REVIEW OF EXISTING INITIATIVES TO PREVENT WHALE-SHIP COLLISIONS IN THE PELAGOS SANCTUARY AND ADJACENT WATERS

Report from the Pelagos “Collisions and Shipping” Focus Group (PCSFG)

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1. CONTEXT

At the COP 8 (December 2021), France, Italy and Monaco adopted a new Pelagos Agreement Management and Action Plan for 2022-2027. As part of the new strategy on international cooperation and stakeholders involvements, a new cycle of Working Groups (WG) began. These were created to support Parties in the implementation of some activities of the new Action Plan, including the work on "Collisions and shipping" coordinated by a Focus Group (which is a sub-group of the Mitigation of Impacts WG).

The Pelagos "Collisions and Shipping" Focus Group (PCSFG) is set to work on ~15 objectives and sub-objectives of the Action Plan. However, according to the latest decision by the Meeting of Parties (MOP9) in the current biennium the PCSFG will prioritise all aspects closely related to the recently designated North-Western Mediterranean Particularly Sensitive Sea Area (PSSA; cf. 80th Marine Environmental Protection Committee July 2023 of the International Maritime Organization).

1.1. OBJECTIVE OF THE REPORT

The present report aims at contributing to the *"Activity D-19c"* of the Action Plan: *"Inventory of existing technological measures to reduce collisions"*. However, the objective of this review was not limited to the identification of *"existing technological measures"*, but it was extended to reviewing existing initiatives that could directly or indirectly contribute to the mitigation of whale-ship collisions within the Pelagos Sanctuary and in adjacent waters, including existing national and international legislation, scientific studies and tools, outreach and training campaigns, etc.

The added-value of this report is the sharing of knowledge within the PCSFG to build an effective cooperation network and a participatory process within this group in the current biennium to update Pelagos Parties on shipping and collisions matters.

This document will also complement the results of the two recently funded consultancies on "Assessment of the distribution of maritime traffic and shipping-related underwater noise in the Pelagos Sanctuary" (Call 2) and "Sustainable ports in Pelagos Sanctuary" (Call 5).

1.2 METHODOLOGY

An online form was created on the Pelagos SharePoint to allow members of the PCSFG to fill it with information on existing initiatives. These initiatives include research projects, technical solutions, management solutions, awareness raising campaigns, laws, agreements, etc., which may directly or indirectly contribute to the reduction of the collision risk within the Pelagos Sanctuary and adjacent waters. The present report is based on the information received and gathered by the PCSFG coordinator.

The report contains blue boxes containing pieces of information gathered by the French Working Group on collisions (FWGC). The FWGC organized a workshop at the end of 2023 to discuss technical solutions and provided some additional information that are reported in these boxes.

1.3 RESULTS OVERVIEW

Table 1 provides an overview of subjects and the geographical scales of the identified initiatives. As illustrated, most listed initiatives are focused on cetaceans in the Pelagos Sanctuary or in the north-western Mediterranean Sea (i.e., within the PSSA perimeter). Other broader initiatives which also contribute to mitigate collisions are listed. For instance, some projects target marine megafauna or shipping related features (e.g., ship emissions) in which proposed measures can help reduce ship strike while not being the primary objective of the project.

Table 1. Summary of the whale-ship collision mitigation initiatives listed by the PCSFG.

SUBJECTS	AREAS			
	Pelagos Sanctuary	North-western Mediterranean	Mediterranean	North Atlantic and Mediterranean
Cetaceans	5	6	1	
Marine megafauna			3	1
Shipping features		1	2	

In the next sections, we re-organized the initiatives within the following class: a) existing legal framework and management tools, b) operating tools and c) research projects relevant to the issue of whale-ship collisions.

1.3.1 EXISTING LEGAL FRAMEWORK AND MANAGEMENT TOOLS RELEVANT TO THE ISSUE OF WHALE-SHIP COLLISIONS

1.3.1.1 GLOBAL LEVEL

1.3.1.1.1 International Maritime Organisation (IMO)

The International Maritime Organisation (IMO) objectives are «*to provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution* from ships». IMO has several regulatory tools that are applicable also in the context of marine ecosystem conservation. The environmental aspects of shipping are considered by the Marine Environment Protection Committee (MEPC) and the Sub-Committee on Pollution Prevention and Response (PPR).

IMO regulatory measures include pollution prevention, pollution preparedness and response, ballast water management, biofouling, anti-fouling systems, Special Areas under MARPOL, Particularly Sensitive Sea Areas (PSSA), etc. Other IMO regulatory tools that can be applied to environmental protections are, for example, Traffic Separation Schemes (TSS), Areas to Be Avoided, precautionary areas, other ships' routing tools, pilotage, etc. PSSAs are areas that need special protection because of their recognised ecological, socio-economic or scientific reasons and that may be vulnerable to damage by international shipping activities. A characteristic of PSSAs, compared to other protection schemes in place (e.g., EU Habitat Directives Natura 2000 sites), is that they need to specify associated protection measures before they are established. These measures are often of mandatory nature, and they apply to any ships whatever their flag is.

In July 2023, thanks to a multilateral effort between France, Italy, Monaco and Spain, and with the support of the Pelagos Agreement, IWC and ACCOBAMS, the IMO MEPC approved the establishment of a PSSA in the North-Western Mediterranean to protect particularly fin and sperm whales from collisions with ships. The perimeter of this PSSA corresponds to a big portion of the north-western Mediterranean coast, extending from the eastern boundary of the Pelagos Sanctuary and to the southern boundaries of the Spanish Whale Migration Corridor and the eastern Spanish coast (Figure 1).

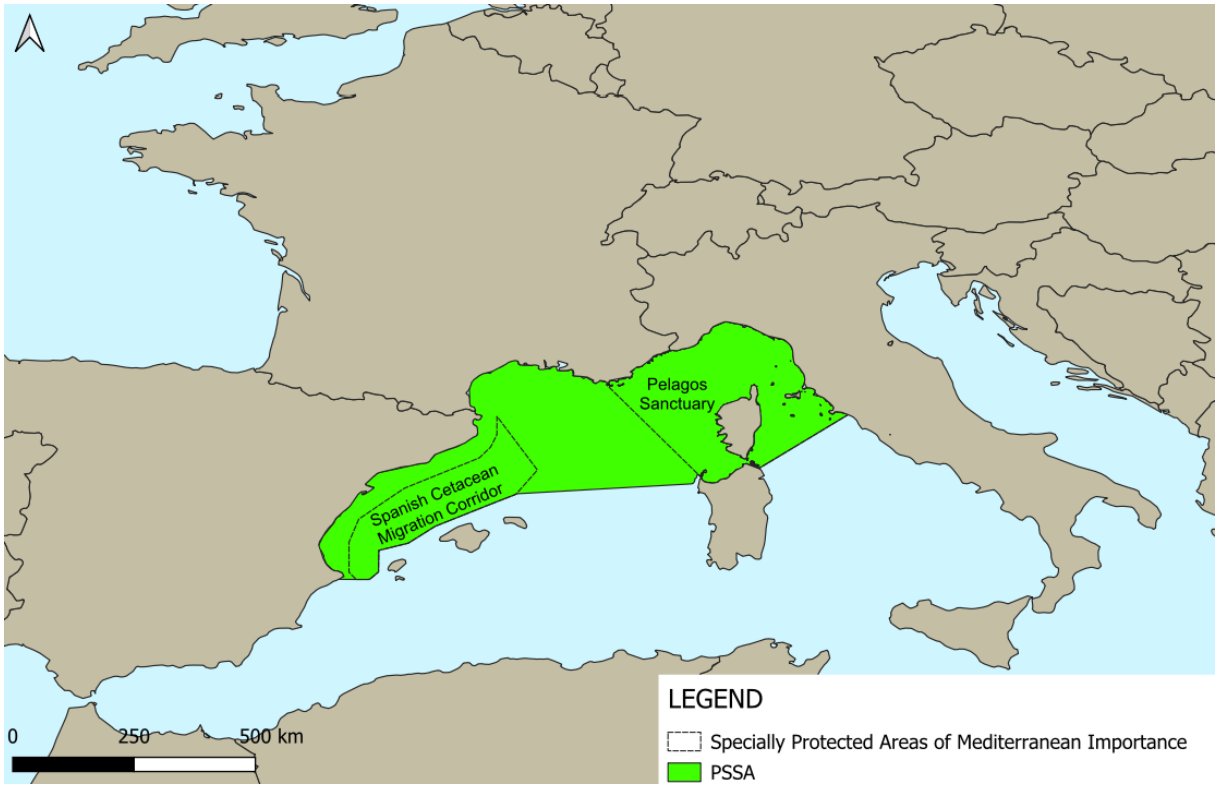

Figure 1. North-Western Mediterranean PSSA. Sources: Sèbe et al., 2023, IMO, 2023

The Associated Protective Measures (APM) agreed within the NW Mediterranean PSSA are the following:

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

France, Italy, Monaco and Spain also agreed on a set of potential associated prospective protective measures, including: *"1. the implementation by the riparian States France, Spain, Italy and Monaco of a Memorandum of Understanding to harmonize and facilitate the collection of data within the NW Med PSSA with the aim of better informing ships on the presence of cetaceans and implementing incentive measures to ships following the PSSA's recommendations to protect cetaceans; 2. to encourage the development of information for seafarers/ship operators through navigational*

warnings, in the future also in digital format through the NAVDAT system; and 3. to encourage the riparian states to review the adopted measures after a certain time to assess their effectiveness, and the opportunity to implement new operational measures at national and international level in order to limit the pressures generated by the maritime traffic on medium and large cetaceans". The active engagement of these four countries in implementing these three points is crucial to achieve an effective PSSA in this region.

The MEPC has also recently designated the whole Mediterranean Sea as an Emission Control Area (ECA) for Sulphur Oxides and Particulate Matter, under MARPOL Annex VI. In ECAs the limit for sulphur in fuel oil used on board ships must be 0.10% mass by mass (m/m), while outside these areas the limit is 0.50% m/m. These new limits will take effect from May 1st 2025. Knowing that speed reduction in general reduces gas emission and whale-ship collisions, the ECA designation may favour whale protection regarding collisions, as stated in the PSSA proposal.

1.3.1.1.2 International Whaling Commission (IWC)

The International Whaling Commission (established in 1946) is the global body (88 member countries) responsible for management of whaling and conservation of whales. The IWC work programme also covers bycatch & entanglement, ship strikes, ocean noise, pollution, marine litter, and sustainable whale watching.

In regard to the whale-ship collision issue, the IWC holds a Global Ship Strikes Database, which receives data from various sources, including the newly established NW Mediterranean PSSA. The work in this area is coordinated by the Ship Strikes Standing Working Group through a biennial strategy and workplan.

1.3.1.2 REGIONAL LEVEL

1.3.1.1.1 Mediterranean Action Plan of the United Nations Environment Programme (UNEP MAP) & Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC)

The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC) is administered by the IMO in cooperation with the Mediterranean Action Plan of the United Nations Environment Programme (UNEP/MAP). REMPEC's objective is to contribute to preventing and reducing pollution from ships and combating pollution in case of emergency, by assisting Mediterranean coastal States in ratifying, transposing, implementing and enforcing international maritime conventions related to the prevention, preparedness and response to pollution from ships. REMPEC holds a database of shipping-related accidents including ship collision events within the Mediterranean Sea.

1.3.1.1.2 ACCOBAMS

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) is a multilateral cooperation tool (among 24 Contracting Parties) aiming to reduce threats to cetaceans by improving current knowledge on these animals. Entered into force 2001, ACCOBAMS is a tool that can contribute greatly to improving knowledge on Mediterranean and Black Sea cetaceans, as demonstrated by the ACCOBAMS Survey Initiative (ASI). ASI was the first multi-species and multi-taxa survey carried out at regional scale.

Regarding whale-ship collisions, ACCOBAMS cooperates with the International Whaling Commission (IWC) Global Ship Strikes Database and participates in discussions on monitoring and mitigation of cetacean ship strikes. Particularly relevant to this topic are Resolutions 7.12 and 8.18.

1.3.1.3 SUB-REGIONAL LEVEL

1.3.1.3.1 The Agreement on the creation of a Sanctuary for Marine Mammals in the Mediterranean Sea

The Pelagos Sanctuary is the only international Specially Protected Area of Mediterranean Importance (SPAMI). The Sanctuary was established via a trilateral Agreement between France, Italy and Monaco (signed in 1999; effective since 2002) to ensure a higher level of protection to marine mammals and their habitats in a portion of the north Mediterranean (north Tyrrhenian/Ligurian sea, part of the Gulf of Lion). The main objective of the Pelagos Agreement is to promote harmonised actions and management measures for the protection of marine mammals and their habitats against all causes of anthropic disturbance and mortality (e.g., pollution, noise, accidental capture, injury, etc). This Agreement has also a strong focus on prevention of deaths caused by collisions with ships (see Articles 9 and 12.2b). In accordance with this focus, several objectives of the Pelagos Agreement Action Plan 2022-2027 target the reduction of ship strikes and the Agreement brings financial and technical support to relevant projects.

1.3.1.4 NATIONAL LEVEL

Within the Pelagos Sanctuary there are national legislations and/or regulations that contribute to directly or indirectly reducing whale-ship collisions.

The French Environmental Code states as follows:

Article L334-2-2

"A position sharing system aimed at avoiding collisions with cetaceans equips:

1° State vessels of a length greater than or equal to 24 meters which do not participate in national security or defense activities;

2° Cargo vessels of a length greater than or equal to 24 meters […];

3° Passenger ships of a length greater than or equal to 24 meters […]

Which fly the French flag, when they sail in the sanctuaries for marine mammals located in the Pelagos and Agoa marine protected areas […]."

Article L334-2-2

"A shipowner […] is punished with a fine of €30,000 for operating a vessel mentioned in 2° or 3° of article L. 334-2-2 of this code, without having equipped it with the device mentioned in the same article L. 334-2-2".

Article L334-2-2

"It is punishable by a fine of €30,000 for equipping a vessel used to offer commercial excursions including marine mammal observations with a position sharing device aimed at avoiding collisions with cetaceans."

Article R334-39

"Vessels having carried out less than ten navigations during the previous calendar year within the perimeter of the Pélagos marine protected area or the Agoa marine protected area are exempt from the obligation to equip themselves with sharing system positions aimed at avoiding collisions with cetaceans. […]"

Article R334-39

With a view to ensuring the effective sharing of cetacean positions between vessels subject to the obligation provided for in Article L. 334-2-2, the position sharing system aimed at avoiding

collisions with cetaceans mentioned in this article meets technical characteristics and requirements in terms of:

1° Compatibility with any vessel subject to the equipment obligation;

2° Accessibility and interoperability of cetacean position data collected, in real time, regardless of the device used;

3° Identification of equipped vessels. […].

In addition to ship strike related regulations, the destruction or the disturbance of protected species, such as marine mammals, is forbidden through Article L411 to L415 from the French Environmental Code. Sanctions may go as far as a 150 000€ fine and 3 years of jail time.

Regarding Italy, the most relevant legislation is the following:

- Articles 9 and 41 of the ***Italian Republic Constitution*** that states that the Republic "*protects the environment, biodiversity and ecosystems, also in the interest of future generations. State law regulates the methods and forms of animal protection*" and that the "*private economic initiative* […] ***cannot take place*** […]*in a way that could damage* […] *the environment*".
- The ***Italian ratification law of the Agreement for the Pelagos Sanctuary*** (Law no. 391/2001) that prohibits competitions of high-speed motorboats within the Pelagos Sanctuary.
- National Marine Protected Areas designated under L. 394/91 include boat speed limits below 10 knots in different zones.

In addition, cetaceans are protected since 1992 under L. 157/92, which includes pecuniary sanctions for voluntary killings.

Finally, in the context of the newly established NW Mediterranean PSSA, France, Monaco, Italy and Spain are engaging in the definition of a Memorandum of Understanding to implement more effectively the provisions contained in Article 12.2b (see section 1.3.1.1.1 for more details).

1.3.2 OPERATING TOOLS TO REDUCE WHALE-SHIP COLLISIONS

1.3.3.1 REPCET®

The "REPérage en temps réel des CETacés" device is an on-board computer system able to monitor whale positions thanks to a 10 years collaboration with shipping companies, environmental actors and engineers. Its aim is to limit the risk of ship strikes, one of the leading causes of accidental mortality of large cetaceans. The REPCET® system allows reporting, sharing and receiving in real time the sighted cetacean positions within a network of subscribers. In 2016, Souffleurs d'Ecume estimated the cost of the REPCET device from 300 to 350 euros per month per ship.

The evaluation of the device showed that system efficiency in reducing the number of collisions and near-miss events for the 21 vessels equipped in 2018 was below 1%. In 2021, 37 ships crossing the Pelagos Sanctuary are equipped with the device. Equipping all vessels crossing the area would improve the efficiency of the system by 19% (i.e., maximum efficiency value of the REPCET device).

The NGO Miraceti (ex-Souffleur d'Ecume) manages the REPCET device.

1.3.3.2 EFFISTRIKE

EFFISTRIKE is a tool available via the OceanPlanner web interface, accessible to non-experts, which aims at evaluating the effectiveness of maritime traffic regulation measures on collisions. Based on existing AIS data, it makes it possible to predict the evolution of maritime traffic and anticipate different scenarios. For example, it is possible to simulate speed limit zones, exclusion zones, or traffic separation devices. Thanks to existing studies on the abundance of fin whales and sperm whales, and on the probability of lethal injury depending on the speed of vessels, the tool is able to predict the number of collision situations, the number of probable fatal injuries, and the economic cost of measures. The project is developed by Quiet-Oceans, WWF and the French Biodiversity Agency.

Output from the FWGC workshop

- The tool can be adapted to other species than fin whales, but additional data on these species is required;
- The integration of ACCOBAMS Survey Initiative data could improve the tool.

1.3.3.3 SICOMAR PLUS

The Italy-France Marittimo Interreg project SICOMAR PLUS (2018-2021) aimed to setup a cross-border system for safety at sea against navigation risks and for the protection of the marine environment. One of the SICOMAR PLUS tools was the "BONIFREP" software module on the PELAGUS system (reporting system for the Bonifacio Strait PSSA) enriched by the cetacean sighting software module called "**Marine Mammals Sightings**". The software application called "BONIFREP" takes its name from the ship reporting system (Mandatory Ship Reporting System), which is mandatory for all ships of gross tonnage greater than or equal to 300 tons that cross the Strait of Bonifacio. The software application is equipped with a specific section on the Web interface of the Pelagus System supports the compilation of the BONIFREP form as required the IMO Resolution MSC.73(69) of 19 May 1998 (Annexes 2-10) on "Description of the Mandatory Ship Reporting System in the Strait of Bonifacio". Such reporting system take advantage of AIS data acquired from the national network and made available to the Pelagus System. This module was enriched by a software extension called "Marine Mammals Sightings", which can be used to monitor and alert on the presence of cetaceans, in order to reduce the risk of collision with cetaceans within the Pelagos Sanctuary. The extension provides a visualization on the GIS of the Pelagus System of the sighting event (location, GDO, cetacean species and numbers, details of the contact who sighted the cetaceans, etc.). It also allows ASM AIS messages such as "*Area Notice addressed – Caution Area: Marine mammals in area*" (as per IMO Circular SN.1/Circ.289), through the national AIS network with coverage in the area. AIS messages are of the addressed type, i.e. directed only to ships present within a given number of nmi (e.g., 10-20nmi) and are available for specific period of time (e.g., 1-2 hours).

During the PSSA discussion, Italy has proposed to improve and implement this approach because, compared to the REPCET system, this is meant to be an extension of the regular AIS/mapping interfaces already mandatory on all ships. Therefore, it would simplify the adherence by all shipping companies.

1.3.3.4 LIFE SEADETECT

The goal of SEADETECT is to build the best automatic detection system for cetaceans and UFOs to prevent collision with ships. Several objectives (tasks) are fixed:

- Task 1: DETECT BOX
- Task 2: P.A.M
- Task 3: Demonstration

- Task 4: integrate cetacean behaviour
- Task 5: Promote awareness

The pilot phase was installed on a ship from the "La Méridional" shipping company. The project will end in 2025.

The project includes the following stakeholders: Naval Group, NexVision, QuietOceans, Greenov, Onera, Diadès Marine, Bureau Veritas, La Méridionale, Ghent Univ, Museum Natural Sciences (Belgium), Tethys.

Output from the FWGC workshop

- The detection range is about 1 km, which gives time to ships to avoid collisions;
- The project also aims to develop an underwater detection system through passive acoustics.

1.3.3 EXISTING RESEARCH PROJECTS RELEVANT TO THE ISSUE OF WHALE-SHIP COLLISIONS

In this section, we highlight research projects aiming at improving the knowledge on specific aspects of the whale-ship collision phenomenon and/or increase awareness among the general public and, more importantly, mariners.

1.3.3.5 BOMBYX, SEASTEMAR, ETHAC AND EUROPAM

The BOMBYX project is a collaborative interdisciplinary study on various subjects, such as biodiversity or anthropic noise pollution led by the LIS laboratory of the Toulon University. One of the main focuses of the project is the detection of marine mammals using Stereo to five-channel sonobuoys. BOMBYX is a long-term acoustic monitoring of whales, dolphins and boat noise carried out in Port-Cros National Parc / Cote Azur since 2014, allowing several studies

SEAsteMAR (Italy-France Marittimo Interreg project) is led by ARPAL, Italian coast Guard, LIS Toulon University, Lamma and CIMA. It is the capitalization of SICOMARplus and GIAS projects and it foresees:

1) Further implementation of the tool implemented in SICOMARplus, with test phases
2) The automatization and further implementation of Bombyx,
3) The creation of an Italo-France Working group with the aim of developing a catalogue of maps and indicators to be included in the alert systems. Risk maps developed in the SICOMARplus project (Grossi et al, 2020) for specific routes will be further updated. Data collected from tagged Cuvier's beaked whale in the GIAS poject will be further analysed to assess exposure of species to marine traffic and measure response behaviour, to develop suitable indicators that will be included in the catalogue
4) The definition of a shared strategy for the adoption of common measures. The Project will run from 03/2024 to 02/2027.

ETHAC project, led by Toulon University / PACA Region, adds 2 Bombyx buoys in Pelagos Sanctuary / PACA Region. The Project will run from 2023 to 2026.

EUROPAM (BIODIVERSA+) is a research project that proposes comparative spatio-temporal acoustic survey of megafauna biodiversity, and its management at a European scale. EUROPAM is based on innovative scientific instrumentation and algorithms, the so-called Bombyx sonobuoys, to increase the knowledge of anthropogenic impacts on marine life. The project is conducted on a wide scale that

allows comparison between locations and types of disturbances, and also between some population segments. It is composed of researchers from many different fields, making the project federative and multi-disciplinary.

EUROPAM aims to increase the knowledge of anthropogenic impacts on marine megafauna through passive acoustic monitoring, on a wide scale that allows comparison between locations and sources of disturbances, and between population segments of e.g. sperm whales. The cornerstones to achieving the goals will be:

- Objective 1: a comparative continuous passive acoustic monitoring in the Mediterranean Sea, in the Azores Atlantic Ocean, and offshore Norway, for an equivalent of 23 000 km2;
- Objective 2: to compare marine soundscapes from the European Arctic to the Mediterranean Sea, and from relatively quiet marine protected areas to areas under strong human activity pressure;
- Objective 3: to develop innovative Artificial Intelligence to describe and model marine soundscapes and their natural patterns (daily and seasonal) that allow us to build and feed a marine soundscape repository in the cloud;
- Objective 4: a strict protocol that will allow the calibration of measurements and provide comparable data across a large range of temporal and spatial scales;
- Objective 5: an additional key management output of EUROPAM is mitigation of whale-ship collision risks.

The project is led by the LIS laboratory (Toulon University, France) which partnered up with the National Park of Port-Cros (France), University of Pavia, Pavia (Italy) and Akvaplan-niva, Tromsø, (Norway) and Institute of Marine Research (Norway), The Project will run from 2023 to 2026.

Output from the FWGC workshop

- Identifying the number of individuals is possible for sperm whales; Sound arrival delay and inter-pulse interval allow to identify the number of individuals.

1.3.3.6 STOP COLLISIONS

The “STOP COLLISIONS” project objective is to detect fin whales along the continent-Corsica routes. The prototype in the testing phase consists of four drifting buoys, geolocated and synchronous, which detect the whale pulses at different frequencies (20 Hz and 40 Hz), and with a range ranging from 8 to 20 km. The next step envisaged would be the installation of buoys which are anchored and not drifting.

In parallel, non-invasive beacons will be deployed for a short period on fin whales present in the area in order to provide elements of understanding on the reactions of animals in collision situations.

In the end, the project can lead to a network of buoys surrounding major maritime routes in the Mediterranean and therefore can be complementary tools to the PSSA.

The project is developed by Quiet-Oceans, WWF, Andromède océanologie and the French Biodiversity Agency.

Output from the FWGC workshop

- The project also implements visual observations in order to estimate the false detection rate;
- At the moment, the system cannot identify the number of cetaceans in range.

1.3.3.7 SEAEXPLORER GLIDERS – PROJECT « LIFE » PIAQUO

The Project "Life" PIAQUO has several objectives:

- Objective 1 : Demonstration on two boats of the possibility of reducing radiated noise via retrofit-optimized thrusters;
- Objective 2 : Demonstration of a system for real-time self-estimation of the noise level radiated by a ship and self-detection of its cavitation;
- Objective 3 : Implementation and evaluation of incentive measures for proactive approaches to reducing radiated noise from ships linked to a database of actual radiated noise from ships;
- Objective 4 : Implementation and evaluation of a system for real-time adaptation of maritime traffic to the state of maritime ecosystems in connection with their passive acoustic mapping;
- Objective 5 : Implementation of innovative web services to support decision-making for public and private actors;

Within Objective 4, some actions related to the detection of marine mammals can contribute to mitigating the collision threat. Indeed, the project plans to use underwater gliders, sailing up to 250 meters deep and spaced 5 km apart, allowing sperm whales and fin whales to be located by following a predefined route. This could result in application to better detect whales and alert ships (Figure 2).

ALSEAMAR leads this project.

Figure 2. Graphical illustration of the Project "Life" PIAQUO

Output from the FWGC workshop

- The detection range is up to ~10 km;
- Gliders are surfacing as needed, usually at a frequency between 1 and 5 hours.

1.3.3.8 FIXED LINE TRANSECT MEDITERRANEAN MONITORING NETWORK (FLT MED NET)

Since 2007, the FLT MED Net project coordinates a continuous monitoring of mega and macro marine fauna (cetaceans, sea turtles, seabirds, and other macro marine fauna), maritime traffic and floating marine litter in the Mediterranean marine region, from ferries as platforms of opportunity. The surveys are carried out along 16 cross-border transects (figure 3). Aside from the observation itself, the project records whales' response to maritime traffic. The monitoring includes recording of ship strikes and near miss events as a proxy of strikes. At present the network has a monitoring effort of more than 1.000.000 km. The Italian Institute for Environmental Protection and Research (ISPRA) coordinates the project.

Particular focus is given for recording possible events of collision or near collision in order to contribute to the comprehension and the definition of mitigation measure for ship strike. Cases of collision or near-collision are clearly reported with details of the dynamic of the event.

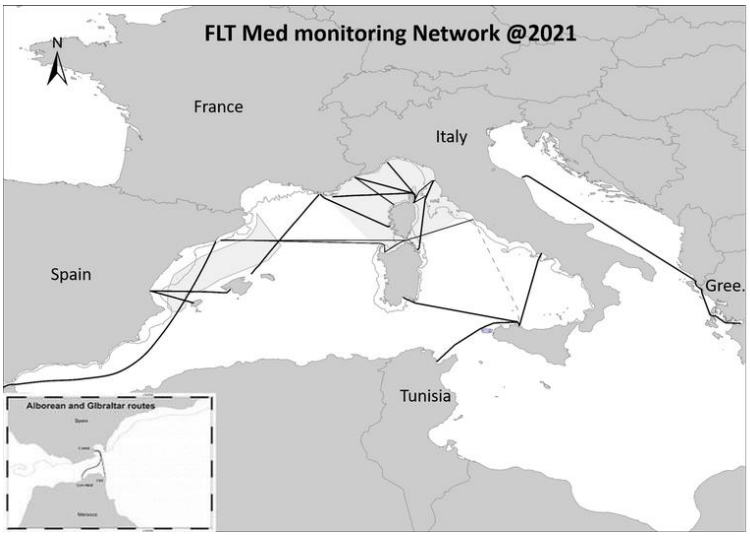

Figure 3. Monitored Ferry routes

Output from the FWGC workshop

- The number of near-collision events increased in the last years.

1.3.3.9 LIFE CONCEPTU MARIS

The CONservation of CEtaceans and Pelagic Sea TUrtles in Med: Managing Actions for their Recovery In Sustainability (CONCEPTU MARIS) is a four-year project supported by the European LIFE institute. It involves more than 12 partners from several countries. The project monitors the distribution of species and their ecological preferences to evaluate the impact of risk factors, identifying the most important sites ("buffer zones", ecological corridors) for the conservation of these species. New tools will be developed to facilitate the choice of effective conservation and risk factor mitigation measures and will foster international cooperation for the protection of these animals.

The project foresees as a Concrete Conservation Action the creation of a training course for crew operating on ferries on the importance of Monitoring Marine megafaun biodiversity and specific modules on ship strike risk (identification of marine mammals, best practice and available tools). The training course is online and it also includes tests that allow to measure its effectiveness. A manual is also distributed onboard, including a map of the PSSA and infographics on the APMs.

Course, manual and PSSA infographics are available in four languages (Italian, French, English and Spanish). Within this action, also a specific Questionnaire on the perception of the risk of collision has been developed and currently distributed to different stakeholders, to understand most effective protection measures.

Five Navigating companies are directly involved in the project, being part of the Advisory -board, hosting researchers on board and enrolling crew members in the online course (Balearia, Minoan, Grimaldi, GNV and Corsica-Sardinia Ferries)

The project will end in 2027.

1.3.3.10 IMPACT-CET

This project aims to map the exposure of favorable habitats for cetaceans, turtles and marine birds to anthropic activities. By comparing the distribution and intensity maps of each type of pressure to those of the species, and this at different periods of time (months, seasons, morning/afternoon, etc.).) and at different spatial scales (Gulf of Lion, Marine Protected Area, North-West Mediterranean, etc.), the project will identify risk areas for animals. This process ultimately allows to make management proposals for better cohabitation between humans and these animals.

The objectives of the project are:

- Objective 1: Identify and map the intensity (frequency and density) as well as the spatial and temporal evolution of various human activities (commercial maritime traffic, pleasure boats, fishing boats, whale-watching, offshore wind farms, etc.).
- Objective 2: Estimate the nature and extent of the potential impact of human activity on the different species of cetaceans, turtles and seabirds
- Objective 3: Provide managers with risk zone maps for each targeted species by type of threat (collision, disturbance, accidental capture, etc.)
- Objective 4: Help managers find appropriate solutions in terms of management and conservation.
- Objective 5: Raise awareness among the concerned professionals and their representative bodies,
- Objective 6: Educate and encourage as many people as possible to get involved in the protection and management of the marine environment.

2. ADDITIONAL INFORMATION

Aside from what PCSFG members reported, the FWGC workshop mentioned one other initiative worth stating. The private company SERCEL develops both onboard and offboard detection tools through passive acoustic monitoring as solutions to reduce collisions. Onboard equipment covers all the area upfront of the ship, allowing whale detection. The equipment needs to be calibrated to each ship's initial emitted sound. The R&D on this equipment is still ongoing.

3. CONCLUSION

This report shows the diversity of direct and indirect initiatives to prevent whale-ship collisions in the Mediterranean Sea, and specifically in the Pelagos Sanctuary. The legal framework is constantly being strengthened by stricter national laws and the implementation of international management tools, e.g., PSSA (Section 1.3.1). Acoustic detection is improving for both fin and sperm whales, species that are the most associated with the collision risk (Section 1.3.3). Synergies between detection projects

could probably be found to improve the detection on both species, but also to develop operational onboard and offboard tools. Increased knowledge of whales and ship behaviour, associated with detection and modelling progress could lead to decision making tools that could strengthen the legal framework and management tools (Section 1.3.2).

The Pelagos "Collisions and Shipping" Focus Group (PCSFG) has to act as a facilitator for all these initiatives in order to mitigate whale-ship collisions. Figure 3 illustrates the synergies between the different kinds of initiatives and the role of the PCSFG in the process.

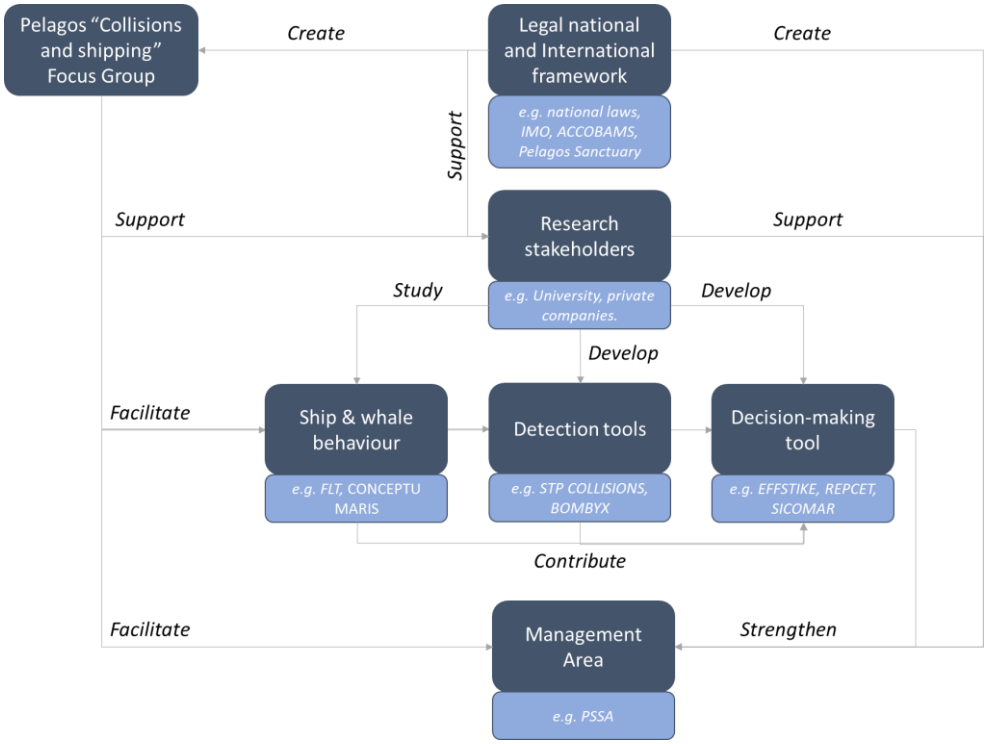

Figure 4. Illustration of the synergies between initiatives to prevent whale-ship collisions and the role of the Pelagos "Collisions and Shipping" Focus Group in the process.