

## **Ships and whales: a fatal relationship?**

### **The issue of ship collisions with large whales**

A ship strike refers to a collision of any kind of vessel, from large boats to jet skis, with a marine animal. Various species are affected, especially large whales and sea turtles, many of which are endangered.<sup>i</sup> Collisions occur when these animals come to the surface to breathe, look for food in shallow areas, or swim near the surface of the sea. When marine mammals and turtles get struck by boats, they are often severely injured or killed.<sup>ii</sup>



There is broad scientific consensus that vessel speed, rather than shape or size (weight, volume), is the most relevant factor in determining the risk of a collision having a lethal effect on the struck animal. This has also been confirmed by several resolutions by the Agreement on the Conservation of Cetaceans of the Black Sea, the Mediterranean Sea and the Contiguous Atlantic Area (ACCOBAMS)<sup>iii</sup> based on the advice from its Scientific Committee and by other international organisations.

Such collisions can occur anywhere ships encounter marine life, but the risk is greatly increased in areas of high ecological value where wildlife must endure a high intensity of shipping traffic. Marine animals are not always easily visible from the deck of a ship, making it difficult for a vessel operator to spot them, and even if they are sighted, there may not be enough time to avoid the collision due to the vessel's inertia.

### The great whales of the Mediterranean Sea: fin whales and sperm whales

Whales hold the title for being the largest creatures on Earth. However, when we consider their size in comparison to a container ship, they appear quite small.



**WHEN EVERY SURFACING BECOMES A DEADLY TRAP.**

Whales are the largest animals in the world. But if you compare them to a transport ship, they are tiny. In a collision, the animals have hardly any chance of survival. Yet they have to come to the surface regularly to breathe.

Megamax-class cargo ship	Fin whale	Sperm whale
Length: 400 m	Length: 16–20 m	Length: 12–20 m
Weight: 283 000 tons	Weight: 48 tons	Weight: 15–45 tons
Average speed: 19 knots		
Cargo ships of this class have an incredible draught of 16 metres and an engine power of over 82,000 hp. There are 220,000 ship movements per year in the Western Mediterranean alone.	Even the world's second largest animal species is much smaller than a cargo ship. In the early 1990s, the population of fin whales in the Mediterranean was estimated at 3,500 animals. Today, only about 1,830 fin whales survive in there. Collisions with vessels are one of the main reasons for this decline.	Sperm whales are deep-diving specialists. They dive up to twenty times a day to depths of up to 1500 metres. At the surface, where they rest and socialise, and must come to breathe, the constantly high noise level in the Mediterranean may make it difficult for them to locate dangers, including fast approaching vessels.

Sperm whales need to surface to breathe after their prolonged deep dives to feed. Once at the surface, they repose and doze, leaving them very vulnerable to being rammed by a ship. Fin whales, for their part, tend to migrate or rest close to the surface, making them frequent victims of collisions.

In the event of a collision between a ship and a whale, the survival chances of the whale depend primarily on the ship's speed. In this regard, numerous **scientific studies show that the probability of a collision having a lethal effect on a whale is very low when the speed of the vessel does not exceed 10 knots.**<sup>iv v</sup>



### **What is ACCOBAMS?**

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) is a regional Agreement which was signed on November 24th, 1996 and entered into force on June 1st, 2001.

ACCOBAMS currently includes 24 Mediterranean and Black Sea Range States: Albania, Algeria, Bulgaria, Croatia, Cyprus, Egypt, France, Georgia, Greece, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Portugal, Romania, Slovenia, Spain, Syria, Tunisia, Türkiye and Ukraine.

The purpose of the Agreement is to reduce threats to whales and dolphins. The Mediterranean Sea has eleven species that are regularly present, while the Black Sea has three. Since 2003, OceanCare is a recognized partner of ACCOBAMS addressing threats and supporting conservation research in the agreement area.

The Parties to the Agreement have adopted numerous Resolutions which define clear measures to reduce the risk of ship strikes, but also to prevent, reduce or mitigate negative impacts of anthropogenic underwater noise on cetaceans.

### Reducing the risk of ship collisions with marine fauna

The only effective measures to avoid serious injury and death of cetaceans from ship strikes at present are, on the one hand, to divert their route to avoid sailing in areas or times with a high density of whales (including the establishment of traffic separation schemes or no-sailing zones) and, on the other hand, to reduce speed in such areas or times by reducing the speed of vessels to less than 10-12 knots, as set out in ACCOBAMS Resolution 7.12 adopted in 2019.<sup>vi</sup>

The conclusions of international experts in this matter are clear: in the event that it is not feasible to divert ships from areas with whales, the most effective option to reduce fatal collisions for marine fauna is to reduce the ships' speed. This has already been demonstrated in various areas of the world, such as on the Atlantic coast of the United States; or in the Hauraki Gulf, in New Zealand.<sup>vii</sup> The effectiveness of other types of measures, for example, alerting mariners about the presence of whales through observers on board or with the use of technological applications (cameras, sensors, etc.), is currently very limited.

As stated above, numerous scientific studies have reached the conclusion that **the risk of collision with lethal effects for cetaceans decreases as the speed of the boats is reduced and that this risk is very low in the speed range close to 10 knots and below.** The same reasoning is used to road traffic in cities and roads to minimise injury to individuals and minimise accidents. Speed limits are specified in traffic rules for the purpose of ensuring road safety. Reducing the speed of a collision not only decreases its lethality, but also provides both sides with additional time to evade each other and prevent the collision from occurring altogether.



### Ships in the Spanish waters of the Mediterranean Sea cannot alter their course to prevent collisions

In recent decades, the populations of fin and sperm whales in the Mediterranean Sea have been on a downward trend. If in the 1990s there were estimated to be 3,500 fin whales in the region, the



number had dropped to 1,800 in the period 2018-2019, according to the results of the latest ACCOBAMS Survey Initiative (ASI).<sup>viii</sup> For sperm whales, there is still much uncertainty about the total size of the Mediterranean population, but it seems most likely, from the available evidence, to be between 500 and 5,000 individuals, with the number of mature individuals being between 250 and 2,500.<sup>ix</sup>

In its latest assessment in December 2021, the International Union for Conservation of Nature (IUCN) maintained the sperm whale in the Mediterranean Sea categorised as "endangered" in its Red List, whereas the fin whale in the region was reclassified from "vulnerable" to "endangered".<sup>x</sup> This is the penultimate category before these species go extinct.

For these two species, collisions with boats are the main cause of human-induced deaths in the north-western Mediterranean, an area with a high and increasing intensity of maritime traffic.

Vessel movements in the north-western Mediterranean are around 220,000 per year, with average speeds ranging between 14 and 20 knots for merchant vessels or even up to 35 knots for ferries.<sup>xi</sup> According to the analysis of navigation data (AIS), approximately 75% of the total distance travelled by commercial vessels sailing in this area is at average speeds exceeding 10 knots.

Ship strikes with sperm whales and fin whales contribute significantly to the continuing decline in the numbers of these two species. Given their slow growth and low reproductive rate, they cannot replenish their numbers fast enough to compensate for these losses, so there is a risk that collisions may end up being the determining factor in the disappearance of these species in this marine region.

In 2021, a study was conducted by the Spanish Centre for Public Works Studies and Experimentation (CEDEX) to analyse the potential collision risk between whales and maritime traffic in the Cetacean Migration Corridor.<sup>xii</sup> According to this study, it has been found that whales in the region suffered collisions with ships, putting their populations at risk. It is predicted that without proper measures to reduce the risk of collision, the populations of medium and large cetaceans will decrease. The study suggests that implementing a strategy to reduce ship speeds would greatly reduce the likelihood of fatal collisions and injuries to marine wildlife.

The International Maritime Organisation (IMO) has acknowledged the risk of collisions with large cetaceans in the northwestern Mediterranean by designating this region as a Particularly Sensitive Marine Area (PSSA) in July 2023 on the petition of the four range States France, Italy, Monaco and Spain.<sup>xiii</sup> However, the established measures only provided a recommendation to sailors should navigate with particular caution within the northwestern Mediterranean 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.

ACCOBAMS and the International Whaling Commission (IWC), in a joint report, determined that: *the area around the Balearic Islands and the main shipping routes radiating from Ibiza, Mallorca and Menorca towards the Gulf of Lyons, Valencia and Alicante constitute one of the top high-risk areas for interactions between shipping, and especially fast ferry lines and whales.*<sup>xiv</sup>

Scientific studies have concluded that the presence of sperm whales and fin whales is widespread in the northwestern Mediterranean Sea. In other words, **in this part of the Mediterranean it is not possible to predict the areas where these large whales are present at any given time, so the option that ships could divert their routes to avoid colliding with them is not feasible.**



Adopted by all range states surrounding the northwestern Mediterranean PSSA, ACCOBAMS Resolution 8.18 (2022)<sup>xv</sup> states that “*where routing to keep whales and vessels apart is not possible, the only demonstrated measure to reduce fatal collisions with most large whales is to reduce speed*”.

Finally, to ensure the real protection of the whales in this region of the Mediterranean and prevent the decline of their populations, it is imperative to impose speed restrictions on the ships that pass through.

### **Implementing a mandatory ship speed reduction measure is the most effective solution to prevent whales from dying in collisions**

In areas where vessel speed reduction measures have been implemented, it has been found that voluntary measures are rarely enforced or successful. A recent study of eleven ship speed reduction programmes in different parts of the world showed that the compliance rate of voluntary measures was between 9% and 41%, whereas the mandatory measures had a compliance rate exceeding 80%.<sup>xvi</sup>

In other words, to ensure effectiveness, speed reduction measures must be mandatory and applied to all ships without exception.<sup>xvii</sup>

One of the great advantages of mandatory vessel speed reduction is that it creates a level playing field for all shipping companies. This ensures that they are all subject to the same restrictions and that compliance does not place them at a competitive disadvantage. However, this level playing field cannot be achieved by mere recommendations or voluntary measures. ACCOBAMS Resolution 8.17 on underwater noise, adopted in 2022, clearly stipulates that the implementation of mandatory measures provides a level playing field for the private sector. This consideration is made in the framework of ACCOBAMS' request, through this Resolution, to Member States to promote the implementation of ship speed reduction as an operational measure with multiple environmental benefits, including the reduction of underwater noise and greenhouse gas emissions, as well as the risk of collision with ships.<sup>xviii</sup>

### **Good for the climate, less noise, less air pollutants and a decrease in whale fatalities**

Reducing the speed of shipping, in addition to reducing the risk of collisions with cetaceans, leads to fuel savings and, consequently, a reduction in CO<sub>2</sub> emissions as well as air pollutants (SO<sub>x</sub>, NO<sub>x</sub> and black carbon).

Shipping is a sector with high greenhouse gas (GHG), as well as various atmospheric pollutants and black carbon emissions, due to its high dependence on fossil fuels. If it were a country, it would be the world's sixth highest emitter of GHGs, with more than 1 Gigatonne of CO<sub>2</sub>-eq emissions, according to data from the IMO.<sup>xix</sup>

Regarding CO<sub>2</sub> emissions, comprehensive analysis considering various factors such as weather conditions and the need for extra vessels to maintain the same transport service when reducing speed at a global fleet level, indicates that a reduction of 10% and 20% in ship speed could lead to a decrease in CO<sub>2</sub> emissions by approximately 13% and 24% respectively.<sup>xx</sup>

This measure also makes it possible to reduce the level of underwater noise emitted by ships in the vast majority of cases. Specifically, current data show that a 10% reduction in ship speed across the world fleet could reduce shipping noise by 40%. With regard to collisions with whales, a 10% decrease in speed would result in a 50% risk reduction, while a 20% decrease in speed could accomplish a 78% decrease in collision risk.<sup>xxi</sup>



Slow steaming emerged as a strategic response from the maritime industry to address the decrease in demand and surplus supply of ships caused by the 2008 economic crisis. This resulted in large reductions in GHG emissions and other atmospheric pollutants, as the most tangible and measurable environmental benefits. This was acknowledged by the IMO in its Third Study on GHG emissions.<sup>xxii</sup>

In summary, among the various operational measures available, reducing ship speed is the most cost-effective way to reduce the environmental impact of shipping. It is an immediately applicable measure and does not require technological modifications. Regulated slow shipping has no impact on the overall cost of the shipping industry and leads only to a marginal increase in logistics and supply chain costs for consumers.<sup>xxiii</sup>

Positive effects of applying speed reduction to the global fleet				
Decrease in:	CO <sub>2</sub> emissions	NO <sub>x</sub> , SO <sub>x</sub> y black carbon emissions	underwater noise	risk of collision with whales
<b>Speed reduction in:</b>				
<b>10%</b>	13%	13%	40%	50%
<b>20%</b>	24%	24%	67%	78%

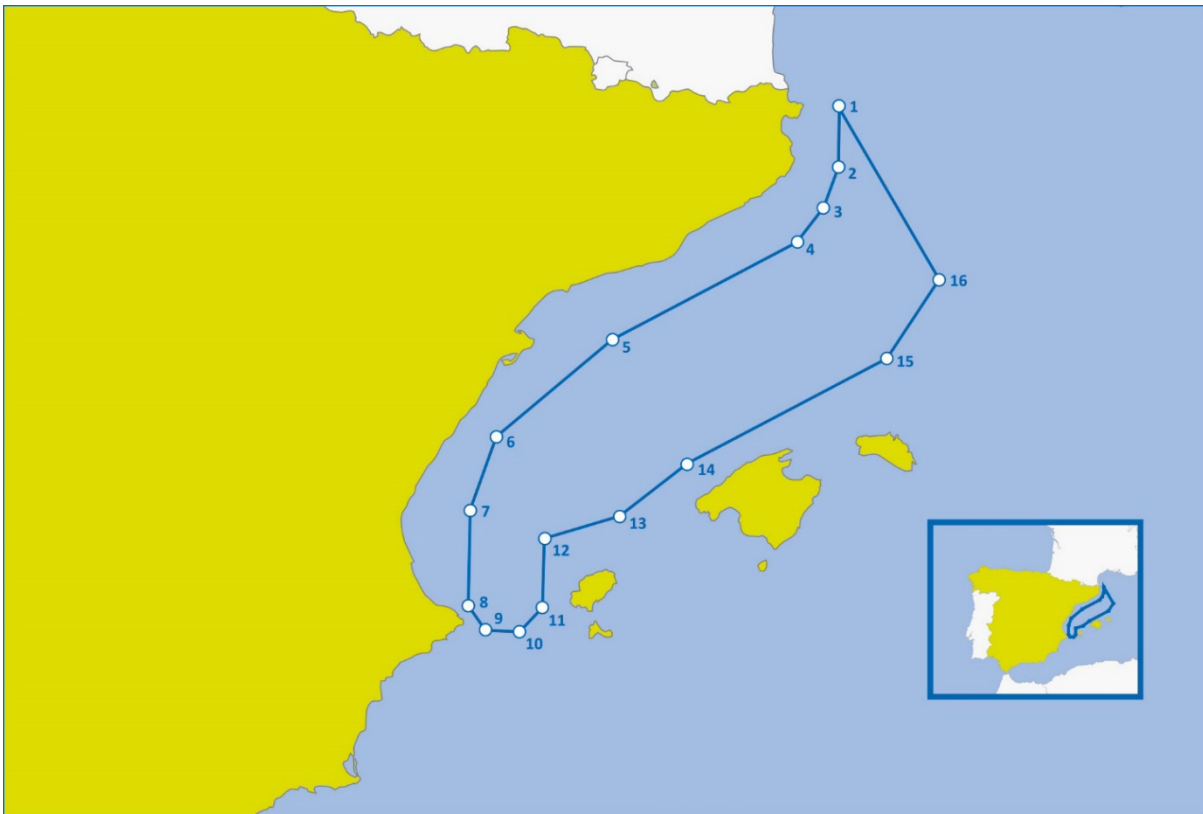
Source: GL Reynolds Environmental Sustainability Consultants (2019) and Leaper R (2019)

**IT IS PROPOSED TO PUT THE FOLLOWING TWO SECTIONS IN SOME SORT OF A BOX**

**The Mediterranean Cetacean Migration Corridor**

The "Mediterranean Cetacean Migration Corridor" in Spanish waters of the northwestern Mediterranean, with an area of 46,385 km<sup>2</sup>, is located between the regions of Valencia, Catalonia, and the Balearic Islands. It was declared by Spain as a Marine Protected Area (MPA) in 2018 and shortly afterwards, in 2019, as a Specially Protected Area of Mediterranean Importance (SPAMI) by the Barcelona Convention (UNEP/MAP).

The Cetacean Migration Corridor is an area of crucial importance for fin whales in their migratory movements to and from the Ligurian Sea. This is recognized by Royal Decree 699/2018, of June 29, by which Spain declared it a Marine Protected Area.<sup>xxiv</sup> This regulation also acknowledges the importance of this area in protecting various cetacean species, such as the sperm whale, bottlenose dolphin, striped dolphin, common dolphin, pilot whale, grey pilot whale, and Cuvier's beaked whale, as well as marine turtles, particularly the loggerhead turtle. Additionally, it acknowledges the significance of this area for the protection of sharks and sea birds.



*Map of the Marine Protected Area (MPA) "Mediterranean Cetacean Migration Corridor". Source: Royal Decree 699/2018.*

Intense vessel traffic at speeds of more than 10 knots in the Cetacean Migration Corridor jeopardises the good condition of this habitat. The high speeds at which existing shipping activities in this area are carried out, are therefore incompatible with the conservation and protection objectives of this protected marine area.

Consequently, Spain should regulate maritime traffic through a compulsory speed limit, in order to achieve an adequate reconciliation of this activity with the imperative protection of biodiversity in the area and to effectively address the decline of the fin whale and sperm whale population caused by ship strikes.

The management plan for the Mediterranean Cetacean Migration Corridor, currently under development by the Spanish Ministry for Ecological Transition and Demographic Challenge, is the appropriate instrument to introduce a binding speed limit of 10 knots. This measure ensures the compatibility of the shipping activity with the objective of safeguarding cetacean species, which are in a concerning state of conservation. There are currently no other less restrictive measures for navigators yet equally effective and efficient, especially in the short term.

Implementing a mandatory speed limit of 10 knots in the Cetacean Migration Corridor would ensure that Spain complies with its international and regional commitments to protect the marine environment, its endangered species, and their habitats. These commitments include the United Nations Convention on the Law of the Sea (UNCLOS) (arts. 192, 194), the Convention on Biological Diversity (art. 8, 22.1), the Convention on the Conservation of Migratory Species of Wild Animals (art. 3.4), ACCOBAMS (art. 2) and the ZEPIM Protocol to the Barcelona Convention (arts. 6, 11), in addition to the European framework obligations under the Habitats Directive (art. 12) and the Marine Strategy





Framework Directive (descriptors 1, 4, 11). In addition, it would be an important contribution to the Sustainable Development Goals (SDGs) of the United Nations, especially SDG 14 (conserve and sustainably use the oceans, seas and marine resources for sustainable development).

In addition, the implementation of a mandatory speed limit as the currently only effective measure in this area would enforce Spanish national laws that apply to the Economic Exclusive Zone (EEZ) with the aim of safeguarding biodiversity. Specifically, the Royal Decree 1727/2007 aims to protect cetaceans from any disturbance or physical harm caused by vessels (except for civil protection activities, maritime rescue and pollution control, maritime and air public safety and national defence, which will be governed by their specific regulations, as stated in art. 3.6), establishing that the rights of free navigation and innocent passage will be exercised under the terms provided for in international law, although foreign vessels must comply with the measures decreed for the protection of cetaceans (art. 3.7). Therefore, it is important to consider that collisions with cetaceans and also, in certain cases, the emission of underwater noise, may involve a violation of the measures established in Royal Decree 1727/2007.

In conclusion, besides being an environmentally necessary measure to protect endangered sperm and fin whale populations within the context of Spain's environmental jurisdiction over the Cetacean Migration Corridor, a mandatory reduction of vessel speed does not interfere with the right to navigation in the Exclusive Economic Zone.

### **The problem of underwater noise**

Underwater noise caused by human activities has been recognised in numerous scientific studies, but also by EU law and multi-environmental agreements such as ACCOBAMS and Convention on the Conservation of Migratory Species of Wild Animals (CMS) as a critical pollutant negatively affecting global marine ecosystems and marine wildlife.<sup>xxv</sup>

Negative impacts of underwater noise have been documented on some 150 marine species, ranging from marine mammals (47 species) to fish (66 species) and invertebrates (36 species), with even tiny organisms like zooplankton being affected.

Underwater noise is a form of pollution that has transboundary impacts, making it particularly difficult to manage in marine protected areas. The European Union Marine Strategy Framework Directive (MSFD, 2008/56/EC) has acknowledged underwater noise as one of the 11 Descriptors that Member States have pledged to regulate in order to attain Good Environmental Status (BEA). Deliberate disturbance of species, including all cetaceans, listed in Annex IV of the European Union Habitats Directive (92/43/EEC), is forbidden. Underwater noise can also be qualified as a kind of disturbance.

Sound travels nearly 5 times faster underwater than it does in the air. It is also not linear, but travels in all directions. Underwater noise generated by human activities is commonly classified into two types: impulsive and continuous. Impulsive underwater noise is typically composed of short, powerful bursts of extremely loud sound that are repeated over a period of time. This noise is produced by geophysical surveys, such as hydrocarbon research and exploration with air guns, military active sonar systems, and industrial construction operations, such as pile driving.

Continuous noise typically manifests as a persistent, low-frequency sound, and it is mostly caused by shipping, offshore oil and gas production, and offshore wind farms.

Globally, commercial shipping is a major contributor to underwater noise, especially as more than 80% of global trade (by volume) is conducted by sea.

The European Maritime Transport Environmental Report (EMTER) of the European Maritime Safety Agency (EMSA) and the European Environment Agency (EEA) published in September 2021 states that, between 2014 and 2019, underwater noise emissions doubled in all European seas.<sup>xxvi</sup>

Ships typically emit low-frequency sounds when sailing. The primary cause of this is the cavitation phenomena generated by the propellers. Cavitation refers to the creation of tiny vapour bubbles in the water, which then implode, resulting in audible pressure waves. Cavitation in propellers can result in component damage and reduced performance, in addition to generating significant noise.

The underwater noise produced by shipping creates a permanent and constantly increasing “acoustic fog”, a phenomenon called “masking”. This “acoustic fog” masks natural sounds and alters the behaviour of marine animals. It can interfere with the frequencies used by various types of whales, dolphins, seals, fish and other marine animals in their vital activities, such as the call of a mate, or detecting prey or predators. All these impacts, together with stress, displacement from important habitat and panic, can affect reproduction and growth rates, in turn influencing even the long-term welfare of the population.

There are several options for reducing underwater noise, with the most effective being to reduce noise emissions at the source. Such options can be technical, as well as operational and practical. Regarding impulsive noise from hydrocarbon prospecting, the most effective is certainly to abstain from engaging in this activity, which only aggravates the climate crisis. When it comes to continuous noise from shipping, the primary focus must be on reducing cavitation caused by the propeller (optimising propeller design, properly adapting it to the hull and the usual operating conditions, improving wake flow around the hull ahead of the propeller, and proper maintenance), which frequently also improves efficiency.

Nevertheless, the most efficient and readily implementable solution is to practise slow steaming. By decreasing the speed of ships, there will be a corresponding decrease in underwater noise emissions, along with other positive environmental advantages.

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