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ADDRESSING MORTALITIES AND INJURIES TO CETACEANS FROM SHIP STRIKES IN THE MEDITERRANEAN

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Presented by Simone Panigada, Chair of the Scientific Committee

Issue: addressing mortalities and injuries to cetaceans from ship strikes in the Mediterranean

1. Action requested

The Scientific Committee is invited to:

a) **review** this document addressing mortalities and injuries to cetaceans from ship strikes in the Mediterranean;
b) Provide **advice** and **recommendations** regarding ship strikes issues, especially on the development of a protocol for investigating and documenting ship strikes injuries and mortalities.

2. Background

In the framework of the Resolution 7.12 (Ship Strike) and in line with the Work Programme 2020-2022, the Secretariat requested the Scientific Committee to monitor/assess high-risk areas for ship strikes (CCH) in the Mediterranean Sea by:

- developing a protocol for investigating and documenting ship strikes injuries and mortalities;
- identifying high risk areas for ship strikes (CCH) in collaboration with the Task Manager regarding the Protected Areas for Cetaceans;
- evaluating the feasibility and develop a “whale safe” certificate to be delivered to shipping companies adopting suggested mitigation measures to reduce ship strike risk.

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Background information

ACCOBAMS and the International Whaling Commission (IWC) have recognized the problem of ship strikes and have been working together to develop a better understanding of the issue and to develop effective mitigation measures, *inter alia*, within the ACCOBAMS area.

A Working Group (WG) with an according Steering Committee (SC) was established under the auspices of the ACCOBAMS Scientific Committee to ensure that the recommendations of the workshops and the resolutions from the Meeting of the Parties are acted upon. The SC and WG will work in close contact with the ACCOBAMS Secretariat, the IWC, the Pelagos Sanctuary and other relevant experts.

An early focus for the WG should be to liaise with riparian nations and other to obtain information concerning both cetaceans and vessel traffic, that will enable the identification of areas for cetaceans (especially fin and sperm whales) where they are (or are potentially) susceptible to ship strikes (based upon models of risk that incorporate information on whale and vessel distribution and predictions of collision rates). On this basis, it will be better able to determine where, and what kind of mitigation measures can be taken.

This will be achieved by:

- reporting and mapping of vessel movements and shipping density at appropriate geographical scales, including estimates from vessels not required to transmit AIS signals;
- collaboration with maritime companies and vessel operators, involving both bottom-up (i.e., awareness, involvement) and top-down (i.e., regulatory) approaches;
- mapping the temporal and geographic distribution and abundance of cetaceans in relation to similar information on vessel traffic to identify potential higher risk areas;
- estimation of numbers of ship strikes including data from:
    - stranding networks (including detailed necropsies);
    - photo-identification studies (photographs may contain evidence of non-lethal encounters with vessels);
    - data collected by the IWC ship strike database;
- modelling exercises to assess the level of risk and potential conservation implications.

The ultimate objective for ACCOBAMS is to collect enough information to allow a robust assessment of the extent of ship strikes within the agreement area, and develop and evaluate effective mitigation measures. Ship strikes are a potential concern for both cetacean welfare and conservation, and in some cases also from a human safety perspective. These factors will all be taken into account when assessing priority for mitigation measures, but measures will be especially directed at areas/species where there are serious conservation implications.

The work carried out by the SC and WG will lead to the creation of a Mediterranean network, including ACCOBAMS Range States, ACCOBAMS Partners, the IWC, different research institutes, and concerned shipping companies to contribute to the central database on ship strikes developed by the IWC, to facilitate information exchange and data sharing.

Link with the Scientific Committee and IWC Ship Strike Working Group

A strong link with the Ship Strike Working Group (SSWG) of the IWC has been established in order to use the same online database developed by the SSWG and to follow the recommendations of the previous joint workshops.

Key components of the work of the IWC involve better communication with stakeholders (e.g., shipping companies), direct involvement of shipping in mitigation initiatives, and increased reporting of collision incidents via regional initiatives and especially the global ship strikes database (https://iwc.int/ship-strikes). This will lead to an increased effort in this regard within the ACCOBAMS area.

Such efforts shall include:

(1) promotion of the issue and the importance of reporting via a number of fora, including specialist marine press;
(2) further evaluation and dissemination of information on mitigation approaches;
(3) additional co-operation with the International Maritime Organization (IMO) (and its MEPC) both via IWC and CMS agreements, but also through initiatives with member states (the most appropriate mechanism for IMO action);
(4) improved protocols for the identification of ship strikes via necropsies;
(5) investigation of incidences with regard to the nature of ship strike injuries within photo-identification studies (e.g., ship strikes project funded by the Pelagos Agreement);
(6) encourage studies that improve access to the temporal and spatial distribution of shipping, particularly vessels that do not transmit AIS information;
(7) encourage studies that improve our understanding of the temporal and spatial distribution of cetaceans within the region, including telemetry studies;
(8) encourage studies to develop and evaluate mitigation measures, incorporating *inter alia* results from (6) and (7) above, recognizing that appropriate measures will need to be specific to an area but that changes to shipping may also impact on other areas.

This working group should continue to work to collate information and reports on relevant studies within and outside the ACCOBAMS area. It will foster collaboration with ASCOBANS, CMS and IMO and develop priority actions and studies, including the consideration of a project to develop a standard training module to be used to train naval crews to improve knowledge on cetaceans and potential mitigation and avoidance measures.

IWC Strategic Plan to Mitigate the Impacts of Ship Strikes on Cetacean Populations: 2022-2032

The International Whaling Commission (IWC) is the primary international body responsible for the conservation and stewardship of large whales, and it is addressing the problem of ship strikes through its Scientific (SC) and Conservation Committees (CC). Reducing ship strikes is a priority for both Committees, and so at IWC57 in 2005 the IWC established a Ship Strike Working Group (SSWG) under the CC. Understanding when, where, how and why vessels collide with cetaceans is important in developing appropriate mitigation to reduce the occurrence of these events. The IWC is focusing efforts on obtaining data to allow a quantitative evaluation of the problem in order to target mitigation efforts. The SSWG, along with a number of partners, has developed a standardised global database of collisions between vessels and whales to collect global data on ship strike events. It is not only a depository for existing information but, an ongoing online facility for collecting new information.

The overall aim of the SSWG is to raise awareness of the need for action on ship strikes at both a national and international level and to promote the development and use of effective tools to tackle the issue. It is envisioned that

the SSWG will be developed in to three interrelated components: a Data Manager in the IWC Secretariat; the Working Group (WG) on Ship Strikes under the Conservation Committee (CC) and an Expert Panel to advise both the Data Manager and the WG. In addition, the Data Manager will be advised by the existing Data Review Group on accurate and timely recording of data to the Ship Strikes Database.

The Ship Strikes Strategic Plan describes the direction of activities intended to reduce the threat of ship strikes with cetaceans in the near and distant future. The strategy is based on a collaborative approach - with a strong intent to continue to work with others to complement and add value wherever possible to existing initiatives. Within the IWC context, the WG on Ship Strikes will work to capitalise on links with other work areas, including the work of the Scientific Committee, and with individual initiatives such as Whale Watching, Conservation Management Plans and the Strandings Initiative. Externally, the IWC will seek to maintain strong collaborations with other relevant international organisations, non-governmental organisations, industry and the scientific community working on shipping research and management, to advance the implementation of the IWC's ship strike strategy, capacity development and the conservation of cetaceans and other taxa.

Identify High Risk Areas

A High Risk Area is defined as the convergence of either areas of high volume of shipping and whales, or high numbers of whales and shipping. Areas of high volumes of shipping include designated shipping lanes, historic shipping routes and port approaches. Areas of high numbers of whales include areas where whales aggregate, whales are known to return in numbers on a regular basis, or critical population areas or habitats. As used herein, the term "High Risk Area" is a relative term with no specific threshold assigned to its use. It is important to minimize the impacts of ship strikes particularly when vulnerable populations are involved or ship strikes could adversely impede population growth of large whales.

A global approach is led by ACCOBAMS through the definition of new Cetacean Critical Habitat (CCH) at the ACCOBAMS area level. Mapping high risk areas for fin whales and sperm whales towards marine traffic of large commercial vessels is one of the objectives. Such map is the first step in identifying and/or confirming locations at the ACCOBAMS level where ship strike threat occurred.

For each location identified, the Ship Strike Working Group should work with IUCN MMPA TF to develop proposals (taking account of the Stages given in Table 1) for ship strike reduction measures specific to that region over the next three years. The IUCN MMPA TF has already begun this work and the work was endorsed by the Commission at its 65th meeting in September 2014 (IWC/65/Rep01).

Table 1. Stages in identifying high risk areas and developing appropriate mitigation strategies

Stage 1	High risk area of potential concern identified based on overlap of shipping and whale distribution or a high number of reported incidents.
Stage 2	Survey data for whales, AIS data for shipping used to inform risk analysis and local vs international jurisdiction.
Stage 3	Consideration of possible practical options based on risk analysis. Recommendations from IWC Scientific Committee, IWC approaches relevant states to offer information and advice.
Stage 4	Stakeholder workshops to discuss possible mitigation measures and optimize risk reduction with stakeholder interests.

Stage 5	Relevant states consider proposals to IMO assisted by supporting information from IWC.
Stage 6	Measures implemented through IMO.
Stage 7	Continued monitoring to evaluate ongoing effectiveness of measures.

High Risk Areas, where ship strikes are common in the ACCOBAMS Region:

1. Strait of Gibraltar - fin and sperm whales (de Stephanis and Urquiola, 2006) [Recommended seasonal speed restriction in place through IMO, next action Stage 7]

The Strait of Gibraltar is an area of high vessel traffic, most commonly transited by ferries, fast ferries and cargo ships. A new commercial harbour, built in 2007, has shifted traffic to cross directly through sperm whale feeding grounds. Sperm and fin whales are the most vulnerable cetacean species to ship strikes in this area (de Stepanis and Urquiola, 2006). Details can be found in the report of the Joint ACCOBAMS/Pelagos Workshop on Large Whale Ship Strikes in the Mediterranean Sea.

2. Balearic Islands - fin and sperm whales

The main shipping routes radiating from Ibiza, Mallorca and Menorca towards the Gulf of Lions, Valencia and Alicante constitute one of the top High Risk Areas for interactions between shipping, and especially fast ferry lines, and whales. Studies conducted by Alnitak (e.g., Cañadas et al., 1999; Cañadas et al., 2000; Cañadas et al., 2005) highlight the relevance of the waters around these islands for cetaceans and particularly sperm and fin whales. Reports of collisions in all three islands and the intensity of ferry traffic clearly highlight the need for intensified monitoring and mitigation efforts. Spain has been conducting pilot monitoring studies using AIS data.

3. Balearic Basin and Catalan Coast – fin and sperm whales

Presence of fin whales during spring along the Catalan coast, Northeastern Spain, has been monitored over the last eight seasons with daily surveys during the months of March to beginning of June collecting data on presence, photo-identification, behavioural, oceanographic studies, biological sampling, and drone footage. The Fin Whale Project is an initiative of the NGO EDMAKTUB (Asociación para el Estudio y Divulgación del Medio Acuático especialmente los cetáceos). This project, started in 2013, studies the and all aspects influencing the whales to stay in the area to feed.

High numbers of whales are sighted every year along the Catalan coast and at the end of the continental shelf. Most of the sightings are in waters below 200m depth. Feeding activity has been described based on behavior supported by drone footage. The Catalan coast, especially areas of less than 200 meters are highly transited by boats heading to or from Barcelona and Tarragona harbors. The feeding behavior of the whales mainly in superficial waters thus increases the high risk for collisions and deserves more attention and mitigation. Within the Balearic Basin the Spanish authorities have implemented the whale migration corridor (SPAMI) which is a pilot project that have the aim to protect cetaceans.

4. Eastern Alborán Sea - fin and sperm whales

This area constitutes one the main cetacean hotspots in Europe and the Mediterranean (Cañadas et al., 2005). Maritime traffic in this region is also extraordinarily complex and new ferry and fast ferry lines have raised concerns over the increased risk of collision with whales. New technological measures to mitigate risk in this area are of special interest given the positive momentum of cooperation between researchers, relevant authorities and the shipping

sector as a result of the reconfiguration of the Traffic Separation Scheme of Cabo de Gata and the Notices to Mariners in the Strait of Gibraltar (Tejedor et al., 2008). This task is currently being directed by the Spanish Ministry of the Environment, Rural and maritime Affairs (Fundación Biodiversidad).

5. Pelagos Sanctuary - fin and sperm whales [Next action Stage 4]

Panigada et al. 2006: from 1972 to 2001, out of 287 fin whale carcasses, 46 individuals (16.0%) were known to have been killed by vessel interactions. The minimum mean annual fatal collision rate increased from 1 to 1.7 whales/year from the 1970s to the 1990s. Fatal strike events (82.2%) were reported in or adjacent to the Pelagos Sanctuary, characterized by high levels of traffic, including High Speed Craft (HSC), and whale concentrations. Among 383 photo-identified whales, 9 (2.4%) had marks that were attributed to a ship impact. Near misses have been reported to occur frequently through an observer scheme on some of the ferries. The high likelihood of unreported fatal strikes combined with other anthropogenic threats suggests an urgent need for a comprehensive, basin-wide conservation strategy, including ship strike mitigation requirements, like real-time monitoring of whale presence and distribution to re-locate ferry routes to areas of lower cetacean density, and reducing ship speed in high cetacean density areas (Panigada et al., 2006). (See Joint ACCOBAMS/Pelagos Workshop on Large Whale Ship Strikes in the Mediterranean Sea).

A workflow for the identification of persistent presence of hot-spots of fin and sperm whales along intense-traffic corridors has been developed within the EU cross-border Interreg Italy-France Maritime 2014-2020 SICOMAR plus project. Using data collected from ferries, the analysis allowed for the identification of persistent areas along shipping corridors. Results are presented in Grossi et al. 2021. The existing FLT Med Network could be a basis for the development of the analysis along other corridors.

The risk of ship strike is the highest during summer months since they are the busiest in this area due to the passenger ferries that have all a speed above about 13 knots (Vaes et al. 2013). This risk also increases substantially in summer notably for fin whales with the contraction by a factor of three compared to winter of the potential core habitat (at Mediterranean level, Druon pers. Comm., last habitat model updated in Panigada et al. 2017). The seasonal distribution of the potential core habitat is detailed in Druon et al. (2012). The concentration of the fin whale population in a reduced core habitat and the more intense maritime traffic both largely increase the risk of ship strike during summer. This risk increases over time due to the rise of passenger traffic in the last 5 decades (e.g., from 1 to 7.5M for Corsica between 1965 and 2010, INSEE 2010).

6. Hellenic Trench, Greece - sperm whales (Frantzis et al., 2014, 2019)

Localized studies of sperm whales in the eastern Mediterranean suggest that distribution is highly concentrated within limited areas with low densities elsewhere. Long-term studies in the Hellenic Trench, which is a designated Important Marine Mammal Area (https://www.marinemammalhabitat.org/portfolio-item/hellenic-trench/), have suggested that SW of Crete and west of the Peloponnese are consistent areas of high concentrations of sperm whales, where ship strike mortalities are known to have occurred. Over 50% (15 out of 28) of sperm whale strandings examined between 1992 and 2021 along the coast of Greece showed clear evidence of ship strikes. The density of shipping - with major shipping routes – also suggests this should be classified as a High Risk Area. Given the high overlap of sperm whale sightings with shipping tracks, and the high incidence of evidence of ship strikes from stranded sperm whales, the Pelagos Cetacean Research Institute (PCRI) has been in dialogue on this issue with the Greek authorities during the last 7 years. In parallel, the IWC and a coalition between IFAW-WWF-OceanCare-PCRI have also initiated a dialogue with the Greek authorities and regional stakeholders (e.g., ACCOBAMS) on possible re-routing measures (e.g., IMO Traffic Separation Scheme - TSS). The Greek authorities have issued two NAVTEX Notices to Mariners – which appear in the pilot books - in 2021 informing mariners about the presence of whales in the area and describing the areas of highest risk.

Mitigation measures and ongoing efforts

Mitigation measures for ship strikes with fin whales have been discussed during dedicated IWC-ACCOBAMS workshops (Beaulieau sur Mer, 2010; Panama, 2014), during which different recommendations were discussed and suggested. Measures that separate whales from vessels (or at least minimise co-occurrence) in space and time to the extent possible are the most effective, where this is possible (e.g., routing schemes). 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. Speed reductions to 10 knots have been demonstrated to be effective (Vanderlan and Taggert, 2007; Conn and Silber, 2013; Laist et al., 2014).

Emphasis should also be placed on the collection and reporting of data to the IWC Global Ship Strikes Database which will both: (1) facilitate the proper evaluation, prioritisation and monitoring of ship strikes as a threat to various populations and regions; and (2) assist in the development of mitigation measures.

One of the key components of the IWC Ship Strikes Strategic Plan is to identify high risk areas for ship strikes; Important Marine Mammal Areas (IMMAs) represent a systematic and biocentric approach to identifying important habitats, and as such they can be helpful in identifying potential high risk areas for ship strikes. In particular, if an IMMA contains a species or population that is vulnerable to ship strikes, and it is transited by significant shipping, the area can be "flagged" for further investigation and potential mitigation.

The latest IWC-IUCN-ACCOBAMS workshop (Messinia, 2019) recommends the following steps are undertaken as part of a process to identify High Risk Areas for Ship Strikes based on IMMAs:

1. Traffic information (e.g., types of vessels, size, speed, flag, etc.): plotting major ship routes to see if they cross IMMAs which host significant or high density populations of species that are threatened and/or vulnerable to ship strikes.

2. Species information (e.g., Relative abundance, status, Animal Behaviour/seasonality/key lifecycle use in and within IMMAs).

3. Management and Mitigation.

The workshop recommended to further develop the process for the designation of a Particularly Sensitive Sea Area (PSSA) by IMO at a scale that includes the North-West Mediterranean Sea, Slope and Canyon IMMA, plus potentially the Spanish corridor, to take into account whale population movements and distribution. Zoning within the area with ship strike mitigation tools such as speed reduction and routing measures could be proposed as part of Associated Protective Measures within the PSSA.

Co-operation with IMO, other IGOs, national authorities, the shipping industry, port authorities and the whale watching industry is essential if effective mitigation is to occur. For example, through the CCH process, launched by ACCOBAMS, overlapping ongoing and known human threats and Important Marine Mammal Areas (IMMAs).

Recently two EU funded projects within the cross-border Interreg Italy-France Maritime 2014-2020 program have tackled the issue for ship strikes.

The SICOMAR plus project has realized the following actions:

- study of shipping corridors in the Pelagos Sanctuary (in progress);
- identification of high-risk areas along main shipping corridors (Grossi et al., 2021);

- course module for personnel and officers of command deck, realized in French, Italian and English and currently available as an e-Learning course. Three major shipping companies have participated to the training course distributed to their personnel;
- development of an alert system through AIS for the presence of cetaceans (actions developed by the Italian Coast Guard).

GIAS:

- installation of acoustic buoys to detect presence of sperm whales along the French Coast (action developed by the University of Toulon).

Early in 2022 the EU Life Project CONCEPTU MARIS will start. It will capitalize some actions conducted by SICOMAR plus foreseeing the actions for the mitigation of the risk of collision. Being ACCOBAMS in the Advisory Board of the Project, this initiative is ready to be used to the aims of this document. Specifically, actions directed to the implementation of a training course on risk of collisions, as well as awareness actions, are foreseen.

Actions from the three mentioned projects can be further capitalized and put into a network for their effective spreading in the ACCOBAMS Regions, as well as for the needed integration with other ongoing initiative (e.g., REPCET, FLT Mediterranean Network).

Whale-Safe DRAFT Program

Save the Whales from Ship Strikes

The problem

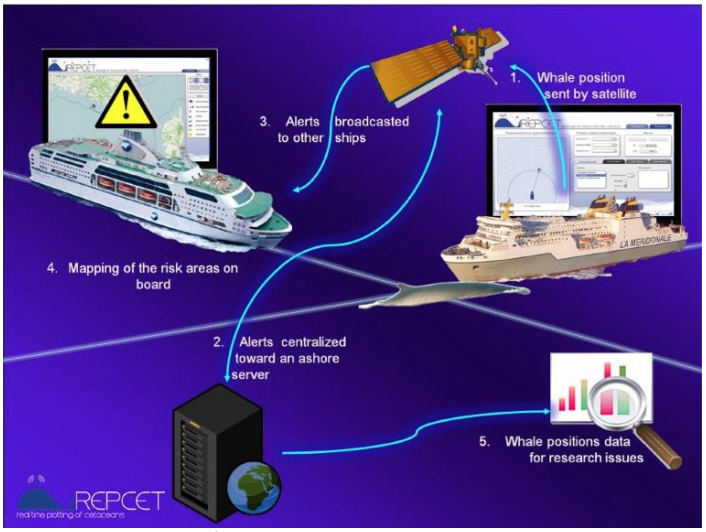
The increasing size of commercial shipping and cruise fleets and their increasing speed result in rising numbers of ship collisions with cetaceans, some of which can be deadly, and others cause serious injuries.

Ship strikes may be happening more frequently than previously suspected. Struck and killed whales and dolphins may not be found and big commercial ships may not actually detect a collision and report it to the relevant authorities.

As a consequence, the International Whaling Commission and other databases of ship strikes are investing a lot of effort to increase the information and experience lack of reporting from many of the major shipping and cruising vessels.

Countries are reluctant to propose changes to shipping lanes to the IMO and industry's actions to reduce ship strikes has proved slow and ineffective. As years go by, the fast growing shipping industry might be rapidly leading some whales populations near the brink of extinction.

The lack of available information on whales distribution is an additional problem as it makes it difficult to implement measures where needed and in a timely manner.



Whale-Safe Program

The international shipping industry needs to take immediate action to prevent ship strikes. ACCOBAMS, through a cooperation with Friend of the Sea and the Tethys Research Institute is suggesting a simple and effective solution.

Shipping companies need to engage unilaterally, by signing and adhering to a **Save the Whales policy**, to:

- have in place an onboard **full time marine mammal's observation program**, on all vessels. These systems must constantly cover the area in front of the vessels (120° minimum).
- Use an online platform onboard to **be receive real time information on sighted marine mammals near the shipping lanes and planned path (e.g., REPCET – Fig 1 © Miraceti)**.
- **Share whales' observations** in real time through an online platform to make this information available to all ships in the area and for statistical purposes.
- **Allow ACCOBAMS and Friend of the Sea and Tethys to access real time** data on company vessels and nearby marine mammals through the online platform.
- Have a **procedure in place to react** to and avoid nearby marine mammals.

- Have a procedure in place to increase alert levels (e.g., by slowing down, human observation, lane deviation, etc.) when crossing specific high risk areas, such as **Important Marine Mammal Areas (IMMAs).**

Compliance with the policy can be achieved by means of already implemented systems or Friend of the Sea, such as:

- oboard infrared cameras,
- marine mammals presence alert software
- a network reporting platform.

Figure 1: Sperm whale fluke on HD and Thermal Imaging camera

Friend of the Sea will promote Whales Safe approved shipping companies and cruise lines to consumers and companies worldwide, recommending use of their services.

Promotion will be carried out by means of international press releases, direct communication with companies, events, trade shows, social media.

Royalties Costs

The **yearly per vessel contribution** to the Friend of the Sea Save the Whales program is planned to be 5.000,00 Euros, in case the company can already provide evidence of implementation of equivalent Whale-safe systems.

Companies which do not yet have systems in place to cover project requirements, will incur in a total **monthly** cost of approximately 5.000,00 Euros covering:

- Registration to Friend of the Sea Save the Whales program
- International marine mammals alert platform (such as REPCETR for example)
- Thermal Imaging / HiDef Imaging Camera System (120°)
- RADES – Real-time Auto Distance and Range Estimation at Sea
- ADMM - Automated Detection of Marine Mammals

The cost excludes *una tantum* installation costs and product shipping costs. Additional costs apply for 360° camera coverage.

Whale-safe approved companies can also apply to the full Friend of the Sea Sustainable Fishing certification program. The Revenue from companies' registration will allow to cover costs for a Whales Safe project team in support of existing Friend of the Sea and Tethys's staff.