf of Lion. Some Natura 2000 sites are already established in these areas, which could help address these pressures. This information can also guide targeted mitigation measures and support assessments of cumulative impacts on species within high-risk zones.

For *Caretta caretta*, results from CONCEPTU MARIS indicate that while the species is present in French waters, its core suitable habitat is concentrated around Corsica, largely overlapping

with the Natura 2000 site “*Grands dauphins de l’Agriate*” (FR9402019) which already include the species in the SDF. Considering the northward expansion trend detected for *Caretta caretta*, particularly during the summer and likely linked to climate-related changes, **continuous monitoring is recommended to enable prompt, adaptive conservation actions.**

Spanish waters

Considering the existing areas as part of the Natura 2000 network, there is a spatial overlap between those including designation for *Tursiops truncatus* and the modelled core predicted areas for the species as shown in Figure 5 of Annex 1. Specifically, modelled core predicted areas overlap with either Special Areas for Conservation and Sites of Community Importance in the Alboran Sea, Balearic Islands and around the Columbretes Islands.

However, there are nine already protected Natura 2000 sites in Spain, where *Tursiops truncatus* is not explicitly listed among the designation targets (Table 3). Thus, representing potential candidates for inclusion in future revisions of the Natura 2000 sites SDF.

Table 3. Natura 2000 sites in Spain that overlap with important habitat for *Tursiops truncatus* as predicted by species distribution models, but where the species is not listed in the Standard Data Forms. Extracted from Annex 1 - C2.1 Milestone.

MS	SITECODE	SITENAME
ES	ES5212005	L'Almadrava
ES	ES5222007	Alguers de Borriana-Nules-Moncofa
ES	ES6110009	Fondos Marinos de Punta Entinas-Sabinar
ES	ES6110010	Fondos Marinos Levante Almeriense
ES	ES6170037	El Saladillo - Punta de Baños
ES	ESZZ16007	Espacio marino de la Marina Alta
ES	ESZZ16008	Espacio marino del Cabo de les Hortes
ES	ESZZ16009	Espacio marino de Cabo Roig
ES	ESZZ16011	Espacio marino Cañones de Alicante

As for *Caretta caretta*, the Alboran Sea and the Menorca channel within the Balearic Islands, fall as areas of moderate suitability for the species. The *Espacio Marino Cañones de Alicante* is the only Natura 2000 site in Spain where the species is not explicitly listed in the SDF, but the species distribution models predict this space as highly suitable for the species, thus representing a potential candidate for its inclusion in future revisions.

Areas where both *Tursiops truncatus* and *Caretta caretta* are most exposed to the risk caused by maritime traffic are located in the Alboran–Gibraltar region, extending north along the Spanish coast up to the Ibiza channel and the Balearic Islands, partially overlapping several Nature 2000 sites. Here, Sites of Community Importance such as the “*Canal de Ibiza*” and specifically for the Alboran-Gibraltar Area the “*Estrecho Oriental*”, “*Estrecho Occidental*” and “*Sur de Almería - Seco de los Olivos*” intersect several exposure hotspots as detected in CONCEPTU MARIS. These pressures are thus worth being considered within the management plan of the sites.



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ANNEX I - Milestone C2.1

Report on the Evaluation
of the coherence and gaps
between the Action plan
strategies and the identified
important and risk areas
and species needs

info@lifeconceptu.eu
www.lifeconceptu.eu

Prepared for: **LIFE CONCEPTU MARIS**
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Alignment and gaps with Spatial-Based protection measures

Action Plan and Area-Based conservation and mitigation strategies

Action plan strategies

The conservation of cetaceans and sea turtles within European Union (EU) Member States in the Mediterranean Region is significantly supported by the Habitats Directive (1992, HD), which is a key European legislative instrument in the environmental field. The overarching goal of this directive is to ensure the "*preservation, protection and improvement of the quality of the environment, including the conservation of natural habitats and wild fauna and flora*". The directive explicitly lists cetacean and sea turtle species in its Annexes II and IV, highlighting their importance for conservation under this legislation. A central mechanism of the HD is the establishment of the **Natura 2000 network**, a Community-wide system of nature protection areas. This network aims to ensure the long-term survival of the most valuable and threatened species and habitats in Europe, with Member States (MS) responsible for proposing sites for their inclusion. The directive recommends EU MS to comply with the Natura 2000 framework by further designating Special Areas of Conservation (SACs) for protected mobile species, which would encompass both cetaceans and sea turtles given their highly mobile nature, large home ranges, and long migrations. The directive requires the protection of their habitats and the prevention of habitat deterioration and disturbance. The regular monitoring of the species' status is mandatory, and MS must report every six years on the directive requirement implementation, including conservation status, trend and threats of species and habitats, and measures taken. Any plan or project likely to affect a designated site must undergo an appropriate assessment, and could be implemented only if site integrity is not adversely affected, with few strictly defined exceptions. Consistency of legal frameworks to avoid conflicting activities within Natura 2000 sites is required.

The HD works in synergy with other relevant marine protection frameworks, such as the **Marine Strategy Framework Directive** (2008, MSFD), which was specifically designed to complement the HD for marine protection. This integrated approach also aligns with the requirement of monitoring the Good Environmental Status (GES) of marine waters and of species and habitats, with a mandatory reporting every six years.

The protection of cetaceans and sea turtles in the Mediterranean region is also guided by specific action plans adopted under the framework of the **Barcelona Convention**, which prioritizes the conservation of the marine environment and its biological diversity through the **Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol)** (UNEP MAP, 1995). These action plans serve as regional strategies that set priorities and activities for conservation and, although they are not legally binding, they call for improved solidarity and coordination among the states in the region.

The "Action Plan for the conservation of cetaceans in the Mediterranean Sea" was originally adopted in 1991 and underwent its latest update in 2021. This update was specifically requested by the Contracting Parties to the Barcelona Convention at their 21st Conference of the Parties (CoP 21) in December 2019. The plan development involved close

collaboration with ACCOBAMS (The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area), as obligations related to cetaceans under the SPA/BD Protocol are fulfilled through ACCOBAMS implementation and a Memorandum of Collaboration between ACCOBAMS and SPA/RAC. The Mediterranean Sea is recognized as a marine biodiversity hotspot, since it hosts a remarkable diversity of cetaceans, with eleven regular resident species among twenty-five species that occur or have occurred in the basin. However, as cetaceans are highly mobile, long-lived vertebrates at the top of marine food webs, they are susceptible to numerous threats, including fisheries interactions (bycatch, overfishing, and depredation), ship strikes (a major concern for fin and sperm whales), underwater noise, disturbance from boat traffic (including cetacean-watching activities), chemical pollutants (like PCBs and mercury), marine debris (macro- and microplastics), habitat loss and degradation, and the overarching impacts of climate change, all of which can have cumulative effects. The Action Plan outlines priority actions across four categories: Education and Awareness, Capacity Building, Research and Monitoring, and Management, and its main objective is to provide a comprehensive conservation framework and guidance to improve the conservation status of cetacean populations within the Mediterranean Sea, aligning with decisions from international bodies like ACCOBAMS, the Pelagos Sanctuary Agreement, and the International Whaling Commission (IWC). It is recommended that these action plans are updated every five years based on regional and national assessments of their implementation.

The "Action Plan for the Conservation of Marine Turtles in the Mediterranean" was initially adopted in 1989 and was last updated in 2019. Marine turtles in the Mediterranean Sea exhibit some of the highest threat scores globally, with their widely dispersed foraging grounds that make them vulnerable to various threats such as bycatch, vessel strikes, pollution, and coastal development.

In general, the conservation of highly mobile species such as CEPTU species is inherently complex due to their large home ranges and long-distance migrations, which span multiple national jurisdictions and management frameworks and make the gathering of needed information challenging. This necessitates coordinated actions among nations, international and regional organizations, and a wide range of stakeholders. Conservation plans under the HD emphasize an ecosystem- and threat-based approach, recognizing the need to integrate area-based measures, such as those implemented through the Natura 2000 network and Marine Protected Areas (MPAs), with broader sectoral mitigation efforts that target anthropic threats, including those caused by fisheries, shipping, tourism, and the oil and gas industries. MPAs are particularly important for protecting critical habitats and supporting the implementation of harmonized monitoring and conservation protocols. The MSFD complements the HD by fostering synergies in marine protection, contributing to a holistic strategy for achieving GES. Regular monitoring and assessment efforts, aligned with the EcAp/IMAP process, are essential for tracking the distribution, abundance, and demography of these species, as required by the HD and related frameworks on a six-year cycle.

Area-based conservation measures

Area-based conservation measures, such as MPAs, Specially Protected Areas of Mediterranean Importance (SPAMIs), and Other Effective Area-Based Conservation Measures (OECMs), are recognized as fundamental tools for safeguarding marine biodiversity in the Mediterranean Sea. These measures are crucial for guiding, coordinating, and strengthening conservation efforts in the Mediterranean region, especially for highly mobile species like CEPTU species.

Key area-based conservation tools for cetaceans and sea turtles in the Mediterranean basin include several types of **protected areas at sea**. These are considered one of the most effective tools for marine biodiversity protection and are crucial for the conservation of CEPTU species. They are identified or classified under various **national, regional, and international legal frameworks** such as the EU HD and Birds Directives (through the Natura 2000 network), the Barcelona Convention, and the Convention on Biological Diversity (CBD). Protected areas at sea can vary in their level of protection and permitted activities, but all aim to contribute to biodiversity conservation, ecosystem resilience, and the sustainable management of marine resources. The Post-2020 Regional Strategy for MPAs and OECMs in the Mediterranean Sea supports the designation of new or the extension of existing MPAs with focused management actions, as well as zoning within existing MPAs.

At the EU level:

- **Natura 2000 Network:** is the cornerstone of the EU nature conservation policy. It is a coherent ecological network of protected areas established under the EU HD and the EU Birds Directive. The network aims to ensure the long-term survival of Europe's most valuable and threatened species and habitats, both on land and at sea. It includes two types of sites: Special Areas of Conservation (SACs) designated under the HD, and Special Protection Areas (SPAs) designated under the Birds Directive. The network also includes intermediate steps, such as proposed Sites of Community Importance (pSCIs), suggested by Member States based on scientific criteria, and Sites of Community Importance (SCIs), which are officially adopted by the European Commission but not yet designated by Member States. Within six years, these SCIs must be converted into Special Areas of Conservation (SACs) with appropriate conservation measures. While not defining strict no-take zones, Natura 2000 sites promote sustainable management practices, allowing human activities that are compatible with conservation objectives. This network of nature protection areas within EU MS aims to assure the long-term survival of cetacean species listed in its annexes.

At Mediterranean region level:

- **Specially Protected Areas of Mediterranean Importance (SPAMIs):** are designated under the SPA/BD Protocol and aim to protect sites of ecological, scientific, aesthetic, cultural, or educational value. SPAMIs can include marine and coastal areas under national jurisdiction or, in exceptional cases, in areas beyond national jurisdiction. Once designated, all Parties to the Convention are obligated to respect and ensure

the protection and conservation of SPAMIs, making them a legally recognized tool for regional marine biodiversity conservation. Some SPAMI are specifically designated for the protection of marine mammals, notably, the Pelagos Sanctuary and the Spanish Cetacean Migration Corridor. Efforts are ongoing to monitor these areas and propose new potential SPAMIs.

At National level:

- **National Designated Areas** are protected areas identified and established by individual countries under their national legislation to conserve important natural habitats, species, and landscapes (<https://www.eea.europa.eu/en/datahub/datahubitem-view/f60cec02-6494-4d08-b12d-17a37012cb28>). Despite being nationally designated, their conservation roles are integrated and reported within regional (EU) and international biodiversity frameworks. These areas often complement international and regional conservation networks and may include various categories.

At global level:

- **Other Effective Area-based Conservation Measures (OECMs)**: are recognized under the Convention on Biological Diversity (CBD) and promoted within global biodiversity frameworks, including the Post-2020 Global Biodiversity Framework (Kunming-Montreal GBF) and EU Biodiversity Strategy for 2030, as complementary to formal protected areas including the Natura 2000 network. These are geographically defined areas, other than protected areas, that achieve positive long-term outcomes for biodiversity conservation through their governance and management.

Other area based approaches or measures

The conservation of CEPTU species, whose large home ranges and long migrations span various jurisdictions, requires coordinated actions across different scales and a solid scientific baseline.

Non-binding scientific descriptions of important areas at global and regional level:

- **EBSAs (Ecologically or Biologically Significant Marine Areas)** are non-binding scientific descriptions of areas, identified through an expert-driven process following specific criteria, that have particular ecological or biological importance. They are identified under the CBD to highlight key areas that should be considered in marine planning and conservation, but EBSAs themselves are not formal protected areas or management designations, they serve as a basis for informing conservation priorities. In the Mediterranean Sea, 15 EBSAs have been identified, which include Mediterranean Natura 2000 sites and SPAMI.
- **Important Marine Mammal Areas (IMMAs) and Important Marine Turtle Areas (IMTAs)**: are non-binding key spatially-defined areas that represent important habitats for cetaceans and marine turtles, respectively, and are determined through an expert-driven scientific identification process that followed specific criteria,

developed under the IUCN Marine Mammal Protected Areas Task Force and IUCN Marine Turtle Specialist Group, respectively. The process represents a biocentric approach to identify important areas and can be flagged for further investigation and potential mitigation measures.

- **CCH** (previously Cetacean Critical Habitats, has become recently Cetacean Cooccurrence with Human activities): are non-binding scientifically identified marine areas that are *particularly important* for one or more cetacean species, because they provide essential ecological functions. This scientific process and tool were developed under ACCOBAMS, and are used in marine conservation planning to identify potential future protected areas. More recently (2016*), the ACCOBAMS Scientific committee has launched the update of the area identification process, which will integrate ecological and threat-based data, in coherence with other frameworks such as the Convention on Migratory Species (CMS) and the MSFD. This concept integrates the spatial distribution of pressures with the animals' most important habitats to inform management and prioritize mitigation approaches, either area-based or sectorial-based. At present, the mapped CCH areas are still those based only on the importance for the species.
- **Ecological Corridors:** Both national and transboundary mobile species corridors are defined and managed to connect habitats and facilitate species movement. They are being integrated into national conservation planning and regional frameworks such as the Barcelona Convention's SPAMI protocol, which encourages their inclusion in the List of SPAMIs.

*ACCOBAMS-MOP6/2016/Res.6.24

(https://www.accobams.org/wp-content/uploads/2016/06/ACCOBAMS_MOP6_Res6.24.pdf)

Sectorial-based measures specifically designed to mitigate anthropogenic pressures:

The Mediterranean Sea faces intense and cumulative human pressures that threaten marine habitats and species, particularly wide-ranging ones like cetaceans that depend on large, undisturbed areas. In this context, including Area-Based Measures for Mitigating Pressures such as temporal closures, and exclusion zones, are essential tools for mitigating these impacts. By regulating or limiting harmful activities within defined spatial boundaries, such measures help reduce noise and maritime traffic disturbance, prevent habitat degradation, protect critical areas for feeding, breeding, and migration, and strengthen the resilience of ecosystems and species to ongoing environmental pressures. The primary area-based measures and schemes specifically employed to mitigate pressures in the Mediterranean are:

- **Maritime (or marine) Spatial Planning (MSP)** is a EU Directive that proposes an integrative process to address the use of sea space, facing increasing demand from traditional and emerging sectors while preserving the proper functioning of marine ecosystems. MSP can result in plans, permits and other administrative decisions that set the spatial and temporal distribution of relevant existing and future activities and

uses in the marine waters. The key benefits of MSP include: i) the increased cross-border cooperation between EU MS to develop energy grids, shipping lanes, pipelines, renewable energy and other activities, but also to develop coherent networks of protected areas, and ii) the protection and preservation of the environment through early identification of impact and opportunities for multiple use of space.

- **Particularly Sensitive Sea Areas (PSSAs)** are areas that can be designated by the International Maritime Organization (IMO) under its Marine Environment Protection Committee (MEPC) for their protection from international shipping activities. Associated Protective Measures within PSSAs, such as speed reduction and routing measures, can help mitigate threats like vessel strikes with large whales.
- **Traffic Separation Schemes (TSS) and Routing Schemes** are maritime navigation measures developed and adopted by the IMO, primarily for improving vessel traffic safety. While primarily aimed at vessel navigation, these measures are effective in reducing vessel strike risk for large whales by separating whales from vessels or minimizing their co-occurrence in space and time.
- **Fisheries Restricted Areas (FRAs)** are established within the framework of Regional Fisheries Management Organizations (RFMOs), such as the General Fisheries Commission for the Mediterranean (GFCM), and are based on sectoral governance, primarily to manage fisheries impacts on vulnerable ecosystems and species. These are sectoral spatial tools that can be used to boost biodiversity conservation beyond MPAs, particularly for managing interactions with fisheries.

Coherence & gaps on spatial protection measures

This report aims to evaluate the coherence and gaps between the Action plans and strategies and the important and risk areas and species needs identified by the Life CONCEPTU MARIS (Deliverable C1). The analysis primarily focused on the coherence between the spatial protection measures (area-based measures) already in place in the Mediterranean basin and the important areas identified by the Life CONCEPTU MARIS project using primarily visual data. For cetacean species, in addition to visual observations, the comparison also considered environmental DNA (eDNA) results, which provide complementary information on species occurrence in areas where visual detections are limited or absent. This integrated approach allowed a broader evaluation of spatial coherence for all cetaceans, excluding *Caretta caretta*, for which only visual data were used. For the species *Kogia breviceps*, no visual detections were recorded during the surveys, and its presence in the Mediterranean Sea was confirmed exclusively through eDNA analyses; thus, the coherence assessment for this species relies solely on molecular evidence.

The initial primary check focuses on the coherence and gaps related to Natura 2000 sites for the species listed in Annex II of the HD, specifically *Tursiops truncatus* and *Caretta caretta*, for which the HD requires the designation of SACs. Then the coherence and gaps have been

evaluated for all Mediterranean CEPTU species focusing on all the main area-based conservation measures – PSSA, National Designated Sites and SPAMI – with the aim to comprehensively evaluate the spatial protection landscape and identify both existing strengths and critical gaps in conservation across the Mediterranean Sea. Then a second step compared the results from CM with other science-based designation of important areas for animals (IMMAs, CCHs, EBSAs and IMTAs). Those internationally recognised areas may serve as a basis to strengthen measures of conservation if needed and become (completely or partially) Marine Protected Areas for example.

As the distribution of these pelagic species transcends national boundaries, the project operates in a transboundary context, providing information to support coordinated and integrated conservation strategies among different Member States, consistent with the Habitats Directive and regional conventions (e.g., Barcelona Convention, SPA/BD Protocol). References to national waters are provided only as general geographic context, where certain areas may be more relevant to a specific country. Accordingly, Figure 4 is intended to provide a general overview of the areas for which countries are called to define Maritime Spatial Planning, without detailing the specific boundaries of Member State competence (e.g., 12 nautical miles from the baseline or the Ecological Protection Zone declared by Member States in some of the relevant sea areas).

Table 1 provides an overview of the potential spatial layers considered for the analysis. Each entry specifies the source, applicable legal or regulatory status, and, where available, a direct link to the database. Figures 1–3 illustrate the spatial layers listed in Table 1, grouped according to their regulatory framework (binding vs. non-binding). In addition, Figure 4 presents the EEZ and Territorial Sea boundaries, not as spatial protection measures, but as jurisdictional references.

Table 1. List of sources for the spatial layers of marine protected areas and related designations used in the analysis.

	Framework	Regulated	Layer Source	Link to the original file	Filtered file name
Natura 2000	Habitat Directive /Birds Directives	✓ Yes	European Environmental agency	https://sdi.eea.europa.eu/data/be2142b0-7dc4-42e3-afac-f7cc5f1a9ac6	Filtered for Med Region by spatial intersection and in the attribute table for sitetype B and C: Natura2000_end2023_ea_v_3035_100_k_natura2000_p_2023_v01_r00_MED
National Designated Areas	National legal frameworks	✓ Yes	European Environmental agency	https://www.eea.europa.eu/en/datahub/datahubitem-view/f60cec02-6494-4d08-b12d-17a37012cb28	Nationally_Designated_Sites_CDDA_eea_v_3035_100_k_mpa-in-marine-assessment-area_p_2021_v01_r00_MED

SPAMI	Barcelona Convention UNEP-MAP / SPA-RAC	✓ Yes	European Environmental agency	https://sdi.eea.europa.eu/data/be2142b0-7dc4-42e3-afac-f7cc5fla9ac6	Filtered for SPAMI in the Mediterranean region: SPAMI_marine_area_ee a_v_3035_100_k_mpain marineassessmentarea_ p_2021_v01_r00_MED
IMMAs / IMTAs	IUCN	✗ No (no direct regulation)		https://www.marinemammalhabitat.org/immas/	Available only for IMMAs upon request; IMTAs still not proposed and designated.
EBSAs	CBD criteria	✗ No (no direct regulation)	MAPAMED / CBD	https://www.mapamed.org/#	Extracted from “MAPAMED_2019_editio n_version_2” selecting DESIG_CAT_ENG = EBSA
CCH	ACCOBAMS	✗ No (no direct regulation)	MAPAMED / IMO	https://www.mapamed.org/#	Extracted from “MAPAMED_2019_editio n_version_2” selecting DESIG_CAT_ENG = Critical Cetacean Habitat
PSSA	IMO designation	✓ Yes (navigation regulations)	MAPAMED / IMO	https://www.mapamed.org/# and https://geoplatform.tools4msp.eu/layers/geonode:NWMed_PSSA_WGS84/layer_export#/	Extracted from “MAPAMED_2019_editio n_version_2” selecting DESIG_CAT_ENG = Particularly Sensitive Sea Area

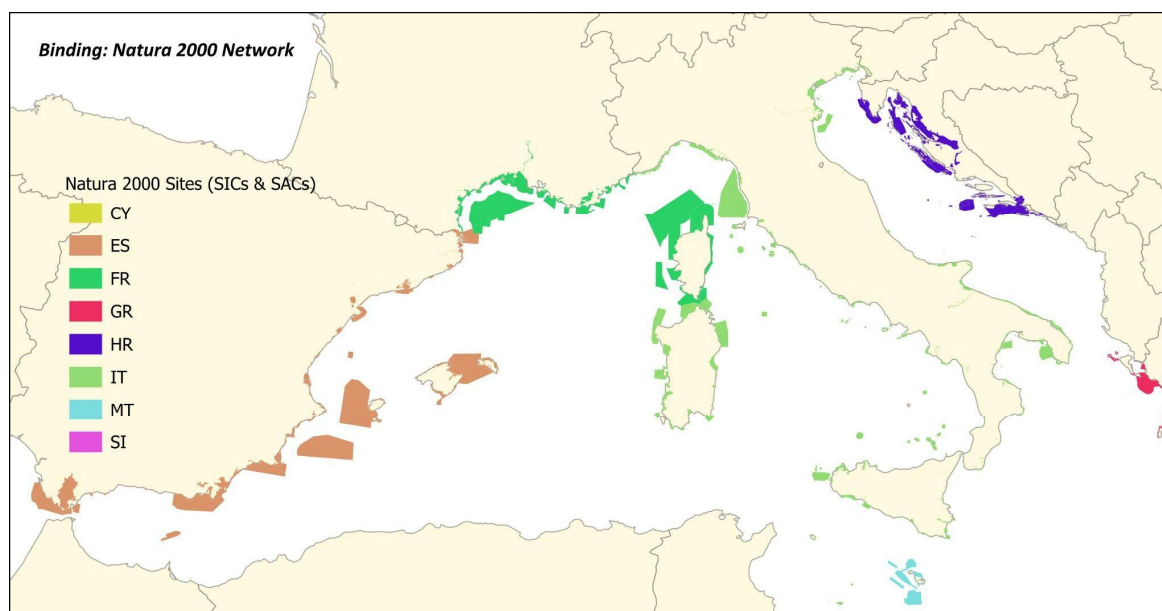


Figure 1. Natura 2000 Network sites in the Western Mediterranean and Adriatic Seas, organized by Member States. Only SACs (Special Area of Conservation) and SICs (Site of Community Interest) listed in the official EEA website (filtered for sitetype B and C) are

included here, while the most recently proposed candidate sites not yet included can be added upon indication from the Member States.

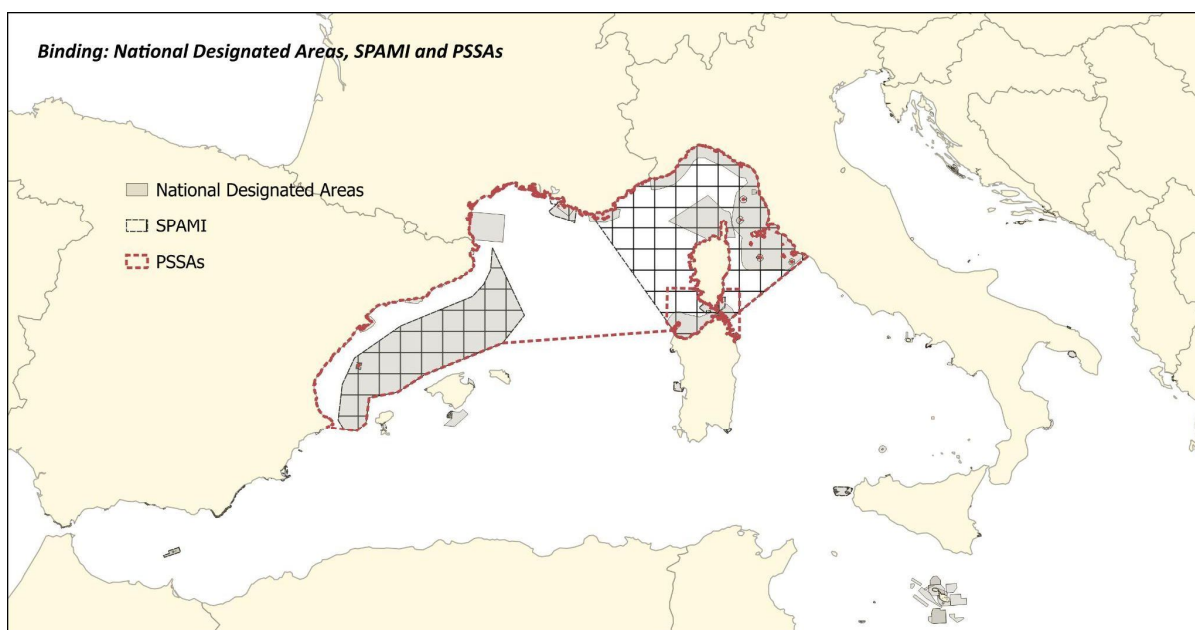


Figure 2. Other binding protected areas: Nationally Designated Areas, Specially Protected Areas of Mediterranean Importance (SPAMIs), and Particularly Sensitive Sea Areas (PSSAs).

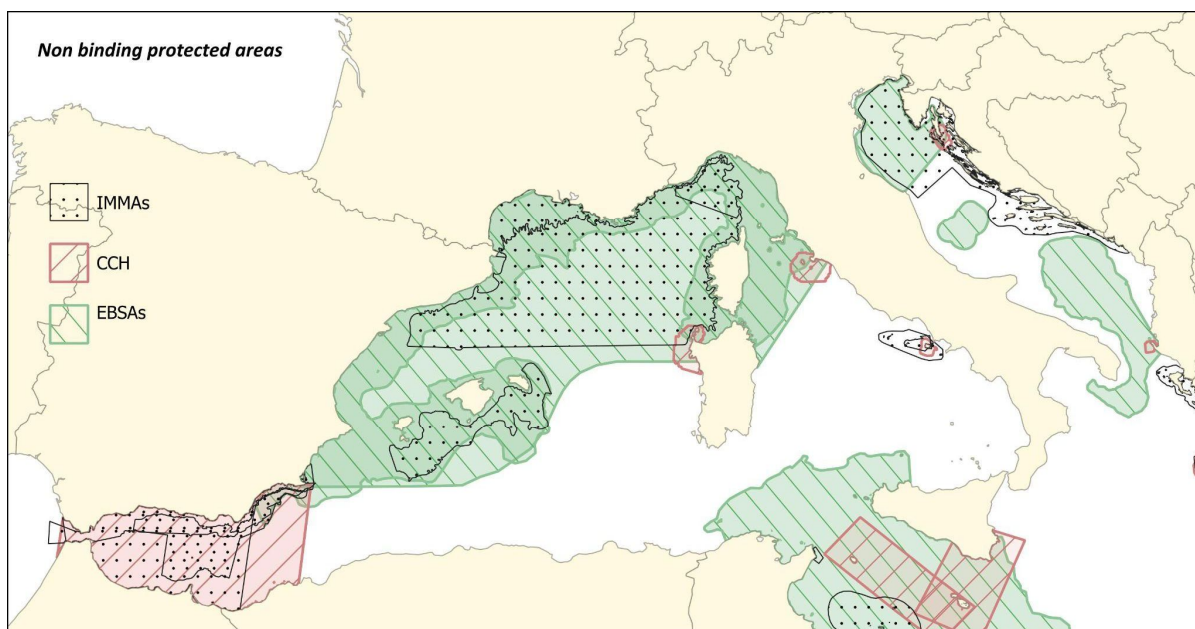


Figure 3. Non-binding protected areas in the western Mediterranean and Adriatic Seas, including Important Marine Mammal Areas (IMMAs), Cetacean Critical Habitats (CCHs), and Ecologically or Biologically Significant Marine Areas (EBSAs).

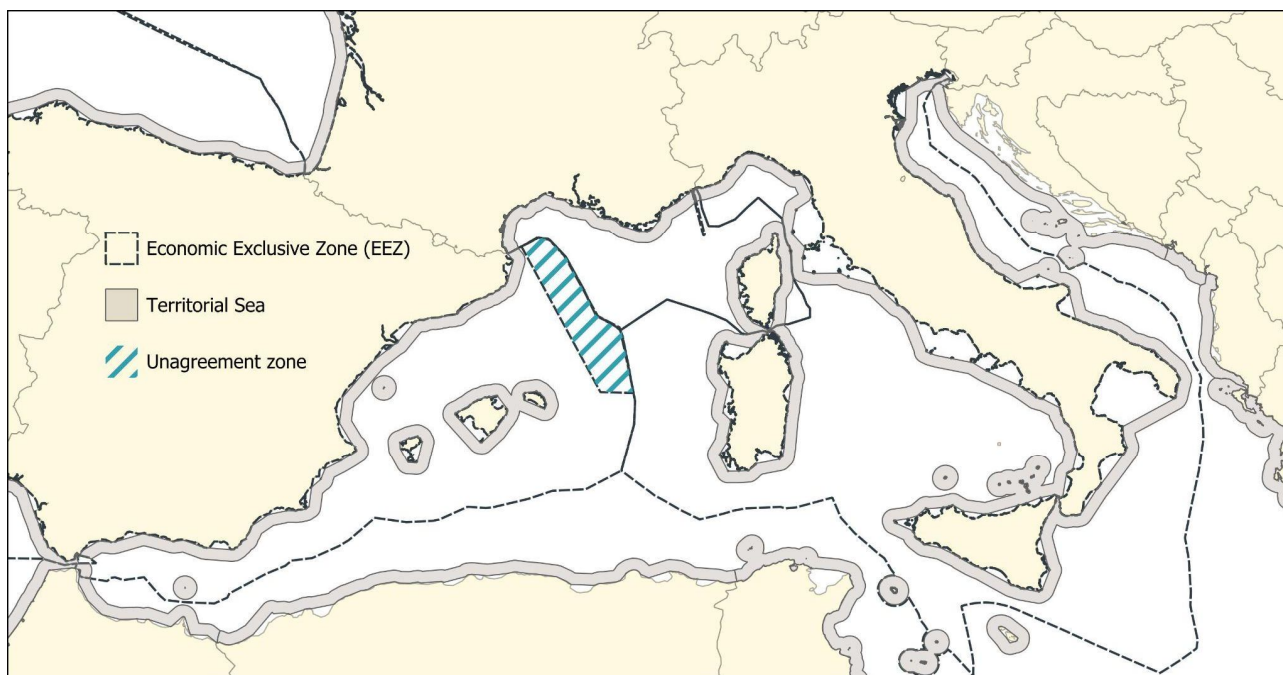


Figure 4. EEZ and Territorial Sea boundaries, reproduced from <https://maritime-spatial-planning.ec.europa.eu/sea-basins/west-mediterranean>. Areas shown for general reference, without detailing specific national jurisdiction boundaries (e.g., declared Ecological Protection Zones).

1. Coherence and gaps with IMPORTANT AREAS for CEPTU species listed in in the Annex II of the Habitat Directive

1.1 *Tursiops truncatus*

a. Coherence with Natura 2000 sites

Within the Natura 2000 network, 253 marine sites, including proposed SCI, SCI and SACs, are designated across the Mediterranean Sea to include *Tursiops truncatus* (species code 1349, Annex II of the HD). In terms of national distribution, these sites are located in: Spain (71), France (36), Italy (80), Greece (53), Croatia (6), Malta (3) and Cyprus (4). Among these, a small number have been specifically designated for the protection of the species, including “Tutela del *Tursiops truncatus*” (SIC IT5160021) and “Tutela del Tursiope Mar Ligure” (SIC IT1312392) in Italy, as well as “Grands dauphins de l'Agriate” (SAC FR9402019) and “Grands dauphins du golfe du Lion” (pSCI FR9102018) in France.

The spatial overlap between Natura 2000 sites including designation for *Tursiops truncatus* and the modelled core predicted areas is shown in Figure 5. The following section summarises areas of strong and partial coherence, as well as gaps, and also Natura 2000 sites that overlap important habitat for the species but do not include it in their Standard Data Form (SDF).

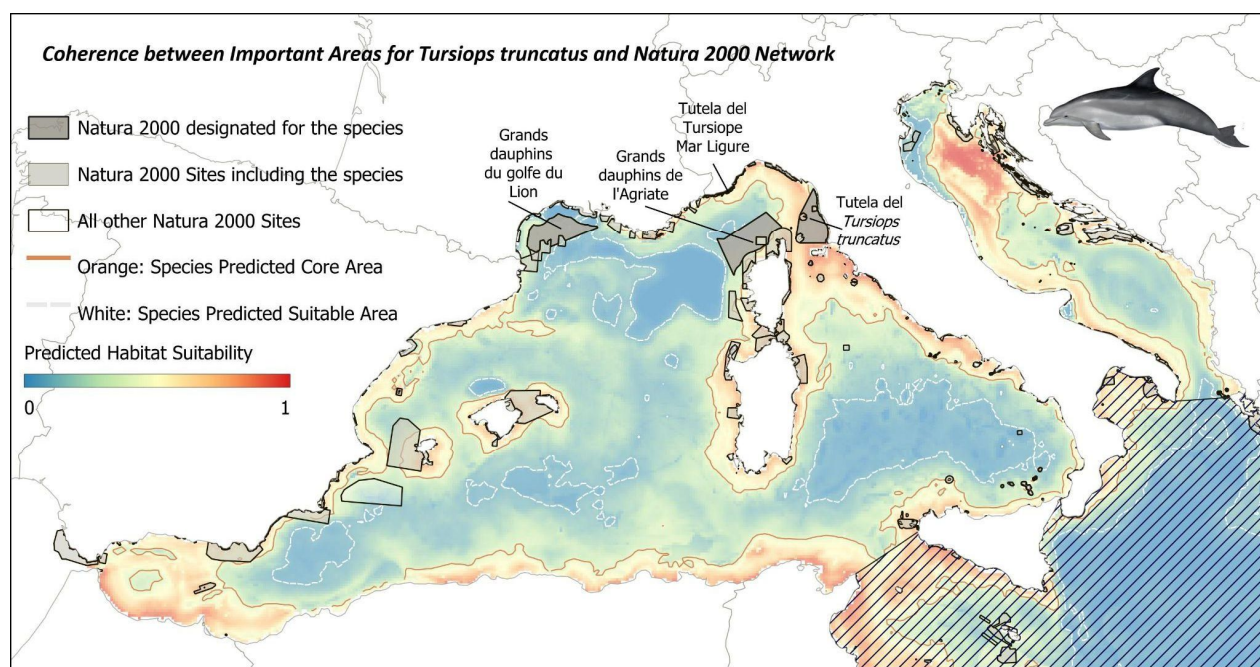


Figure 5. Predicted habitat suitability for *Tursiops truncatus* in the Mediterranean Sea and overlap with Natura 2000 sites. Suitable and core habitats (yellow to red) are shown. Sites specifically designated for the species or including the species are respectively in dark grey (“Tutela del *Tursiops truncatus*” - SIC IT5160021 and “Tutela del Tursiope Mar Ligure” - SIC IT1312392 in Italy, “Grands dauphins de l'Agriate” - SAC FR9402019 and “Grands dauphins du Golfe du Lion” - pSCI FR9102018 in France) or light grey, while other Natura 2000 sites where the species is not listed are shown with grey outline. Data source: eea <https://sdi.eea.europa.eu/data/be2142b0-7dc4-42e3-afac-f7cc5f1a9ac6>

Areas of coherence

Several sectors of the western and central Mediterranean Sea show strong overlap between predicted core habitat for *Tursiops truncatus* and existing Natura 2000 sites.

Coherence is particularly evident for areas that are specifically designated for the species, such as “**Tutela del *Tursiops truncatus***” (SIC IT5160021) and “**Tutela del Tursiope Mar Ligure**” (SIC IT1312392) in Italy, as well as “**Grands dauphins de l'Agriate**” (SAC FR9402019) and “**Grands dauphins du golfe du Lion**” (pSCI FR9102018) in France. Although recognized as an important habitat, this site in the Gulf of Lion is not fully identified as a core area by our model. Nonetheless, its ecological significance is well established, and the seasonal suitability maps indicate high suitability in parts of the Gulf of Lion shelf, particularly during summer (Arcangeli et al., 2025).

Beyond these targeted sites, strong coherence is also observed in other areas.

In the **Alboran Sea**, this includes sites such as “*Estrecho Occidental*”, “*Estrecho Oriental*”, and “*Espacio marino de Alborán*”, as well as the Balearic Islands (“*Canal de Ibiza*”, “*Canal de Menorca*”, “*Arxipelag de Cabrera*”) and the Spanish waters around the Columbretes Islands. In the **Gulf of Lion**, in addition to “*Grands dauphins du golfe du Lion*”, coherence is also observed with “*Récifs des canyons Lacaze-Duthiers*” and “*Prunet et Bourcart*”.

In the **Ligurian Sea**, in addition to “*Tutela del Tursiope mar Ligure*” and “*Tutela del *Tursiops truncatus**”, strong coherence is also observed with the “*Plateau du Cap Corse*” and multiple Natura 2000 sites surrounding Corsica and the northern coast of Sardinia.

Within the **Tyrrhenian Sea**, a dense network of sites—including the Tuscan Archipelago, the Pontine Islands, and the northern Sicilian archipelagos—clearly overlaps with predicted core habitat.

In the **Adriatic Region**, strong coherence is observed along the Croatian coastline, where numerous coastal Natura 2000 areas overlap with highly suitable habitat. Elsewhere, especially in the northern Adriatic several sites (e.g. “*Adriatico Settentrionale*” – *Emilia Romagna*, “*Adriatico Settentrionale*” Veneto – “*Delta del Po*”, “*Tegnue di Chioggia*”) correspond to areas that were predicted as only partially suitable or immediately adjacent to core zones for *Tursiops truncatus*.

Outside the project Regions (western Mediterranean and Adriatic Regions), the sites identified in the Gulf of Taranto emerged as other key coherent areas.

Spatial Gap analysis

Despite the good coverage provided by several sites, spatial gaps remain in highly suitable areas not included within the Natura 2000 framework. In general, the suitable habitat encompasses larger areas than those currently designated, largely due to the limited protection of offshore waters, whereas sites for *Tursiops truncatus* are typically identified in more coastal areas. This discrepancy is especially evident along the Italian coastline, in the Ligurian and Tyrrhenian Seas, around Sardinia and Sicily, and in the Adriatic Sea. Some specific examples are:

- i) the Tuscany Archipelago, the Tyrrhenian coastline, particularly along Tuscany, Latium and Campania;
- ii) the Calabrian Ionian Sea;
- iii) parts of the Sardinian coastline, especially along the south-eastern side;

- iv) large offshore portions of the Adriatic Sea, as well as the central Italian coast and the Apulian Adriatic coastline;
- v) Spanish coastal waters and the majority of the Alboran Sea.

b. Coherence with N2000 sites for *Tursiops truncatus* habitats (not in SDF)

Across Italy, Spain, and France, about 39 Natura 2000 marine sites overlap with areas of high predicted suitability for *Tursiops truncatus*. However, the species is not explicitly listed among the designation targets in their SDF, even though these sites are designated under the HD (SCI/SAC) or as mixed sites (SPA + SCI/SAC). These include approximately 30 sites in Italy, 9 in Spain, and none in France.

The full list of these marine sites for Italy, Spain is provided in Table 2. Some examples include:

- Spain: *Espacio marino Cañones de Alicante* (ESZZ16011), an extensive offshore site along the eastern coast, which lies very close to predicted core habitat, as well as several coastal sites on the Spanish Mediterranean coast (e.g. *Espacio marino del Cabo de les Hortes*, *Espacio marino de Cabo Roig*).
- Italy: several coastal sites along the Tyrrhenian Sea, such as *Fondali tra Capo Circeo e Terracina*, *Fondali di Santa Marinella*, and *Secche di Tor Paterno*.

These cases highlight areas where the species occurs but is not formally acknowledged in the site documentation, and thus represent potential candidates for inclusion in future revisions of the Natura 2000 SDF. *[A more detailed, site-specific analysis may be undertaken at a later stage, in close cooperation with the competent authorities, where required by national legislation]*

Table 2. Natura 2000 marine sites in Italy, France and Spain **that overlap with important habitats for *Tursiops truncatus*** predicted by species distribution models (SDMs in Deliverable C1), but where the species is not listed in the Standard Data Forms (SDFs); data source: EEA retaining only "Marine areas, Sea inlets"
<https://sdi.eea.europa.eu/data/be2142b0-7dc4-42e3-afac-f7cc5f1a9ac6>,

MS	SITECODE	SITENAME
ES	ES5212005	L'Almadrava
ES	ES5222007	Alguers de Borriana-Nules-Moncofa
ES	ES6110009	Fondos Marinos de Punta Entinas-Sabinar
ES	ES6110010	Fondos Marinos Levante Almeriense
ES	ES6170037	El Saladillo - Punta de Baños
ES	ESZZ16007	Espacio marino de la Marina Alta
ES	ESZZ16008	Espacio marino del Cabo de les Hortes
ES	ESZZ16009	Espacio marino de Cabo Roig
ES	ESZZ16011	Espacio marino Cañones de Alicante
IT	IT1315670	Fondali Capo Berta - Diano Marina - Capo Mimosa
IT	IT1315971	Fondali Porto Maurizio - San Lorenzo al Mare - Torre dei Marmi
IT	IT1315972	Fondali Riva Ligure - Cipressa
IT	IT1315973	Fondali Arma di Taggia - Punta San Martino

IT	IT1322470	Fondali Varazze - Albisola
IT	IT1345175	Fondali Isole Palmaria - Tino - Tinetto
IT	IT5160020	Scarpata continentale dell'Arcipelago Toscano
IT	IT6000001	Fondali tra le foci del Fiume Chiarone e Fiume Fiora
IT	IT6000002	Fondali antistanti Punta Morelle
IT	IT6000003	Fondali tra le foci del Torrente Arrone e del Fiume Marta
IT	IT6000004	Fondali tra Marina di Tarquinia e Punta della Quaglia
IT	IT6000005	Fondali tra Punta S. Agostino e Punta della Mattonara
IT	IT6000006	Fondali tra Punta del Pecoraro e Capo Linaro
IT	IT6000007	Fondali antistanti S. Marinella
IT	IT6000008	Secche di Macchiatonda
IT	IT6000009	Secche di Torre Flavia
IT	IT6000010	Secche di Tor Paterno
IT	IT6000011	Fondali tra Torre Astura e Capo Portiere
IT	IT6000012	Fondali tra Capo Portiere e Lago di Caprolace (foce)
IT	IT6000013	Fondali tra Capo Circeo e Terracina
IT	IT6000014	Fondali tra Terracina e Lago Lungo
IT	IT6040020	Isole di Palmarola e Zannone
IT	IT8030041	Fondali Marini di Gaiola e Nisida
IT	IT9140005	Torre Guaceto e Macchia S. Giovanni
IT	IT9310048	Fondali Crosia-Pietrapaola-Cariati
IT	IT9320096	Fondali di Gabella Grande
IT	ITA010033	Banchi di Marettimo
IT	ITA080010	Fondali Foce del Fiume Irminio
IT	ITA090027	Fondali di Vendicari
IT	ITB040017	Stagni di Murtas e S'Acqua Durci

c. Coherence with other binding protected areas (national and international)

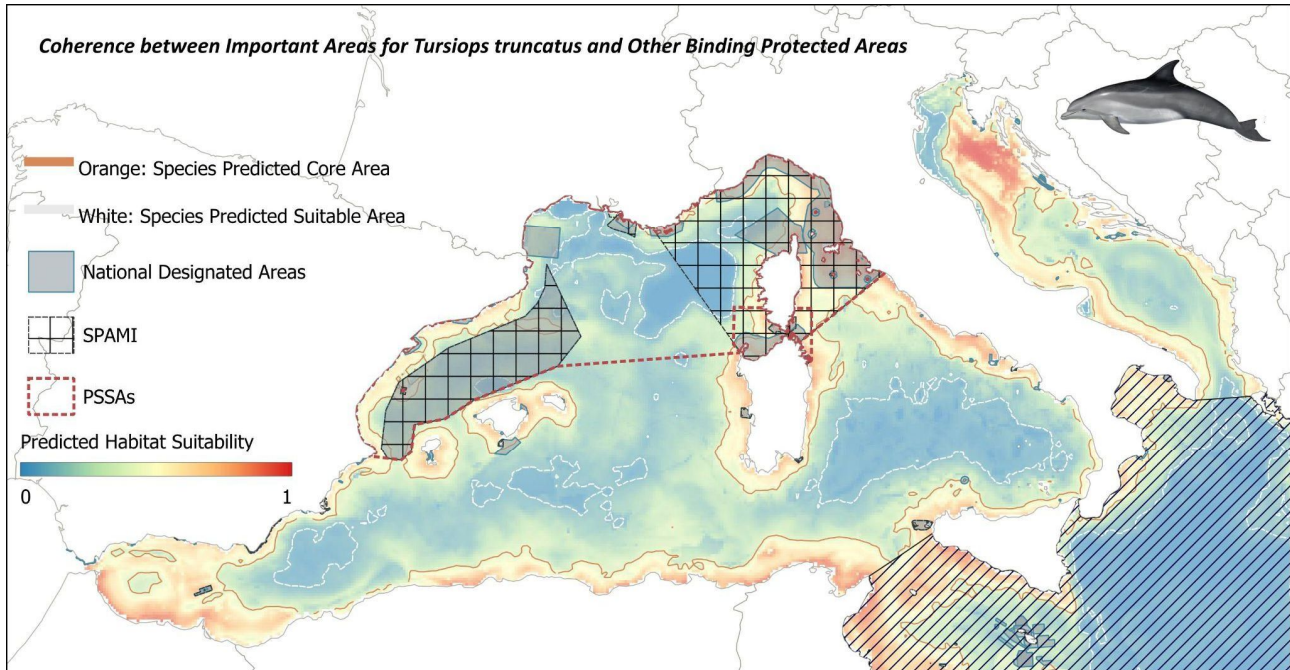


Figure 6. Predicted habitat suitability for *Tursiops truncatus* in the Mediterranean Sea and overlap with other binding protected areas (SPAMI, National designated areas and PSSAs). Core (red) and suitable (yellow) habitats are shown.

Areas of coherence

Strong coherence between predicted core habitats of *Tursiops truncatus* and binding designations are mainly represented by the Pelagos Sanctuary (SPAMI), which encompasses large sectors of the Ligurian and north-western Tyrrhenian Seas, where predicted core areas coincide with its boundaries. Similarly, the PSSA of the Western Mediterranean Sea, covering the Strait of Bonifacio between Corsica and Sardinia, shows clear coherence with predicted core habitats. Nationally designated marine areas in the northern Tyrrhenian Sea also contribute to this coherence.

Partial alignment is observed where binding designations cover suitable but not core habitats. A prominent case is the Spanish Cetacean Migration Corridor (SPAMI), which lies adjacent to core predicted areas. While the overlap with the highest suitability zones is limited, this corridor plays an important role in connecting geographic units between Spain, the Balearic Islands, France and the Pelagos Sanctuary, and therefore retains high ecological value. Similarly, some national designated areas along the Spanish coast intersect with suitable habitat but do not fully cover the modelled core areas.

Spatial gaps

Despite the contribution of SPAMI and PSSA frameworks, several important gaps remain, largely consistent with those already identified under Natura 2000 (Figure 5). Notably, areas of high predicted suitability for *Tursiops truncatus* are not adequately covered along the Tyrrhenian coast, particularly in southern Tuscany, Latium and Campania, the Sardinian

coastline, especially on the south-eastern side, and across large portions of the Adriatic Sea, including the central Italian coast and the Apulian Adriatic sector. Even if outside the Conceptu Maris project areas, the Calabrian Ionian coast and the Gulf of Taranto have also emerged as important areas for species that currently lack adequate protection.

d. Coherence with non-binding science-based areas

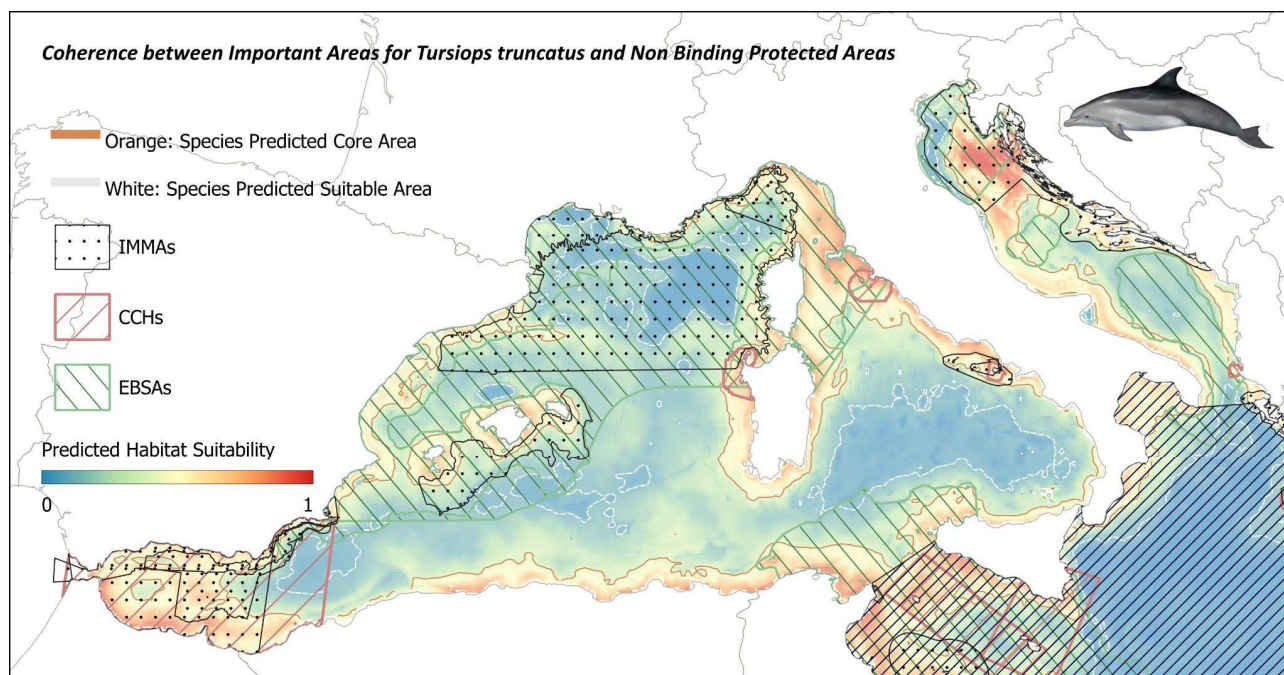


Figure 7. Predicted habitat suitability for *Tursiops truncatus* in the Mediterranean Sea and its overlap with non-binding, science-based areas identified as important for cetaceans species (IMMAs, CCHs, and EBSAs). Core (red) and suitable (yellow) habitats are shown.

Tursiops truncatus is listed in almost all IMMAs and CCH, with the exception of one small area. Within the IMMAs around northern Sardinia and Corsica specifically target *Tursiops truncatus*, while those in the Alboran Sea and Sicily are designated for broader biodiversity, which also encompasses *Tursiops truncatus*. The overall overlap between predicted core habitats of *Tursiops truncatus* and non-binding, science-based designations (IMMAs, CCHs, EBSAs) is **generally very good** in the areas that are most important for the species (Figure 7). The Alboran Sea is consistently recognised as a hotspot, being covered both by an IMMA and by a CCH. The Balearic Islands and the north-western Mediterranean Sea are similarly well represented, with several IMMAs and complementary coverage from CCHs. In the Tyrrhenian Sea, both an IMMA and the Spanish Cetacean Migration Corridor extend across the north-western basin, which is also fully included within an EBSA, thus ensuring multi-layered recognition of its ecological importance. Strong coherence also emerges in the Sicily Channel and adjacent coasts of Sicily and Tunisia, where a combination of CCHs, IMMAs and EBSAs overlap with predicted suitable habitats. Finally, the northern Adriatic Sea is covered by both an IMMA and an EBSA, reinforcing its role as a key area for the species. However, **important gaps** remain along the central and southern Adriatic Sea, the western Ionian Sea, the waters around Sardinia, excluding the more northern areas, and the Algerian

coastline, which emerge as highly suitable areas but are not yet recognised by existing science-based initiatives.

e. Coherence with eDNA findings

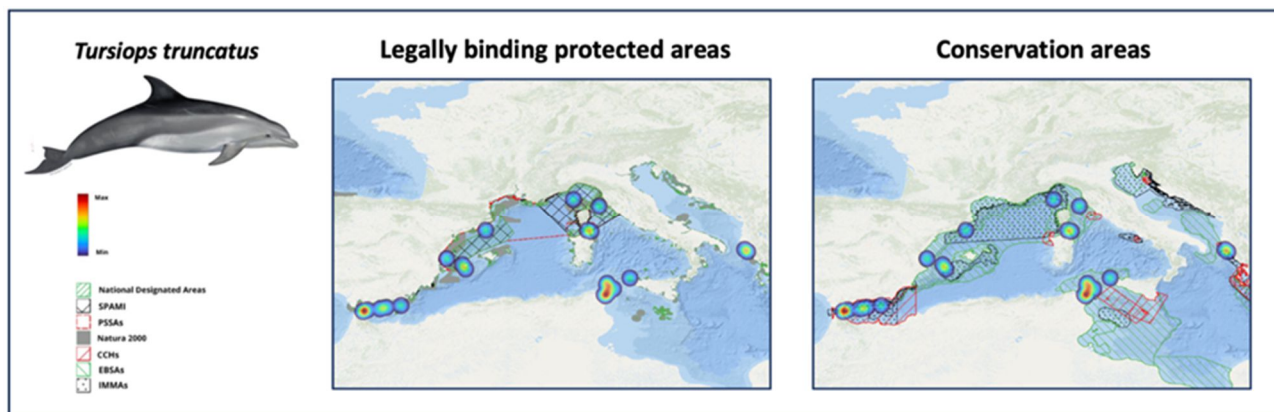


Figure 7b. Kernel density distribution of *Tursiops truncatus* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMAs, CCHs, and EBSAs).

Legally binding protected areas: concordance except for the Alboran Sea and the Tunisian Plateau, where eDNA detected the strongest eDNA signal of the species. The waters off the Tunisian coast may host a potential resident population.

Conservation areas: higher concordance as the IMMAs and ESBAs networks include the Alboran Sea, Tunisian plateau (and waters between Sicily and Tunisia) and the Balearic Islands, covering almost completely the species distribution range according to eDNA.

Coherence between eDNA and predicted habitat suitability based on visual census: mostly concordant.

1.2 *Caretta caretta*

a. Coherence with Natura 2000 areas

Within the Mediterranean Natura 2000 network, 235 marine sites are designated to include *Caretta caretta* (species code 1224, Annex II of the HD). At the national level, these are distributed as follows: Spain (65), France (29), Italy (126), Greece (8), Malta (4) and Cyprus (3). The spatial overlap between Natura 2000 sites including the species *Caretta caretta* and the modelled habitat is shown in Figure 8. The following sections summarise areas of strong and partial coherence, as well as spatial gaps, and also highlight Natura 2000 sites that overlap important habitat for the species but do not explicitly include it among their designation targets.

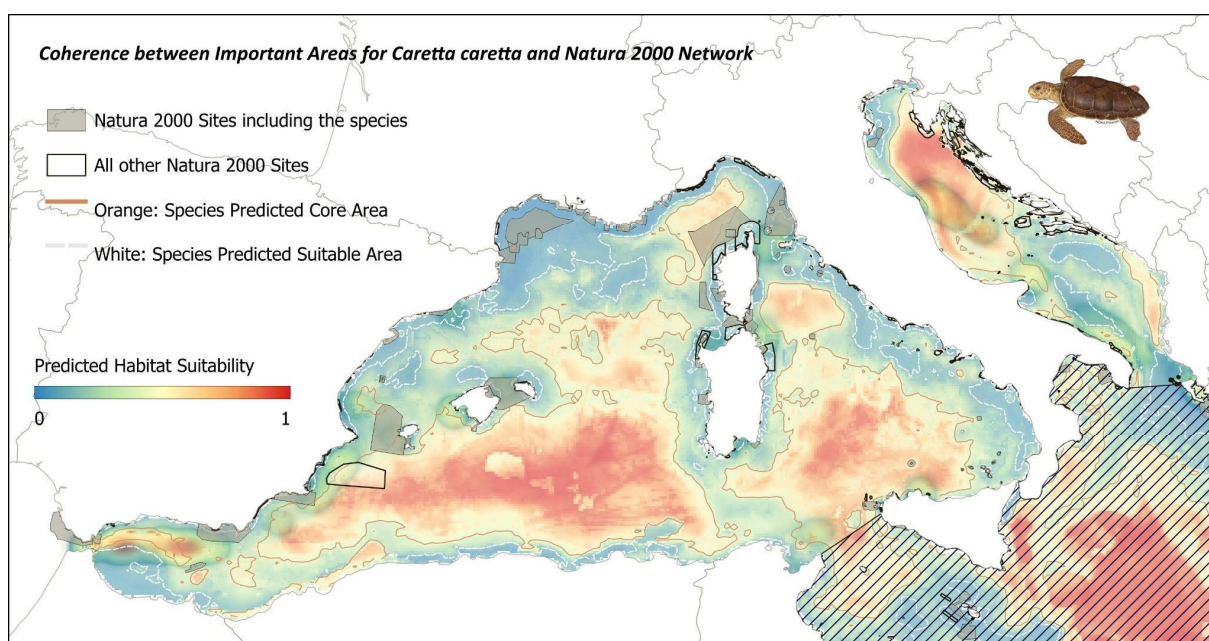


Figure 8. Predicted habitat suitability for *Caretta caretta* in the Mediterranean Sea and overlap with Natura 2000 sites. Core (red) and suitable (yellow) habitats are shown together with Natura 2000 sites. Areas specifically designated for the species or including the species are respectively in dark or light grey, while other Natura 2000 sites are shown with grey outline. data source: EEA <https://sdi.eea.europa.eu/data/be2142b0-7dc4-42e3-afac-f7cc5f1a9ac6>.

Areas of coherence

Given the generalist behaviour of *Caretta caretta*, many Natura 2000 sites fall within areas of predicted suitability (white contours in Figure 8). However, overlap with the modelled core areas (red contours) remains limited and is mainly located around Corsica (France, e.g. "Grands dauphins de l'Agriate" – FR9402019) and the Egadi and Ustica Islands (Italy). These results, together with the extensive suitable habitats, should be regarded as preliminary and warrant further confirmation as new data become available for all currently under-sampled areas (Central and Levantine Basin).

A broader set of sites falls within areas of moderate suitability, particularly along the western Alboran Sea (Espacio Marino de Alboran, Sur de Almeria, Valles submarinos del Escarpe de

Mazarròn), Baleriac Islands (Canal de Menorca), or in the northern Tyrrhenian Sea (Site “Tutela del *Tursiops truncatus*”). These provide partial coverage of turtle habitat but do not fully encompass the highest suitability areas identified by the model.

Spatial Gap

Despite coverage, gaps remain in several ecologically important zones where high predicted habitat suitability is not matched by the already in place Natura 2000 sites. These areas include:

- i) the central and northern offshore **Adriatic Sea**, including the coastal central Adriatic (at the boundaries between Marche and Abruzzo);
- ii) the central **Tyrrhenian Sea**, where a new SCI has recently been proposed by the Italian Environmental Ministry;
- iii) the adjacent waters of the **Algerian Basin**, particularly between Sardinia and the Balearic Islands (south Balearic sector).

b. Coherence with N2000 sites for *Caretta caretta* habitats (not in SDF)

Analysis of modelled core habitats reveals few Natura 2000 sites, mostly in Italy and one in Spain, that strongly overlap with areas that were predicted as highly suitable for *Caretta caretta*, but where the species is not explicitly listed in the SDF.

- In **Spain**, the most relevant case is the *Espacio marino Cañones de Alicante* (ESZZ16011).
- In **Italy**, notable examples include extensive marine habitats around northern Sicily, such as *Isola di Pantelleria*, the *Banchi di Marettimo*, *Fondali di Capo Zafferano*.
- In **France**, no relevant overlaps with predicted core areas were identified.

The complete list of Natura 2000 sites overlapping suitable habitats for *Caretta caretta* but in which the species is not listed in the Standard Data Form is provided in **Table 3**.

In addition, some sites adjacent to core predicted areas may warrant further consideration. These include the **Pontine Archipelago** (*Fondali circostanti l'Isola di Ponza* – IT6000016; *Fondali circostanti l'Isola di Ventotene* – IT6000018), which lies close to or encompasses areas of high suitability but currently do not list the species in their SDFs.

Table 3. Natura 2000 marine sites in Italy, France and Spain that overlap with important habitats for *Caretta caretta* as predicted by species distribution models (SDMs), but where the species is not listed in the Standard Data Forms (SDFs). The Ionian coast and central Mediterranean Sea are not included as they were excluded from the model domain. data source: EEA <https://sdi.eea.europa.eu/data/be2142b0-7dc4-42e3-afac-f7cc5f1a9ac6>

MS	SITECODE	SITENAME
ES	ESZZ16011	Espacio marino Cañones de Alicante
IT	ITA020052	Fondali di Capo Zafferano
IT	ITA010033	Banchi di Marettimo

c. Coherence with other binding protected areas (national and international)

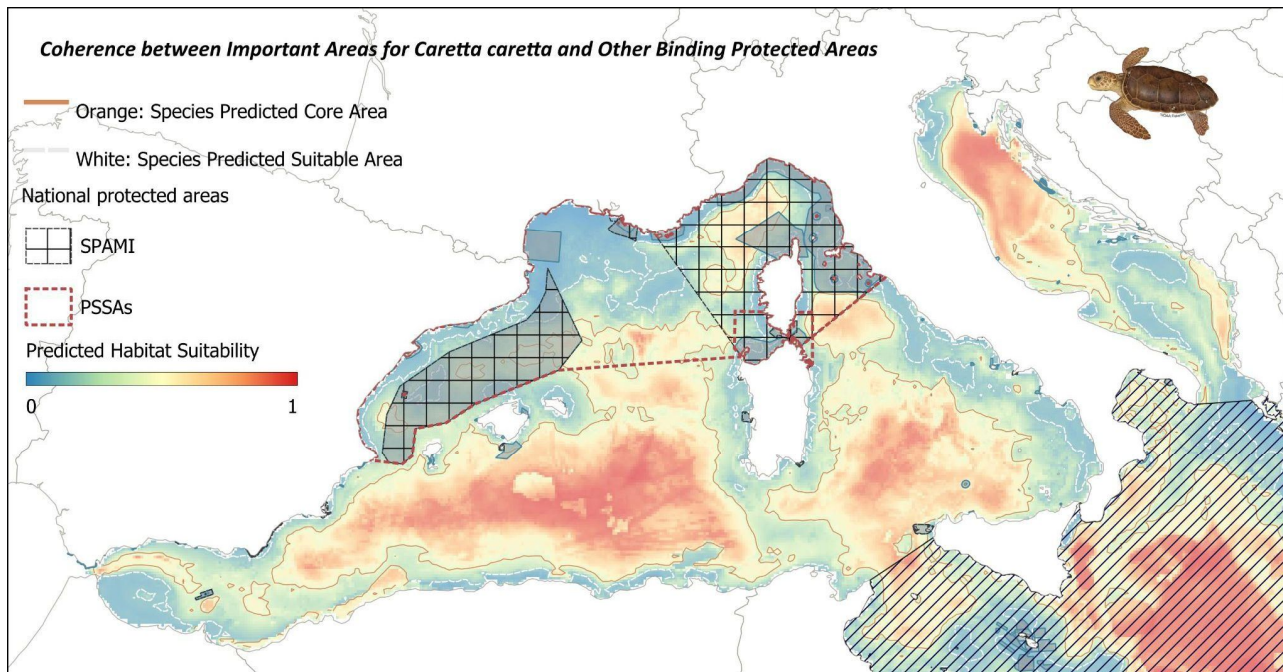


Figure 9. Predicted habitat suitability for *Caretta caretta* in the Mediterranean Sea and overlap with other binding protected areas (SPAMI or National designated areas). Core and suitable habitats (red to yellow) are shown.

Zones of overlap between predicted habitat for *Caretta caretta* and other binding frameworks at national and international level are shown in Figure 9, including SPAMIs, PSSAs and nationally designated marine parks. Although most SPAMIs were originally established for cetaceans, their inclusion here illustrates how areas designated for other taxa may also contribute to turtle conservation, even if formal updates to such frameworks are more complex than for Natura 2000 sites.

Strong coherence is observed where predicted core habitats coincide with existing designations, such as along the north-western Mediterranean Sea, where the Pelagos Sanctuary (SPAMI) extends across large marine areas. Similarly, the PSSA of the Western Mediterranean Sea, covering the Strait of Bonifacio between Corsica and Sardinia, intersects with habitats of moderate suitability for the species.

Partial coherence is found with the Spanish Cetacean Migration Corridor (SPAMI), which overlaps areas of medium predicted suitability but may still support connectivity between western Mediterranean areas. In addition, several national marine parks and reserves in Italy and Spain encompass suitable habitats, although in most cases they were not explicitly designated for the turtle.

Despite these overlaps, **important gaps** remain, particularly in the **central Tyrrhenian Sea**, the **Adriatic offshore waters**, and the **Algerian Basin**, where no binding frameworks are currently in place despite high predicted suitability for the species.

d. Coherence with non-binding science-based areas

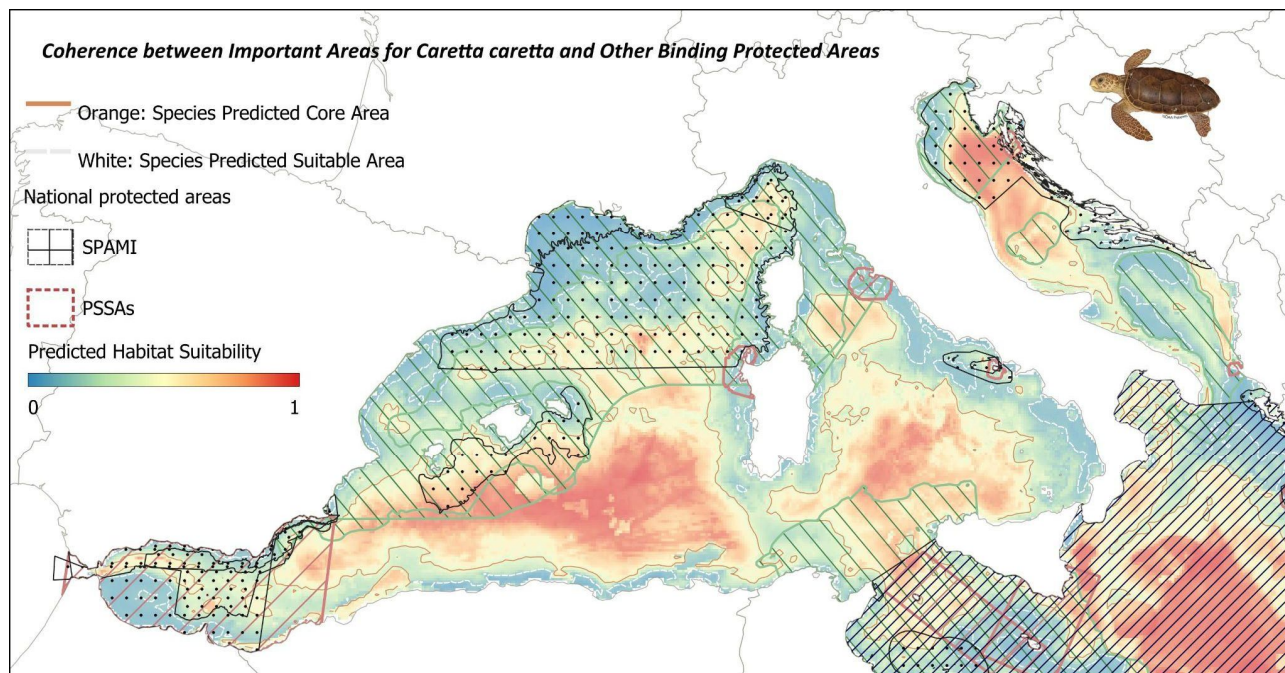


Figure 10. Predicted habitat suitability for *Caretta caretta* in the Mediterranean Sea and its overlap with non-binding, science-based Ecologically or Biologically Significant Marine Areas (EBSAs).

Predicted habitats of *Caretta caretta* show broad overlap with EBSAs in the Northern Adriatic Sea, the Strait of Sicily, the Alboran Sea and around the Balearic Islands (Figure 10). However, **notable gaps** persist in offshore sectors of the central Tyrrhenian Sea and the Algerian Basin, which are identified as highly suitable by the models but remain outside current EBSA designations.

2. Coherence and gaps with IMPORTANT AREAS for CEPTU species NOT listed in in the Annex II of the Habitat Directive

2.1 *Stenella coeruleoalba*

a. Coherence with legally binding protected area

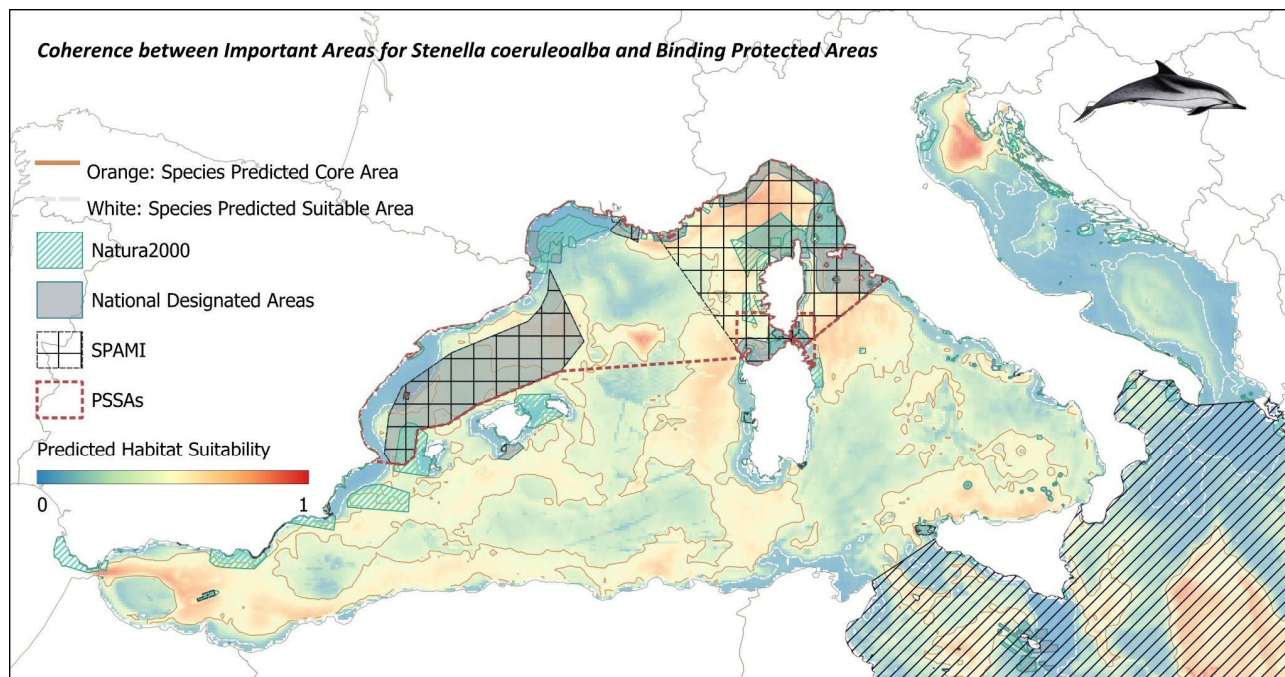


Figure 11. Predicted habitat suitability for *Stenella coeruleoalba* in the Mediterranean Sea and overlap with binding protected areas (Natura 2000, SPAMI, National designated areas and PSSA). Core and suitable habitats (red to yellow) are shown.

Areas of coherence

In the **North and Western Mediterranean sea**, predicted suitable habitat for *Stenella coeruleoalba* shows good coherence with existing protected areas in coastal and offshore areas, especially in correspondence with the large SPAMI of the Pelagos Sanctuary and the Spanish Migration corridor. The North-Western Mediterranean PSSA also encompasses a large portion of the most significant suitable habitat predicted for the species.

In the **Tyrrhenian Sea and along the Spanish coastline**, several Natura 2000 and National designated areas intercept the species' suitable habitat.

In the **Adriatic Sea**, large portions of the predicted core areas overlap with Natura 2000 sites and National Designated Areas, especially along the Dalmatian coast and towards Montenegro and Albania.

Spatial Gap

Several gaps remain primarily in the large offshore areas of the Alboran sea and the Algerian basin, in the central and southern Tyrrhenian Sea, especially in correspondence with the bathymetric structures, and several predicted high-suitability patches also remain uncovered in the connection area towards the Eastern Mediterranean.,

In the south-central Adriatic basin, wide areas of predicted suitable habitat remain outside the gridded protected areas, particularly in offshore zones.

b. Coherence with non-binding, science-based conservation areas

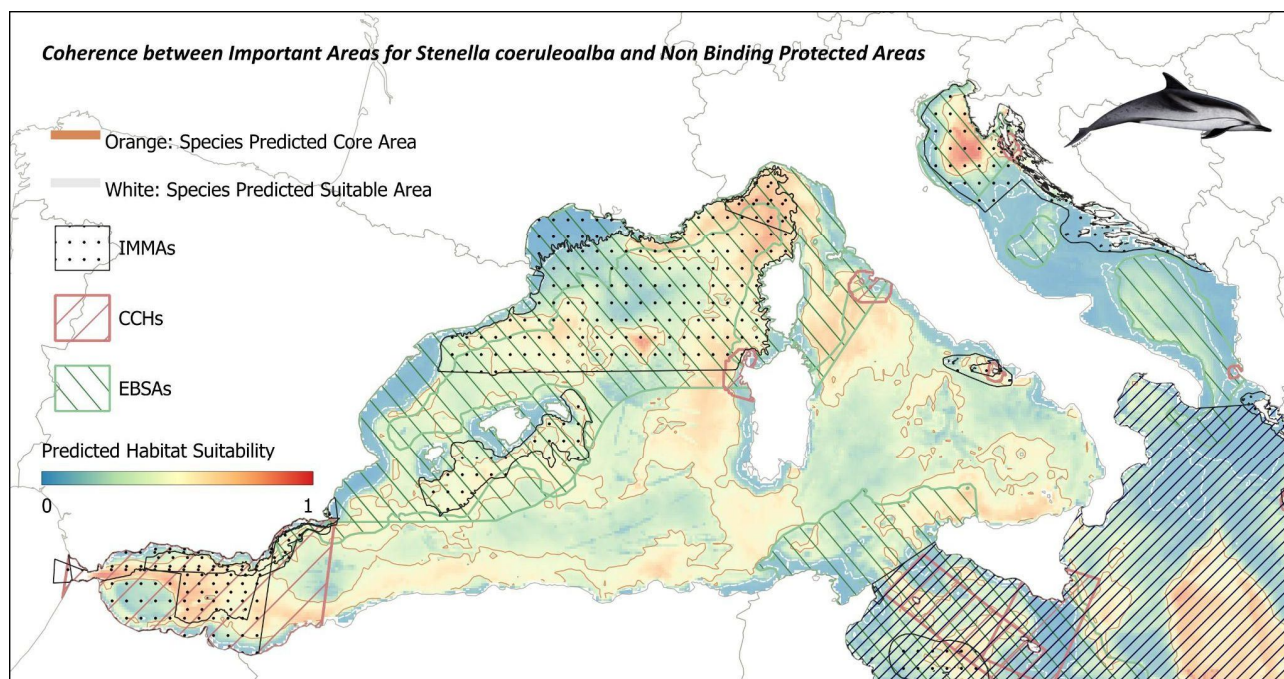


Figure 12a. Predicted habitat suitability for *Stenella coeruleoalba* in the Mediterranean Sea and its overlap with non-binding, science-based areas.

Areas of coherence

In the **western Mediterranean Sea**, significant coherence is observed between the predicted suitable habitat of *Stenella coeruleoalba* and the important areas already identified through science-based processes, such as IMMAs, CCHs, and EBSAs. These include the Alboran Basin, Spanish waters, the northwestern Mediterranean Sea, the northern and southern Tyrrhenian Sea, the Pontine Archipelago, southern Sardinia, and the Sicilian Channel.

Strong coherence is also found in the **Adriatic region**, where all predicted suitable habitat is encompassed within the areas previously identified through science-based processes.

Spatial Gap

Some portions of the predicted habitat remain uncovered in the central portion of the Tyrrhenian Sea, as well as in correspondence with bathymetric features and north of Sicily, and in the Sardinian Basin.

c. Coherence with eDNA findings

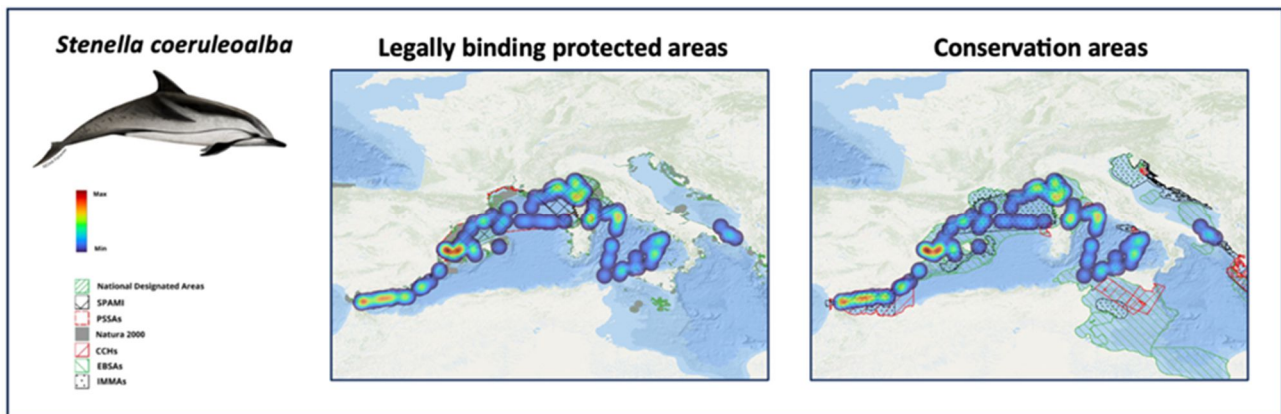


Figure 12b. Kernel density distribution of *Stenella coeruleoalba* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMAS, CCHs, and EBSAs).

Legally binding protected areas: although current protected areas partially cover the habitat of the species, *Stenella coeruleoalba* is also widely distributed in the Tyrrhenian and the Alboran Sea, as well as in the Central-Western Med, areas that are currently not under protection. A hotspot is also found in the Caprera Canyon, partially protected by the Pelagos Sanctuary (SPAMI).

Science-based conservation areas: the network of suggested conservation areas shows a higher overlap with the habitat use found with eDNA with exception of the open Tyrrhenian Sea (NOTE: as the species is the most widely distributed in the whole basin, we expect that only part of its natural range can be efficiently protected).

Coherence between eDNA and predicted habitat suitability based on visual census: mostly concordant, although eDNA detects hotspots also in the south Adriatic/Ionian Sea and in the Spanish cetacean migratory corridor.

2.2 *Balaenoptera physalus*

a. Coherence with legally binding protected area

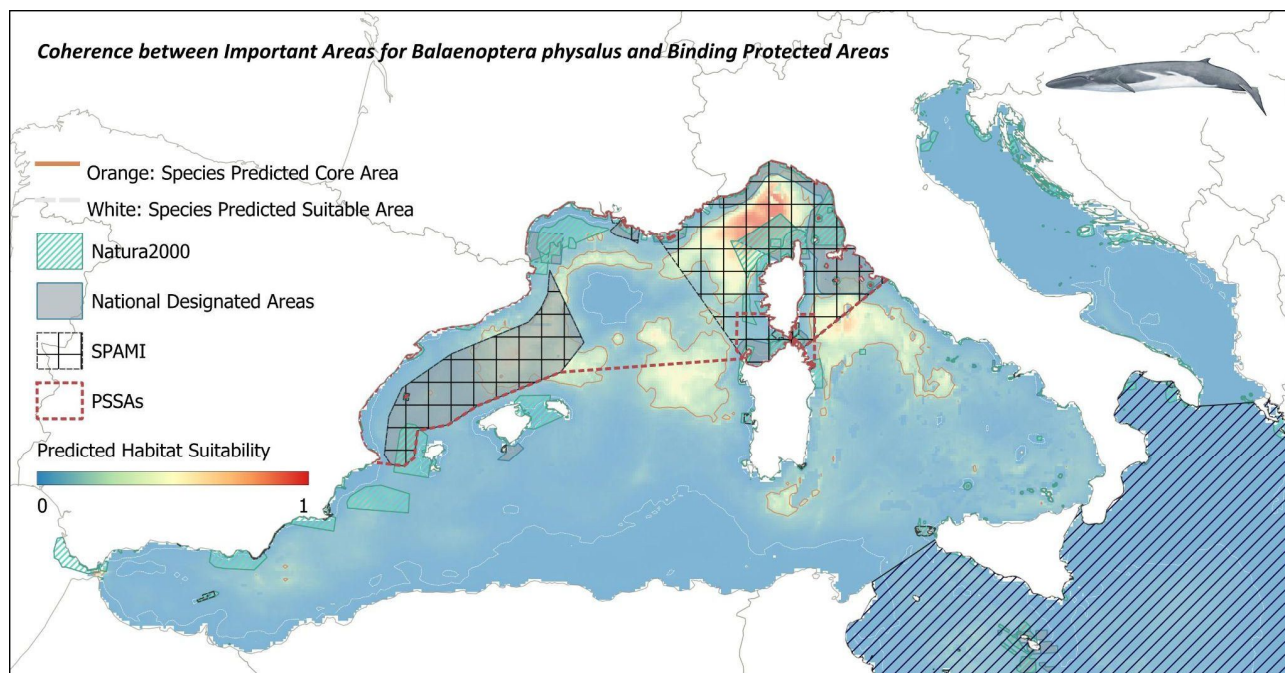


Figure 13. Predicted habitat suitability for *Balaenoptera physalus* in the Mediterranean Sea and overlap with binding protected areas (Natura 2000, SPAMI, National designated areas and PSSA). Core and suitable habitats (red to yellow) are shown.

Areas of coherence

In the **western Mediterranean Sea**, there is strong alignment between the predicted suitable habitat of *Balaenoptera physalus* and existing protected areas, particularly the two large SPAMIs: the Pelagos Sanctuary and the Spanish Cetacean Migration Corridor. In this region, the northwestern Mediterranean PSSA encompasses all primary core areas of the species. This alignment suggests that policy decisions have been largely guided by the species' ecological requirements. Additionally, the Natura 2000 network, especially along the southern Spanish coast, covers some smaller suitable areas that are likely important during the fin whale migration.

Spatial Gap

The main gaps are mainly found in the central Tyrrhenian Sea, in the Sardinia-Baleari sea and south of Sardinia.

b. Coherence with non-binding, science-based conservation areas

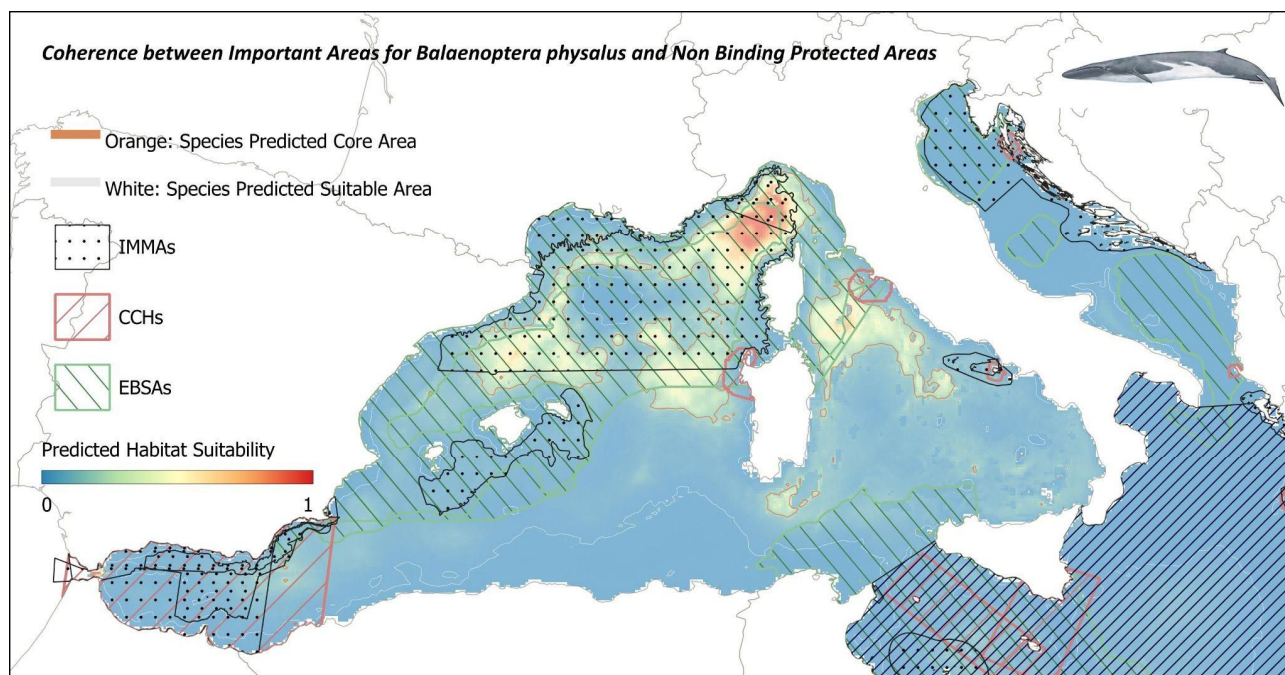


Figure 14a. Predicted habitat suitability for *Balaenoptera physalus* in the Mediterranean Sea and its overlap with non-binding, science-based areas.

Areas of Coherence

In the western Mediterranean Sea, the science-based process has successfully identified all the main important areas for *Balaenoptera physalus* in the northwestern area, extending the coverage into parts of the central Tyrrhenian Sea.

Spatial Gaps

However, some important areas for the species remain unprotected, notably in the southern portion of the central Tyrrhenian Sea and off southern Sardinia.

c. Coherence with eDNA findings

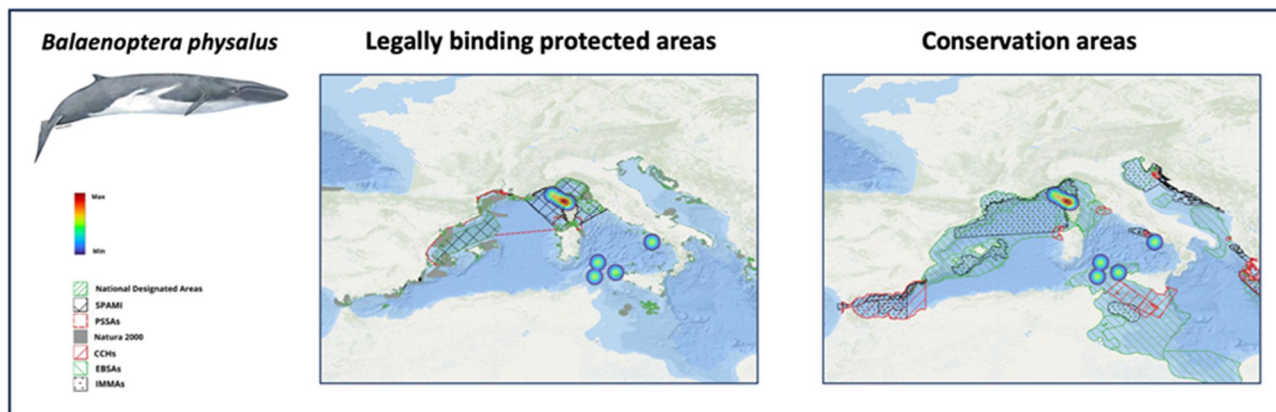


Figure 14b. Kernel density distribution of *Balaenoptera physalus* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMIs, National Designated Areas) and (right) science-based conservation areas (IMMAAs, CCHs, and EBSAs).

Legally binding protected areas: the SPAMIs system protects its main habitat, the Pelagos Sanctuary, but the species utilizes the southern Tyrrhenian Sea stretching into the Sardinia-Sicilian channels as well, which is currently not under protection.

Science-based conservation areas: as above, the Tyrrhenian Sea and Sardinia-Sicilian channels are excluded from the science-based conservation areas as well.

Coherence between eDNA and predicted habitat suitability based on visual census: partially concordant, although environmental DNA detections are absent in the migratory corridor (differently from visual observations), while they are found in the Tyrrhenian Sea and Sardinia-Sicilian channels (where visual observations are scarce). This latter incongruence could be related to the fact that the southern areas are primarily used as migration corridors, where animals pass through without spending much time. As a result, visual observations are less likely to occur, whereas molecular traces are still released and can therefore be detected through eDNA techniques.

2.3 *Delphinus delphis*

a. Coherence with legally binding protected area

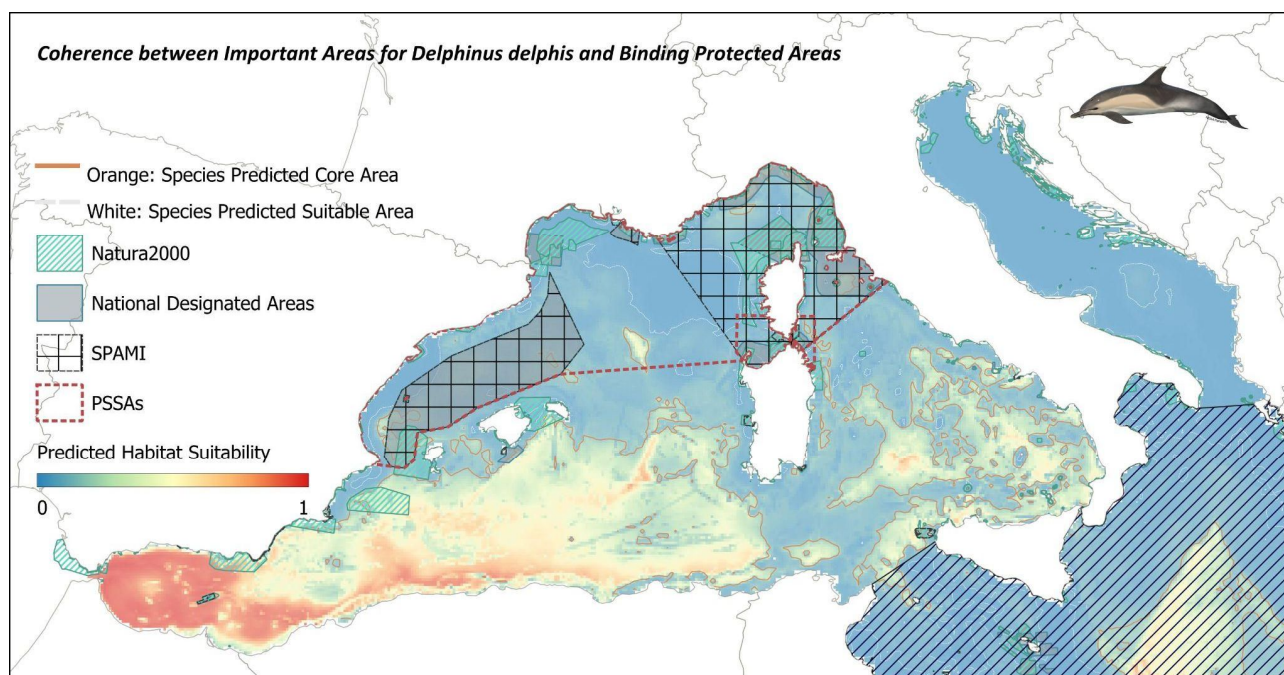


Figure 15. Predicted habitat suitability for *Delphinus delphis* in the Mediterranean Sea and overlap with binding protected areas (Natura 2000, SPAMI, National designated areas and PSSA). Core and suitable habitats (red to yellow) are shown.

Areas of Coherence

Two SPAMIs— the Pelagos Sanctuary for the Conservation of Marine Mammals and the Cetaceans Migration Corridor in the Mediterranean—partially encompass important areas and core/suitable habitats for *Delphinus delphis* (common dolphin).

The Natura 2000 Network includes only a limited portion of the species' core habitat in the Alboran Sea, primarily located offshore. Notable exceptions include the offshore SCI “Espacio marino de Alborán” (ESZZ16005), as well as several SCIs in the Central Tyrrhenian Sea, particularly around the main Sicilian archipelagos and surrounding the waters of Malta.

Spatial Gaps

The majority of important areas and suitable habitats for *Delphinus delphis* lie outside the current network of designated conservation areas. The newly established North-Western Mediterranean PSSA will partially cover core and suitable habitats in the northern sector of the Western Mediterranean Sea.

However, major spatial gaps remain especially in the large southern sectors and in particular: in the Alboran Sea, where key habitats are largely unprotected, in the Central-southern Tyrrhenian Sea, despite its ecological relevance, especially around the Sicilian archipelagos and in the Sicilian Channel.

b. Coherence with non-binding, science-based conservation areas

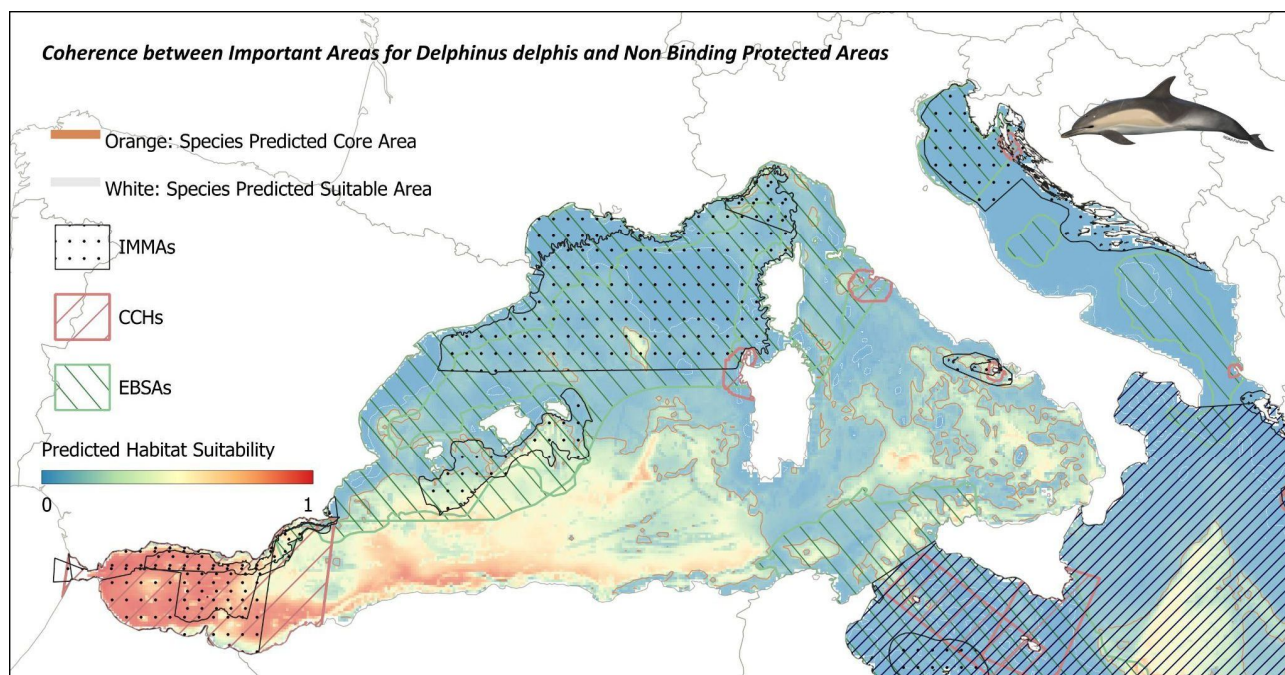


Figure 16a. Predicted habitat suitability for *Delphinus delphis* in the Mediterranean Sea and its overlap with non-binding, science-based areas.

Areas of Coherence

The overall coherence of the conservation framework for *Delphinus delphis* significantly improves when non-binding area designations are taken into account. Notably, the Alboran Sea is entirely encompassed within three IMMAs, and the north-western Mediterranean Sea also benefits from extensive coverage.

Spatial coverage is further enhanced in the Sicilian Channel and southern Sicily, with additional, though more fragmented, protection in areas such as the Pontine Archipelago, Ischia, and Ventotene—all of which represent core habitats for the species.

Suitable habitats for *Delphinus delphis* are fully covered in the Adriatic region, contributing to a high level of spatial coherence in that area.

Spatial Gaps

Significant spatial gaps however persist in the southern sector of the Western Mediterranean Sea, particularly off the Algerian coastline, and in the Central-southern Tyrrhenian Sea. These areas encompass ecologically relevant habitats for *Delphinus delphis* that currently fall outside science-based areas Network.

d. Coherence with eDNA findings

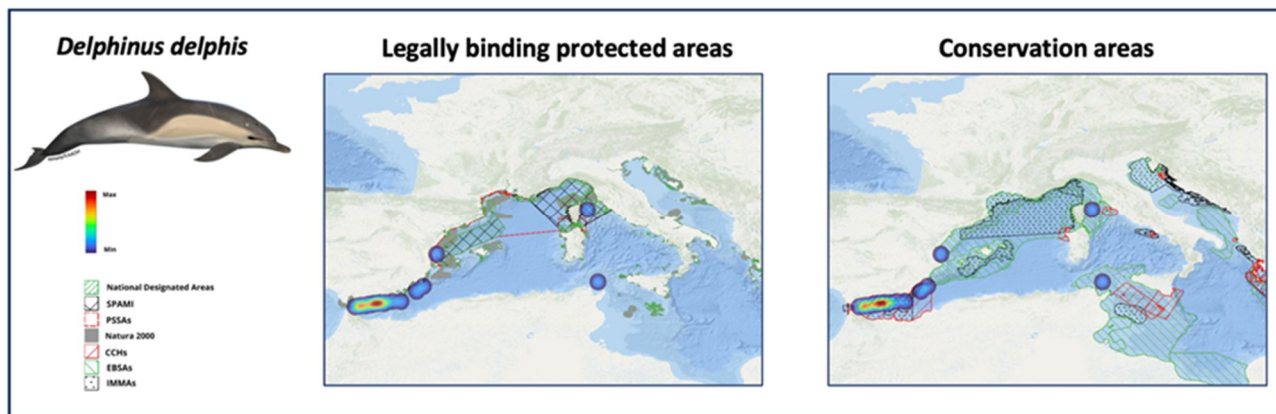


Figure 16b. Kernel density distribution of *Delphinus delphis* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMAs, CCHs, and EBSAs).

Legally binding protected areas: protected areas are currently not including the species natural habitat detected through eDNA, with the exception of the waters off Corsica coast, which is currently protected by the Pelagos Sanctuary (SPAMI).

Science-based conservation areas: scientific-informed suggested conservation areas perfectly cover the detected distribution range of the species based on eDNA survey.

Coherence between eDNA and predicted habitat suitability based on visual census: there is almost complete concordance between the two approaches.

2.4 *Grampus griseus*

a. Coherence with legally binding protected area

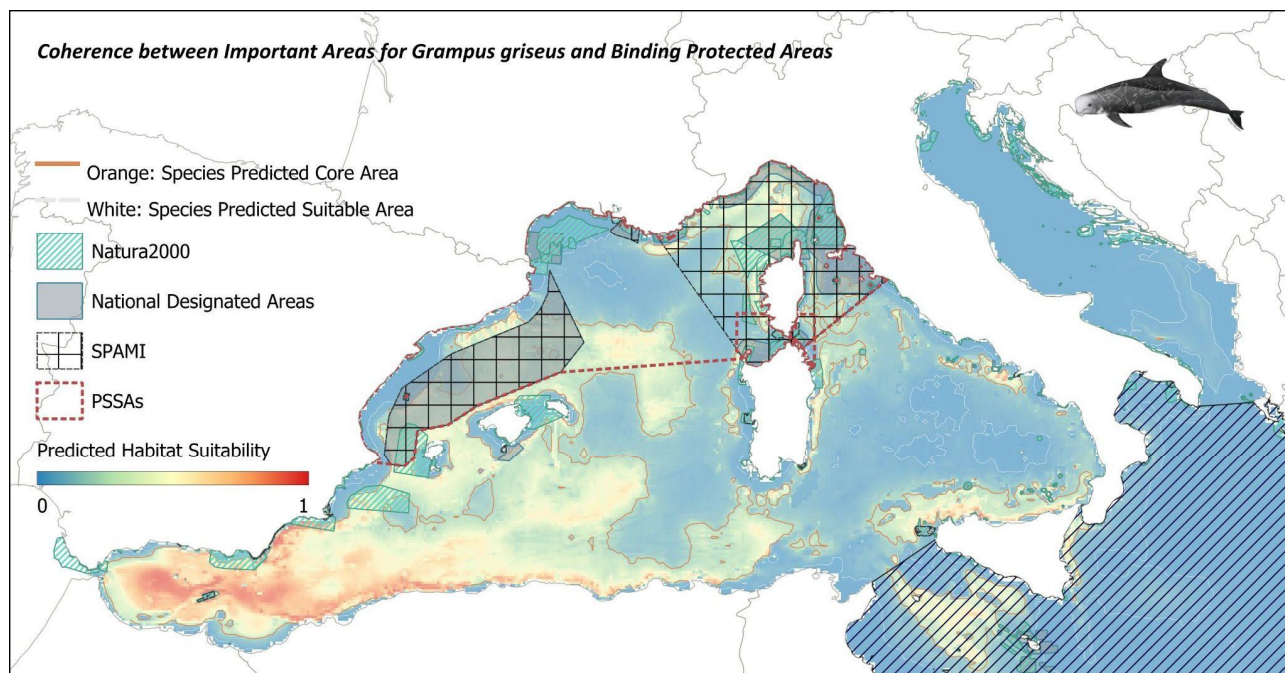


Figure 17. Predicted habitat suitability for *Grampus griseus* in the Mediterranean Sea and overlap with binding protected areas (Natura 2000, SPAMI, National designated areas and PSSA). Core and suitable habitats (red to yellow) are shown.

Areas of Coherence

The predicted core area for the species in the Ligurian Sea is covered by the Pelagos Sanctuary Areas, with further protection offered by some Natura2000 sites, namely the “*Grands dauphins de l’Agriate*” – FR9402019 and the “*Tutela del Tursiope mar Ligure*”. In the western part of the Mediterranean Basin the SPAMIs Spanish Cetacean Migration Corridor covers a wide portion of species core habitat. At a more local scale, some Natura 2000 sites in the Alboran Sea are also well placed for the species.

Spatial Gaps

Overall, only a limited, mostly coastal part of species’ predicted core habitat is covered by protected sites, highlighting the need for additional high-seas protection, particularly in the Alboran Sea and the slope regions of the Tyrrhenian Sea. Waters around Sicily are especially lacking in conservation coverage, despite their demonstrated importance for the species.

b. Coherence with non-binding, science-based conservation areas

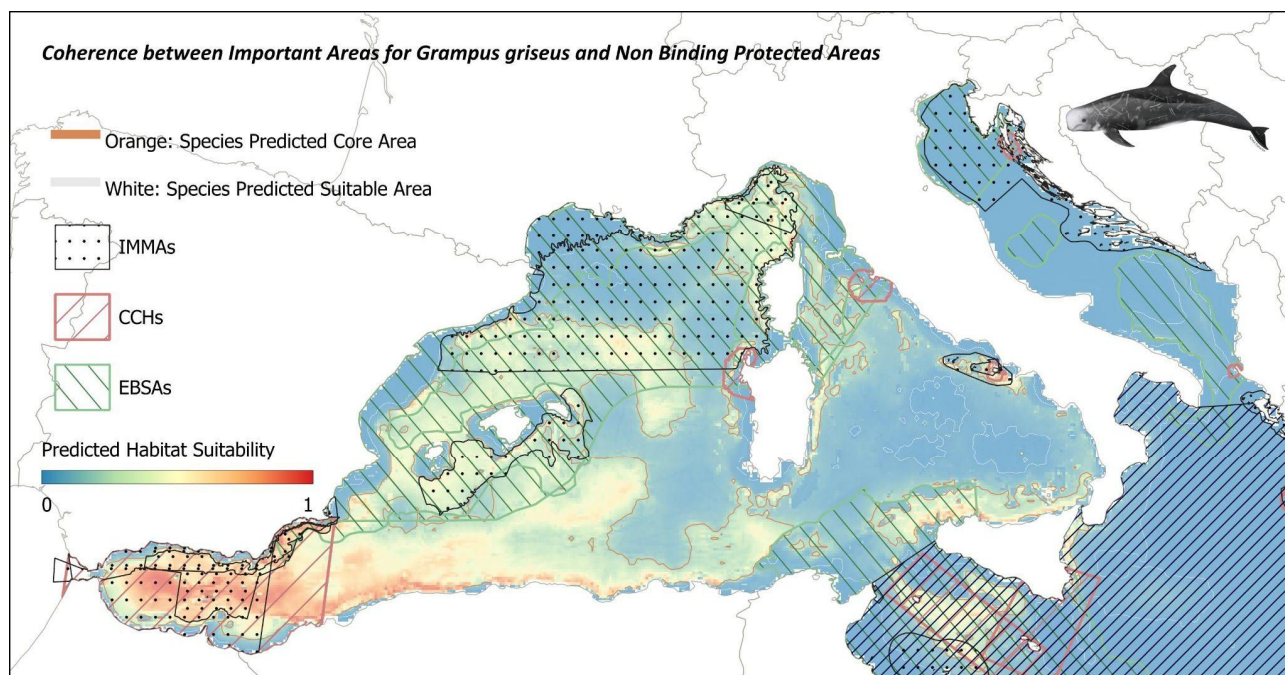


Figure 18a. Predicted habitat suitability for *Grampus griseus* in the Mediterranean Sea and its overlap with non-binding, science-based areas.

Areas of Coherence

In the **western Mediterranean Sea**, there is a higher alignment between the predicted suitable habitat of *Grampus griseus* and existing science-based conservation areas. Most core and suitable habitats, including the Alboran Sea, waters around Sicily, the northern Tyrrhenian Sea, and areas along the Spanish and French coasts, are well covered by IMMAs, CCHs, and EBSAs. However, some key regions are only partially included within non-binding conservation frameworks, resulting in weaker overlap between predicted habitats and formal protection. In the **Adriatic region**, there is a notably strong alignment between the predicted suitable habitat of *Grampus griseus* and existing non-binding conservation areas. Both the principal core and suitable habitats are largely encompassed within science-based designations, indicating a comprehensive spatial overlap that supports ongoing conservation efforts in the region.

Spatial Gaps

Significant spatial gaps remain in the southern part of the western basin, particularly off the Algerian coastline, along much of the Sardinian coast, and on the northeastern coast of Sicily. These areas lack adequate coverage by science-based conservation designations, highlighting the need for further assessment and potential expansion of protective measures.

c. Coherence with eDNA findings

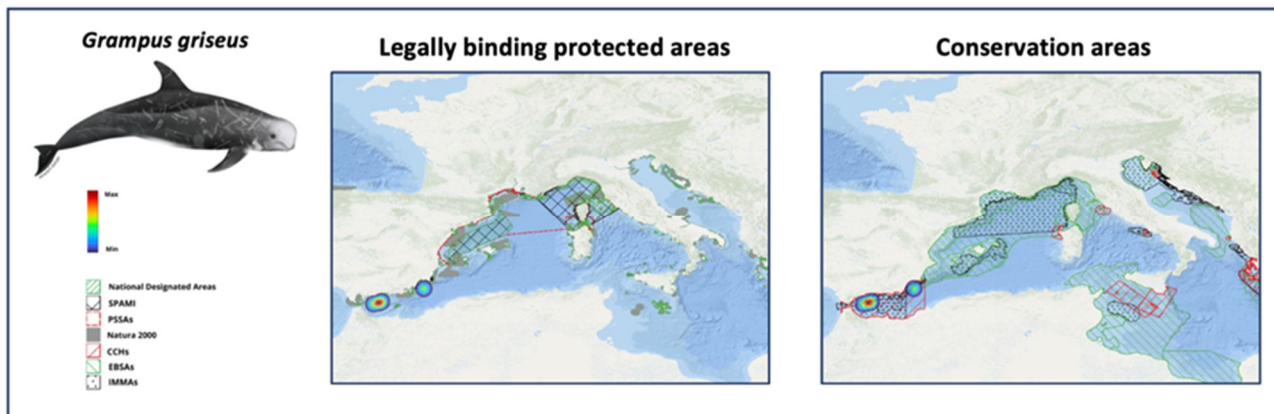


Figure 18b. Kernel density distribution of *Grampus griseus* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMAs, CCHs, and EBSAs).

Legally binding protected areas: currently protected areas do not cover the species distribution range found with eDNA analysis.

Science-based conservation areas: higher concordance is found, as the Alboran Sea, where most eDNA detections are found, is included in the IMMAs network.

Coherence between eDNA and predicted habitat suitability based on visual census: concordance for the Alboran Sea, although eDNA survey did not detect the species in the Pelagos Sanctuary.

2.5 *Globicephala melas*

a. Coherence with legally binding protected area

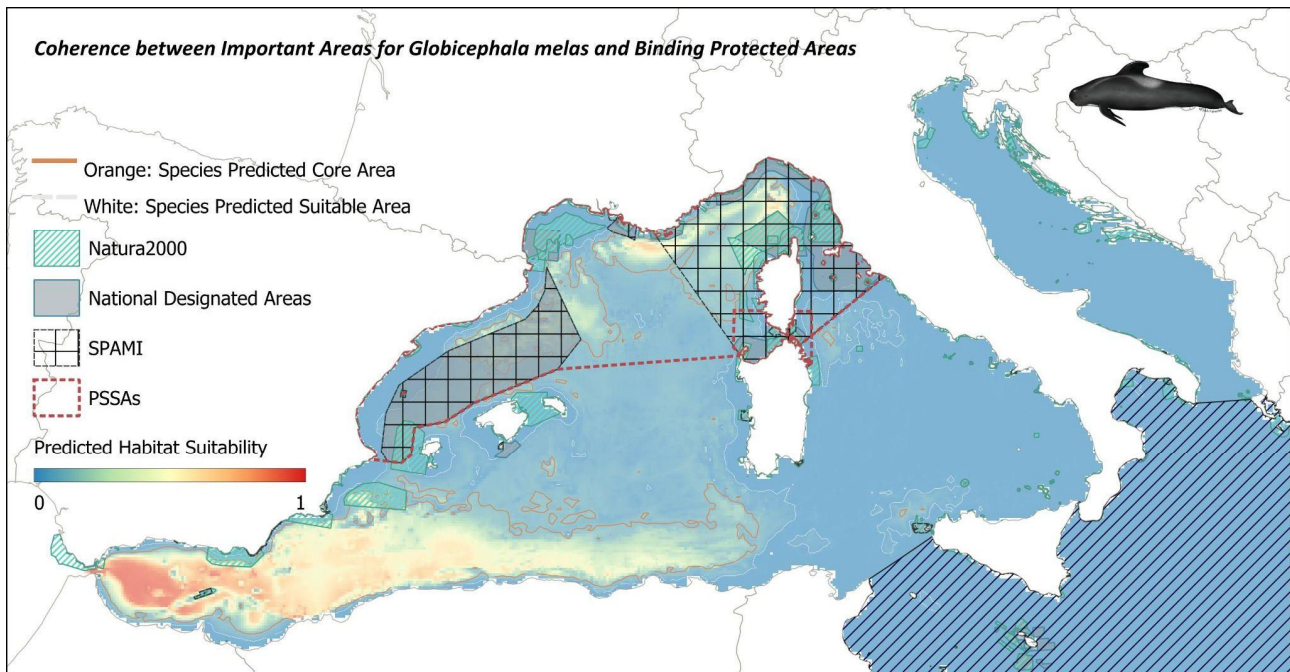


Figure 19. Predicted habitat suitability for *Globicephala melas* in the Mediterranean Sea and overlap with binding protected areas (Natura 2000, SPAMI, National designated areas and PSSA). Core and suitable habitats (red to yellow) are shown.

Areas of Coherence

In the western Mediterranean Sea, binding conservation areas provide substantial coverage of the main northern suitable and core habitats. At a more local scale, key areas are protected by the Sicilian archipelagos, including the Aeolian and Pelagie Islands, and in the Alboran Sea by several Natura 2000 sites. Although these areas are not specifically designated for *Globicephala melas*, they partially overlap with the species' predicted core and suitable habitats, thereby contributing to its potential protection.

Spatial Gaps

Significant gaps persist within the core habitat areas of *Globicephala melas*, particularly in the Alboran Sea and along the Algerian coastline, where coverage by binding conservation areas remains insufficient.

b. Coherence with non-binding, science-based conservation areas

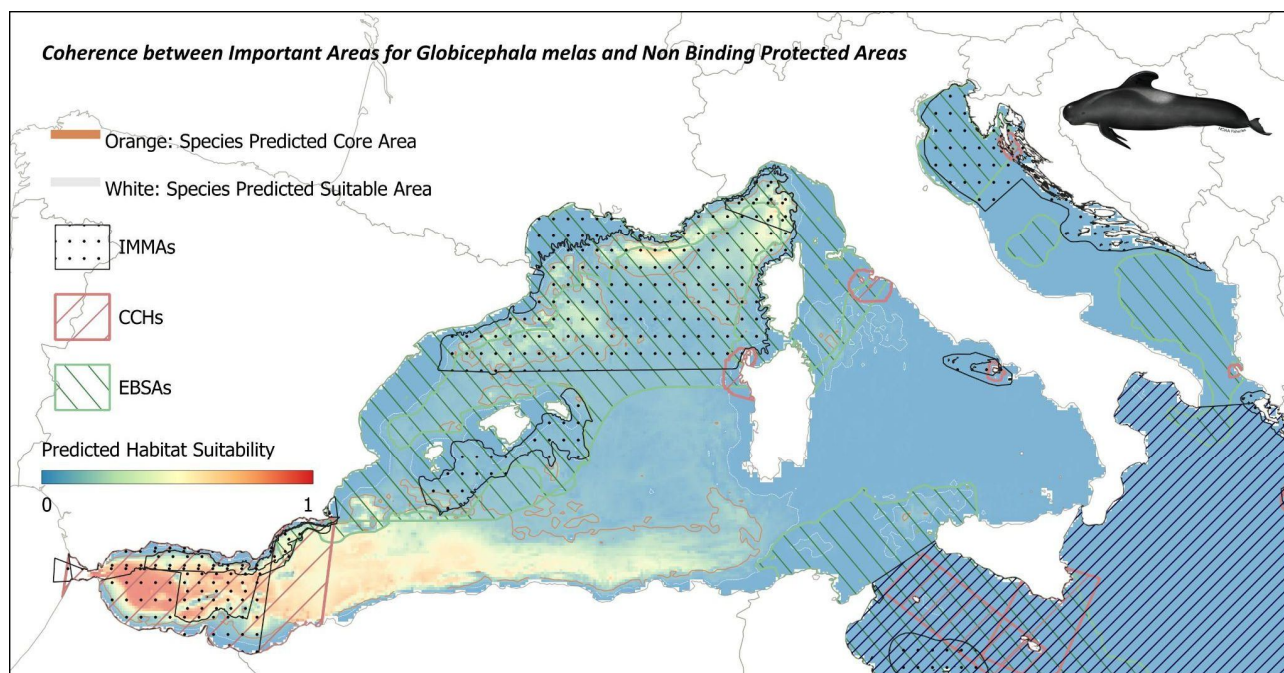


Figure 20a. Predicted habitat suitability for *Globicephala melas* in the Mediterranean Sea and its overlap with non-binding, science-based areas.

Areas of Coherence

In the **western Mediterranean Sea**, there is a strong alignment between the predicted suitable habitat of *Globicephalo melas* and existing science-based conservation areas. Most of the core and suitable habitats, such as the Alboran Sea, the northern Tyrrhenian Sea, and off the French, Spanish and Corsican coastline, are well covered by IMMAs, CCHs, and EBSAs. However, some key regions are only partially included within non-binding conservation frameworks, resulting in weaker overlap between predicted habitats and formal protection. In the **Adriatic region**, there is a notably strong alignment between the predicted suitable habitat of *Globicephalo melas* and existing non-binding conservation areas.

Spatial Gaps

The main spatial gap remains in the southern part of the western basin, particularly off the Algerian coastline. These areas lack adequate coverage by science-based conservation designations, highlighting the need for further assessment and potential expansion of protective measures.

c. Coherence with eDNA findings

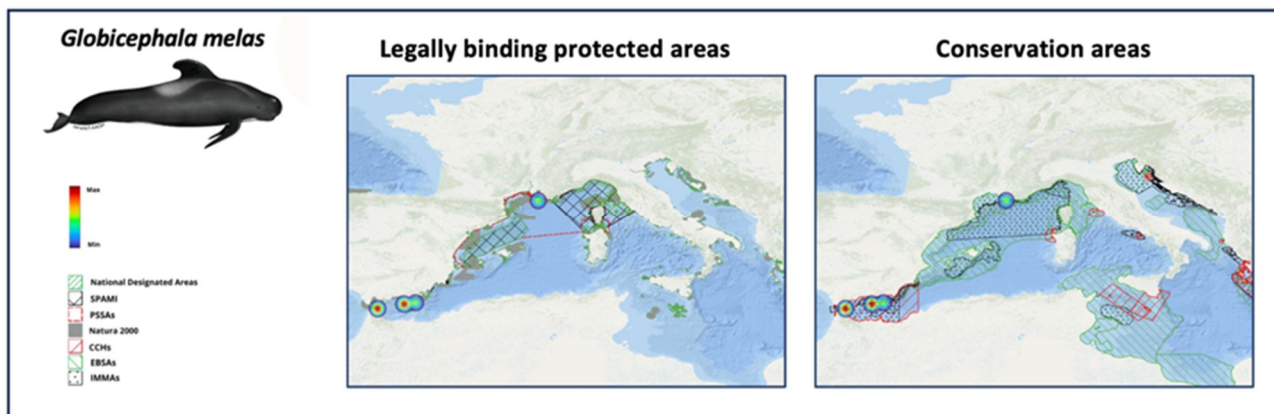


Figure 20b. Kernel density distribution of *Globicephala melas* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMAs, CCHs, and EBSAs).

Legally binding protected areas: currently protected areas do not cover the species distribution range found with eDNA.

Science-based conservation areas: higher concordance is found, as the Alboran Sea is included in the IMMAs network. The species is also found in the Gulf of Lion, again included in the IMMAs.

Coherence between eDNA and predicted habitat suitability based on visual census: almost complete concordance between the two approaches.

2.6 *Ziphius cavirostris*

a. Coherence with legally binding protected area

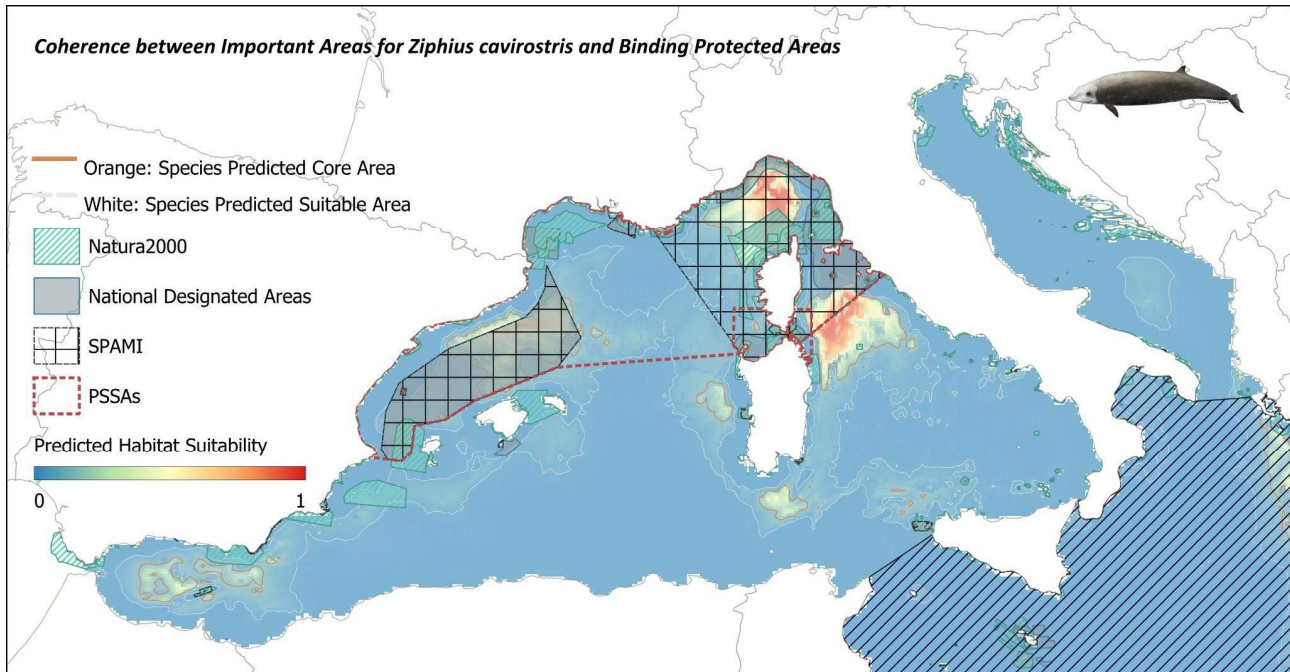


Figure 21. Predicted habitat suitability for *Ziphius cavirostris* in the Mediterranean Sea and overlap with binding protected areas (Natura 2000, SPAMI, National designated areas and PSSA). Core and suitable habitats (red to yellow) are shown.

Areas of coherence

Three main areas have been identified for species presence and habitat suitability: the Balearic Sea, the central Ligurian Sea, and the northern Tyrrhenian Sea. The first two areas are well covered by protected sites, particularly through the two large SPAMIs, the Spanish Cetacean Migration Corridor and the Pelagos Sanctuary. In the Ligurian Sea, the presence of Natura 2000 sites, such as the “*Grands dauphins de l’Agriate*” (FR9402019), effectively protects the southern portion of the species’ identified important area.

Spatial Gaps

Currently, the central Tyrrhenian Sea lacks the necessary protection status for the species, as the main suitable area lies outside the existing boundaries of the Pelagos Sanctuary. Similarly, important habitats for the species have been identified in the Alboran Sea and the southern Tyrrhenian Sea, in both cases located in areas where no legally designated protected areas currently exist.

b. Coherence with non-binding, science-based conservation areas

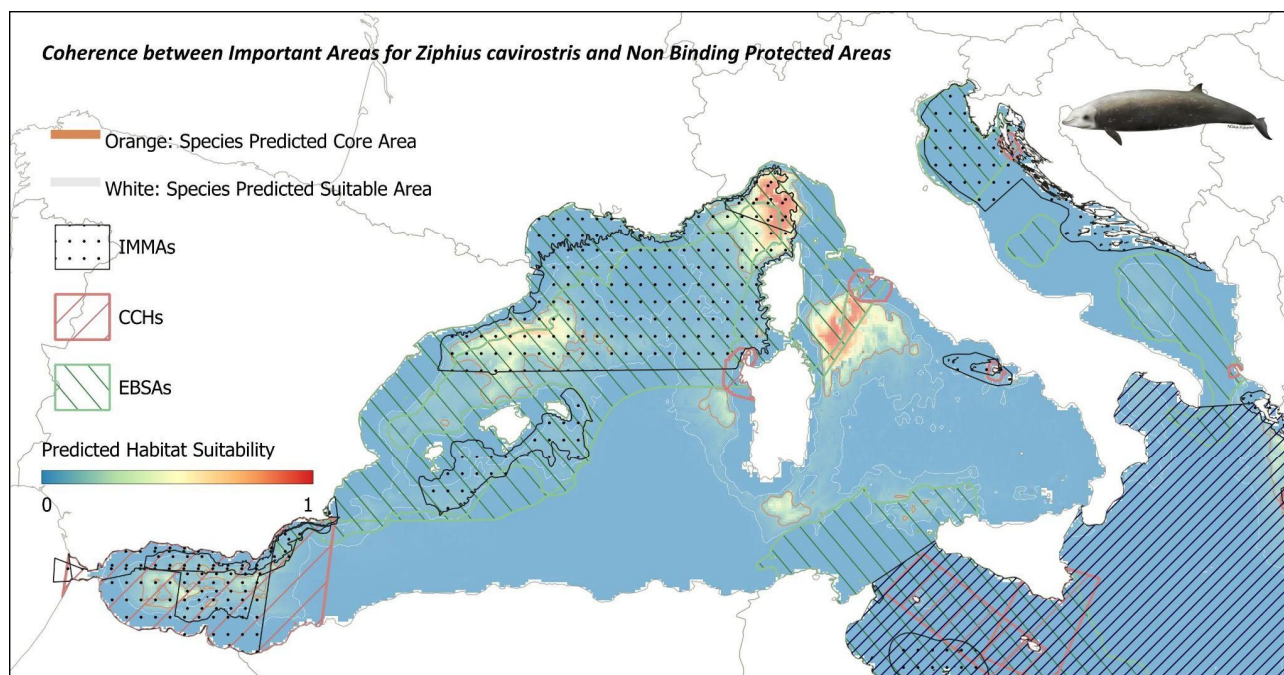


Figure 22a. Predicted habitat suitability for *Ziphius cavirostris* in the Mediterranean Sea and its overlap with non-binding, science-based areas.

Areas of coherence

Two IMMAs, the “Western Ligurian Sea” and “Genoa Canyons and the North West Mediterranean Sea”, Slope and Canyon System respectively, cover two core suitable habitat areas for the species. Similarly, the IMMAs in the Alboran Sea successfully cover a very important area for this species.

Spatial Gaps

The central Tyrrhenian Sea continues to emerge as an important area for the species (see also Arcangeli et al., 2016) but remains partially outside existing conservation coverage. It is worth noting that this area has already been identified as an Area of Interest (AOI) in the IMMA Atlas and is likely to be proposed soon as a new IMMA. Some important areas are also highlighted in the southern and northwestern parts of Sardinia, which may warrant further attention.

c. Coherence with eDNA findings

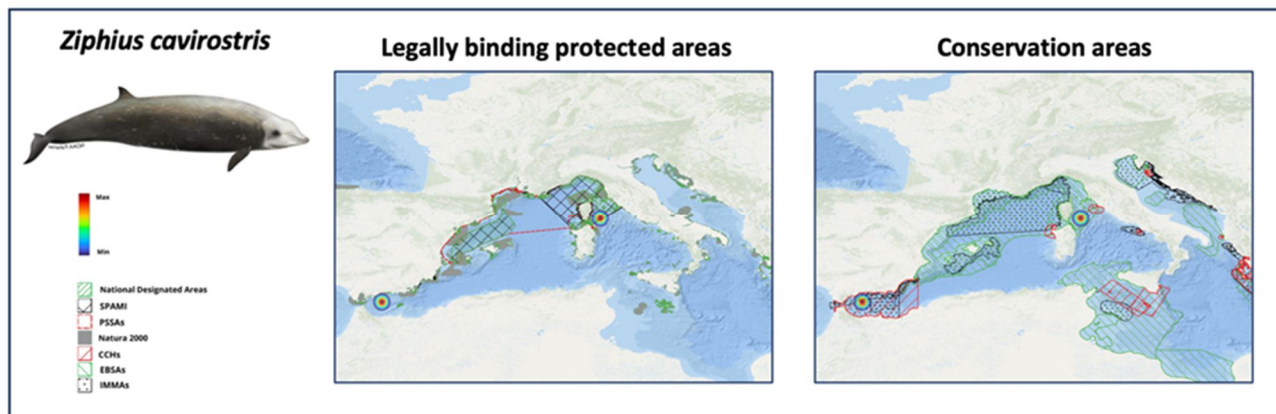


Figure 22b. Kernel density distribution of *Ziphius cavirostris* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMA, CCHs, and EBSAs).

Legally binding protected areas: the two SPAMIs partially protect the area of distribution of the species.

Science-based conservation areas: partial concordance, as Alboran Sea and the Caprera Canyon in the central Tyrrhenian sea are included in this network. The metabarcoding data shown in the map are integrated with barcoding results, showing the presence of the species also in the Pelagos Sanctuary, Spanish cetacean migratory corridor and in the deep Tyrrhenian Sea. The latter, in particular, is not under any protection or suggested as a conservation area.

Coherence between eDNA and predicted habitat suitability based on visual census: good concordance for the two hotspots of the central Tyrrhenian sea and Alboran sea, and the presence detected in the Pelagos Sanctuary and Spanish cetacean migratory corridor.

2.7 *Physeter macrocephalus*

a. Coherence with legally binding protected area

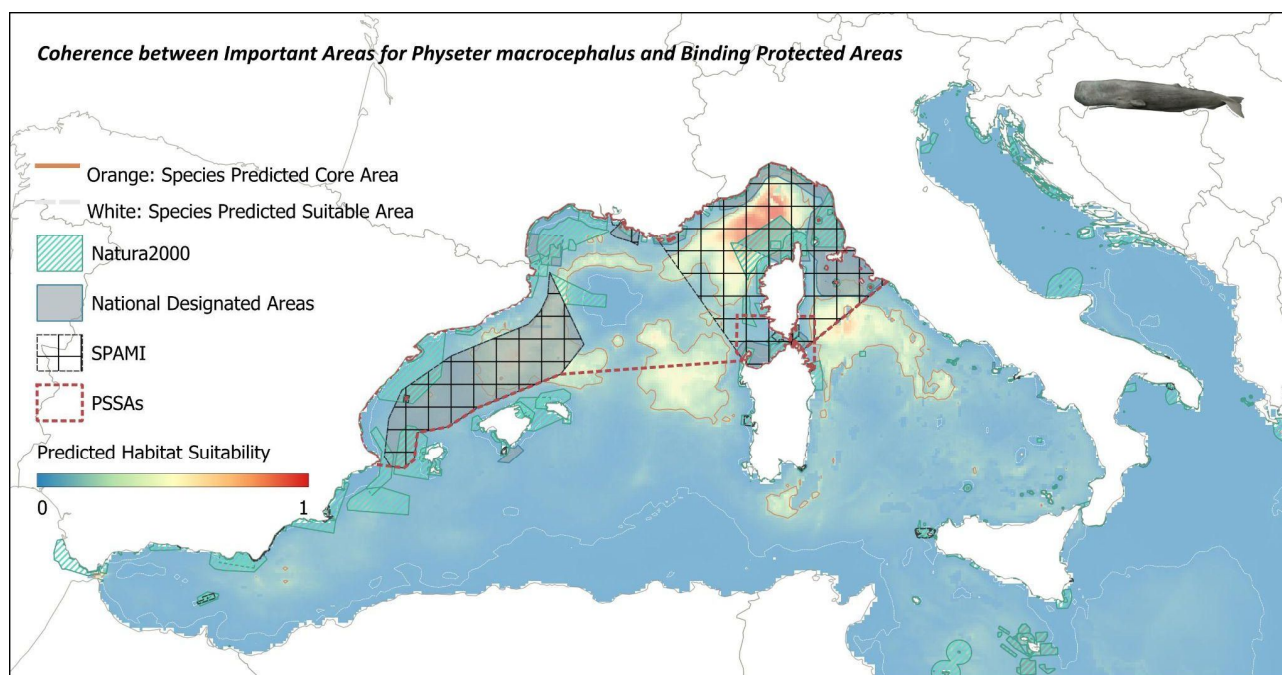


Figure 23. Predicted habitat suitability for *Physeter macrocephalus* in the Mediterranean Sea and overlap with binding protected areas (Natura 2000, SPAMI, National designated areas and PSSA). Core and suitable habitats (red to yellow) are shown.

Areas of coherence

Species Predicted Core Area is mainly located in central Ligurian Sea, covered by the Pelagos Sanctuary; further coherence area is with the Natura 2000 site “*Grands dauphins de l’Agiate*” – FR9402019. The Spanish Cetacean Migration Corridor also successfully covers an important area for the species in the Balearic Sea.

Spatial Gaps

Species predicted suitable habitat spans from the Ligurian Sea to the Balearic Sea, with an important area south the Gulf of Lion, which currently is not protected by legally binding protected areas. It has to be noted how the newly instituted Northwestern Mediterranean PSSA will largely fill this current gap.

As already evidenced for the goose-beaked whale, the northern Tyrrhenian sea also hosts a suitable area for the species, just outside the south-eastern boundary of the Pelagos Sanctuary. For this species, the suitable habitat expands in the central Tyrrhenian sea, with specific areas off South-eastern Sardinian coasts.

b. Coherence with non-binding, science-based conservation areas

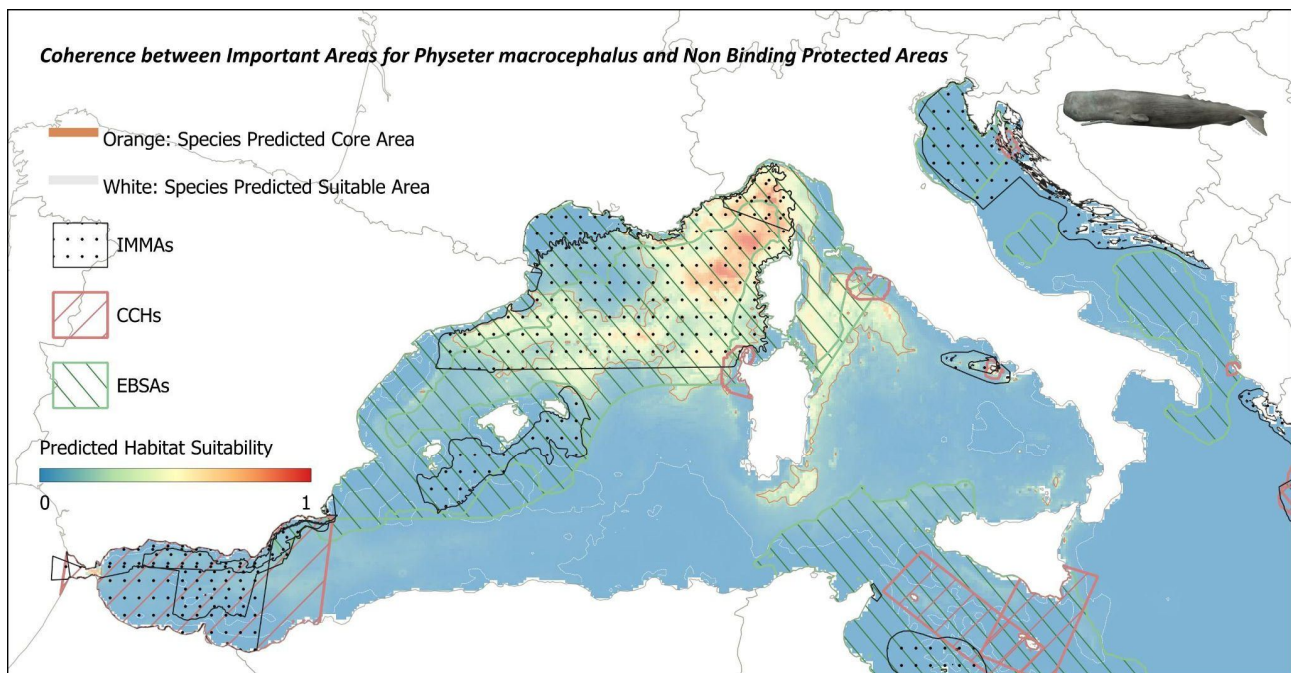


Figure 24a. Predicted habitat suitability for *Physeter macrocephalus* in the Mediterranean Sea and its overlap with non-binding, science-based areas.

Areas of coherence

The *Species Predicted Core Area* is almost entirely encompassed by non-binding, science-based zones, especially in the northwestern Mediterranean, the Alboran Sea, and the Adriatic region.

Spatial gaps

Some gaps remain, particularly in the Central Tyrrhenian Sea — notably off the southeastern coast of Sardinia and around the Aeolian Archipelago.

c. Coherence with eDNA findings

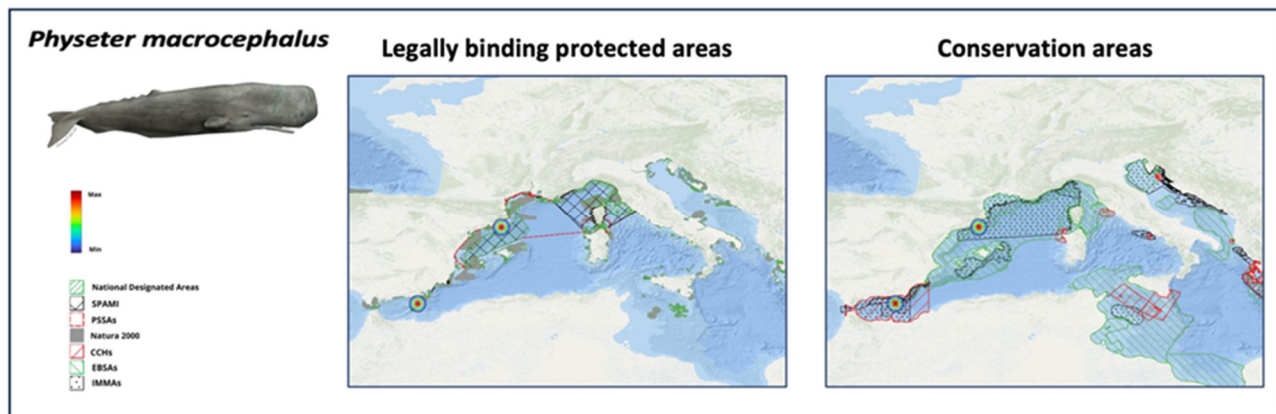


Figure 24b. Kernel density distribution of *Physeter macrocephalus* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMA, CCHs, and EBSAs).

Legally binding protected areas: partial concordance, as the Spanish Migratory Corridor is protected as a SPAMI, but the Alboran Sea is not.

Science-based conservation areas: these areas' networks better cover the distribution range of the species.

Coherence between eDNA and predicted habitat suitability based on visual census: partial concordance, due to the fact that the eDNA approach is not ideal for deep-diving species such as the sperm whale. However, one eDNA detection was found in the Alboran Sea, but none in the Pelagos Sanctuary (main species habitat based on the visual-based models).

(N.B. the Figure 24b is based on only two metabarcoding detections, probably underrepresenting species distribution range)

2.8 *Kogia breviceps*

a. Coherence with eDNA findings

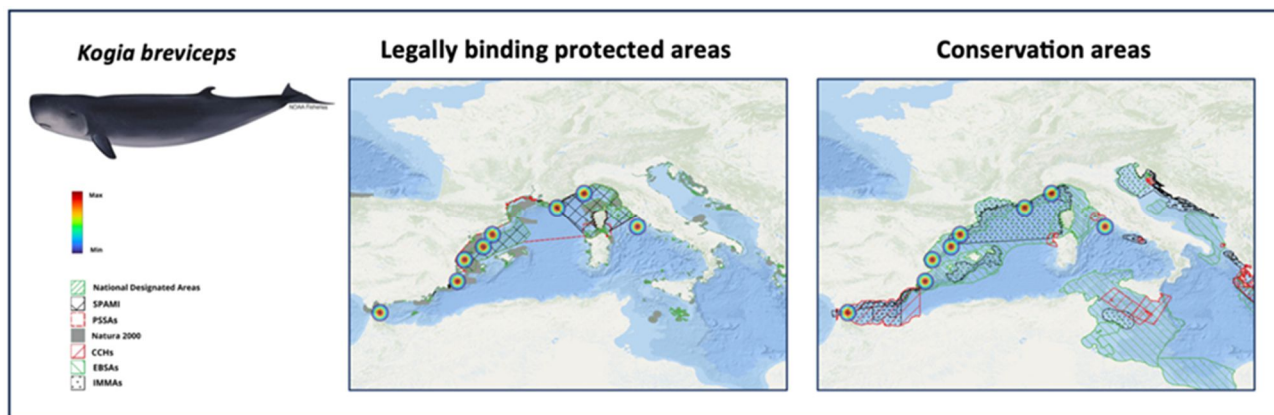


Figure 24c. Kernel density distribution of *Kogia breviceps* in the Mediterranean Sea based on eDNA detections, and its overlap with (left) binding areas (Natura 2000, SPAMI, National Designated Areas) and (right) science-based conservation areas (IMMAs, CCHs, and EBSAs).

This species was detected only through eDNA surveys.

Legally binding protected areas: widely distributed in the Western Mediterranean basin from Gibraltar to the Ligurian Sea, with a spot of presence in the central Tyrrhenian sea. The two SPAMIs partially cover its western and northern distribution range.

Conservation areas: these areas' network better cover the species distribution, including the Alboran Sea and the waters off the French coast (from Gulf of Lion up to the Pelagos Sanctuary). The spot in the central Tyrrhenian sea remains outside any identified area.

Coherence between eDNA and predicted habitat suitability based on visual census: n.a. as no visual data are available for this species.

3. Overlap of spatial protection measures with RISK EXPOSURE AREAS for CEPTU species

High-risk exposure areas were determined using an index that integrates species encounter rates with pressure density data (results reported in Deliverable C1). The purpose here is to highlight the overlap between these areas and existing protected zones, whether established specifically to mitigate pressures (e.g., PSSAs) or more generally for species conservation. **This information can support the integration of targeted mitigation measures into Protected Area management plans or help assess potential cumulative impacts on species within these zones (for example, areas facing higher general risk from marine litter, which may increase the overall vulnerability of local species).** While the general patterns are presented here, more detailed information on seasonal Risk Exposure Areas, and consequently, more precise recommendations for potential mitigation measures, can be found in Deliverables C1 and C2.

3.1 *Tursiops truncatus* Risk Exposure Assessment

Floating Marine Macro Litter (FMML)

Across the western Mediterranean and the Adriatic, higher risk exposure for FMML is scattered across several hotspots, partially overlapping also existing Natura 2000 sites for *Tursiops truncatus* (Figure 25) and other binding protected areas (Figure 26).

In particular, relatively high FMML exposure for *Tursiops truncatus* is found within the Bonifacio PSSA and the Pelagos SPAMI, where exposure increases in warmer months (Arcangeli et al., 2025-Deliverable C1), with partial overlap with designated spatial protection areas in the Tuscan Archipelago, north-west Corsica, and north-west Sardinia (Asinara) (Figure 26).

Additional areas with higher exposure risk are located around the Balearic region, in the Alboran Sea, the southern Tyrrhenian and Tunisian coast, which do not overlap with any designated spatial protection areas in offshore waters (Figure 25 and 26).

The Adriatic Sea shows high and persistent exposure in large areas with no protection, with the exception of the offshore area near Greece (Paxos–Antipaxos).

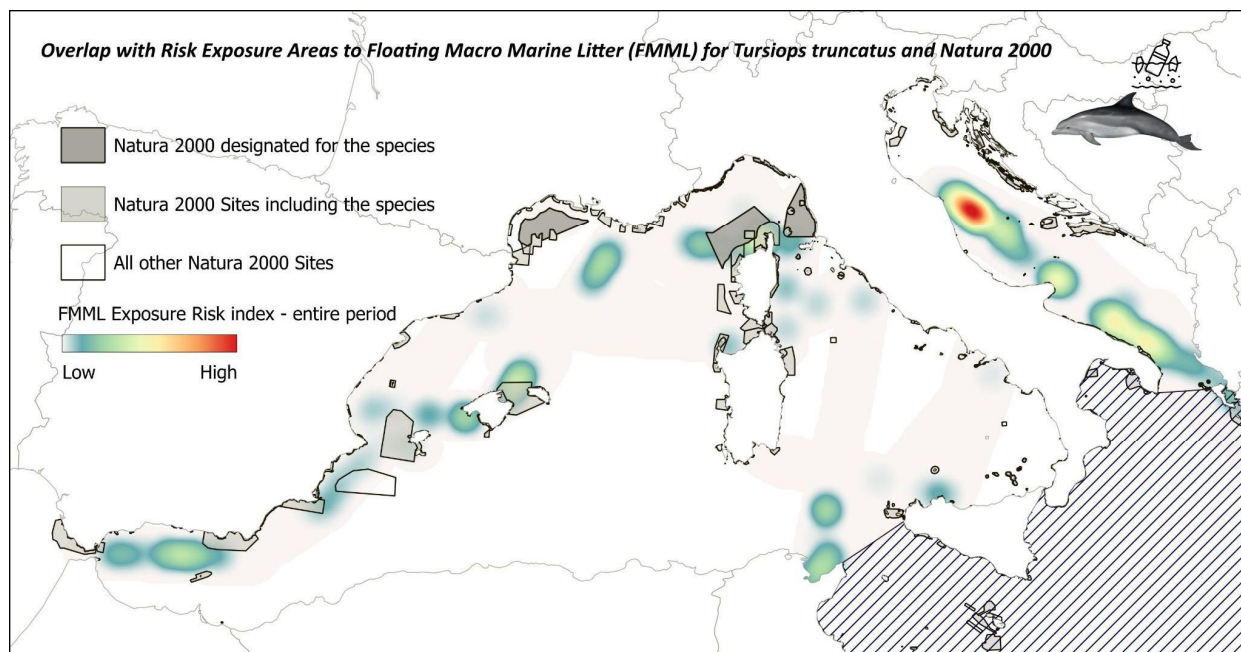


Figure 25. Overlap with Risk Exposure Areas to Floating Macro Marine Litter (FMML) for *Tursiops Truncatus* and Natura 2000 Network. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

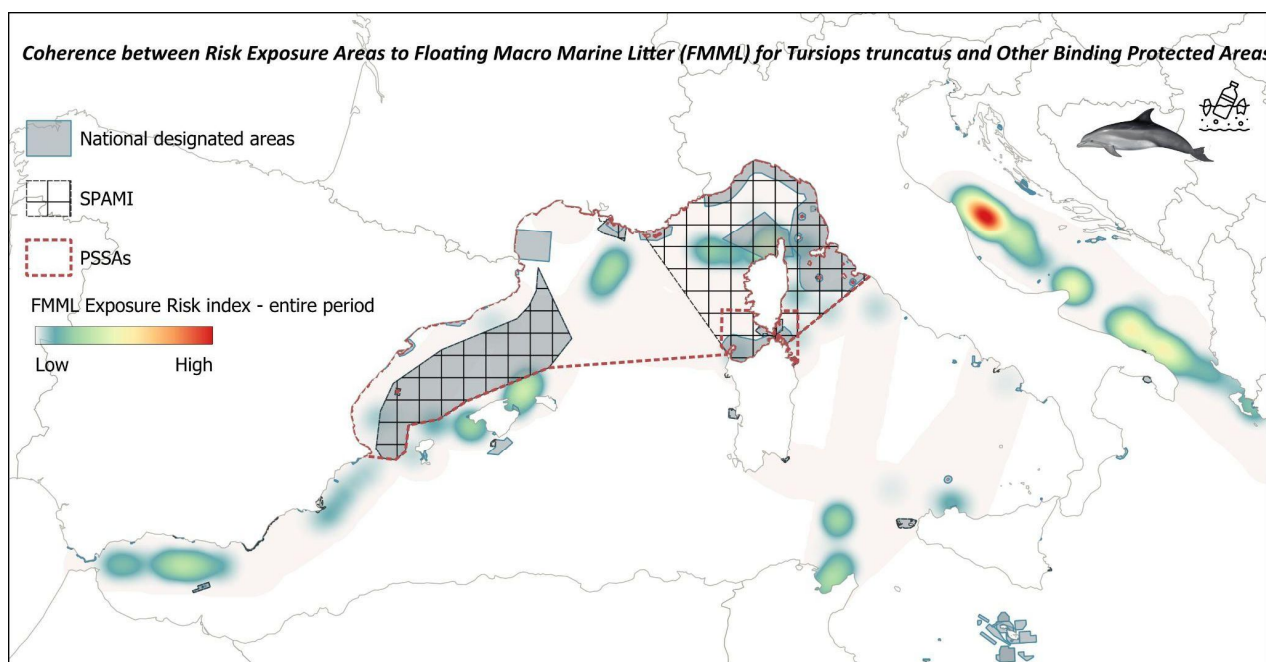


Figure 26. Coherence between Risk Exposure Areas to Floating Macro Marine Litter (FMML) for *Tursiops Truncatus* and other binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

The areas identified by non-binding science based frameworks (Figure 27) largely capture several hotspots where *Tursiops truncatus* is most exposed to the risk of FMML, especially

within the IMMAs and EBSAs in the Adriatic, Balearic region, and north-western Mediterranean. High-risk areas in the southern Tyrrhenian and Tunisian waters remain largely outside current non-binding designations, indicating priority zones for future consideration.

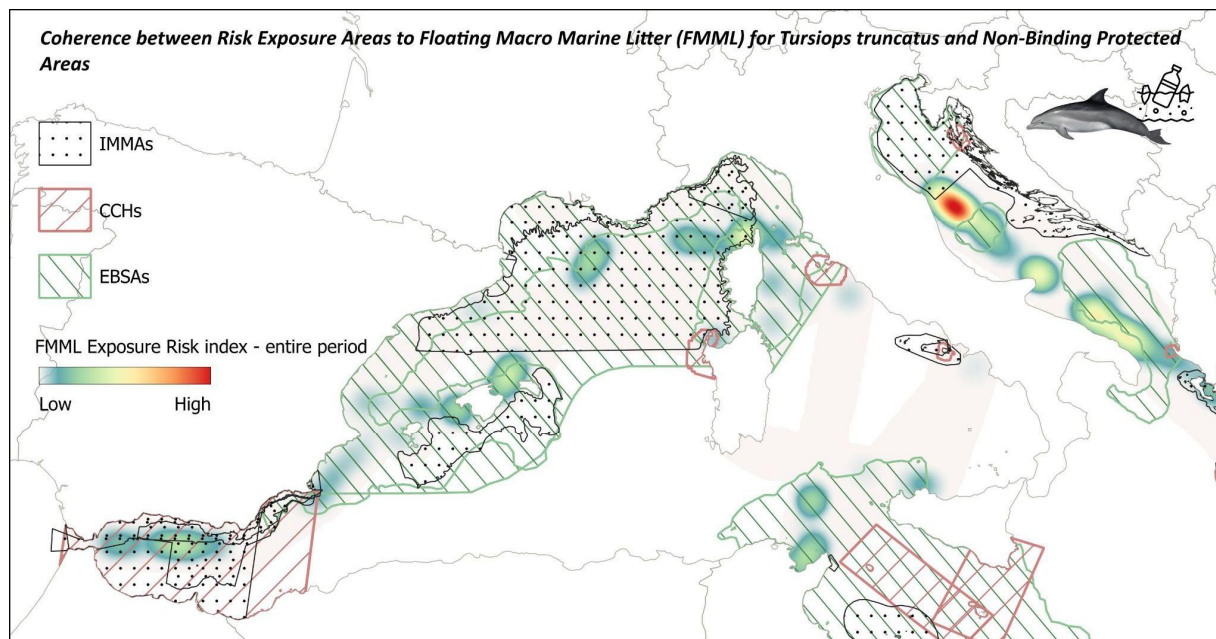


Figure 27. Coherence between Risk Exposure Areas to Floating Macro Marine Litter (FMML) for *Tursiops Truncatus* and non binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

Maritime Traffic

At subregional scale, the areas where *Tursiops truncatus* is most exposed to the risk caused by maritime traffic are located in the Alboran–Gibraltar region, extending north along the Spanish coast up to the Ibiza channel and the Balearic Islands, partially overlapping several Nature 2000 sites (Figure 28). Here, the Cetacean Migration Corridor SPAMI intersects several exposure hotspots along the Ibiza channel, the Balearic Islands and the Spanish mainland coast, however excluding the high risk exposure areas around the main ports of Valencia and Barcelona (Figure 29).

High exposure risk areas for the threat of MT are also largely found in the Adriatic Sea where protection coverage is mostly absent (Figure 28 and 29).

In the Pelagos Sanctuary SPAMI, areas of higher exposure risk are mainly found in the southern sector, largely coinciding with the Bocche di Bonifacio PSSA (Figure 29), and in the eastern sector, where they partially overlap with Natura 2000 sites designated for the species (i.e., “Tutela del *Tursiops truncatus*” SIC IT5160021 and “Grands dauphins de l’Agriate” SAC FR9402019) (Figure 28).

The North-Western Mediterranean PSSA encompasses most of the identified hotspots of higher risk exposure for the species, particularly along their eastern portions, which overlap with the Pelagos SPAMI (Figure 29).

The southern hotspots outside the Palermo port and in the Sicily Channel where the highway of the sea crosses important areas for the species remain outside any type of protection.

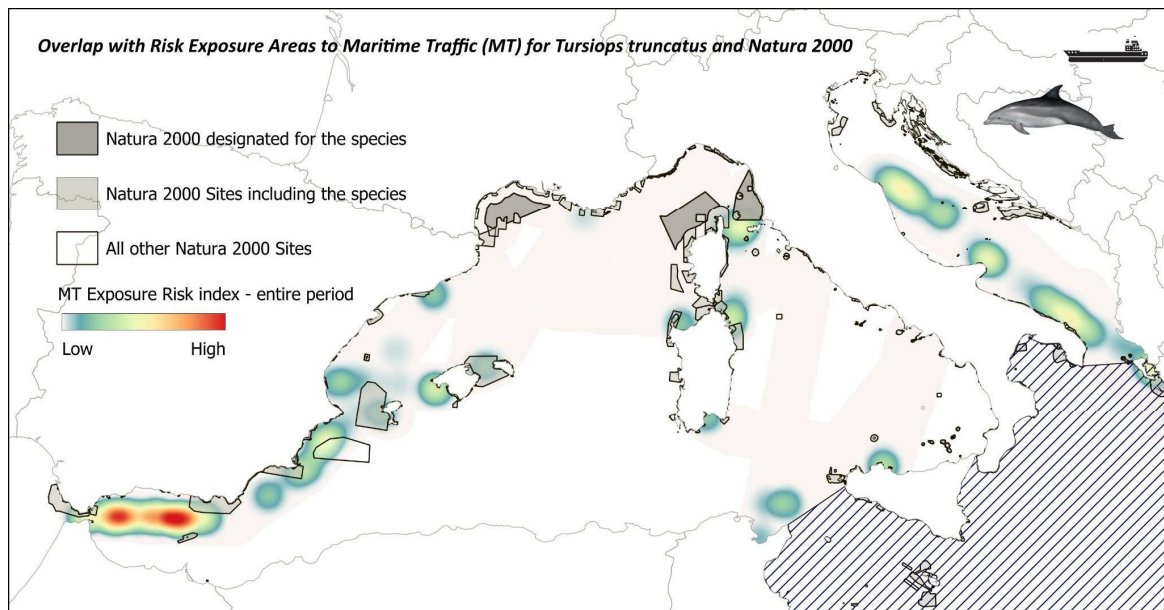


Figure 28. Coherence between Risk Exposure Areas to Maritime Traffic (MT) for *Tursiops Truncatus* and Natura 2000. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

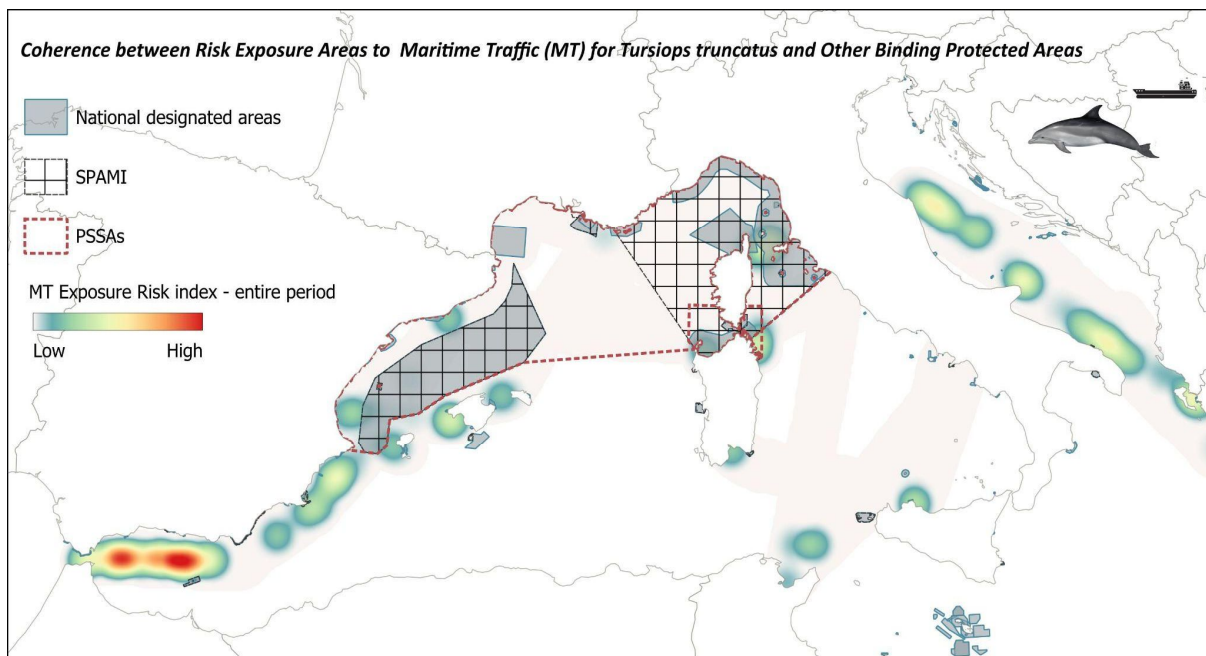


Figure 29. Coherence between Risk Exposure Areas to Maritime Traffic (MT) for *Tursiops Truncatus* and other binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

When the analysis is extended to include non-binding conservation measures, all the main MT exposure hotspots appear to be covered. The major hotspot in the Alboran Sea is fully encompassed by the IMMA and CCH designations, while the Strait of Sicily is mostly covered by BSAs, and the northern Adriatic by an IMMA. Nevertheless, some uncovered hotspots still persist in the central Adriatic Sea, highlighting remaining spatial gaps even within these science-based conservation frameworks.

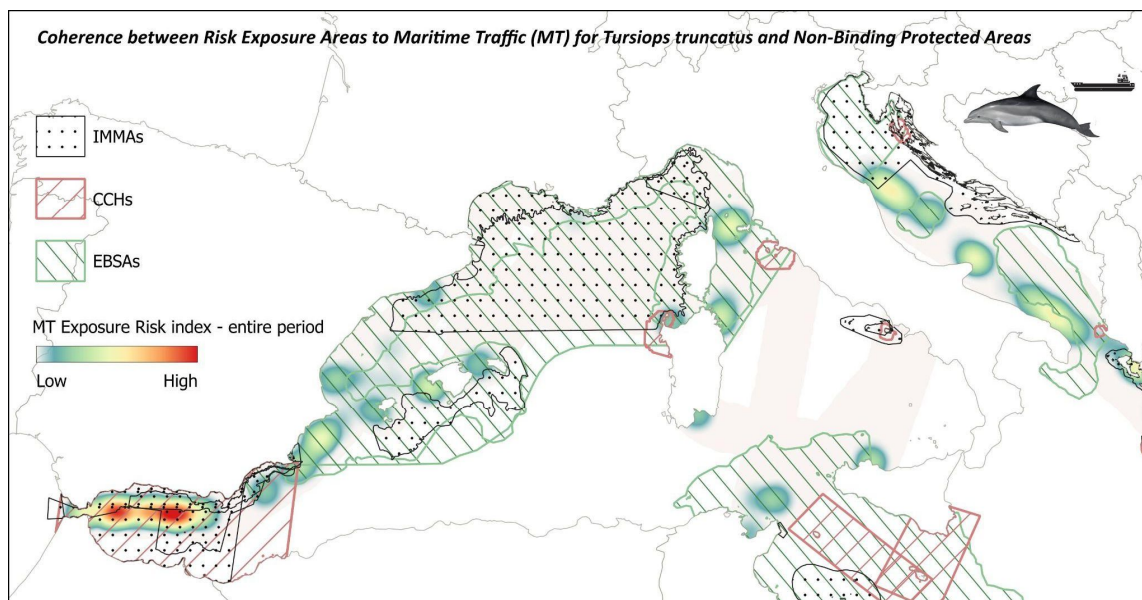


Figure 30. Coherence between Risk Areas to Floating Macro Maritime Traffic (MT) for *Tursiops Truncatus* and non binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

Summary on *Tursiops truncatus* gap analysis results related to exposure hotspots

The integrated gap analysis for *Tursiops truncatus* under FMML and MT pressures shows that key exposure hotspots lack effective protection under binding instruments and are currently intercepted by science-driven non-binding frameworks. Natura 2000 sites offer limited overlap with the major risk exposure areas, mainly along the Pelagos area, the Spanish coast, and the Balearic Islands, while the Adriatic, southern Tyrrhenian, and parts of the Alboran–Gibraltar region remain largely uncovered. Other binding instruments (SPAMIs, PSSAs, and nationally designated areas) improve coverage in the north-western Mediterranean, particularly for FMML, but still fail to include major hotspots. Only non-binding, science-based frameworks (IMMAs, EBSAs, and CCHs) provide broader overlap, encompassing the Alboran traffic and litter exposure hotspot, the Sicily Channel, and the northern Adriatic. However, gaps persist especially in the southern Tyrrhenian.

3.2 *Caretta caretta* Risk Exposure Assessment

Floating Marine Macro Litter (FMML)

All the hotspot areas where *Caretta caretta* is mostly exposed to the risk caused by FMML, including the large areas of the Tyrrhenian and Adriatic sea, are generally outside any Natura 2000 sites, either those explicitly including the species in their SDF or the others (Figure 31), or other binding protected areas (Figure 32). Only the area along the eastern Spanish mainland coast shows partial overlap with several Natura 2000 sites.

The Northwestern Mediterranean PSSAs and the two SPAMIs primarily cover the western Mediterranean, which is not a key area for the species except during warmer months, when exposure to FMML is also high; thus, these protections only partially cover this period.

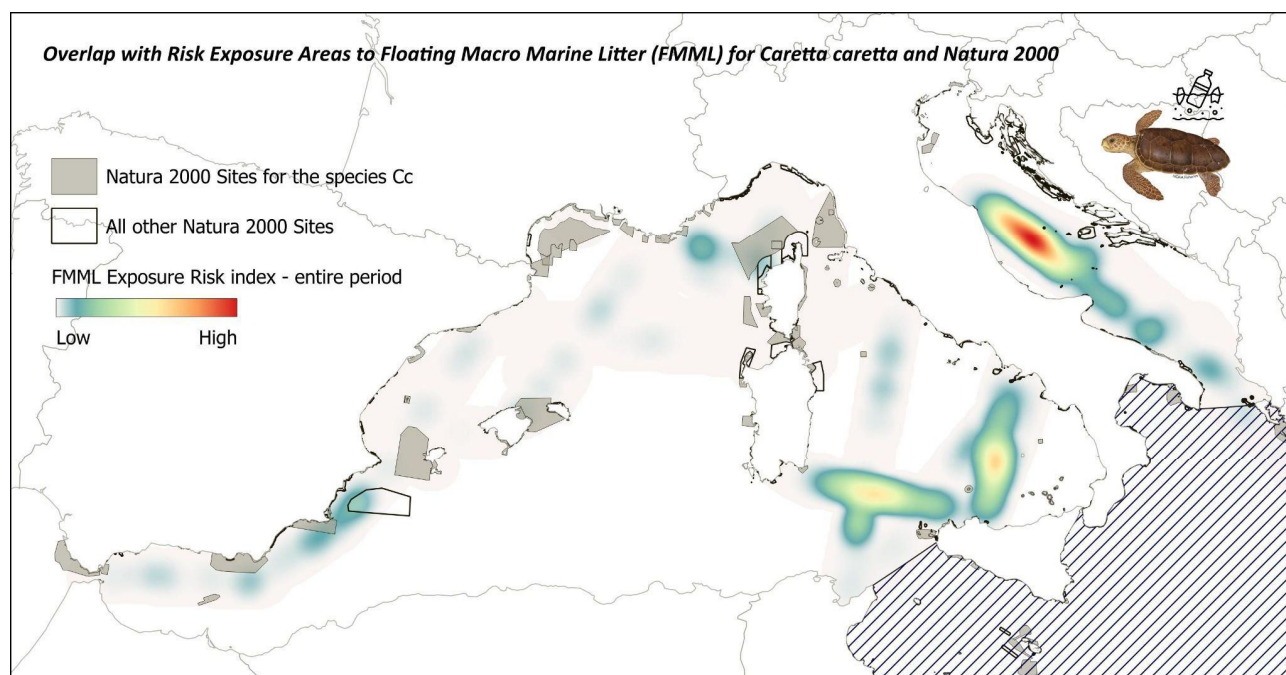


Figure 31. *Overlap between Risk Exposure Areas to Floating Macro Marine Litter (FMML) for Caretta caretta and Natura 2000 Network. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.*

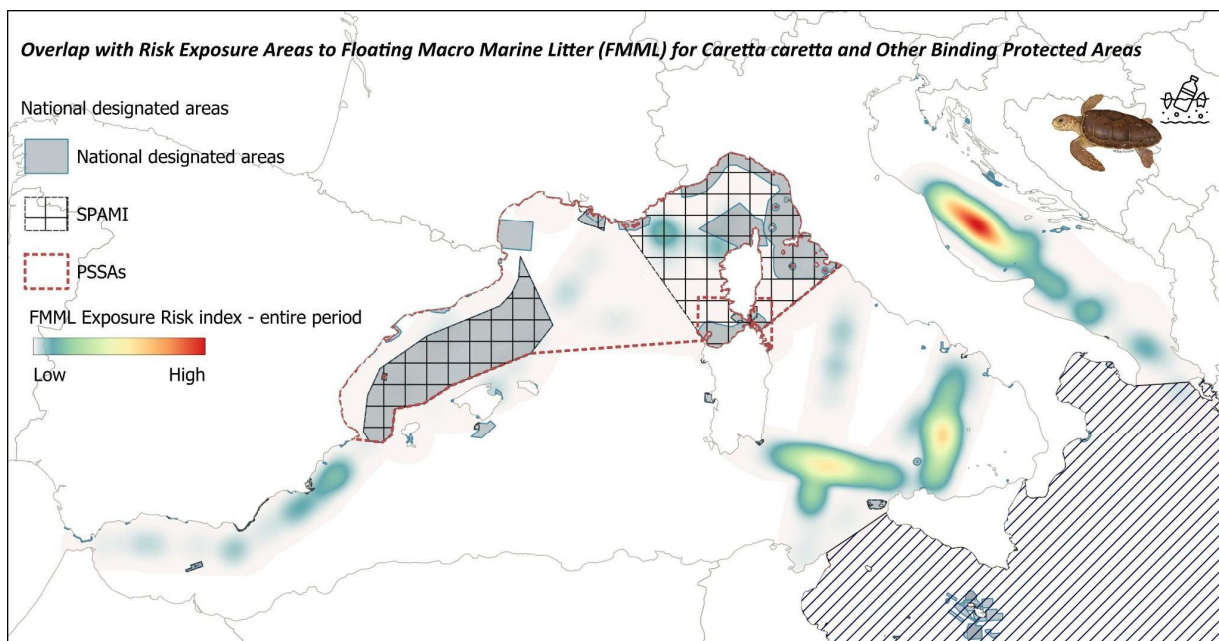


Figure 32. *Overlap with Risk Exposure Areas to Floating Macro Marine Litter (FMML) for *Caretta caretta* and other binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.*

Within the science-based, non-binding areas—considering only EBSAs, since IMMAs and CCHs are specific to cetaceans—the main hotspot of highest exposure risk for *Caretta caretta* to FMML in the central Adriatic Sea is covered by an identified EBSA, while most other high-risk areas, particularly the larger portion of the southern-western Tyrrhenian–Sicily Channel hotspot, remain mostly outside the identified areas (Figure 33).

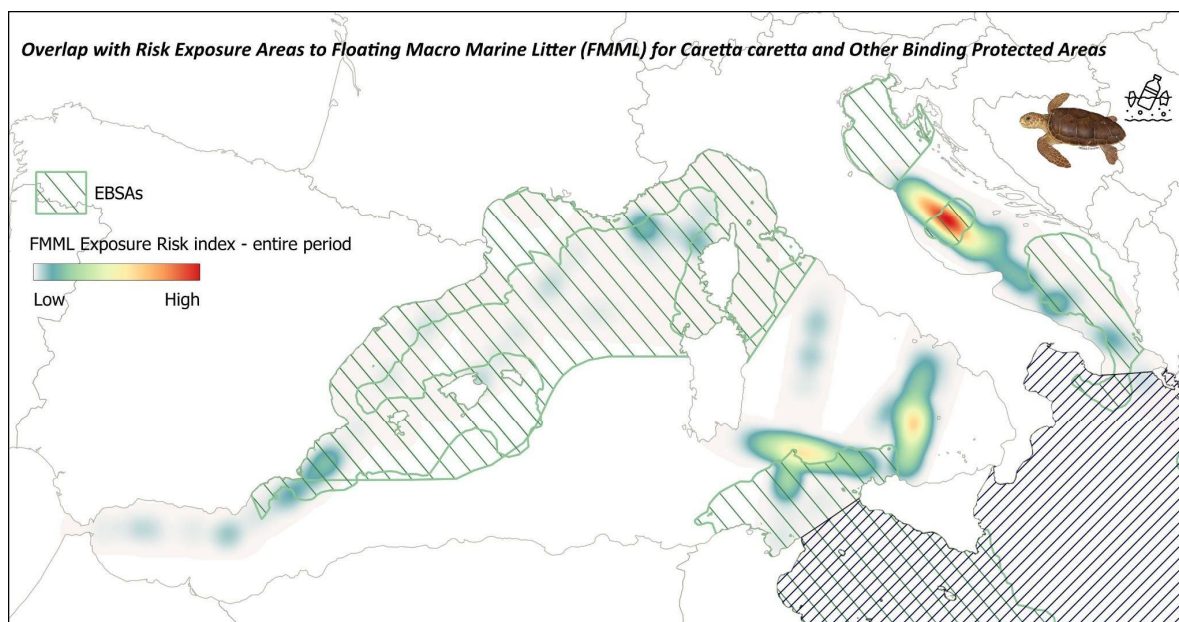


Figure 33. *Overlap with Risk Exposure Areas to Coherence between Risk Exposure Areas to Floating Macro Marine Litter (FMML) for *Caretta caretta* and non binding Protected Areas.*

Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

Maritime Traffic

The areas where *Caretta caretta* is most exposed to the threat of maritime traffic are mainly located in the Adriatic Sea and the Alboran Sea, stretching up north along the eastern Spanish coasts. While the Alboran–Gibraltar area only partially intersects some Natura 2000 sites (Figure 34), the risk area identified in the Adriatic Sea remains almost completely uncovered (Figure 34 and 35).

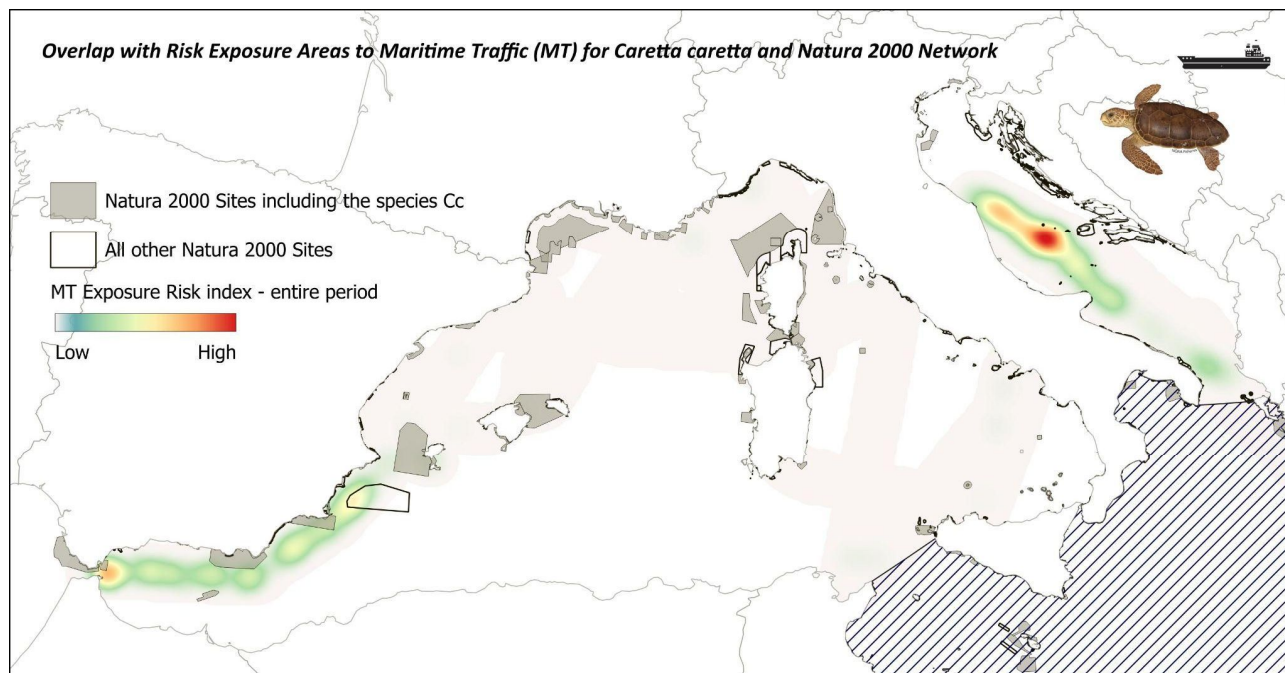


Figure 34. Overlap with Risk Exposure Areas to Maritime Traffic (MT) for *Caretta caretta* and Natura 2000 Network. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

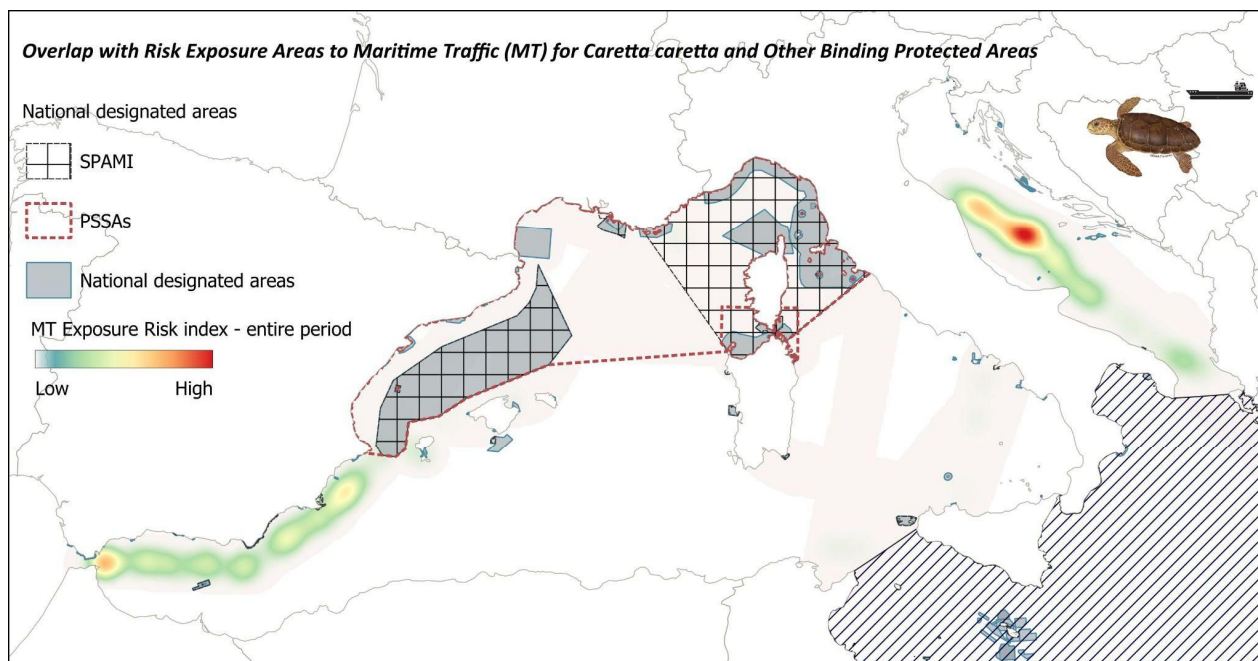


Figure 35. *Overlap with Risk Exposure Areas to Maritime Traffic (MT) for Caretta caretta and other binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.*

The science-based, non-binding EBSAs intercept the highest exposure risk areas of the central Adriatic Sea and the eastern Spanish hotspot, while other areas in the Adriatic Sea and the large Alboran-Gibraltar area remain largely uncovered (Figure 36).

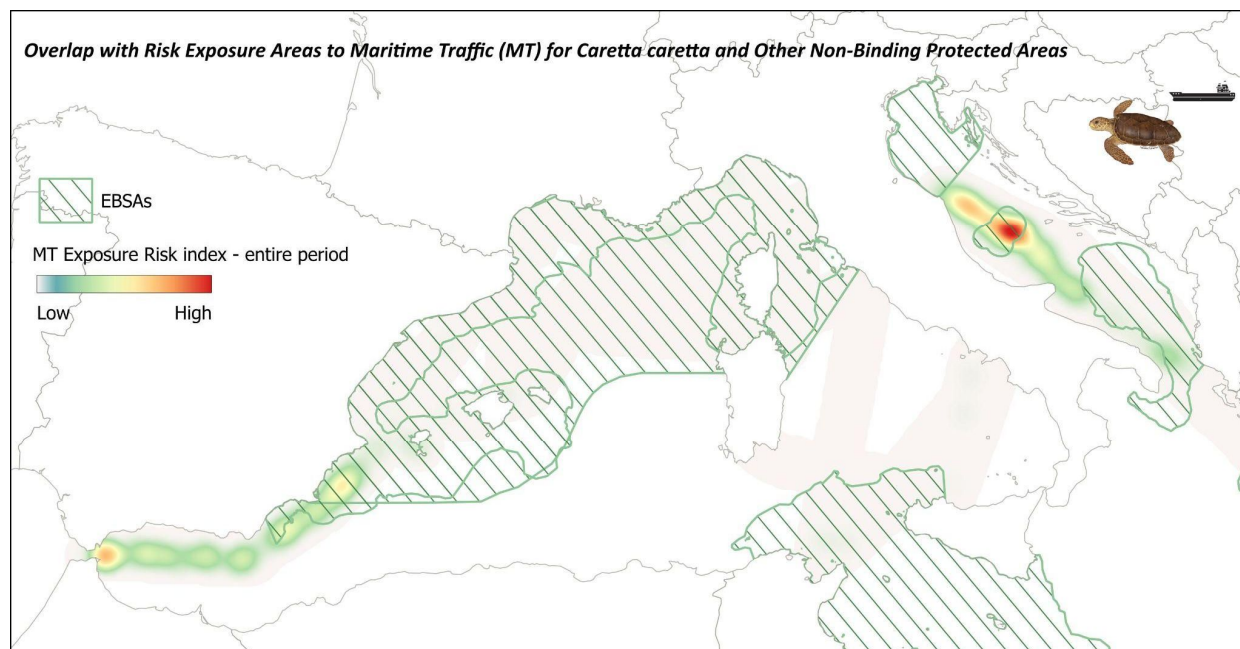


Figure 36. *Overlap with Risk Exposure Areas to Maritime Traffic (MT) for Caretta caretta and non binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.*

Summary on loggerhead turtles gap analysis results related to exposure hotspots

The integrated gap analysis for loggerhead turtles under FMML and MT pressures shows that the main exposure hotspots remain largely unprotected. Natura 2000 sites offer minimal coverage, leaving the Tyrrhenian, Adriatic, and Alboran Seas mostly uncovered. Other binding instruments show similar gaps, failing to include these persistent hotspots. Only non-binding, science-based frameworks provide partial improvement, covering limited areas of the central Adriatic, while major exposure zones such as the Alboran and eastern Tyrrhenian Seas remain outside protection. Overall, there is a clear mismatch between exposure hotspots and existing conservation frameworks across the Mediterranean.

3.3 All Cetaceans species

Floating Marine Macro Litter (FMML)

The risk posed by FMML to cetaceans is widespread, with the highest exposure areas located in the northwestern Mediterranean. Binding spatial instruments (Figure 37) provide substantial coverage in this region, particularly within the Pelagos Sanctuary and, to some extent, along the Spanish Cetacean Migration Corridor SPAMIs. Coastal Natura 2000 sites also encompass certain exposure hotspots near the Spanish mainland and in the Alboran Sea, whereas offshore areas in both the Alboran and Ligurian–Provençal basins remain largely unprotected, except for the PSSA, which however specifically targets the threat from maritime traffic. Moreover, the Tyrrhenian and Adriatic Seas, both persistent hotspots of FMML exposure for cetaceans, remain largely unprotected.

When extending the analysis to other non-binding instruments, the coverage of exposure areas becomes almost complete, except for the Tyrrhenian Sea, which remains partly uncovered, particularly in its central sector, and for some portions of the Adriatic Sea (Figure 38).

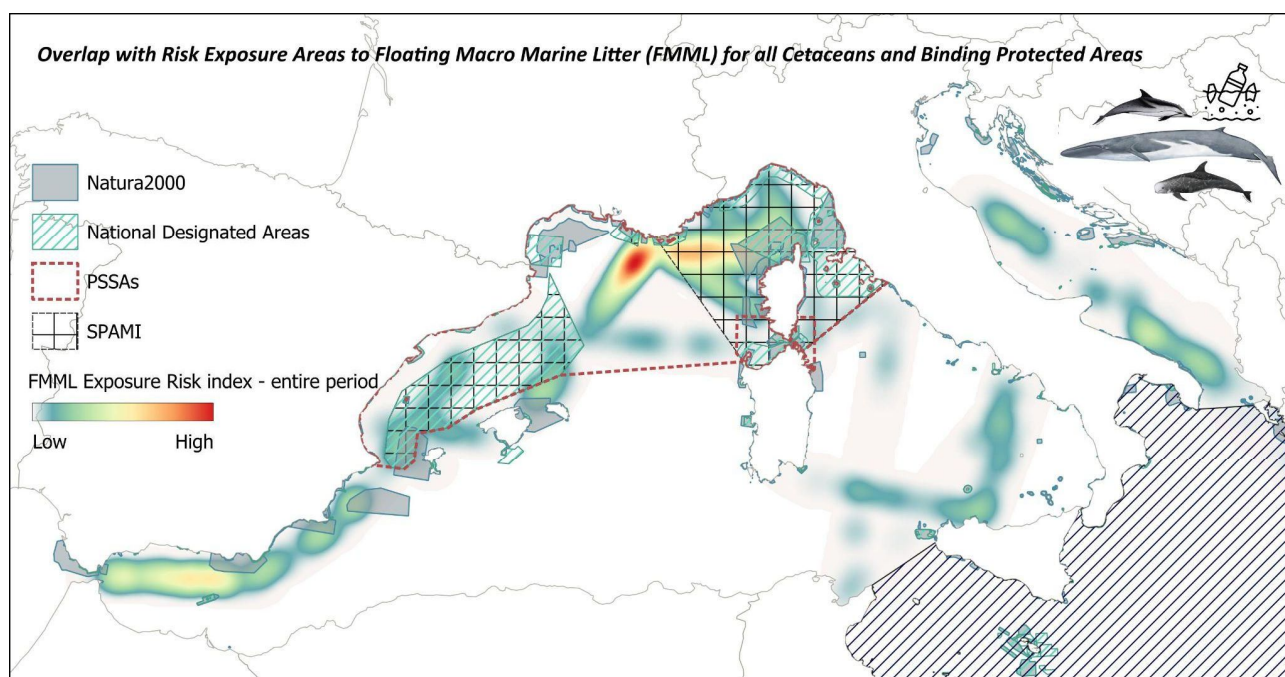


Figure 37. Overlap with Risk Exposure Areas to Floating Macro Marine Litter (FMML) for all Cetacean and Binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

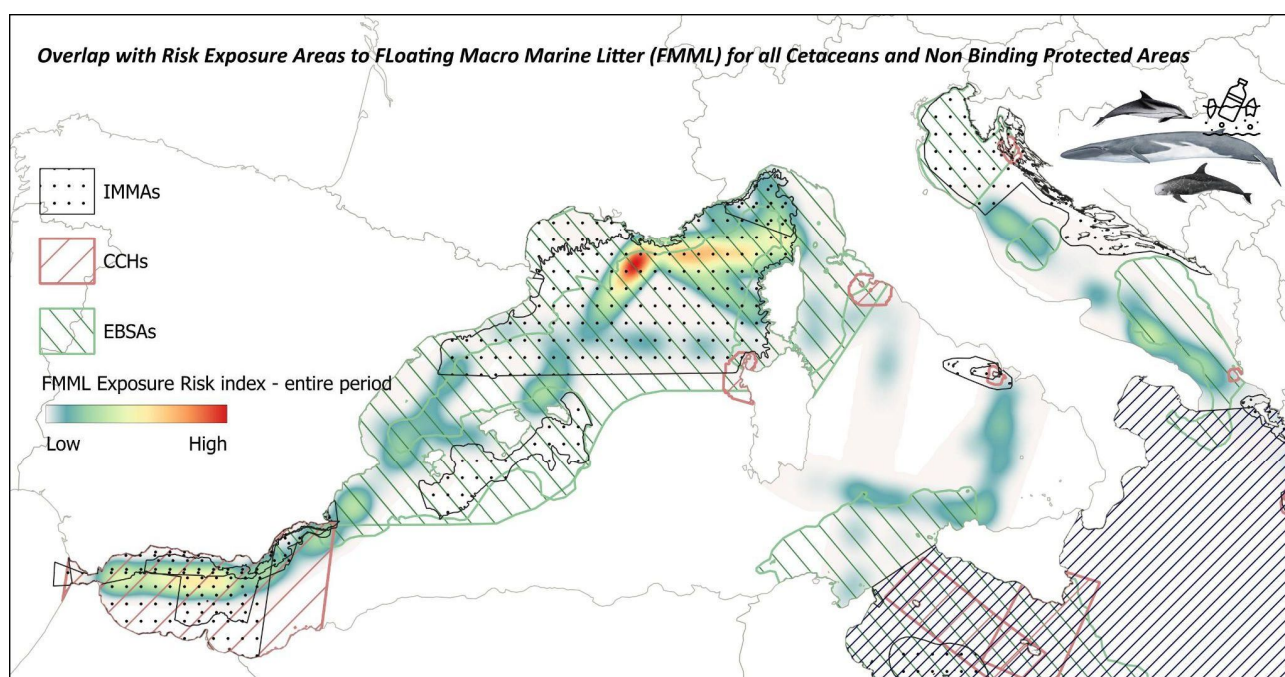


Figure 38. Overlap with Risk Exposure Areas to Floating Macro Marine Litter (FMML) for all Cetacean and non Binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.

Maritime Traffic

The main hotspot where cetaceans are most exposed to the threat of Maritime Traffic is located in the Alboran–Gibraltar region, which largely falls outside any spatially binding protection instruments (Figure 39), except for a few Natura 2000 sites along the Spanish coast that partially overlap the identified hotspot. Minor hotspots in the north-western Mediterranean are well covered by PSSAs, SPAMIs, Natura 2000, and nationally designated areas. The Adriatic Sea remains largely unprotected; however, when considering all cetacean species together, and given the lower species diversity in this basin, it appears of comparatively lesser importance than the Alboran region.

As observed for FMML, when analysing non-binding, science-based protection instruments (Figure 40) the coverage of hotspot areas is greatly enhanced, with the Alboran Sea particularly well represented by IMMAs, CCHs, and EBSAs.

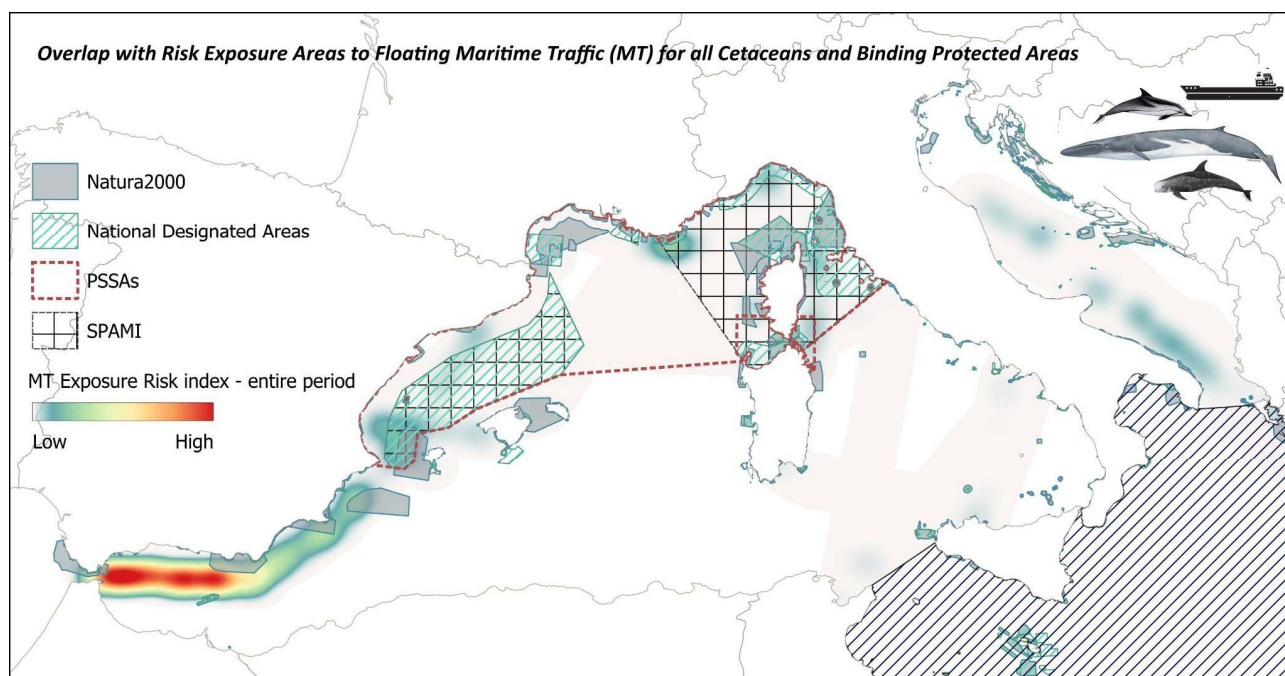


Figure 39. *Overlap with Risk Exposure Areas to Maritime Traffic (MT) for all Cetacean and Binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.*

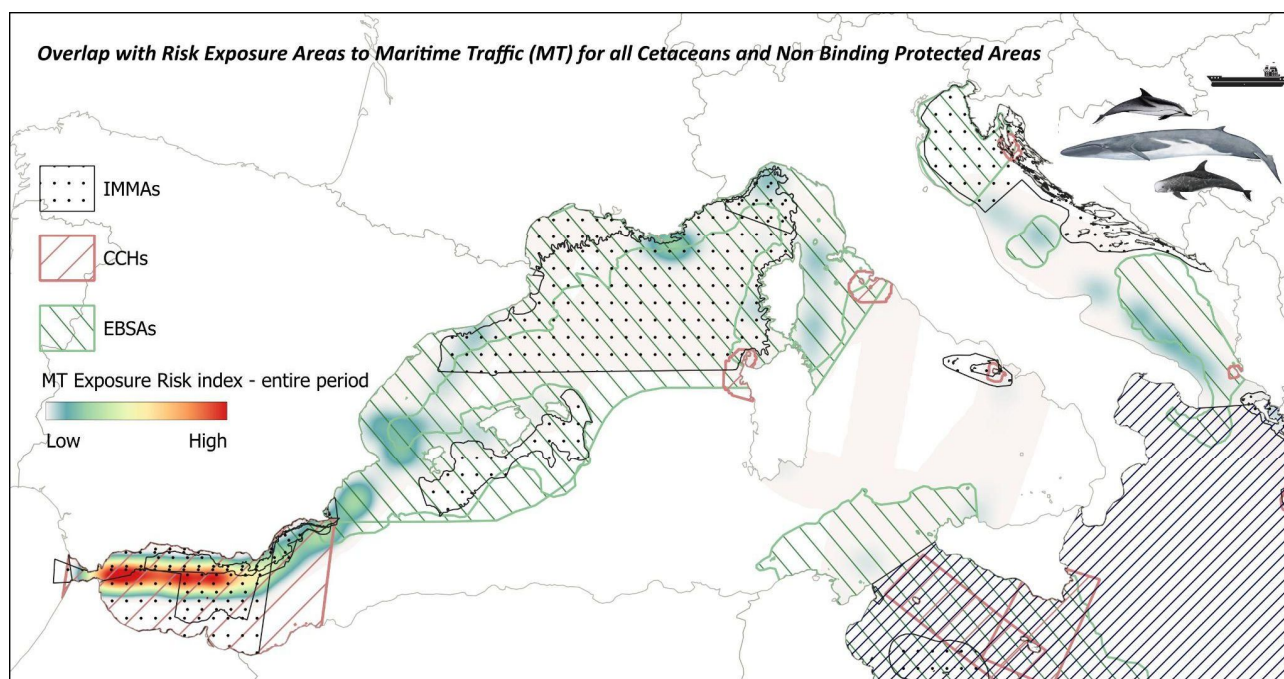


Figure 40. *Overlap with Risk Exposure Areas to Maritime Traffic (MT) for all Cetacean and non binding Protected Areas. Risk exposure areas were determined using an index that integrates species encounter rates with pressure density data.*

Summary on cetacean gap analysis results related to exposure hotspots

The integrated gap analysis for all cetaceans under FMML and MT pressures shows that key exposure hotspots remain largely unprotected by binding instruments. Coverage is good in the north-western Mediterranean (Pelagos area and Spanish Cetacean Corridor) but limited elsewhere, with the Alboran–Gibraltar, central Tyrrhenian, and Adriatic Seas mostly uncovered. Inclusion of non-binding, science-based frameworks (IMMAs, EBSAs, CCHs) greatly improves coverage, particularly in the Alboran and northern Adriatic, yet important gaps persist in the central Tyrrhenian and parts of the Adriatic. This highlights the need for stronger integration of binding measures with these biocentric, internationally recognized science-based areas (e.g., IMMAs and CCHs) across the Mediterranean.

Alignment and gaps with Spatial-Based protection measures

The evaluation report focus mainly in offshore areas and identifies significant areas of both coherence and critical gaps between established protection and conservation frameworks and the spatial distribution of important areas, risk zones, and ecological needs of Cetacean and Pelagic Sea Turtle (CEPTU) species in the Western Mediterranean (WMED) and Adriatic–Ionian (ADRION) subregions.

Overall, the highest degree of spatial coherence is generally observed for non-binding, science-based areas, whereas major gaps persist in the coverage provided by legally binding protection measures, particularly in offshore areas and in relation to the mitigation of specific anthropogenic pressures.

Main Coherence Evidenced Coherence refers to the spatial alignment between the predicted suitable or core habitats and identified risk areas for CEPTU species (based on visual observations and eDNA data) and existing spatial protection measures.

1. Coherence with Binding Protected Areas

Strong coherence is primarily observed within large-scale, binding designations, mostly located in the north-western Mediterranean:

- **SPAMIs and PSSAs:** The **Pelagos Sanctuary (SPAMI)** and the **Spanish Cetacean Migration Corridor (SPAMI)** successfully encompass core habitats for several cetacean species, including *Tursiops truncatus*, *Stenella coeruleoalba*, *Balaenoptera physalus*, and *Physeter macrocephalus*. The Pelagos Sanctuary, in particular, effectively covers predicted core areas of more rare species such as *Grampus griseus*, *Globicephala melas* and *Ziphius cavirostris* in the Ligurian Sea.
- **Mitigation of Risk:** The recently established **North-Western Mediterranean PSSA** further enhances coherence by encompassing most of the identified Maritime Traffic (MT) risk hotspots, especially in its eastern sector, which overlaps with the Pelagos SPAMI.
- **Species-Specific Designations:** Sites designated under Natura 2000 for *Tursiops truncatus*, such as those in the Ligurian Sea (Italy) and the Gulf of Lion (France), show strong overlap with species predicted core habitats.

2. Coherence with Non-Binding, Science-Based Areas

Coherence is consistently highest when non-binding frameworks such as Important Marine Mammal Areas (IMMAs), Cetacean Critical Habitats (CCHs), and Ecologically or Biologically Significant Marine Areas (EBSAs) are considered.

- **Habitat Coverage:** These frameworks provide substantially better coverage of CEPTU species' distribution ranges than legally binding areas.
 - For *Tursiops truncatus*, coverage is particularly strong, encompassing the Alboran Sea, Balearic Islands, and northern Adriatic.
 - For *Delphinus delphis*, coherence increases markedly, with the Alboran Sea fully included within IMMAs and additional high overlap observed in the Adriatic region.
 - For *Balaenoptera physalus*, science-based processes successfully identify nearly all major important areas in the north-western Mediterranean.
- **Risk Coverage:** Non-binding frameworks also exhibit broader overlap with exposure risk hotspots (FMML and MT) than binding instruments, successfully encompassing major areas such as the Alboran Sea (traffic and litter exposure), the Sicily Channel, and the northern Adriatic.

Main Gaps Evidenced

Gaps represent highly suitable habitats or high-risk exposure areas that currently lack adequate protection under existing conservation frameworks.

1. Gaps in Coverage of Important Areas (Binding Instruments)

Core geographical gaps in protection persist across multiple CEPTU species, largely due to the coastal focus of current protection measures:

- **Offshore and Highly Mobile Species:** Suitable habitats often extend beyond currently designated areas, reflecting the limited protection afforded to offshore waters.
- **Tyrrhenian Sea:** The **central and southern Tyrrhenian Sea** consistently emerges as a major spatial gap for several species, including *Tursiops truncatus*, *Balaenoptera physalus*, *Delphinus delphis*, *Ziphius cavirostris*, and *Physeter macrocephalus*.
- **Adriatic Sea:** Large offshore portions of the **Adriatic Sea** remain inadequately protected for *Tursiops truncatus* and *Caretta caretta*, particularly along the central Italian coast and the Apulian Adriatic sector.
- **Southern Western Mediterranean:** Areas along the **Algerian coast** and the **southern sector of the Western Mediterranean** represent significant gaps for *Stenella coeruleoalba*, *Delphinus delphis*, and *Globicephala melas*.
- **Annex II Species Gaps:** Despite the Habitats Directive (HD) requirement to designate Special Areas of Conservation (SACs) for *Tursiops truncatus* and *Caretta caretta*, important habitats along the Tyrrhenian and Sardinian coasts for *T. truncatus* remain unprotected. For *C. caretta*, major gaps are found in the central and northern offshore Adriatic and the central Tyrrhenian Sea.

2. Gaps in Coverage of Risk Exposure Areas (Binding Instruments)

Binding instruments consistently fail to adequately cover major exposure hotspots, revealing a disconnect between conservation planning and threat mitigation needs.

- **Maritime Traffic (MT) Gaps:** The **Alboran–Gibraltar region** is identified as the main MT hotspot for all cetaceans but largely falls outside any spatially binding protection. High MT risk areas in the **Adriatic Sea** also remain almost entirely uncovered for both *Tursiops truncatus* and *Caretta caretta*.
- **Floating Marine Macro Litter (FMML) Gaps:** For *Caretta caretta*, major FMML exposure hotspots in the **Tyrrhenian and Adriatic seas** lie mostly outside Natura 2000 or other binding protection areas. The southern Tyrrhenian and Tunisian coasts also lack coverage for *Tursiops truncatus*.

3. Gaps and Inconsistencies in Science-Based Areas

Although non-binding frameworks provide far better coverage, some spatial gaps and inconsistencies persist:

- **Persistent Tyrrhenian Gaps:** The central Tyrrhenian Sea remains a gap for several species, particularly deep-divers such as *Ziphius cavirostris* and *Physeter macrocephalus*.
- **eDNA Inconsistencies:** For *Balaenoptera physalus*, eDNA detections indicate habitat use in the southern Tyrrhenian and Sardinia–Sicily channels, areas not currently included in science-based conservation frameworks. Similarly, *Kogia breviceps* has been detected via eDNA in the central Tyrrhenian, yet this area remains outside any identified conservation boundary.

The overall findings emphasize the **need for stronger integration of binding conservation measures with biocentric, internationally recognized science-based areas (IMMAs and CCHs)** across the Mediterranean to address existing gaps. Additionally, several cases were identified where species occur within Natura 2000 sites but are **not explicitly listed in their Standard Data Forms (SDFs)**, notably around 30 sites in Italy and 9 in Spain for *Tursiops truncatus*. Even if not specifically designed for species of Annex IV of the Habitat Directive, the Natura 2000 network could represent a valuable tool for the protection of all species list in Annex VI, thus these represent valuable candidates for inclusion in future updates of the Natura 2000 SDFs.