ANNEX 20

RESOLUTION MEPC.380(80)
(adopted on 7 July 2023)

DESIGNATION OF THE NORTH-WESTERN MEDITERRANEAN SEA AS A PARTICULARLY SENSITIVE SEA AREA

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

BEING AWARE of the ecological criteria, in particular relating to uniqueness or rarity, critical habitat, dependency, fragility and bio-geographic criteria, and the social, economic and cultural, and scientific and educational criteria of the North-Western Mediterranean Sea Area as well as its vulnerability to damage by international shipping activities and the steps taken by France, Italy, Monaco and Spain to address that vulnerability,

NOTING the *Revised guidelines for the identification and designation of Particularly Sensitive Sea Areas* adopted by resolution A.982(24) as amended by resolution MEPC.267(68), (Revised PSSA Guidelines), and the *Guidance document for submission of PSSA proposals to IMO* set forth in MEPC.1/Circ.510,

NOTING ALSO the *Guidance document for minimizing the risk of ship strikes with cetaceans* (MEPC.1/Circ.674) sets out a number of measures to reduce the risk of collision between large cetaceans and ships,

HAVING AGREED that the criteria for the identification and designation of a Particularly Sensitive Sea Area (PSSA) provided in the Revised PSSA Guidelines are fulfilled for the North-Western Mediterranean Sea,

HAVING NOTED that the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) at its tenth session agreed a set of draft recommended associated protective measures (APMs) within a Particularly Sensitive Sea Area in the North-Western Mediterranean Sea, which address ship strikes with cetaceans, and that the Maritime Safety Committee, at its one-hundredth and seventh session, agreed that these APMs could be referred by the NCSR Sub-Committee directly to MEPC 80, taking into account the general nature of the APMs, aiming at information-sharing primarily for contributing to the protection of the marine environment,

1 DESIGNATES the North-Western Mediterranean Sea, as defined in annex 1, as a Particularly Sensitive Sea Area;

2 INVITES Member Governments to recognize the ecological, socio-economic and scientific criteria of the North-Western Mediterranean Sea area, set forth in annex 2 to the present resolution, as well as its vulnerability to damage by international shipping activities, as described in annex 3 to this resolution;

3 ALSO INVITES Member Governments to note the associated protective measures established to address the area's vulnerability, the details of which are contained in annex 4 to this resolution, and request ships flying their flag that they act in accordance with such measures.

ANNEX 1

DESCRIPTION OF THE NORTH-WESTERN MEDITERRANEAN SEA PARTICULARLY SENSITIVE SEA AREA (NW MED PSSA)*

Description of the Particularly Sensitive Sea Area

To minimize the risk of ship strikes with cetaceans and ship-generated pollution and to protect the area's unique and threatened species as well as to preserve as far as practicable its critical habitat and diversity, mariners should exercise extreme care when navigating in the area bounded by the geographical coordinates of the Particularly Sensitive Sea Area, provided below, and adhere to the Associated Protective Measures set out in annex 4.

The North-Western Mediterranean Sea Particularly Sensitive Sea Area (NW Med PSSA) is located between the coastline of France, Italy, Monaco and Spain and is defined by a line encompassing the following coordinates:

A	38° 39' 59.379" N	000° 6'0.000" E
B	38° 39' 59.379" N	000° 47' 59.476" E
C	38° 50' 03.331" N	001° 00' 00.398" E
D	39° 19' 01.812" N	001° 00' 25.212" E
E	39° 28' 42.075" N	001° 40' 02.495" E
F	39° 51' 21.986" N	002° 16' 09.853" E
G	40° 34' 13.067" N	004° 04' 31.926" E
H	40° 58' 0.000" N	008° 12'0.000" E
I	41° 09' 10.800" N	009° 31'10.800" E
J	42° 21' 14.400" N	011° 31'0.000" E

To be noted, from H (Falcoe Cape) to I (Ferro Cape) the south boundary follows the coastline of Sardinia. Coordinates are provided by the WGS84 datum.

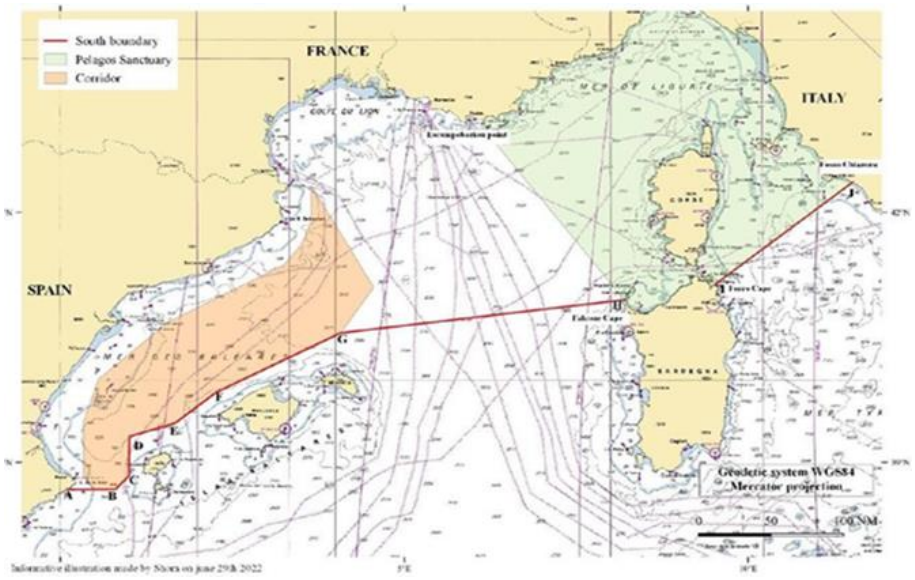


Figure 1: Map showing the NW Med PSSA (Source: SHOM)

* The text in this annex is taken from the information provided by France, Italy, Monaco and Spain in document MEPC 79/10.

This area encompasses the existing Spanish "Mediterranean Cetacean Migration Corridor" and the Pelagos Sanctuary defined as such:

A – "Mediterranean Cetacean Migration Corridor"

ID	Longitude (ETRS-89)	Latitude (ETRS-89)
1.	003° 39' 02.002"E	42° 18' 57.294" N
2.	003° 39' 02.026"E	41° 54' 15.252" N
3.	003° 30' 32.060"E	41° 37' 36.567" N
4.	003° 15' 18.370"E	41° 23' 05.374" N
5.	001° 34' 43.766"E	40° 42' 21.785" N
6.	000° 33' 27.757"E	40° 00' 55.698" N
7.	000° 20' 21.559"E	39° 30' 07.070" N
8.	000° 20' 21.559"E	38° 49' 44.729" N
9.	000° 30' 05.254"E	38° 39' 59.379" N
10.	000° 47' 59.476"E	38° 39' 59.379" N
11.	001° 00' 00.398"E	38° 50' 03.331" N
12.	001° 00' 25.212"E	39° 19' 01.812" N
13.	001° 40' 02.495"E	39° 28' 42.075" N
14.	002° 16' 09.853"E	39° 51' 21.986" N
15.	004° 04' 31.926"E	40° 34' 13.067" N
16.	004° 33' 24.766"E	41° 06' 51.050" N

B – Pelagos Sanctuary

Boundary	Description	Longitude	Latitude
Western	*A line extending from the Escampobariou Point (on the western edge of the Giens peninsula)*	N 43°01'70"	E 06°05'90"
	to the Falcone Cape (the westernmost part of the Gulf of Asinara)	N 40°58'00"	E 08°12'00"
Eastern	*A line extending from the Ferro Cape (on Sardinia's north-eastern coast)*	N 41°09'18"	E 09°31'18"
	to Fosso Chiarone (on the west coast of Italy)	N 42°21'24"	E 11°31'00"

ANNEX 2

ECOLOGICAL AND SOCIO-ECONOMIC CRITERIA OF THE NORTH-WESTERN MEDITERRANEAN SEA PARTICULARLY SENSITIVE SEA AREA (NW MED PSSA)*

1 Introduction

1.1 The NW Med PSSA covers a perimeter corresponding to the eastern boundary of the Pelagos Sanctuary and to the west to the Spanish cetacean migration corridor. These are two specially protected areas of Mediterranean importance (SPAMI) established under the Barcelona Convention and dedicated to cetaceans including over 230 EU Natura 2000 sites. The area fully or partly overlaps, under the Convention on Biological Diversity (CBD) framework, the two ecologically or biologically significant marine areas (EBSA) and three important marine mammal areas (IMMA) identified by the International Union for Conservation of Nature (IUCN) Marine Mammal Protected area task force. This perimeter also includes most of the Strait of Bonifacio PSSA.

Physical features

1.2 The North-Western Mediterranean portion of the basin is characterized by the rapid plunge of its coasts towards the deep-sea (up to 2,000 m in some area) in proximity of the main islands (Corsica and Sardinia) and off the Ligurian coasts and most of the Provence-Alpes-Côte d'Azur's and Catalonia's coasts. The continental shelf is developed off Tuscan coasts (including all around the Tuscan archipelago) and Valencian coasts, with a maximum extension (about 100 km wide) within the study area in the Gulf of Lion (Occitanie).

1.3 Another notable feature of the North-West Mediterranean seabed is that it shows one of the highest densities of canyons globally, veritable submarine valleys present on the oceanic slope, generally between 300 and 600 m deep. Canyons are usually defined from the border of the continental shelf, having their "head" beginning at -200 m deep, and finishing at the bottom of the oceanic bed at -2,000 m deep.

1.4 The Mediterranean is an evaporation basin: precipitation and river inputs do not compensate for evaporation. This water deficit is made up by Atlantic water entering the surface through the Strait of Gibraltar. Less salty and therefore less dense than the Mediterranean water, this water will remain on the surface and determine the surface circulation.

1.5 The surface currents have a complex organization, particularly around Corsica. The main horizontal marine currents have a so-called cyclonic direction (counterclockwise). The areas where they reach a higher intensity in our study area, i.e. an average annual speed of more than 0.25 m per second, are the Ligurian Sea and the Tyrrhenian Sea, east of Bonifacio (Corsica). Seasonal trends show an increase in speed during the summer and autumn.

1.6 Upwelling phenomena, vertical currents that allow deep water to rise to the surface, are due to a combination of horizontal currents with the wind and can be influenced by the presence of submarine canyons. The Ligurian Sea and the northern Tyrrhenian Sea are the most exposed to this phenomenon. In spring, the increase in the temperature of the marine waters leads to a vertical stabilization of the water masses. Thus, marine currents play a very important role in the functioning of ecosystems: through their associated horizontal and vertical movements, they accompany the export of organic matter from the coast to the open sea.

* The text in this annex is drawn from information provided by France, Italy, Monaco and Spain in document MEPC 79/10. All references used in this resolution are set out in the annex to document MEPC 79/10.

General

1.7 The North-Western Mediterranean Sea is one of the world's 10 biodiversity hot spots, and although it represents only 1% of the total surface area of the oceans, it is home to around 10% of the world's recorded species. The area therefore simultaneously evidences multiple criteria for PSSA designation: critical habitat, dependency, diversity, productivity, spawning or breeding grounds, fragility, biogeographic importance, social or economic dependency, and research and education. These criteria, which are described below, demonstrate the global importance of the area, they have also been considered thoroughly under a number of policy frameworks on natural heritage and socio-economic elements of the marine environment, including under the CBD and Barcelona conventions, and European Union policies (e.g. Marine Spatial Planning, Marine Strategy Framework Directive, Common Fishery Policy, Habitats Directive and the General Fisheries Commission for the Mediterranean (GFCM)).

2 Ecological criteria

Uniqueness or rarity

2.1 The North-Western Mediterranean is part of a semi-enclosed sea with a high rate of endemism. The vast majority of its biological populations are composed of Mediterranean subpopulations, genetically isolated from the Atlantic populations and the others.

Critical habitat

2.2 The ecological and biological significance of the PSSA is supported by the existence of two areas listed under the CBD framework of the EBSAs, which are overlapping it:

.1 the North-Western Mediterranean Benthic Ecosystems; and

.2 the North-Western Mediterranean Pelagic Ecosystems.

In addition, over two thirds of the PSSA are covered by the "North-Western Mediterranean Sea, Slope and Canyon System", the "The Shelf of the Gulf of Lion" and the "Western Ligurian Sea and Genoa Canyon" IMMAs, identified by the IUCN Marine Mammal Protection Working Group. Moreover, the PSSA includes a candidate IMMA (the "Central Tyrrhenian Sea IMMA") and an Area of Interest (the Tuscan Archipelago), which could soon become IMMAs. It is also adjacent to the "Balearic Islands Shelf and Slope IMMA", off the southern coasts of Balearic Islands, a critical habitat for the Mediterranean sperm whale. It also includes the Pelagos Sanctuary for marine mammals.

2.3 These areas have a set of geomorphological and oceanographic features that favour productivity levels of extraordinary biological and ecological importance for the region. In particular, the PSSA area overlaps important habitats for the endangered Mediterranean fin whales (*Balaenoptera physalus*), the endangered sperm whales (*Physeter macrocephalus*), the vulnerable Cuvier's beaked whales (*Ziphius cavirostris*), the Habitats European Directive Annex II bottlenose dolphins (*Tursiops truncatus*) and the endangered Risso's dolphins (*Grampus griseus*) (ACCOBAMS 2022). All cetacean species are also listed in Annex IV of the Habitats, Fauna and Flora European Directive 92/43/EEC (animal and plant species of Community interest that require strict protection). These species are included in the IUCN red list.

2.4 The preservation of cetaceans is a necessity in terms of maintaining the ecological balance in the Mediterranean Sea and contributes to the mitigation of climate change (Roman et al. 2014) their economic value must also be considered, as cetaceans play a major role in the development of tourism in the area. Finally, from the point of view of biodiversity, some of the Mediterranean cetacean subpopulations are genetically isolated from Atlantic populations and the others (e.g. fin and sperm whales), which gives them a unique value.

2.5 Numerous studies have attempted to define the habitat of cetaceans and distinguish the presence of different species by physical and hydrological factors such as surface water temperature and the different water masses present, topographical features, and currents. The presence of cetaceans is often dependent on the distribution of the prey they feed on. The continental slope is the preferred habitat of species with a specialized diet composed mainly of cephalopods: the sperm whale, the Cuvier's beaked whale, the long-finned pilot whale and the Risso's dolphin; the great abyssal plain is the preferred habitat of the fin whale. The bottlenose dolphin prefers waters to the continental shelf, usually within the 100 m isobath.

2.6 The PSSA is frequented by several species of cetaceans, eight of which (fin, sperm, Cuvier's beaked and long-finned pilot whales, Risso's, bottlenose, striped and common dolphins) are regularly present all year round.

2.7 The importance of this area for fin whales is clear: the estimated abundance of this species within the PSSA represents about 67% of the whole Mediterranean population (ACCOBAMS 2021). Concerning the sperm whale, compared to the total Mediterranean estimate of about 1,400 individuals (ACCOBAMS 2021), the estimate in half of the PSSA (the whole Pelagos Sanctuary and French waters; Laran et al., 2017) was between 300 and 600 individuals, with higher numbers in winter. The predicted distribution of these two species is shown in figures 2 and 3.

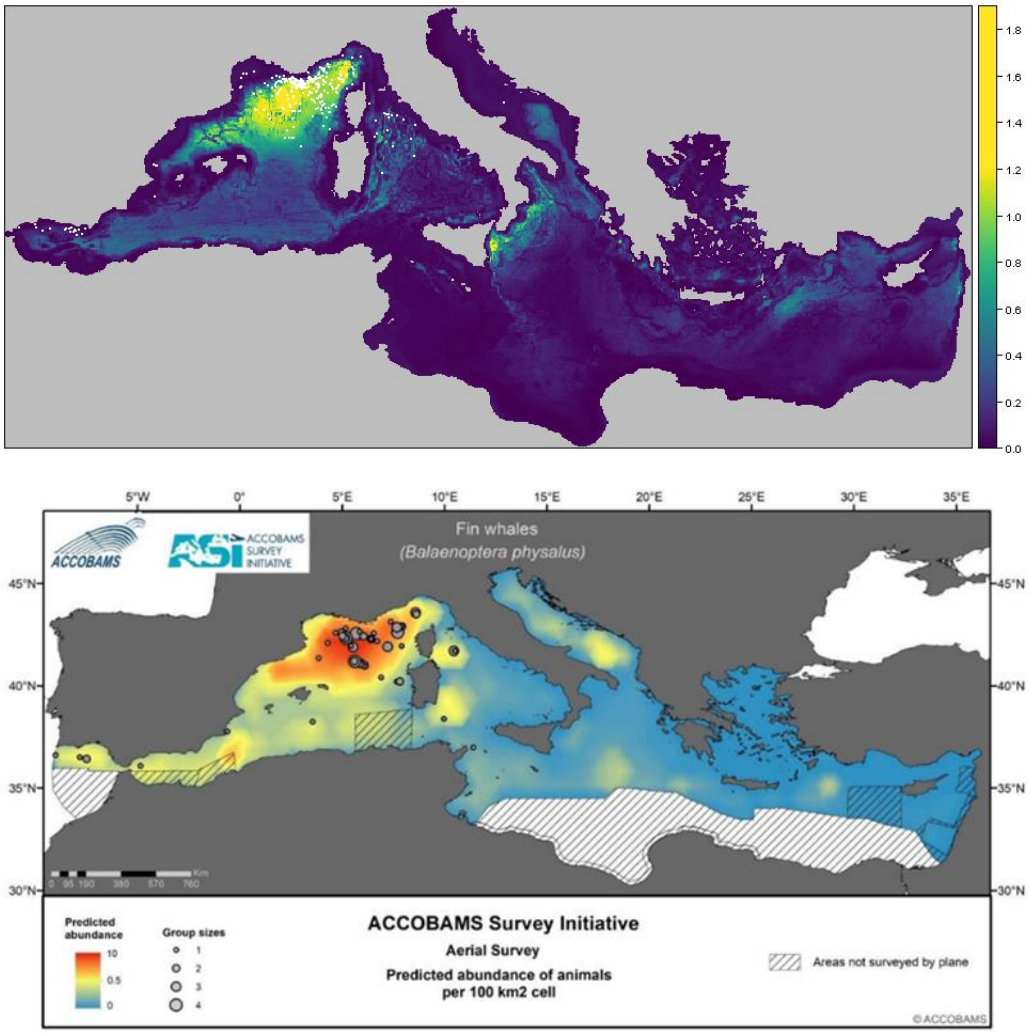


Figure 2: Above: Fin whale predicted densities (summer data: 1999-2016) (Mannocci et al., 2018); Below: Fin whale predicted densities (summer 2018) (ACCOBAMS, 2021).

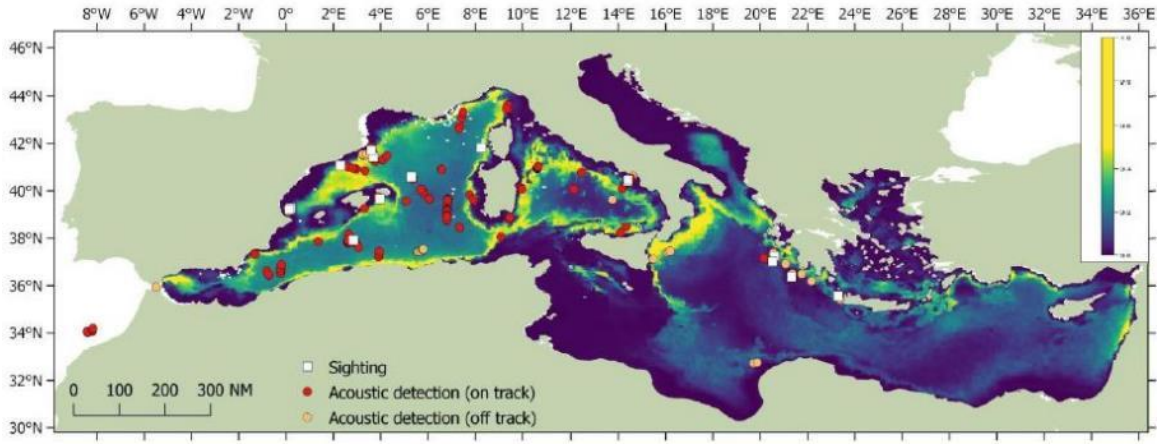


Figure 3: Sperm whale sightings and acoustic detections (ASI 2018, white squares and red/orange circles), overlaid on a predictive density map from Mannocci et al., 2018 (yellow = highest probability, blue = lowest probability) (ACCOBAMS, 2021).

2.8 To date, there is no fine-scale mapping of the preferential habitats of these cetacean species for the entire North-Western Mediterranean basin that could be used to guide a zoning approach. Thus, the identification of areas with higher risk of collision between ships and sensitive species (the fin whale and the sperm whale) within the PSSA is complex.

2.9 The latest cetacean research campaigns in the Mediterranean carried out as part of the ACCOBAMS Survey Initiative (ASI) have confirmed the knowledge on preferential presence of fin whales within the PSSA (figure 2), particularly from off the Gulf of Lion to the coastal and offshore waters off Catalonia. Concerning the offshore areas, this may be linked to the presence of cyclonic eddies that are the main reason for the high productivity of the area, as canyons play more a local role.

2.10 The North-Western Mediterranean has one of the highest densities of marine canyons recorded globally and regionally, which probably strongly contributes to make it highly productive (see section 2.13). Concerning the Spanish offshore and coastal areas, this has been recently confirmed as a core-feeding habitat for fin whales, especially in shallow coastal waters, through satellite tagging. Interestingly, these coastal waters coincide with areas of higher density within the North-West Mediterranean for European sardines (*Sardina pilchardus*) and European anchovies (European anchovy). Their occurrence extends to the edge of the continental shelf and their distribution generally overlaps, although sardines are distributed closer to the coast and reach larger sizes (EC et al,. 2020).

2.11 Concerning the sperm whale, the predicted distribution by Mannocci and colleagues (2018) (figure 3) shows higher densities in the area within the PSSA between the Balearic Islands and the Spanish continental coast.

2.12 A synthesis of distribution of both species has also been carried out for the Pelagos Sanctuary and adjacent waters (Laran et al., 2012). Based on multiple data sets over 15 years, gathering more than 6,000 opportunistic observations, this study highlighted a number of important features on species' spatial and temporal distribution, including:

.1 the fin whale regularly frequents both the Pelagos Sanctuary and the adjacent waters of the Provençal area and southern Gulf of Lion;

.2 within the Sanctuary, the fin whale seems to be present mainly in the western part;

.3 the distribution of fin whales in spring seems to be mainly related to permanent frontal structures, while from June to September it is also related to temporary frontal structures. At the end of the summer, the distribution of fin whales is more related to permanent frontal zones located closer to the coast in the Liguro-Provençal area or certain upwelling zones such as the one to the east of Bonifacio;

.4 the sperm whale is frequently found on the continental slope but can also be found in certain restricted areas offshore; and

.5 the highest sperm whale encounter rates are in areas with lower fin whale encounter rates, demonstrating very distinct ecological niches likely due to their very different diets (planktonophagous the fin whale, teutophagous the sperm whale).

Dependency

2.13 The area and particularly the Pelagos Sanctuary is an essential feeding ground for several cetacean species in the North-Western Mediterranean; here, meteorological and oceanic conditions allow primary productivity in spring and summer to be higher than in the coastal area. For example, Atlantic krill (*Meganyctiphanes norvegica*), a zooplankton species that is exceptionally abundant in the Sanctuary in summer and autumn, is the only identified source of food for fin whales in summer in the Ligurian-Provençal basin.

2.14 Cuvier's beaked whales, long-finned pilot whales, sperm whales and Risso's dolphins also take advantage of the Sanctuary's high productivity, particularly on the slope and in the canyons, but with a time lag compared to fin whales, since the peak abundance of their prey (mainly cephalopods) is observed later in the season. Bottlenose dolphins or striped dolphins are permanently present in the waters of the Sanctuary thanks to less specific diets consisting of cephalopods or fish.

2.15 The NW Med PSSA also includes cetacean corridors. Of particular importance are the Spanish cetacean migration corridor, north of the Balearic Archipelago, which is also an important feeding area for striped dolphins, Risso's dolphins, sperm whales and beaked whales (mainly a three-month period, between April and June). This corridor is also used by fin whales during their migration from the African coasts of the Mediterranean to the Gulf of Lion and the Ligurian Sea, in June and July.

2.16 The North-West Mediterranean is characterized by a very high density of submarine canyons. Canyons are important habitats for some cetacean species (e.g. Cuvier's beaked whales) and they also contribute to upwelling phenomena enhancing local primary productivity with the effects extending up the food chain to include birds, marine mammals and fisheries. Commercially important pelagic and demersal fisheries and unique benthic habitats are commonly associated with the heads of shelf-incising submarine canyons that are characterized by steep bedrock exposures. Submarine canyons that extend across the continental shelf and approach the coast are known to intercept organic-matter-rich sediments being transported along the inner shelf zone. This process causes organic-rich material to be supplied and transported downslope, where it provides nourishment to feed a diverse and abundant macrofauna (Wurtz 2012).

2.17 Other unique habitats that are highly vulnerable to shipping accidents are present in the region surrounding the PSSA. For example, the Camargue wetlands – a Ramsar site of about 135,000 ha, the largest French wetland and the second largest Mediterranean wetland after the Nile Delta region and a key site of international importance for nesting, staging and wintering of several species of waterbirds.

Productivity

2.18 Although the Mediterranean is generally considered to be an oligotrophic sea, i.e. low in nutrients, its North-Western basin is characterized by relatively high mesotrophic productivity throughout the year, due in part to the physical characteristics mentioned above (see sections 1.2 and 2.13). The phytoplankton bloom begins in mid-April. This high level of primary productivity conditions the structuring of the upper levels of the food web, in particular the presence of tertiary consumers such as cetaceans, which are particularly abundant in summer.

Spawning and breeding grounds

2.19 Mediterranean cetaceans do not show specific breeding grounds. However, a high percentage of juvenile whales are reported in the study area. Biopsy sampling analyses determined that at least one third of the individuals sampled were breeding females and the remaining two thirds were active breeding males (Siliart et al., 2012), supporting the hypothesis of this as an area favourable to the reproduction of the species. Similarly, the analysis of the structure and composition of the groups and their sex ratio have shown that this area is favourable for sperm whales and long-finned pilot whales too (Di-Méglio et al., 2016).

2.20 Sardines' persistent spawning habitats are identified along Spanish and French waters, especially surrounding the river mouth areas of Ebro and Rhone, with persistent nursery habitats in the coastal areas and over the continental shelf edge of the Gulf of Lion and in the northern part of the Ebro delta. Concerning anchovies, persistent spawning areas are described along the continental shelf of the same region, with persistent nursery habitats found mainly over the Spanish continental shelf and in a localized area of the central part of the French waters (EC et al., 2020).

Fragility

2.21 The semi-enclosed nature of the Mediterranean Sea and its high level of endemism, already mentioned, as well as the near absence of tides, make it particularly vulnerable to any change. The constant increase in human activities at sea, in particular maritime traffic, combined with phenomena linked to climate change (warming, acidification, eutrophication and bioaccumulation of marine waters in particular) are weakening the natural balance of the North-Western Mediterranean zone.

2.22 As far as cetaceans are concerned, all the species frequenting the area are particularly vulnerable because of their slow growth, their high longevity (up to 100 years for some individuals) and their low reproduction rate: for these species in particular, human exploitation of the area at high levels (maritime traffic, but also fishing and leisure activities) is a permanent challenge (Reeves and Notarbartolo, 2006).

2.23 The importance and fragility of this region is clearly demonstrated by the large and consistent amount of official international deliberations and recognitions (Pelagos Agreement, Strait of Bonifacio PSSA, 11 SPAMIs, 2 EBSAs) and expert recognitions (3 IMMAs) and the national implementations of area-based protection measures (7 National Parks, 230 Natura 2000 sites and other marine protected areas).

Bio-geographic criteria

2.24 The particular qualities of the North-Western Mediterranean Sea have already been mentioned and make it singular in biogeographic terms. This singularity is 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, in the shape of a horseshoe. It runs about 20 nautical miles along the western coast of Corsica, the Italian coast of Liguria and the French Riviera in a cyclonic movement. The permanent nature of this front, as well as its inter-annual stability in terms of hydrology, gives it a dominant role in the organization of phytoplankton communities and ensures the maintenance of a zone that is richer in nutrients than the adjacent regions, particularly in spring (Goffart et al., 1994).

2.25 The North-Western Mediterranean is of particular importance from an ornithological point of view. It is the most important area in the world for the conservation of the Balearic Shearwater (*Puffinus mauretanicus*), a species endemic to the North-Western Mediterranean whose status is considered critically endangered in Europe. The area is also essential for Audouin's Gull (*Larus audouinii*), whose conservation status in Europe is said to be "localized" as more than 90% of the breeding population is clustered in less than 10 sites. The colony in the Ebro Delta (Spain) alone accounts for 67% of the world population of this species (Gutierrez et al., 2008). The area is also used extensively by the Mediterranean endemic subspecies of the crested cormorant (*Phalacrocorax aritotelis desmarestii*) and storm-petrel (*Hydrobates pelagicus melitensis*).

2.26 This area hosts Mediterranean subpopulations of tropical, subtropical or boreal fish species or coastal invertebrates, but also top predators such as fin whales, sperm whales or bottlenose dolphins. This allows the existence of a naturally balanced and functional food web. The importance of biodiversity within the study area and the genetic specificity of its populations makes it a special area, whose deterioration could lead to the disappearance of entire subpopulations.

3 Social, cultural and economic criteria

Social or economic dependency

3.1 The Mediterranean coasts welcome an ever-increasing number of travellers and are a stronghold of world tourism. Seaside tourism, favoured by an exceptional marine environment, is one of the main economic resources of this region. The proximity of several beautiful islands (Corsica, Sardinia, the Tuscan archipelago, Balearic Islands, etc.) makes this region particularly attractive and, to a large extent, economically dependent on tourism.

3.2 Commercial whale-watching (a tourist service that allows visitors to observe cetaceans in their natural environment) has been a fast-growing activity since the 1990s. A study conducted in the French Mediterranean identified 32 operators (with a capacity of 1,075 places). Between the 1980s and the early 2000s, the annual growth rate in the number of operators was estimated at 3.5% (Mayol et al., 2014). This activity is mainly carried out between June and September.

3.3 Professional fishing is an integral part of the Mediterranean landscape, despite a relative economic weight and decreases in the number of vessels, sailors, sales in value and volume. It contributes to the dynamism and survival of the Mediterranean coastal economic fabric as well as to its reputation. Fishing activity is constrained in several ways, particularly with the decline in fish stocks and the management measures implemented to remedy this (MTES, 2019).

4 Scientific and educational criteria

Research

4.1 It is essential to study Mediterranean cetaceans in order to gain a better understanding of them and then define the most effective management and conservation rules. The Pelagos Sanctuary, which includes France, Italy and Monaco, is a pilot area in which a number of international research programmes are already being conducted to improve knowledge not only of cetacean populations in the North-Western Mediterranean, but also of the main anthropogenic threats to which they are exposed, both at sea and on land. The establishment of the Spanish cetacean migration corridor also makes it possible to promote research on these populations, embracing an even wider diversity of habitats.

Education

4.2 Knowledge of cetacean populations must continue to progress, but it must also be disseminated to as many people as possible. The existence of marine protected areas contributes effectively to this and promotes collective awareness of the rich and fragile nature of marine areas and the populations they shelter, through the awareness-raising and communication activities they implement.

4.3 The development of whale-watching activities in situ also contributes to this, when properly supervised. The emblematic nature of cetaceans makes it possible to communicate more widely with the general public on ecological issues that concern the entire marine environment and the impacts it is suffering, particularly as a result of direct human action and climate change. The training of marine professionals is also an important lever for raising awareness, which can be deployed in different formats: initial and ongoing training, courses, webinars, etc.

ANNEX 3

VULNERABILITY TO DAMAGE BY INTERNATIONAL SHIPPING ACTIVITIES*

1 Vessel traffic characteristics

Introduction

1.1 The Mediterranean Sea is one of the busiest shipping areas in the world, being the gateway between the European continent and Asia via the Suez Canal. With an estimated 220,000 merchant ships per year, 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 100 m in size, sailing at between 14 and over 20 knots (ferries, cargo ships, tankers, container ships, etc.) and up to more than 35 knots for high-speed craft (HSC), which are mainly used to serve the islands.

1.2 From the mid-1990s to the mid-2000s, the Mediterranean Sea has seen a 58% increase in transit capacity, coupled with a 30% increase in vessel size since 1997. Maritime transport in the Mediterranean basin is expected to increase in the coming years, both in number of routes and in intensity, especially in connection with the enlargement of the Suez Canal. Marine Mammal Observers working within the Fix Line Transect Mediterranean Network (FLT) aboard ferries, at the command deck, raise awareness of the navigating staff of ferries.

1.3 An analysis of Automatic Identification System (AIS) data by the Centre for studies and expertise on risks, environment, mobility and urban and country planning (Cerema – France) shows a gradual trend towards an increase in the number of vessels equipped with this identification system using the area and in the number of voyages made in the area (figure 4).

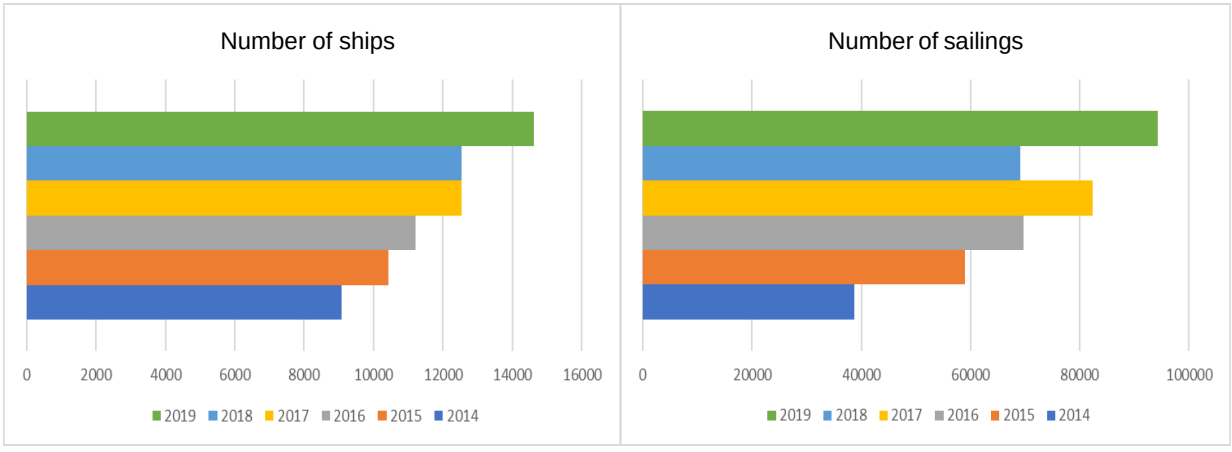


Figure 4: Number of ships and sailings in the study area (based on AIS data).

* The text in this annex is taken from the information provided by France, Italy, Monaco and Spain in document MEPC 79/10. All references used in this resolution are set out in the annex to document MEPC 79/10.

Operational factors

1.4 In the North-Western Mediterranean, shipping traffic is mainly structured towards or from the ports of Valencia, Tarragona, Barcelona, Marseille, Genoa, La Spezia and Livorno for goods traffic, to which are added the ports of Toulon, Sète, Nice, Savona and all ports in the islands of Corsica, Sardinia, the Tuscan archipelago, Sicily and the Balearic Islands for passenger transport. This geographical situation of proximity to the islands, combined with commercial port infrastructures, promotes maritime ferry traffic. Moreover, the cruise activity has largely developed 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). Finally, more than 700 marinas are listed in the Mediterranean basin.

Vessel types

1.5 A study conducted by the Quiet Oceans consultancy on behalf of WWF (Gallou and Folegot, 2020) analysed shipping traffic in the North-Western Mediterranean, using AIS data from 2019. In terms of distance travelled in this area, passenger ships and cargo ships travel by far the greatest distance, followed by motorized pleasure craft and fishing vessels.

Traffic characteristics

1.6 Freight traffic is higher 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 is highly structured around links between the main ports of France, Spain and Italy on the one hand, and Corsica, the Balearic Islands, Sardinia and the Tuscan archipelago 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 and with cruise activity (see figures 5 and 6).

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

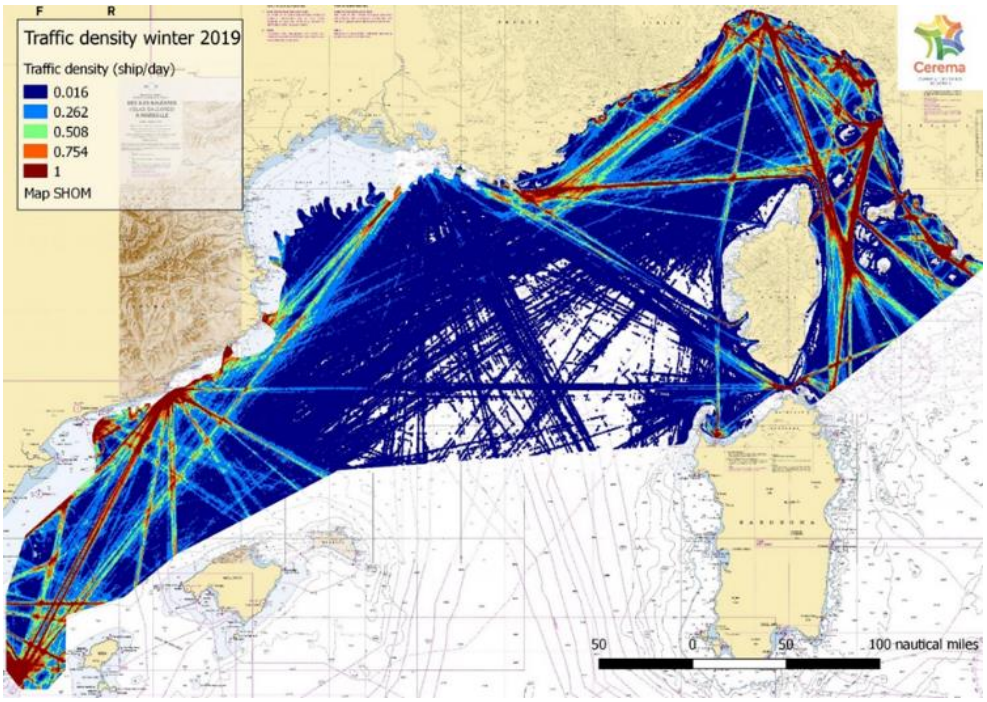


Figure 5: Representation of the maritime traffic during the winter period (2019, AIS source).

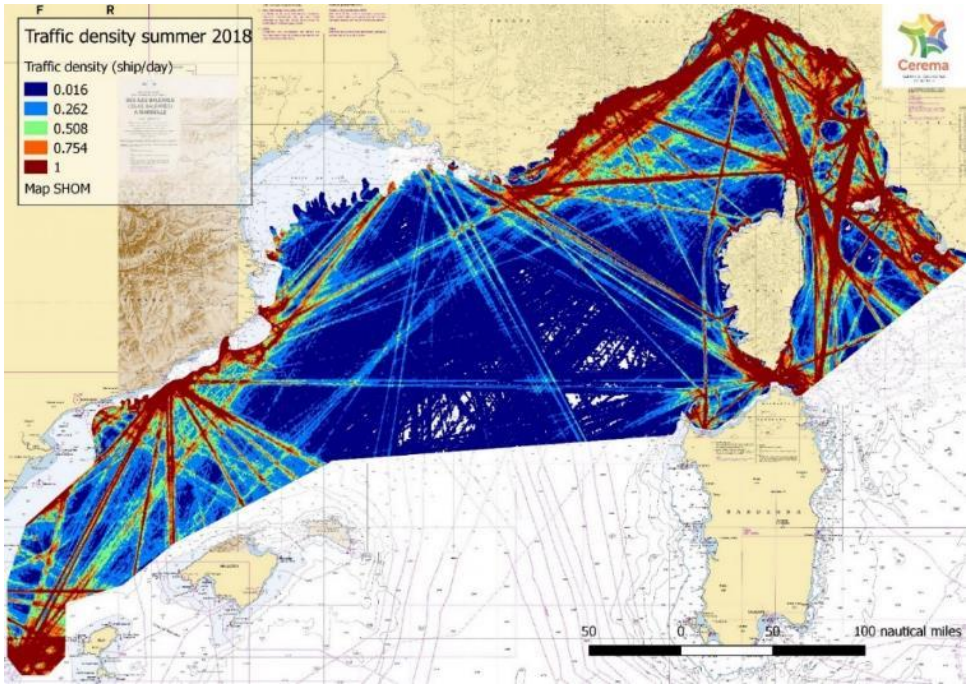


Figure 6: Representation of the maritime traffic during the summer period (2018, AIS source).

Harmful substances carried

1.8 The rules on the transport of harmful substances are derived from the International Convention for the Prevention of Pollution from Ships, known as the MARPOL Convention. These rules are contained in different international codes, depending on the nature and mode of transport of these substances. The Mediterranean is an important transport route, but also a major oil loading and unloading centre. It is also a major route for tankers.

1.9 In 2006, about 18% of the world's crude oil shipping, representing 4,224 voyages and 421 million tonnes, took place in the Mediterranean (MIU, 2008). Of the 10 main ports of discharge identified in 2006, 4 are located in the study area: Fos and Port-de-bouc (Marseille region), Genoa and Savona (Italy).

1.10 In 2006, liquefied natural gas (LNG) and liquefied petroleum gas (LPG) loadings amounted to 31 and 19 million tonnes respectively and unloading to 25 and 20 million tonnes for the whole Mediterranean (MIU, 2008).

1.11 Transported chemicals include organic compounds, animal oils and fats, inorganic compounds and other miscellaneous products. The transport of chemicals in liquid and gaseous form represents a relatively small share of international maritime trade (about 2%) but remains a very dynamic and important sector in terms of value of goods; however, their accidental release would be harmful to the marine environment.

2 Natural factors

Hydrographical

2.1 Some areas are known to present risks to navigation, due to the presence of the narrowness of the passage or sectors with numerous islands and islets. This is particularly the case of the Strait of Bonifacio, which is 15 to 20 km wide and 100 m deep at its deepest point between southern Corsica and northern Sardinia. At its eastern mouth, it also contains the islands of the archipelagos of La Maddalena, Lavezzi and the island of Cavallo. This passage is considered dangerous due to the presence of numerous rocks and strong currents that can increase the risk of grounding and other accidents. These characteristics prompted the establishment of the Bonifacio Strait PSSA.

2.2 The small pass of the islands of Hyères is also a potentially dangerous area for large vessels. Located between the Giens peninsula and the island of Porquerolles, its narrowest part extends over less than one mile, with depths of less than 20 m. The traffic of passenger HSC is very important in the summer season. Cruise ships and ro-ro passenger ships also use it, generally in an east-west direction in heavy westerly weather (GIS3M, 2010).

Meteorological

2.3 The Mediterranean climate is characterized by hot, dry summers under the influence of the Azores anticyclone, and mild, relatively rainy winters. Local winds are variable, in both direction and strength, and become stronger in winter with gusts that can exceed 100 km/h. North and north-west winds (Tramontane and Mistral) create the most violent storms.

Oceanographic

2.4 In the Mediterranean, the influence of the tides is weak; the tidal range does not exceed 40 cm on average near the coast. Tidal currents are weak and negligible compared to wind-induced currents. Generally, they are not felt near the coast in wide open areas, but they can be rapid in some narrow passages or shallow areas. The average sea waves and swell are generally weak, due to the small size of the Mediterranean basin where swells are infrequent and not very developed. The strongest states of the sea, in terms of height, are generated by north to north-west winds.

3 Other Information: Impacts of shipping traffic on the area

Collisions between ships and large cetaceans

3.1 The impact of ship collisions is now internationally recognized as an important threat to cetaceans, especially as shipping 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).

3.2 The actual total number of collisions between large cetaceans and ships and the consequent impact at population level are difficult to be assessed. Accidents generally take place offshore and are rarely noticed by seafarers (this is particularly true when the vessels are large). Nevertheless, scientific work carried out over the last 15 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).

3.3 Analysis of records of collisions between ships and the Mediterranean fin whale population over the period 1971-2001 showed that more than 80% of fatal ship strikes occurred in the North-West Mediterranean (Panigada et al., 2006). During the period 2012-2018, the annual number of deadly collisions within the PSSA perimeter was up to 25.38 (Standard Deviation (SD) =5.97) fin whales per year. Based on recognized management rules, this value means that collisions alone prevent the restoration of the fin whale subpopulation within 100 years. Furthermore, there is almost a 10% chance that ship strike mortality triggers a subpopulation decline.

3.4 Strandings data may complement the information on these accidents. A study carried out on strandings on the French coast since 1972 (Peltier et al., 2019) gave the following results:

.1 collisions are the main human cause of death for fin whales in the western Mediterranean (22.5% of stranding causes analysed on average; they are the cause of one in five strandings for all species combined);

.2 evidence of collision could only be found for the period 2005 - 2017 for the sperm whale in the Mediterranean;

.3 the majority of fin whales fatally struck by ships had not yet reached the reproductive stage; and

.4 the small size of the fin whale population in Mediterranean waters makes it particularly vulnerable to anthropogenic pressures.

3.5 An assessment carried out by France as part of the implementation of the European Marine Strategy Framework Directive (MSFD), in 2018, reports that in the western Mediterranean collisions are a cause for concern for fin whales, accounting for 80% of recorded events, compared to 10% for sperm whales (Spitz et al., 2018). Other work indicates that collisions and incidental catches alone may be responsible for the decline of the Mediterranean fin whale subpopulation, and points to the need for further research to determine how indirect anthropogenic mortalities (pollution, prey depletion) affect the sperm whale population (Sèbe et al., 2020).

3.6 Another approach to assessing the risk of collision is theoretical statistical analysis. Thus, the processing of data concerning shipping traffic with those mentioning the presence of cetaceans made 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), however this work could not be carried out for sperm whales due to the lack of sufficient biological data:

.1 seasonal differences are mainly due to the variability in the number of ships using the area, which doubles in summer compared to winter; and

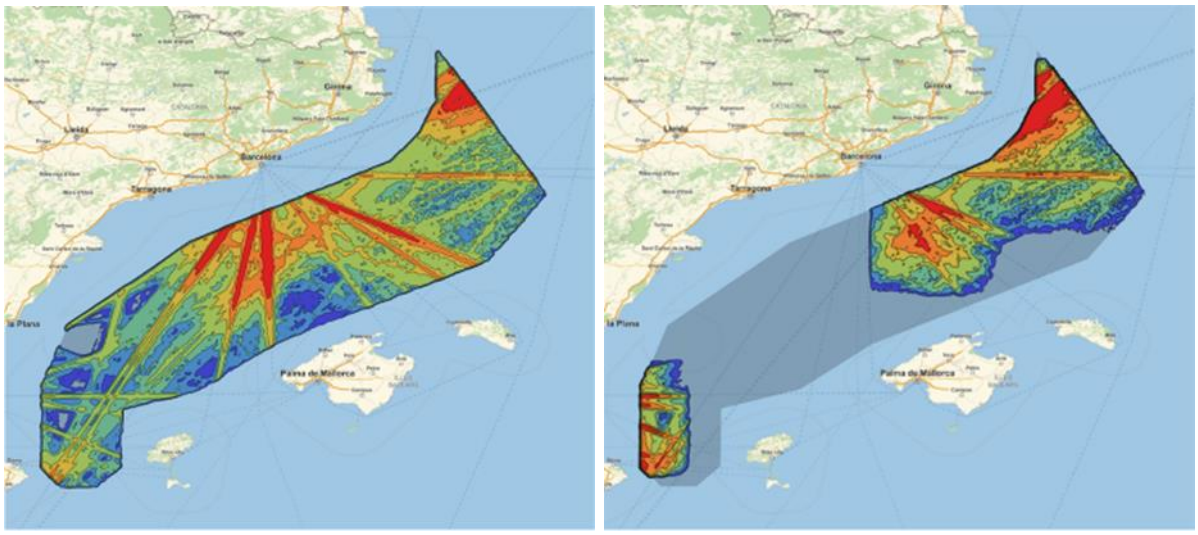
.2 passenger ships and cargo ships have the highest cumulative risk of collision (84% NME in winter, 72% in summer).

3.7 In a similar manner the Spanish experience focused on a study carried out in the MPA Cetacean Migration Corridor in the Mediterranean (CEDEX, 2021), where the presence of fin whales) and sperm whales has been confirmed. For this purpose, a spatial qualitative indicator of "potential risk of collision" was used considering, on the one hand, data related to maritime traffic, based on AIS data, and on the other hand, the available information related to sightings of the species under study, cited above.

3.8 The analysis carried out for the period of Oct 2018-Sep 2019 showed that up to 4,552 ships (including high-speed crafts, passenger ships, cargoes and tankers) have transited this marine protected area, making a total of 5.81 million km travelled with an average route per ship of 132 km.

3.9 In order to obtain the spatial distribution of collision risk, a hazard analysis was carried out, based on the logistic curve that relates the ship's speed and mortality (Vanderlaan and Taggart, 2007) and an approximation to a hazard index based on Vaes and Druon (2013). This index includes not only the traffic involved, but also the characteristics of the ship and its navigation features (i.e. distance travelled), which can affect the fate of the cetacean after the collision. This concept of risk represents a further step, since it combines the hazard of maritime traffic with the exposure associated with the presence of cetaceans.

3.10 The final objective was to identify those zones within the study area where the concentration of individuals and overall risk was higher. Within the cetacean migration corridor, for the total traffic analysed, these areas were identified with the north-western end of the corridor and the area affected by the routes starting from the port of Barcelona, as shown in figure 7. A more detailed analysis (not included in this document) makes it possible to quantify the contribution to this risk indicator of the different categories of ships or the incidence of the seasonal effects of traffic.



Balaenoptera physalus *Physeter macrocephalus*

Figure 7: Potential collision risk index associated with the presence of the cetaceans and maritime traffic in the CCM Oct 2018-Sept 2019 (CEDEX, 2021).

3.11 In order to help the decision-making process, this analysis allows focusing on where and when to take measures (i.e. depending on the availability of data related to a temporal distribution of cetaceans). Based on the above, it is concluded that the whale population has suffered ship strikes in the region and therefore the cetacean population is at risk. Without associated protective measures to mitigate the risk of collision within the perimeter of the PSSA, a decline in the populations of medium and large cetaceans is to be expected. Implementing a speed reduction strategy will allow a significant decrease in the likelihood of collision and fatal wildlife-related injuries.

3.12 The IWC Scientific Committee has identified the need for a better understanding of the relationship between vessel speed, the risk of death or injury to the whale and damage to the vessel. It has considered a number of studies and approaches since 2009 when MEPC.1/Circ.674 was adopted. All the studies considered have confirmed an increased risk with increased speed, supporting the use of speed restrictions as a way of reducing risk. Some studies have attempted to quantify the speed-risk relationship for specific whale species (Conn and Silber, 2013) or the hydrodynamic forces in relation to speed (Silber et al., 2014). Others (e.g. Wiley et al., 2011) have evaluated the relative risk reduction that might be achieved by speed restrictions. In addition to studies based on collisions, studies based on observations of whales close to vessels have inferred greater collision risks with increases in speed (Gende et al., 2011; Harris et al., 2012).

3.13 At its meeting in 2022, the IWC Scientific Committee recommended that "*action needs to be taken to reduce ship strike risks to the Mediterranean populations of fin and sperm whales*". The Committee also recognized that, "*in line with its previous recommendations, since routeing options do not seem to be possible in the area, the most effective way to reduce risk is through speed reductions*". Finally, the Committee recommended that "*any measures that are implemented are fully monitored and evaluated in terms of the risk reduction that is expected to be achieved, including through the use of AIS data to assess levels of industry cooperation, and that measures can be adapted based on this*".

3.14 The most recent example of voluntary speed reduction to mitigate cetacean ship strikes is given by the case of the endangered Bryde's whales in the Hauraki Gulf, New Zealand (Constantine et al., 2015). Since the introduction of a speed limit of 10 knots in 2013, no collision events were recorded after an average of 2.4 whales per annum recorded in the period 1996 - 2014 (Ebdon et al., 2019).

3.15 Along the Atlantic coast of the United States, in the five years after the enactment of mandatory 10 knots speed restrictions in several Seasonal Management Areas, there were no right whale mortalities attributed to ship strikes either in or within 45 NM of these areas. These results indicate a statistically significant reduction in right whale ship lethal strikes in these areas suggesting that the speed limits have been effective (Laist et al., 2014).

3.16 Several models have shown that speeds between 10 and 13 knots drastically decrease the probability of lethal injuries in case of collisions between ships and cetaceans (Vanderlaan & Taggart 2007; Gende et al., 2011; Conn & Siliber 2013). There is strong support to identify 12 knots (11.8 knots or 6.1 m/s) as Bayesian change point of probability for the relationship between ship speed and encounter distance. Average encounter distances above and below the 11.8 knots change point vary from 448 m (95%CrI, 398-485) to 562 m (95%CrI, 468-676) (Gende et al., 2011).

Physical disturbance of cetaceans by ships

3.17 The presence of ships may influence cetaceans: attraction, flight or no apparent reaction, depending on species and individuals (Di-Méglio et al., 2010). It is likely to generate behavioural responses causing individuals to move to less favourable habitats, altering the normal course of functions such as foraging, social functioning, reproduction, suckling, resting or migration. This state of stress alters the health status of individuals and demographic parameters may be degraded. If changes in cetacean behaviour have been observed (notably in the case of the bottlenose dolphin in the Mediterranean) and disturbance distances have sometimes been inferred, it is difficult in the current state of knowledge to quantify the impacts of this pressure in terms of population ecology.

Underwater noise from commercial shipping

3.18 Underwater noise generated by human activities is one of the pressures identified and assessed in the framework of the implementation of the Marine Strategy Framework Directive (descriptor 11 of the Directive) and its complementary process at the Mediterranean level (Ecosystem Approach Process (EcAp) led by the Barcelona Convention). Among the activities concerned is shipping, where the main contributor to the noise generated by a merchant ship is the movement of the engine propeller. The noise level increases with the shape of the propeller, the state of wear of the ship, its size, speed and loading. The literature shows a direct relationship between speed and noise (McKenna et al., 2013; Zobell et al., 2021). Leaper (2019) concluded that a 10% speed reduction would reduce the total sound energy from shipping by around 40% on the global scale.

3.19 In the Mediterranean basin, anthropogenic noise levels have been steadily increasing over the past 50 years as shipping traffic has increased. According to the first EU maritime transport first environmental impact report (EMTER report) published in 2021, for EU waters the total accumulated underwater radiated noise energy more than doubled between 2014 and 2019. The underwater radiated noise (URN) from shipping is now recognized both in IMO and EU as a significant environmental issue with regional and global impact. The European Maritime Safety Agency (EMSA) conducted a study in 2021, focusing on a number of key aspects related to URN: the existing policy and current understanding about sources of continuous URN from different types of ships, its impacts on the marine environment, and mitigation actions. The study was carried out by "WavEC Offshore Renewables" and "Maritime Research Institute Netherlands" (MARIN) on behalf of EMSA. Commercial vessels can have short- and long-term negative consequences for marine life, in particular marine mammals (IMO, 2014, MEPC.1/Circ.833): the diffuse increase by maritime traffic in ambient noise levels, especially in the low frequencies, reduces the communication range of cetaceans, making it difficult for them to find mates or establish social relationships, as well as foraging and orientation. Furthermore, repeated shallow dives to cope with persistent acoustic disturbance are likely to increase the risk of decompression illness in marine mammals (GIS3M, 2010).

3.20 To be noted, ships concerned with speed reductions should be chosen carefully, as these measures can also have opposite effects on underwater noise and gas emissions depending on propeller designs (Leaper, 2019), and the technical criteria of the electrical distribution and the type of propulsion of the ship. As the aim of this project is not to increase the impact of maritime traffic on cetaceans, consideration should be given to the equipment of vessels to reduce noise. For example, changing the propellers during maintenance, having a certificate of conformity, equipping with a noise self-estimation and cavitation detection system. The designation of the PSSA will allow further studies to be carried out on the matter.

Chemical pollution

Hydrocarbons

3.21 Accidental oil spills have become rare in the Mediterranean, the last major accident being the MT Haven in the Gulf of Genoa in 1991, but they can cause considerable damage to the marine environment given the quantities of oil spilled and the length of time it takes for the impacted habitats to recover.

3.22 With regard to illegal discharges, the use of satellite imagery can contribute to the estimation of the number of oil spills from ships, without providing proof that the discharge is illegal or that it is from a ship. In 2016, EMSA's CleanSeaNet platform recorded a total of 1,073 detections of likely polluting incidents and a total of 1,060 detections of potentially polluting incidents in the Mediterranean region and off the Atlantic coasts of Morocco, Portugal, Spain and France. Although these data remain to be confirmed, both in terms of the nature of the pollution and its origin, they clearly indicate that oil pollution incidents caused by ships remain a concern in the Mediterranean.

3.23 Polycyclic aromatic hydrocarbons (PAHs) can bioaccumulate in the tissues of marine mammals. The viscous crude oil spilled during an oil spill can cover the surface of the cetacean's body for a long period of time, which can reduce its filtering capacity: this can be the case for fin whales. The deterioration of zooplankton by an oil spill can also generate an indirect negative impact on some whales, as it is the main food for them.

Anti-fouling paints

3.24 Anti-fouling paints are one of the sources of heavy metals and biocides in Mediterranean waters, particularly off the coast of port areas. Through bioaccumulation, marine mammals can be sensitive to this type of pollution, which can disrupt their immune system and even lead to death.

Other toxic products

3.25 In addition to oil, hazardous and noxious substances (HNS) accidentally spilled into the marine environment can threaten marine species such as cetaceans. HNS include bulk liquid cargoes (petrochemicals, solvents and liquefied gases, etc.), bulk solid cargoes (fertilizers, etc.) and packaged chemicals. The quantities of HNS accidentally spilled have decreased considerably between 1994 and 2013 in the Mediterranean. Since 2003, the discharge of HNS has become insignificant compared to the period from 1994 to 2002.

Marine litter

3.26 The Mediterranean Sea is one of the most affected areas by marine litter in the world and by plastic in particular, which can constitute up to 90% of the seabed litter. A study by Arcangeli et al. 2020 showed that there is a gradient x10 in density of marine litter from

offshore, to coastal and to river. Meaning that marine litters are coming from land through rivers (highest densities) and then are spread over the vast oceanic surface. Its origin is mainly land-based, but it is estimated that ships are the source of almost a quarter of this litter (Koutsodendris et al., 2008; Loakeimidis et al., 2014).

3.27 Accumulation rates vary greatly and are influenced by several factors, such as the proximity of large cities, coastal artificialization and frequentation, hydrodynamics and maritime activities. The semi-enclosed nature of the Mediterranean basin also explains the high accumulation rates observed. The analysis of this waste shows a great variability in its nature and origin, with the highest quantities located mainly near large cities, river mouths and coastal canyons where currents are slower and strong sedimentation occurs.

3.28 In the French part of the study area, accumulation rates of 290 objects/km² can be reached on the continental shelf, with plastic waste found at different depths. The majority of plastic waste found in this area originates from fishing activities, with ferry traffic around Corsica also representing a considerable source of waste, particularly bottles and cans thrown overboard (Gerigny et al., 2019). The presence of marine litter in increasing quantities is a serious threat to marine ecosystems, particularly for turtles and marine mammals (risk of entanglement, suffocation by ingestion).

Biological pollution

3.29 Shipping transport is considered to be the most important vector for the import of exogenous marine species in the world, via ballast water or biofouling accumulated on the surface of ships' hulls, respectively managed by IMO through the Ballast Water Management Convention and the Anti-Fouling System Convention. The semi-enclosed nature of the Mediterranean Sea and the importance of shipping traffic, particularly in its north-western basin, make it very sensitive to this risk. Invasive species can cause the restructuring of entire habitats to the detriment of native species, with the risk of reducing biological and genetic diversity within populations. However, this risk is only likely to affect very indirectly cetacean populations in the Mediterranean.

Greenhouse gas and air pollutant emissions

3.30 Greenhouse gas emissions have a global impact and are generated by various sectors of activity, including transport. Shipping traffic contributes to this, but only to a limited extent: in 2017, 3.15% of total EU greenhouse gas emissions were attributable to international shipping. However, with a significant increase of 32% over the last 20 years and an estimated projection of 50 - 250% by 2050, despite reductions in fuel consumption, the European Parliament voted on 16 September 2020 to include shipping in the EU Emissions Trading Scheme (EU ETS) and to set binding standards for shipping companies to reduce their CO_2 emissions by at least 40% by 2030. Negotiations are still ongoing on the EU's Fit for 55 legislative package.

3.31 CO_2 emissions from maritime transport are estimated at about 10% of the total CO_2 inventories emitted by the 21 Mediterranean countries that are signatories to the Barcelona Convention. These emissions also contribute to increased acidification and eutrophication of the marine environment.

3.32 The consequences of the increase in greenhouse gases on the marine environment are known and include the increase in temperature and acidification of marine waters. This may have consequences for cetaceans in terms of the distribution of their prey and their vulnerability to pathogens, which could thus find more favourable conditions for their development.

3.33 The Mediterranean States have jointly committed, within the framework of IMO, in a landmark initiative on the greening of maritime transport. The States submitted to IMO a joint and coordinated proposal to establish an Emission Control Area for Sulphur Oxides and particulate matter (SECA) in the whole Mediterranean Sea at the seventy-eighth session of the Committee for the Protection of the Marine Environment (MEPC). The designation of this area as a SECA entails the obligation for all ships entering the Mediterranean to use fuel with sulphur content not exceeding 0.10% by mass, i.e. fuel five times less polluting than the international standard in non-SECA. MEPC adopted amendments to designate the Mediterranean Sea, as a whole, as a SECA under MARPOL Annex VI, at its seventy-ninth session in 2022. The amendment is expected to enter into force on 1 May 2024, with the new sulphur limit taking effect from 1 May 2025. This new SECA will significantly improve air quality in the area and protect the health of millions of Mediterranean citizens and their fragile environment.

Summary of groundings, collisions or spills in the area

3.34 The Mediterranean Integrated Geographic Information System for Risk Assessment and Response to Marine Pollution (MEDGIS-MAR), administered by REMPEC, lists 82 events that occurred in the study area between 1977 and 2017. However, as no data is available for the study area between 2002 and 2011, it is likely that some information is missing or not published.

3.35 Of the events listed, 8 resulted in the release of more than 700 tonnes of hazardous substances into the environment (6 involving oil pollution), 8 resulted in the release of between 7 and 700 tonnes, 42 resulted in the release of less than 7 tonnes of hazardous substances.

3.36 The most dramatic event for the marine environment in the area was the accident off Genoa on 11 April 1991, when an explosion followed by a fire on the Cypriot tanker **MT Haven** resulted in the loss of 144,000 tonnes of heavy oil at sea. In terms of media coverage, the sinking of the cruise ship **Costa Concordia** in 2012 is widely remembered, mainly for the loss of life, although its impact on the marine environment was limited.

3.37 In relation to collisions between ships and cetaceans, a very recent collision event can be cited. The vessel **Hypatia de Alexandria**, from the Balearia fleet, brushed against two fin whales that were 15 miles off the coast of the Llobregat Delta on 26 May 2022. One of the individuals made an emergency dive about 50 m from the vessel and the other is believed to have grazed the keel of the vessel.

Measures taken to protect the area and their positive effects

3.38 The wealth and plurality of environmental issues in the study area, as already described, have prompted the coastal States or local authorities concerned to take specific protection measures by creating various marine protected areas. In total, almost 145,000 km² of the study area has a special status.

3.39 A number of measures have already been adopted by IMO including:

.1 adoption on 2 November 1973 of a Special Area (SA) covering the entire Mediterranean under Annexes I (Regulation for the Prevention of Pollution by oil) and V (Regulation for the Prevention of Pollution by garbage from ships) of the MARPOL Convention. This measure came into force on 2 October 1983;

.2 adoption on 15 July 2011 of a PSSA for the Strait of Bonifacio by resolution MEPC.204(62) which refers to protective measures previously adopted by resolution A.766(18) on 4 November 1993; and

.3 adoption on 16 December 2022 of the Mediterranean Sea Emission Control Area for Sulphur Oxides and Particulate Matter by resolution MEPC.361(79).

3.40 Measures have also been taken for the protection of cetaceans including

.1 *International Pelagos Sanctuary* - the Pelagos Agreement (November 1999) for the protection of marine mammals within the Pelagos Sanctuary entered into force on 21 February 2002, after ratification by the three concerned countries (France, Italy, Monaco). The Sanctuary covers a total area of 87,500 km². The objective of the agreement is to maintain a favourable conservation status for marine mammal populations within the Sanctuary, and to this end, to monitor cetacean populations, to reinforce the application of existing legislation on certain fishing activities, to reduce pollution, to regulate tourist observation of cetaceans and to improve the dissemination of information to the public. Since November 2002, the Pelagos Sanctuary has also been recognized by the Barcelona Convention Contracting Parties as a specially protected area of Mediterranean importance (SPAMI); and

.2 *The MPA cetacean migration corridor in the Mediterranean (Spain)* - The Spanish government has designated a 46,385 km² corridor between Valencia, Catalonia and the Balearic Islands as a Marine Protected Area, to protect cetaceans present and migrating in the area. The Barcelona Convention, allowing the area to be designated as a SPAMI, validated this in December 2019.

3.41 In addition a large number of measures have been taken for the wider protection of environments at the national level, these are listed in document MEPC 79/10.

ANNEX 4

ASSOCIATED PROTECTIVE MEASURE FOR THE NORTH-WESTERN MEDITERRANEAN SEA PARTICULARLY SENSITIVE SEA AREA (NW MED PSSA)

Associated Protective Measures (APMs)

The associated protective measures (APMs) recommendatory in nature as identified below are deemed to be applied by any commercial ships and pleasure yachts from 300 gross tonnage and upwards; the APMs would not apply to any warship and other governmental ships operated for non-commercial purposes.

1 Mariners should navigate with particular caution within the NW Med PSSA, in areas where large and medium cetaceans are detected or reported, and reduce their speed to between 10 and 13 knots as voluntary speed reduction (VSR). However, a safe speed should be kept, so that proper and effective action could be taken to avoid collision and any possible negative impacts on ship's manoeuvrability.

2 Mariners should keep an appropriate safety distance or speed reduction measure from any large and medium cetaceans observed or detected in close quarter situation. The safety distance or speed reduction measure should be adapted to the actual navigation circumstances and conditions of the ship.

3 Mariners should broadcast on VHF or other available means on scene, the position of medium and large cetaceans observed or detected within the designated PSSA and transmit the information and the position to a designated coastal Authority or Authorities.

4 Mariners should report any collision with cetaceans to a designated coastal Authority or Authorities, which should forward this information to the International Whaling Commission (IWC) global cetacean ship strikes database.

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