

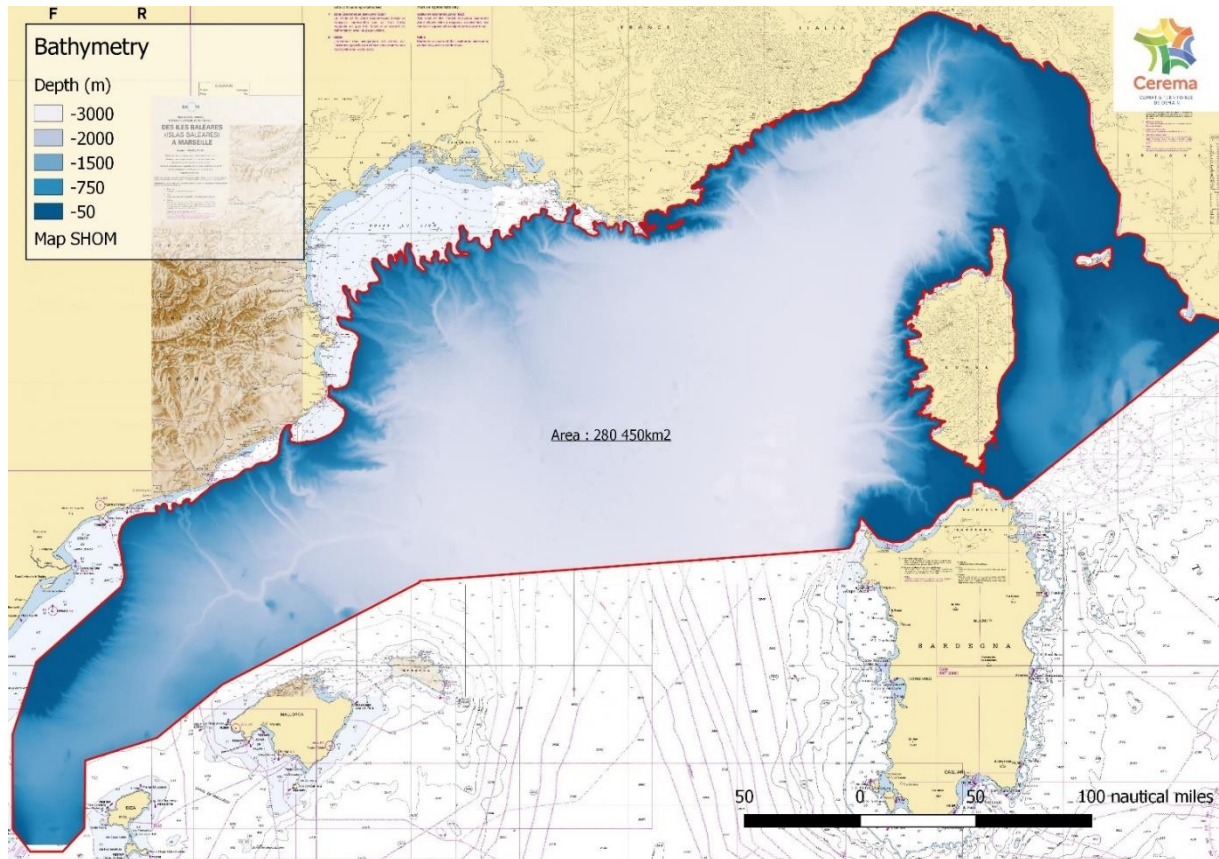
Protecting large cetaceans from the risk of ship strikes in the Mediterranean

Summary of the preparatory study for the submission to the International Maritime Organisation (IMO) of a file for the designation of a Particularly Sensitive Sea Area (PSSA) in the Western Mediterranean

ABSTRACT

The Mediterranean maritime area is both strategic for human activities at sea and for the preservation of a remarkable biodiversity. It is a crossroads for global maritime exchanges, an attractive area for tourism and traditional activities such as fishing, and a place where natural habitats and species that are found nowhere else are found together. Among the pressures on the marine environment, maritime traffic has been identified as a threat to the conservation of cetaceans, particularly large mammals such as the fin whale and sperm whale. Based on this observation, France is at the initiative of submitting to the International Maritime Organisation (IMO) a project for a Particularly Sensitive Sea Area (PSSA) for the north-western Mediterranean basin. This approach is justified by the international nature of the vessels and the particular concentration of marine mammals in this area, as well as by the plurality of sovereign states concerned: France, but also Italy, Spain and Monaco. This summary, which is the result of a more detailed report, takes up some of the characteristics of the north-western Mediterranean basin in its natural, economic and social components, with particular emphasis on maritime traffic and the way in which large cetaceans occupy the maritime space. Various studies characterising the risk of cetacean collisions by ships are discussed, as well as the measures that could be implemented in the area to limit this risk and thus contribute to safer navigation and greater protection of marine mammal populations. Among these measures, the limitation of vessel speed should be studied, as well as the dissemination of information to vessels concerning the frequentation of navigated areas by large cetaceans, through collaborative systems or any other means deemed relevant.

Presentation of the area



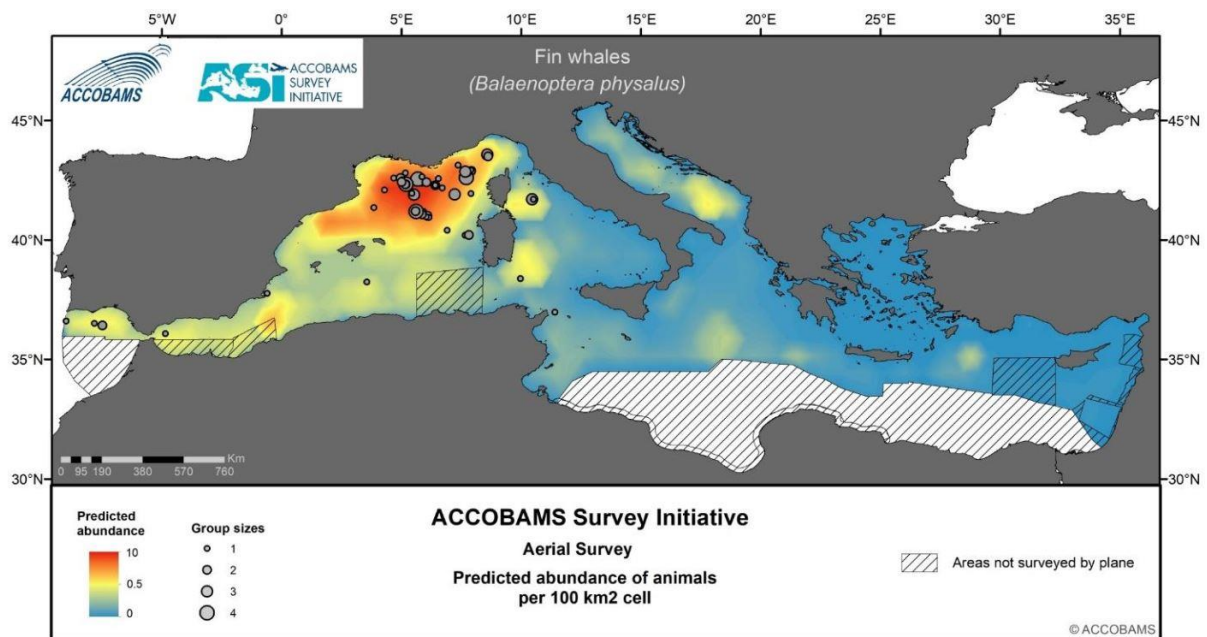
Perimeter and size of the study area

The proposed perimeter corresponds to the Important Marine Mammal Area (IMMA) in the north-western Mediterranean Sea identified by the IUCN Marine Mammal Protection Working Group, extended to the east by the eastern boundary of the Pelagos Sanctuary and to the west to the Spanish cetacean migration corridor, recently recognised as a Specially Protected Area of Mediterranean Importance (SPAMI) under the Barcelona Convention. This perimeter includes the particularly Sensitive Sea area of the strait of Bonifacio.

Importance of the area for cetaceans

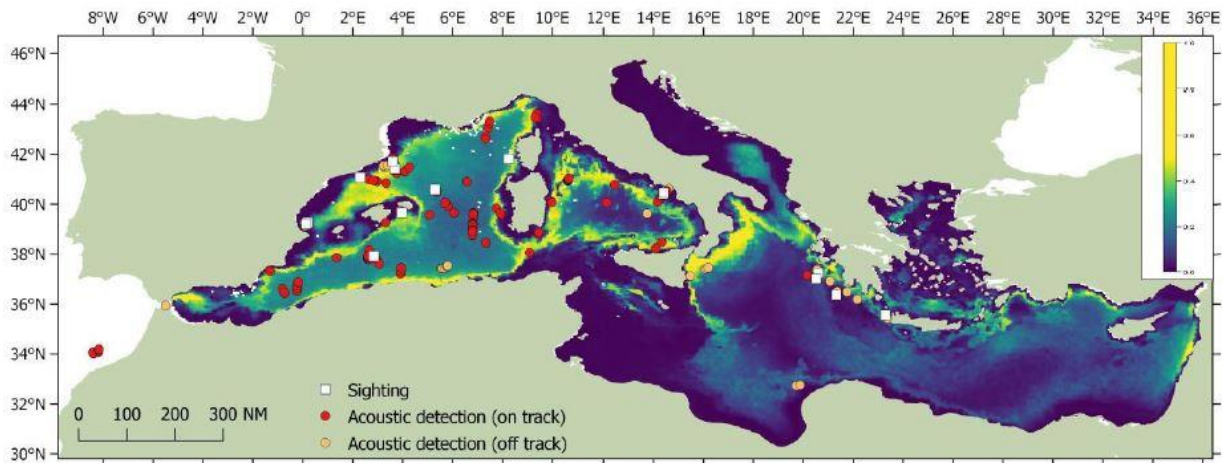
The Mediterranean basin, in its north-western part, benefits from particular oceanographic and geomorphological conditions that give it a certain singularity, particularly marked in the Ligurian Sea with the presence of the Ligurian-Provençal front, a region of rapid transition between the light waters of the Ligurian current and the denser waters of the central zone of this front. Its permanent nature, as well as its interannual stability in terms of hydrology, gives it a dominant role in the organisation of phytoplankton communities and ensures the maintenance of a zone that is richer in nutrients than the adjacent regions, particularly in spring. This high production generates a strong and diversified presence of zooplankton, a source of food for many top predators.

The study area is an important habitat for many marine species, in particular cetaceans, eight of which are commonly seen in the area. Among them, two species appear to be particularly vulnerable to the risk of collision with ships, due to their imposing size: the Mediterranean fin whales (*Balaenoptera physalus*) and the large sperm whales (*Physeter macrocephalus*). The latest cetacean observation campaigns in the Mediterranean carried out within the framework of the Accobams survey initiative (ASI) have made it possible to map the preferential presence of fin whales in the north-western Mediterranean basin.



Predictive map of fin whale distribution in the Mediterranean (from ACCOBAMS, 2021)

The distribution of sperm whales is more difficult to establish due to their long and deep dives and more limited time spent on the surface. However, the latest surveys corroborate the previous conclusions on the distribution of the species in the Mediterranean, with a high prevalence in the western basin (ACCOBAMS, 2021).



Sperm whale sightings and detections (ASI 2018, white squares and red/orange circles), overlaid on a predictive density map from Mannocci et al., 2018 (yellow = highest probability, blue = lowest probability) (ACCOBAMS, 2021)

The continental slope is the preferred habitat of large teutophagous species (specialised diet consisting mainly of cephalopods) to which the sperm whale belongs, while the great abyssal plain is the preferred habitat of the fin whale.

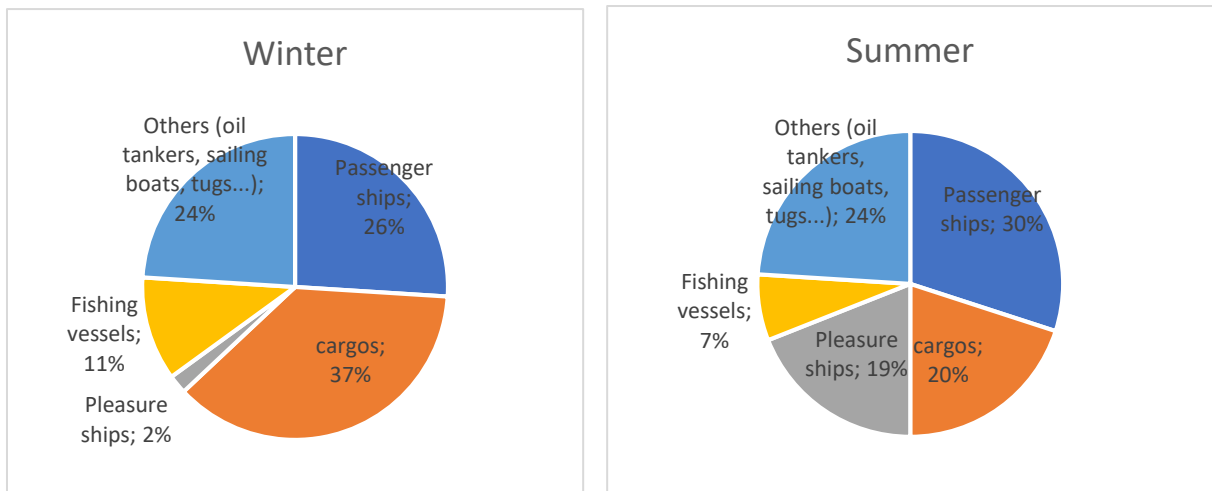
Importance of maritime traffic in the area

The Mediterranean Sea is one of the busiest shipping lanes in the world, being the gateway between Europe and Asia via the Suez Canal. Commercial shipping is particularly intense in the Western Mediterranean, especially in relation to passenger transport. Commercial activity concerns the transport of passengers or goods by ships often exceeding 325 feet in length, sailing at between 14 and over 40 knots (ferries, cargo ships, tankers, container ships, etc.). Maritime transport in the Mediterranean basin is expected to increase in the coming years, both in terms of the number of routes and in terms of intensity, particularly in connection with the doubling of the Suez Canal¹.

In the north-western Mediterranean, maritime traffic is mainly structured towards or from the ports of Valencia, Barcelona, Marseilles, Genoa and La Spezia for maritime goods traffic, to which are added the ports of Toulon, Sète, Nice, Savona and all the island ports of Corsica, Sardinia, Sicily and the Balearic Islands for passenger transport. This geographical situation of proximity to the islands, combined with commercial port infrastructures, favours maritime ferry traffic. Moreover, the cruise activity has developed widely in the Mediterranean, benefiting from favourable weather conditions and dedicated infrastructures: the region represents the second world market for this sector, after the Caribbean (Di Méglio *et al.*, 2010).

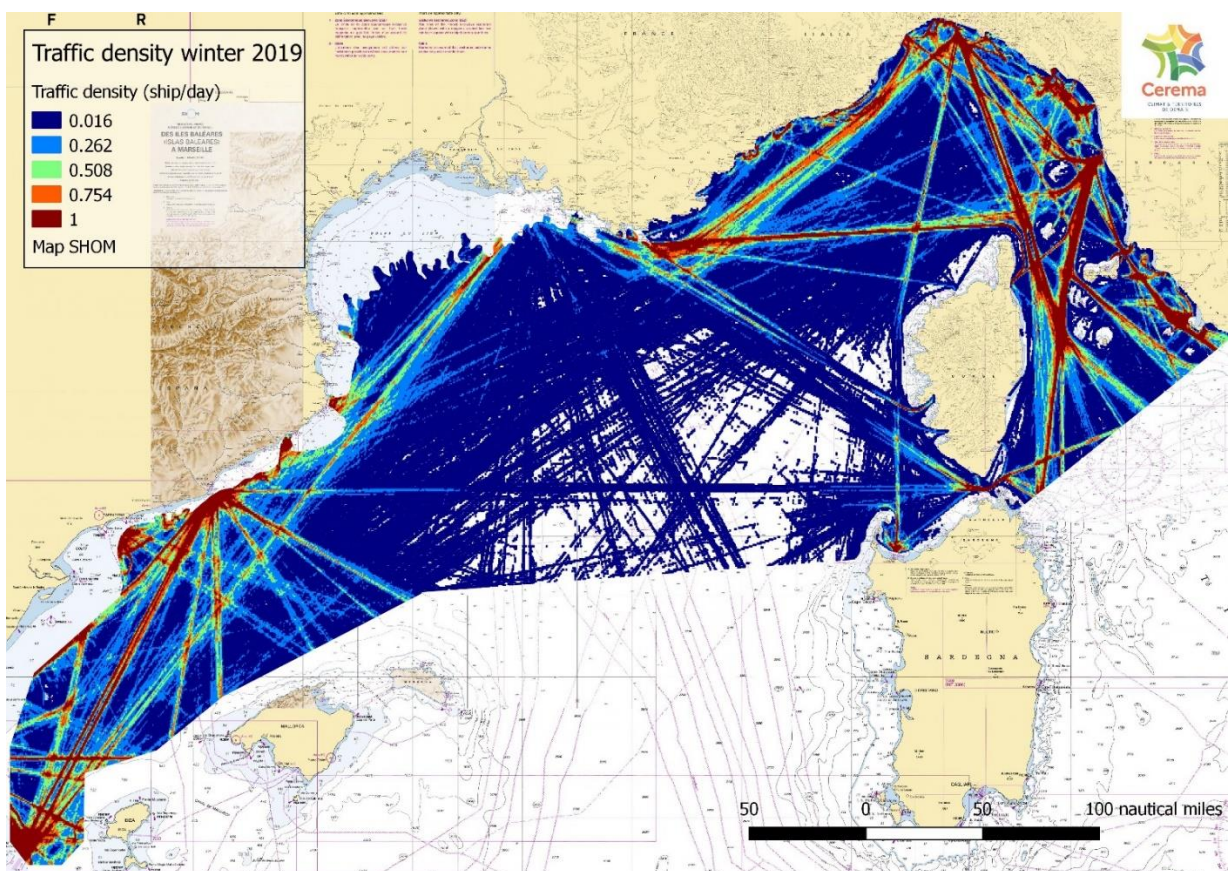
The analysis of maritime traffic in the north-western Mediterranean in 2019, based on "AIS" (Automatic Identification System) ship data, concludes that passenger ships and cargo ships travel by far the longest distances within the study area, followed by motorised pleasure craft and fishing vessels (Gallou et Folegot, 2020).

¹ Source : <https://www.medqsr.org/fr/node/235>, consulted January 8th 2021.



Percentage of distance travelled in the NW Mediterranean Sea, by vessel category and season (AIS 2019 data, analysed by Quiet Oceans)

Freight traffic is mainly concentrated, in winter, in the northern part of the study area, along the coasts of the Gulf of Lion, towards Barcelona and with Corsica and Sardinia. Passenger traffic, on the other hand, is highly structured around the links between the main ports of France, Spain and Italy on the one hand, and Corsica, the Balearic Islands and Sardinia on the other. Traffic intensity increases significantly during the summer months for passenger transport between the Mediterranean islands and the mainland, as well as with additional connections to North Africa and Barcelona.



Representation of the intensity of maritime traffic during the winter period (2019, source AIS)

More than two thirds of the ships using the study area (68% in winter and 71% in summer) fly the European flag, representing more than 70% of the cumulative distances travelled, whatever the season.

The risk of ship collision with large cetaceans

Long underestimated, this impact is now internationally recognised as a major threat to cetaceans, especially as maritime traffic, vessel size and speed continue to increase. Collisions involve a wide variety of vessels, with the risk of collision increasing with vessel speed (as does the severity of injury to the animal), although there is currently insufficient data to adequately quantify this risk (Leaper, 2019).

The number of collisions and the impact they may have on the maintenance of large cetacean populations in the Mediterranean are difficult to assess accurately: they generally take place offshore and are rarely noticed by seafarers (this is all the more true when the vessels are large). Nevertheless, scientific work carried out over the last fifteen years, sometimes in collaboration with shipping companies, has shown that two species are mainly concerned in the Mediterranean: the fin whale (*Balaenoptera physalus*) and the sperm whale (*Physeter macrocephalus*). The latter spends long periods of rest floating at the surface, usually about 10 minutes, between deep dives: this behaviour makes it very vulnerable to ship strikes (UNEP/MAP-RAC/PSA, 2016).

According to the analysis of animals stranded on the French coast between 1972 and 2017, collisions are identified as the main human cause of death for fin whales in the western Mediterranean: 22.5% of the causes of strandings analysed on average; they are the cause of one in five strandings for all species combined (Peltier et al., 2019). The statistical approach also makes it possible to calculate a theoretical ship-whale encounter rate ('near miss event' or NME). This approach was implemented for the study area (excluding the Spanish corridor), and gives the following results for fin whales (Gallou and Folegot, 2020):

- The theoretical number of collision situations is 700 in winter and 2000 in summer
- Seasonal differences are mainly due to the variability in the number of vessels using the area, which doubles in summer compared to winter
- Passenger ships and cargo ships have the highest cumulative risk of collision (84% NME in winter, 72% in summer).

This work could not be carried out for sperm whale populations, due to insufficient biological data.

In view of the above, the study area justifies a proposal for designation as a particularly sensitive sea area by the international maritime organisation. It is indeed an important area, particularly frequented by Mediterranean cetacean populations, and is also an area of intense international maritime traffic. The risk of ship-whale collision is the main cause of human-caused mortality for fin whales in the western Mediterranean (Peltier et al., 2019) and also poses a risk to sperm whale populations. Management measures

must therefore be studied in order to reduce this risk and thus preserve these populations, while improving maritime safety.

Associated management measures considered for the area

The International Whaling Commission considers that currently the only effective collision risk mitigation measures are to avoid areas where concentrations of whales are known and to reduce speed when passing through these areas (MEPC, 2016). Based on previous proposals (GIS3M, 2010), scientific knowledge and measures already implemented in other geographical areas, the following table summarises the proposals that appear to be most suitable for the study area:

Relevant Measure	Ships involved	Comments FR
Keeping ships away from cetaceans		
Adoption of a reporting system	Any ship using the PSSA	Governance to be specified; realistic for the study area?
Recommendation to equip a collaborative system for sharing the positions of large cetaceans (REPCET or compatible equivalent)	Any ship using the PSSA	Involves sustained on-board surveillance, requiring relays (eyestrain) by trained personnel; inoperative in poor visibility or when the animal is diving. Effectiveness depends on the number of vessels equipped ²
Recommendation to vessels to maintain a safe distance of 500 m from any large cetacean detected	Any ship using the PSSA	Common sense measure applicable to all vessels. Limit on whale watching by mariners: at night and while diving.
Recommendation to take on board an independent and trained observer, dedicated to the detection of large cetaceans	Any ship using the PSSA	Does not seem realistic for the study area concerned
Recommendation to install reliable and recognised cetacean detection systems on board	Night-time navigation	To date, such equipment does not exist at reasonable costs.
Reporting the presence of marine mammals by maritime safety information (NAVTEX, NAVDAT)	Any ship using the PSSA	Does not require any specific measures, but is in line with the dissemination of MSIs (SOLAS V). Requires permanent observation of marine mammals.
Speed reduction		
Recommendation to reduce speed to a maximum of 13 knots ³ in reported areas of large cetacean presence	Any ship using the PSSA	Applicable to restricted areas. Risk of increased speed of ships outside the zones, with a risk of the opposite effect to the protection sought. Increased transport costs, technical impact on ships (machine control for speed reduction). Risk of increased air pollution at reduced speed and change in engine speed.
Other		
Recommendation for shift personnel to have undergone training	Any ship using the PSSA	Implementation of these trainings to be established.
Obligation to report any collision with a large cetacean	Any ship using the PSSA	Must be accompanied by non-punitive and supportive measures to facilitate and make reporting transparent.

² Since the entry into force of the law for the Reconquest of Biodiversity, Nature and Landscapes on July 2017, all passenger vessels over 24 meters (79 feet) flying the French flag and sailing in the Pelagos sanctuary are required to be equipped with a position-sharing device to avoid collisions.

³ 13 knots appears to be the speed above which the risk increases sharply and, above 15 knots, the outcome is almost certain to be lethal (*in* Di-Meglio et al., 2010)

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