Quiet Waters for Whales and Dolphins

The one-time opportunity to avoid, reduce and mitigate noise-generating activities in the Mediterranean Cetacean Migration Corridor

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This Report is available in English and Spanish.

FOREWORD

From paper to action – that's a core challenge for conservation efforts around the world. Too often we witness passionate decisions to protect marine species, whether within international or regional agreements or at a national level, ending up in failure and disappointment with the objectives not being met. When it comes to marine protected areas (MPAs), we conservationists increasingly use the term "paper parks" to criticise the weakness or even non-existence of management plans or the lack of implementation and enforcement of clear measures and actions. Of course, in order to clear the way for successful conservation action, the legal framework is a crucial and important step, such as declaring an MPA. Now it is up to all stakeholders to join forces and write a success story for marine conservation in the Mediterranean.

The Spanish government needs to be congratulated for its efforts in designing a national Network of Marine Protected Areas (RAMPE) in recent years. Together with the LIFE INDEMARES project (2013), the offshore enlargement of the Cabrera Archipelago Maritime-Terrestrial National Park (2019) and the declaration of the Cetacean Migration Corridor, 12.3% of Spanish waters have been declared protected zones, surpassing the established Aichi Targets of the Convention on Biological Diversity (10%). There is still a way to go to reach the ambitious objective to protect 30% of the ocean by 2030, which OceanCare calls for together with many other conservation organisations, but making the currently declared protected zones effective in practice would be a significant success.

After intense efforts by the people in the Balearics, Catalonia and Valencia and also in the whole of Spain to prevent new oil exploration and exploitation activities in the waters off the Baleares and between the famous islands and the Spanish mainland (i.e., the Levantine-Balearic marine subdivision), the Spanish government took a conclusive step by establishing the Mediterranean Cetacean Migration Corridor (CMC) as an MPA and proposing its inclusion in the SPAMI (Specially Protected Area of Mediterranean Importance) list of the Barcelona Convention, which was achieved in December 2019 at COP21. Whales and dolphins, which are long-living but slow reproducing species that are exposed to many threats, inhabit and use these waters for important functions within their lifecycle. They may also serve as flagship species; ambassadors for other, less known or less charismatic, marine wildlife requiring protection. So, the opportunity lies right in front of us.

I can see huge potential for developing a state-of-the-art example for a progressive conservation management plan for the CMC protecting marine species from ocean noise, a threat which can originate hundreds of kilometres away from the actual protected area, but still be harmful. If successful, the management plan could serve as a guidance manual for other regions or even other States.

The document in front of you has been written by experts and scientists with in-depth knowledge and complementary experience from both the international arena and the region. It is based on expert advice, key reference documents and relevant case studies that should provide a robust foundation for the development of efficient and pragmatic management measures. It is a product of joint efforts, similar to the approach that is needed if we want to make this MPA flourish.

OceanCare is committed to supporting both the process for developing a proper "best practice" conservation management plan and its implementation. We are eager to bring various stakeholders to the table and provide support to the regulatory bodies and institutions in Spain.

I am a true optimist and am convinced that together we can write a beautiful success story.

Sigrid Lüber
Founder and President
OceanCare

CONTENTS

1. INTRODUCTION

The Mediterranean Sea is home to eleven cetacean species including fin whales, a baleen whale and the second largest mammal on earth, sperm whales, deep divers and the largest representative of the toothed whales, and the Cuvier's beaked whale, a species highly sensitive to sound, as well as a number of dolphin species.

Many of these species – namely the fin whale (*Balaenoptera physalus*), bottlenose dolphin (*Tursiops truncatus*), striped dolphin (*Stenella coeruleoalba*), common dolphin (*Delphinus delphis*), long-finned pilot whale (*Globicephala melas*), Risso's dolphin (*Grampus griseus*), sperm whale (*Physeter macrocephalus*), and Cuvier's beaked whale (*Ziphius cavirostris*) – inhabit and/or migrate through the waters between the Balearic Islands and the Spanish mainland, a region rich in biodiversity which was declared a Marine Protected Area (MPA) on 29th June 2018 by the Spanish government (Royal Decree 699/2018)[i]. This MPA is known as the **Mediterranean Cetacean Migration Corridor** (CMC).

The protected area has a surface area covering 46,385.7 km² with an average width of around 85 km running between the Catalan and Valencian coast, and the Balearic archipelago (see Figure 1). As stated by the Ministry for Ecological Transition and Demographic Challenge (MITECO), these waters are of great ecological value and constitute a migration corridor that is of vital importance for cetacean survival in the Western Mediterranean.

At the 21st Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (known as the **Barcelona Convention**) and its Protocols which was held in Naples, Italy, from 2nd to 5th December 2019, the Parties declared and formally adopted the CMC as a **Specially Protected Area of Mediterranean Importance (SPAMI)**.

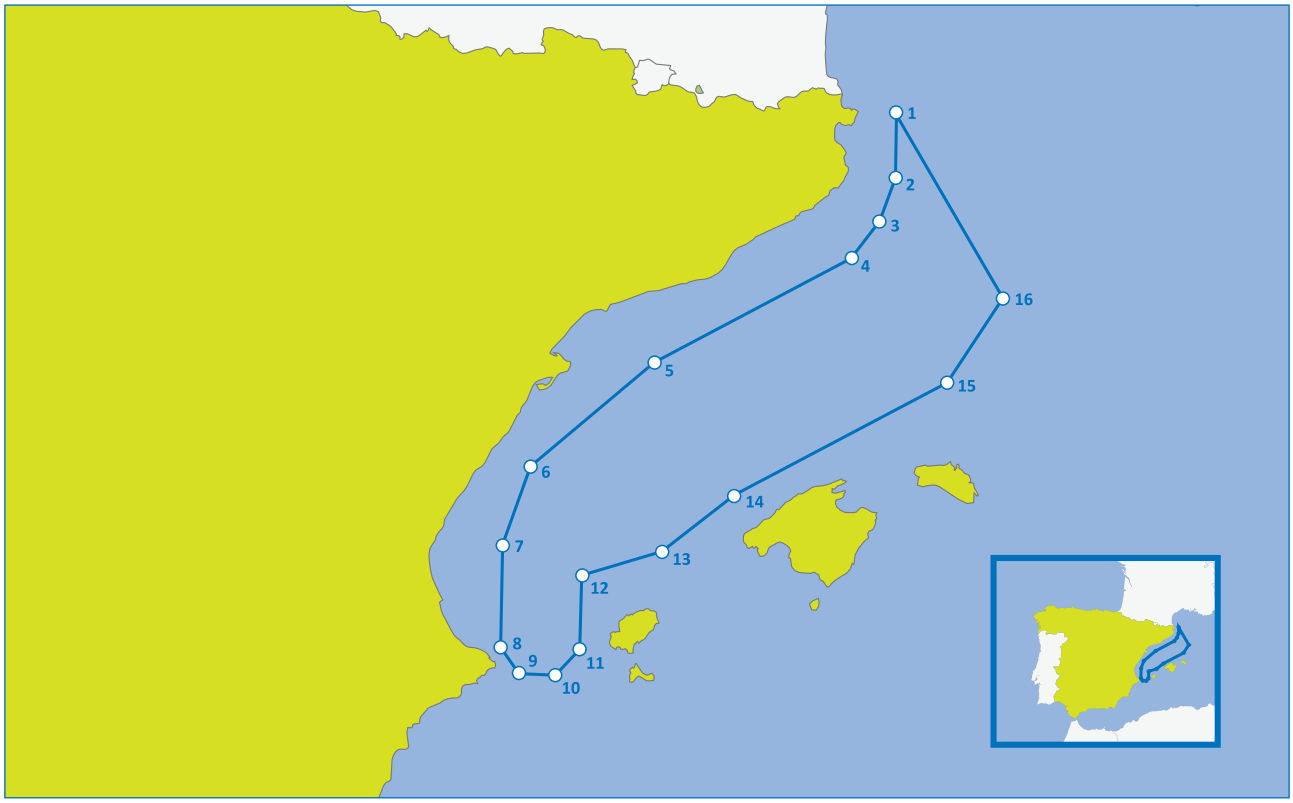


Figure 1: Marine Protected Area (MPA) "Mediterranean Cetacean Migration Corridor". *Source: Royal Decree 699/2018.*

[i] Royal Decree 699/2018, of 29 June, declaring the Mediterranean Cetacean Migration Corridor a Marine Protected Area, approving a preventive protection regime and proposing its inclusion in the List of Specially Protected Areas of Mediterranean Importance (SPAMI List) within the framework of the Barcelona Convention (BOE num. 158, 30-06-2018) https://www.boe.es/buscar/pdf/2018/BOE-A-2018-9034-consolidado.pdf

The challenges to protect cetaceans in the Mediterranean Sea are vast. Habitat loss and degradation, negative impacts from fisheries, ship strikes, climate change and pollution, including chemical, plastic and other waste and, in particular, noise pollution are causing individual and cumulative impacts.

Underwater noise is one of the core threats marine wildlife is facing in the oceans today. It is a transboundary, far-reaching threat that doesn't stop at a declared border and, therefore, poses a specific challenge for the effective management of MPAs and, thus, also to the CMC. Underwater noise has been recognised by the European Union's Marine Strategy Framework Directive (MSFD, 2008/56/EC)[1] as one of 11 descriptors, which Member States committed to manage in order to reach a Good Environmental Status (GES). Ocean noise can also be considered a disturbance, and the deliberate disturbance of species, including all cetaceans, listed on Annex IV of the European Union's Habitats Directive (92/43/EEC) is prohibited[2].

The CMC is exposed to numerous anthropogenic noise-generating activities. The Report "Overview of the noise hotspots in the ACCOBAMS area – Part I, Mediterranean Sea", commissioned by the Secretariat of the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS), classified large parts of the now protected area as "noise hotspots"[3].

In establishing the MPA, the Spanish Government has been clear in its objectives. Avoiding, reducing and mitigating anthropogenic underwater noise are among the core objectives in safeguarding the conservation of the great diversity of marine species – in particular cetaceans, but also other marine wildlife including sharks, seabirds, sea turtles such as the loggerhead turtle (*Caretta caretta*) and pelagic fish such as bluefin tuna (*Thunnus thynnus*) – which use the area as a migration route to their breeding or feeding areas in the northern Mediterranean, or which form part of this highly diverse Mediterranean region as resident species.

This document is designed to support the development of the conservation management plan for the CMC, with a particular focus on avoidance, reduction and mitigation measures for noise-generating activities. Recommendations for monitoring and enforcement are included to make this an example of Best Practice in MPA governance which could be replicated in other locations.

2. BACKGROUND AND RATIONALE

2.1 Actions taken by Spain for the marine environment including its Marine Protected Areas Network

Spain has taken some significant decisions in the past two decades which have pushed forward key actions regarding MPA coverage, managed the risk of ship collisions with endangered species including cetaceans and turtles, and started to address the issue of anthropogenic noise pollution in the marine environment.

The reconfiguration of maritime Traffic Separation Schemes (TSS) at Cabo de Gata (see Figure 2) and the Strait of Gibraltar under the International Maritime Organization (IMO) in 2006 are examples of how solutions can offer a "win-win" situation[4]. Over ten years of monitoring have highlighted the benefits of these actions for biodiversity, relevant authorities and the shipping sector.

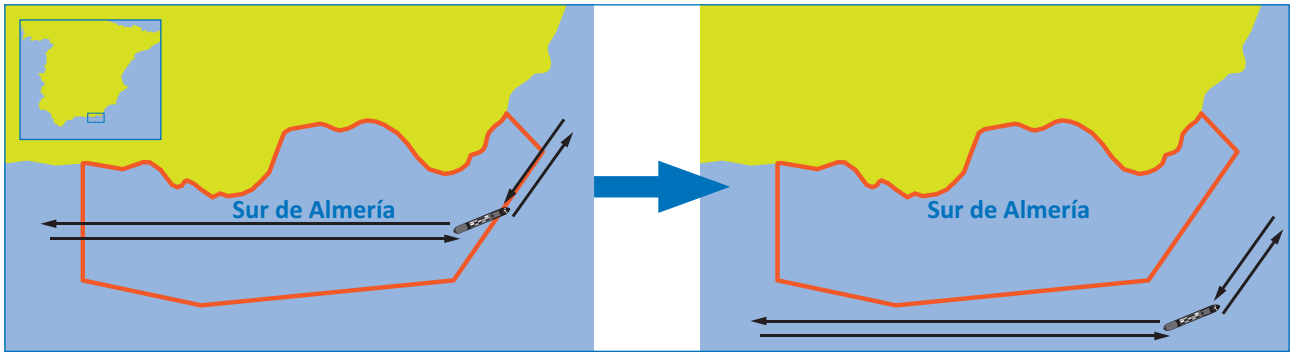


Figure 2: Modifications to the Cabo de Gata Traffic Separation Scheme. *Source: Alnitak. Also see [4].*

These steps are complementary to efforts already undertaken by Spain to increase its national Marine Protected Areas Network (RAMPE). For example, in 2019, the surface area of Cabrera Archipelago Maritime-Terrestrial National Park was increased nine-fold from 10,021 hectares to 90,800.52 hectares (Agreement of the Council of Ministers of February 1, 2019). In total, Spain grants legal protection to 12.3% of its marine waters[ii].

Spain also ambitiously increased its marine NATURA 2000 network[iii] as a result of the LIFE INDEMARES project which was carried out between 1999 and 2014[iv]. LIFE INDEMARES, through its action A-14 which was coordinated by Alnitak, brought together international experts (including from key institutions such as University of Las Palmas, University of La Laguna - BIOECOMAC, NOAA, US Office of Naval Research, WHOI, NATO NURC, IMO) and other stakeholders from the maritime transport, security and energy sectors to consider the issue of noise pollution[v].

Based on the RAMPE network, and under the umbrella of the LIFE Integrated Project (IP) INTEMARES[vi], Spain now has the opportunity to move one step further towards an exemplary implementation of the targets established under the frameworks of the European Union (EU) and the United Nations (UN).

ii MITECO presents the results of the first sexennial Report on the State of Natural Heritage and Biodiversity in Spain. https://www.miteco.gob.es/es/prensa/ultimas-noticias/el-miteco-presenta-los-resultados-del-primer-informe-sexenal-sobre-el-estado-del-patrimonio-natural-y-de-la-biodiversidad-en-espa%C3%B1a-/tcm:30-530022
iii https://ec.europa.eu/environment/nature/natura2000/marine/index_en.htm
iv https://www.indemares.es/en/project/description
v https://www.indemares.es/sites/default/files/informe_final_tecnico_alnitak.pdf
vi https://intemares.es/en

2.2 The Mediterranean Cetacean Migration Corridor and the need for a "best practice" Marine Protected Area to reduce anthropogenic noise levels

The declaration of the CMC SPAMI in 2019 by the Barcelona Convention is an example of Spain's serious commitment to marine protection. This international recognition offers a great opportunity for the Spanish Government to demonstrably prioritise its fight against underwater noise. Now, as MPA management schemes are developed to implement the MSFD and the Maritime Spatial Planning Framework Directive[5], the eyes of the international scientific community are on Spain to see how it will address the pending issue of mitigating the risks of noise pollution in our ocean. With the conservation management plan for the CMC, Spain can lead the way in MPA management in Europe by developing a "best practice" MPA with a specific focus on reducing anthropogenic noise. The recommendations in this report propose a programme of research, monitoring, management, capacity building and communication actions for the CMC. These specific measures aim to support Spain and other Mediterranean Range States in achieving an efficient and integrated network of marine space within the Natura 2000 network as part of the LIFE IP INTEMARES[vii] project as well as implementing the necessary actions to avoid, reduce and mitigate ocean noise impacts.

2.3 Ocean noise pollution and some potential impacts

Underwater noise generated by human activities is commonly classified into two types: continuous and impulsive. Continuous ocean noise is typically a constant drone, and most often generated by shipping, offshore oil and gas production, and offshore wind farms. Impulsive ocean noise is typically made up of intensive short pulses of very loud sound, repeated over a period of time. This noise is generated by geophysical surveys, e.g., for hydrocarbon research and exploration using air guns, military and civil active sonar systems, and industrial construction work such as pile driving[6].

While the ocean is certainly a sound-filled environment and many natural sounds are very loud (wind, ice breaking, etc.), ocean species including fish, crustaceans (lobsters, prawns, krill), molluscs (clams, mussels, oysters, other shellfish), cephalopods (squid, octopus), pinnipeds (seals, sea lions, walrus), sirenians (dugongs, manatees), sea turtles, marine otters, and cetaceans (whales, dolphins, porpoises) are not adapted to anthropogenic (man-made) ocean noise[7,8,9]. Most ocean species rely on sound for their vital life functions, including communication, prey and predator detection, orientation, and sensing their surroundings. When exposed to elevated or prolonged human-caused ocean noise, they can be impacted in a number of ways including masking (the obscuring of natural sounds of interest), spatial displacement, hearing impairment, and stress, and they can even be physically injured or killed. Some impacts can affect the health and welfare of populations[10].

In a report commissioned by OceanCare and published in 2018, Dr. Lindy Weilgart of Dalhousie University, reviewed the available scientific literature on the impacts of noise on fish and invertebrates and summarized these findings[7]. Physical injury, hearing loss, lower reproduction rates, stress, and cellular damage, as well as socioeconomic impacts such as a decline in fish catch rates, and mass mortality of zooplankton are some of the serious consequences for the whole marine ecosystem.

The impact of noise on marine mammals, especially cetaceans, is more widely recognised. They can suffer permanent or temporary hearing impairment, compromising their communication and ability to detect threats. Noise can also mask important natural sounds, such as the call of a mate, or the sounds made by prey or predators. All of these impacts, along with stress, displacement from important habitat, and panic, can affect reproduction and growth rates, in turn influencing the long-term welfare of the population[8,11].

Impulsive noise caused by military activities, such as employing active sonar systems to detect submarines, has been linked to atypical mass strandings of whale and dolphin species, in particular beaked whale species. For

vii https://intemares.es/objetivos

example, in the East Ionian Sea, the stranding of 12 Cuvier's beaked whales along the coasts of the Kyparissiakos Gulf in May 1996 was linked to military activity using Mid Frequency Active Sonar (MFAS)[12]. Another mass stranding of 14 beaked whales in the Canary Islands in 2002 was also linked to MFAS during an international naval exercise[13]. More recently, in January 2006, four Cuvier's beaked whales stranded along the coast of Almería, likely also due to antisubmarine active midfrequency sonar[14] and there are many more examples. Such noise-related strandings are just the tip of the iceberg, as it is most likely that many such strandings are missed and remain undetected. Even for the strandings that have been documented, the overall consequences remain unknown.

Another example of an impact generated by intense noise pulses is a case of atypical behaviour in sperm whales in response to impulsive sound, most likely caused by an airgun survey, which was documented in 2013 by Spanish scientists in the Balearic Islands[15]. An anomalous distribution and abundance of sperm whales was detected in the southern area of the Balearic Islands, which could have been a consequence of the airgun shooting, and which might have posed a risk to this species, as it was reported by the then Ministry of Agriculture, Food and Environment[16]. At that time, the Spanish authorities had not provided any permit to undertake such activities (seismic surveys) around the Balearic Islands. OceanCare reported the findings to the ACCOBAMS Follow-up Committee asking it to investigate the case. After consultation with the Spanish government and reviewing the available information, the Committee noted that "*the fact that underwater noise can be detected at long distance from the place where it is produced leads the Committee to conclude that, in this specific case, the noise could have originated from activities beyond the control of the Spanish authorities*"[17]. It also urged "*Parties to identify the source of long-distance underwater noise in order to address its transboundary effects*".

In addition to the harmful impacts noise can have on marine species, this example illustrates that avoiding such negative impacts within a protected zone involves significant challenges because ocean noise is a transboundary form of pollution. In order to strictly manage impulsive noise-generating activities in particular, so-called buffer zones around sensitive habitats need to be recognised and precautionary principles for risk prevention and management measures have to be applied.

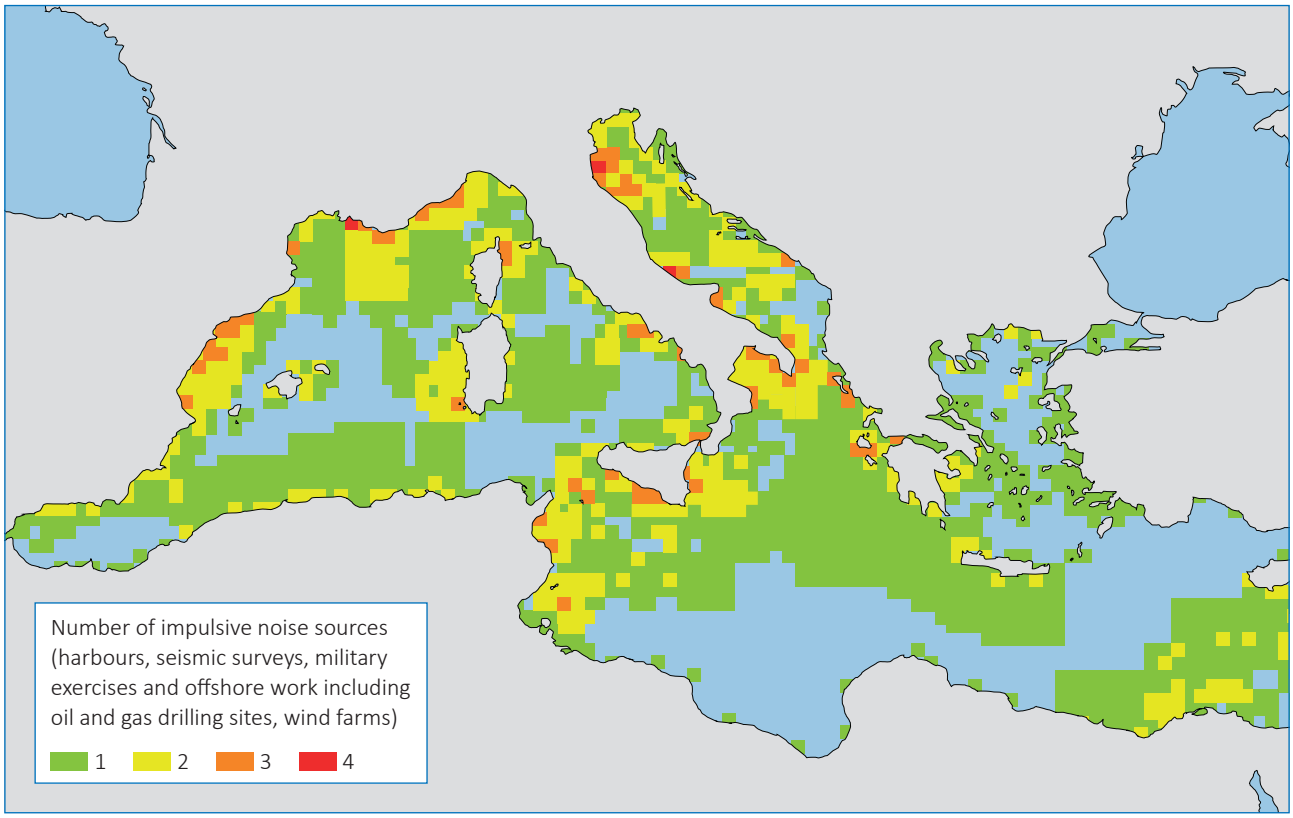


Figure 3: Overview of noise hotspots in the ACCOBAMS Area. *Source: Maglio et al., 2016[3].*

A scientific report commissioned by ACCOBAMS in 2016 identified parts of the CMC area as noise hot-spots (see Figure 3 which only shows impulsive noise sources and not continuous noise caused by shipping)[3].

According to data from MITECO, underwater noise levels are high in areas adjacent to the CMC both on its west side (between the peninsular coast and the Corridor) and on the east side (between the Corridor and the Balearic Islands) (see Figure 4).

In Section 4 of this Quiet Waters Report we provide more detailed information about the individual noise-generating activities within the CMC, including shipping which is the primary source for continuous noise.

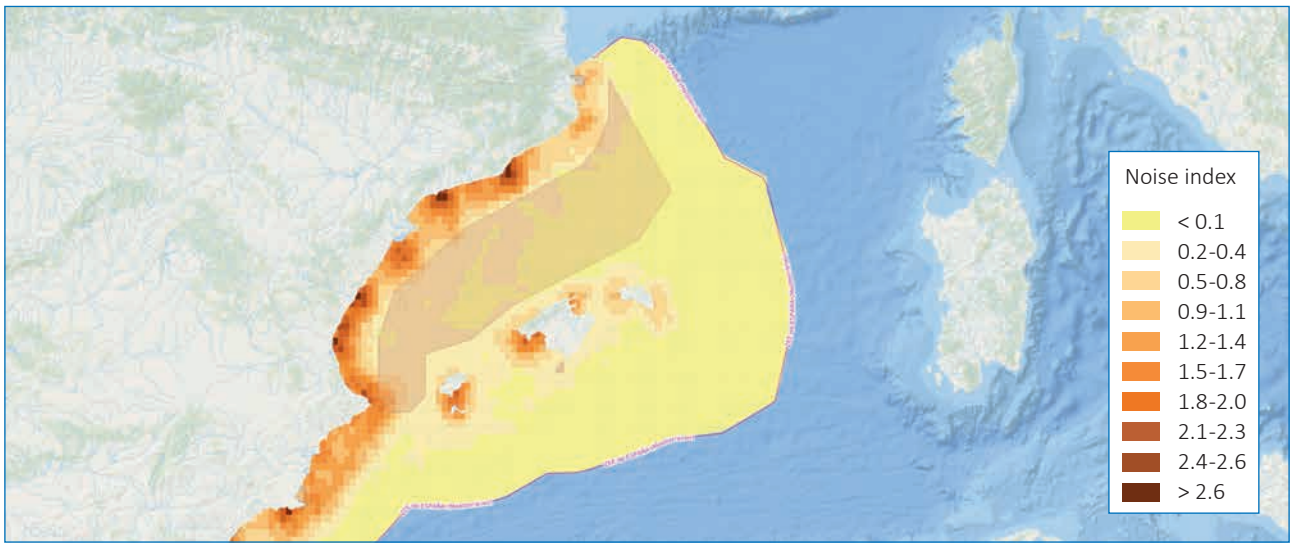


Figure 4: Ocean noise levels in the Cetacean Migration Corridor and adjacent areas. *Source: InfoMAR, data from the first cycle of the Spanish marine strategies (http://infomar.cedex.es/visor.html).*

3. EXISTING LEGAL FRAMEWORK

From words to deeds: Noise reduction measures urgently required globally

Urgent action is needed worldwide to manage the impacts of noise pollution and ship collisions. Spain is well-placed to take the lead in the implementation of actions addressing these threats following the publication of the technical report on the impacts and recommended mitigation actions for underwater noise in 2012 by the Ministry of Agriculture, Food and Environment (now the Ministry for Ecological Transition and the Demographic Challenge)[18]. Action by Spain could constitute the positive momentum that is needed to encourage other nations to follow.

Actions to reduce and mitigate noise pollution have already been agreed on paper by EU countries as a top priority. There is already a legal obligation to adopt and implement conservation measures where countries are members or signatories to international organisations, multilateral environmental agreements and conventions, such as the Barcelona, Bern and Bonn Conventions, the IMO, ACCOBAMS and the General Fisheries Commission for the Mediterranean (GFCM).

Member States of the EU have to adhere to its legislative provisions, e.g., by achieving GES in European waters by 2020. Too often, however, there is a lack of specific, measurable activities. By taking on this task, Spain could play an important role in ending the current *status quo* that has been highlighted by organisations such as OceanCare, and move from words to deeds to meet the agreed upon conservation objectives. A recently published article further details the shortcomings which are preventing GES from being achieved for underwater noise levels in EU waters[19].

A legal framework is already in place, setting the obligation for EU Member States to work towards specific targets.

Some of the relevant EU legislation:

- Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)[2],
- Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (MSFD)[1],
- Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning[5].

There are specific targets under the MSFD with which EU countries should comply in relation to noise pollution. EU Member States were required by law to protect marine wildlife from the impacts of intense underwater noise levels and reach GES for MSFD Descriptor 11 by 2020 by ensuring that the "*introduction of energy (including underwater noise) does not adversely affect the ecosystem*"[viii].

In July 2018, the European Commission published a report assessing the Member States' Programmes of Measures under the MSFD and concluded that "*achieving good environmental status by 2020 across all European marine regions…remains unlikely*" given weaknesses in the Programmes of Measures and gaps in coordination between countries[20].

From the perspective of science and conservation experts on noise pollution, it is clear that the objective of achieving GES for Descriptor 11 by 2020 was not reached by the majority of, if not all, EU Member States[19].

viii https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-11/index_en.htm

Unfortunately, a similar situation of *status quo* also exists in other legal frameworks and international agreements where clear roadmaps and targets on which countries had agreed are not making adequate progress.

At the heart of the EU's approach to conservation is the precautionary principle[21]. In February 2000, the European Commission recognised the importance of the precautionary principle for providing a rapid response "*in the face of a possible danger to human, animal or plant health, or to protect the environment … [particularly in cases] where scientific data do not permit a complete evaluation of the risk*"[ix].

Despite shipping being one of the most harmful noise-generating activities at sea, some countries have failed to take any measures relating to shipping and, in many cases, States have not appropriately considered the IMO's Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life[22] which were approved by the IMO in 2014.

Another concern is the failure to apply measures and guidelines agreed upon under the framework of multilateral agreements, particularly the Convention on the Conservation of Migratory Species of Wild Animals (CMS)[x] Guidelines on Environmental Impact Assessments for Marine Noise-Generating Activities[23], the failure to establish time-area closures, and the differences in interpreting the Environmental Impact Assessment (EIA) obligations arising from European law.

CMS resolutions regarding noise pollution include "Resolution 10.24: Further Steps to Abate Underwater Noise Pollution for the Protection of Cetaceans and Other Migratory Species", which encourages CMS Parties to:

"prevent adverse effects on cetaceans and on other migratory marine species by restricting the emission of underwater noise, understood as keeping it to the lowest necessary level with particular priority given to situations where the impacts on cetaceans are known to be heavy" and *"urges Parties to ensure that Environmental Impact Assessments take full account of the effects of activities on cetaceans and to consider potential impacts on marine biota and their migration routes ..."*[24]

Resolution 10.24 further states that CMS Parties should ensure that EIAs take full account of the impact of anthropogenic noise on marine species; apply Best Available Techniques (BAT) and Best Environmental Practice (BEP); and "*integrate the issue of anthropogenic noise into the management plans of marine protected areas*". At COP13 CMS Parties agreed on a process within Decision 13.59 and 13.60 to assess and review the document "Best Available Technology (BAT) and Best Environmental Practice (BEP) for Three Noise Sources: Shipping, Seismic Airgun Surveys, and Pile Driving" submitted by OceanCare[6] and will consider publishing it as a Technical Series document to make the information easily accessible to Parties.

The same *status quo* and general disregard for agreements with regards to meeting established targets or adopting guidelines is common throughout conventions that address the matter, such as the Oslo and Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention), the Barcelona Convention and other regional seas conventions such as the Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM), known as the Helsinki Convention.

These conventions should play a key role in enhancing concerted action at a regional level which is most required in issues such as noise pollution.

In the Mediterranean, ACCOBAMS has been comparatively active with regards to noise pollution management and prevention. Parties to the Agreement have adopted important resolutions on the "Conservation of Cuvier's

ix Commission adopts Communication on Precautionary Principle. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_00_96 The Precautionary Principle. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=LEGISSUM:l32042&from=DA

x Also known as the Bonn Convention.

beaked whales in the Mediterranean", "Addressing the impact of anthropogenic noise", and the "Guidelines to Address the Impact of Anthropogenic Noise on Cetaceans in the ACCOBAMS Area (ACCOBAMS Noise Guidelines)"[25]. Although these resolutions and guidelines provide a clear science-based framework for action, there is still an urgent need for action to be taken accordingly.

Likewise, other conventions provide a clear framework that, in principle, requires signatory states to agree and cooperate.

Principle 17 of the Convention on Environmental Impact Assessments in a Transboundary Context, known as the Espoo (EIA) Convention states: *"Environmental impact assessment[s], as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority."*

Decision XII/23 'Marine and coastal biodiversity: Impacts on marine and coastal biodiversity of anthropogenic underwater noise' of the Convention on Biological Diversity (CBD) encourages CBD Parties *"to take appropriate measures … to avoid, minimize and mitigate the potential significant adverse impacts of anthropogenic underwater noise on marine and coastal biodiversity"*.

In Decision XII/23, CBD Parties agreed to a significant list of technical commitments, including gathering additional data about noise intensity and types of noise, and building capacity in developing regions where scientific ability can be strengthened. Decision XII/23 urges the transition to quieter technologies and the application of best environmental practice in all relevant activities. The CBD Parties advocate for mapping spatial and temporal distribution of sound through EIAs and combining this acoustic mapping with habitat mapping of sound-sensitive species with regard to spatial risk assessments to identify areas where species may be exposed to noise impacts. They also advocate for the use of spatial and temporal management of activities.

4. RECOMMENDED ACTIONS FOR THE MEDITERRANEAN CETACEAN MIGRATION CORRIDOR SPAMI MANAGEMENT PLAN

The actions recommended here draw on OceanCare's knowledge and experience, including with the development of the management plan for Spain's "El Cachucho" MPA[xi], and the actions taken relating to vessel strikes and noise risk management by LIFE INDEMARES, specifically in its project LIFE02NAT/E/8610[26] which counted on the support of an international scientific committee and the input of experts in public policy, science, maritime traffic and acoustic pollution.

Recommended Actions

4.1 Establish the CONSERVATION GOAL of the CMC SPAMI

4.2 Establish OPERATIONAL OBJECTIVES for the CMC SPAMI

OO1 – Identify main threats and prioritise lines of action
OO2 – Ensure positive and active involvement of relevant stakeholders in the Management of the CMC SPAMI
OO3 – Establish a long-term Monitoring Plan

4.3 Develop a LEGAL FRAMEWORK for the management of the CMC SPAMI

4.1 Establish the CONSERVATION GOAL of the CMC SPAMI

To make the Spanish Cetacean Migration Corridor SPAMI in the Western Mediterranean basin a 'quiet zone' by avoiding, reducing and mitigating the risks and negative impacts of anthropogenic noise on marine species inhabiting or migrating through the Corridor.

4.2 Establish OPERATIONAL OBJECTIVES for the CMC SPAMI

Operational Objective 1: Identify main threats and prioritise lines of action

The aim of this Operational Objective is to ensure that the top priority issues are addressed, and that efforts and budget are allocated in the best possible manner to attain the Conservation Goal of the CMC SPAMI.

The InfoMAR[xii] tool can be used to gain an initial overview of governance, human activities and infrastructure in the Spanish Mediterranean. Further information can be garnered from other tools such as EMODnet[xiii].

InfoMAR and EMODnet highlight the following as potential threats to the CMC Conservation Goal:

a) Oil and gas exploration and exploitation,
b) Vessel traffic,
c) Research activities involving active acoustics, explosions and sonar,
d) Military operations and research,

xi Royal Decree 1629/2011, of 14 November, declaring the marine area of El Cachucho as a Marine Protected Area and as a Special Area of Conservation, and approving the corresponding conservation measures (BOE num. 295, 8-12-2011) https://www.boe.es/eli/es/rd/2011/11/14/1629/dof/spa/pdf

xii http://infomar.cedex.es

xiii https://emodnet.eu/en The main objective of EMODnet Human Activities is to make information available on the geographical position, spatial extent and attributes of a wide array of marine and maritime human activities throughout Europe.

e) Active acoustics in yachting and fishing,
f) Gas pipelines and submarine cables,
g) Pile driving and offshore renewable energy,
h) Dumping.

Each of these categories is further detailed below.

A. OIL AND GAS EXPLORATION AND EXPLOITATION

One of the loudest human activities is searching for oil and gas under the seabed using airguns in seismic surveys. Intense pulses are emitted every 10 to 15 seconds emitting sound waves of up to 260 dB directed towards the seabed though there is also much lateral spread[27].

In recent decades, numerous applications for seismic surveys for scientific exploration and to explore potential hydrocarbon resources in the Spanish Mediterranean have been submitted by the oil and gas (O&G) industry to the Spanish authorities. Despite the multiple risks and impacts of such activities, it was not compulsory until 2013 for these seismic survey projects to undergo an EIA procedure.

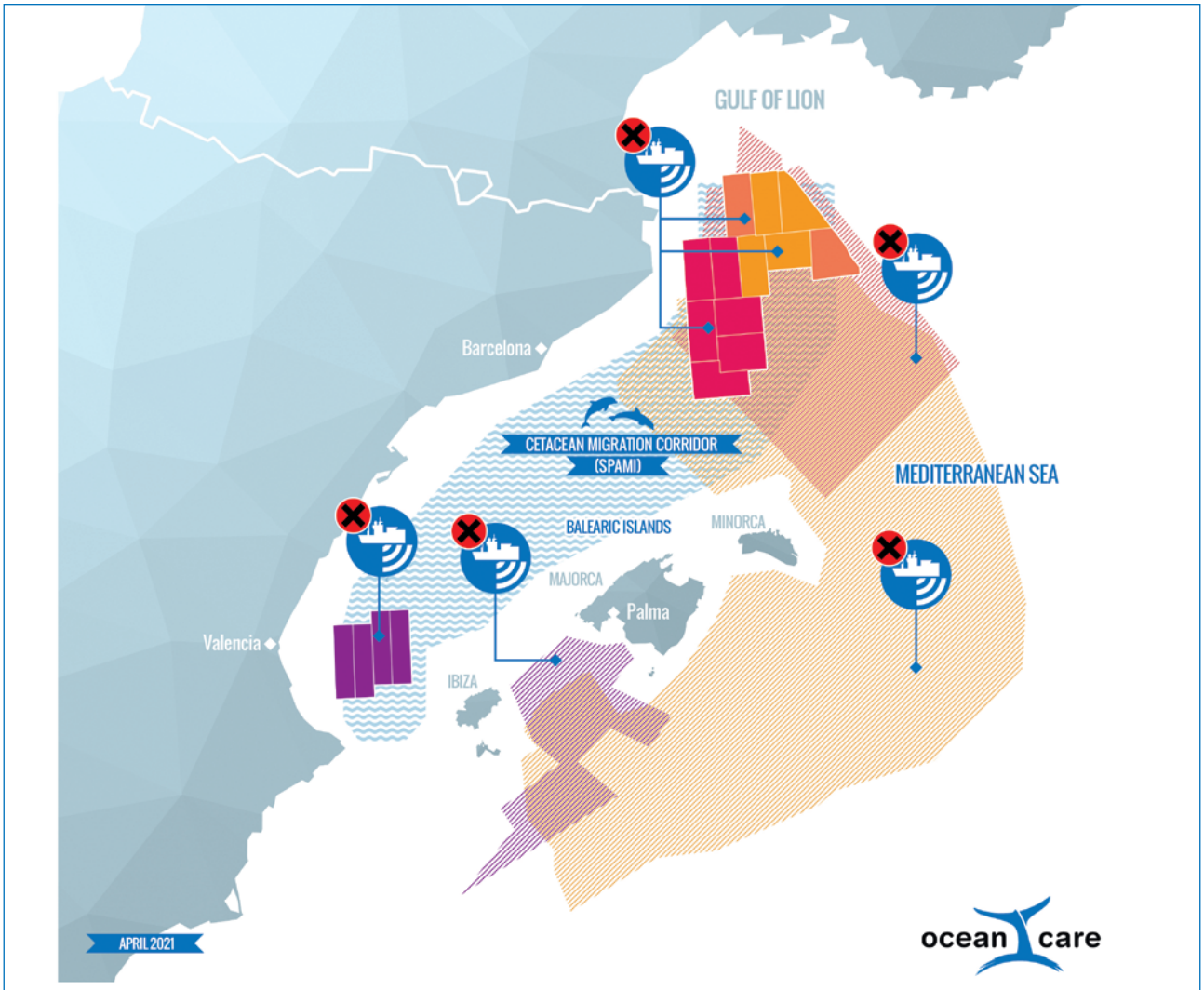
These projects aimed to extract oil or gas in the deep sea by means of offshore oil platforms or to study tectonics in the region. Some of the projects proposed by the O&G industry are similar to the one that caused the largest oil spill in history when, on April 20, 2010, the British Petroleum Deepwater Horizon platform in the Gulf of Mexico caused an environmental catastrophe and economic disaster for fisheries and tourism, the negative effects of which will last for decades[28].

Since the beginning of the past decade, the oil industry has been facing huge social, institutional and political opposition in Spain. This opposition was crucial in achieving the definitive shelving of a series of seismic acquisition projects and hydrocarbon research permits (see Figures 5 and 6).

The Paris Agreement aims to keep the global average temperature rise below 2°C above pre-industrial levels, and also seeks to promote additional efforts so that global warming does not exceed a 1.5°C increase, recognizing that this would significantly reduce the risks and effects of climate breakdown[xiv]. It also establishes the need to cut greenhouse gas emissions to net zero by 2050. This requires significant efforts to be made to transition towards a completely 'decarbonized' energy model, free of fossil fuels, based 100% on energy efficiency and renewable energies.

Taking into consideration this need, the Spanish Climate Change and Energy Transition Law currently states that no new exploration authorizations, research permits and hydrocarbon exploitation concessions will be granted throughout the national territory, including the territorial sea, the Exclusive Economic Zone and the continental shelf[xv]. Regarding exploration projects currently in the pipeline, any application for authorisation to exploit hydrocarbons that had not been registered prior to the date of entry into force of this Law (May 22, 2021) will not be admissible. Finally, December 31, 2042 is set as the date for the definitive termination of the last hydrocarbon exploitation concession currently in force.

xiv https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement
xv Law 7/2021 of 20 May on climate change and energy. Available at: https://www.boe.es/boe/dias/2021/05/21/pdfs/BOE-A-2021-8447.pdf



ARCHIVED HYDROCARBON EXPLORATION PROJECTS IN THE LEVANTINE/BALEARIC MARINE AREA

2015 The oil company *Cairn Energy* renounces its four exploration permits granted in the Gulf of Valencia.

2016 Seismic acquisition project of *Services Pétroliers Schlumberger* in the Gulf of Lion archived.

2017 Resolution of termination of the environmental assessment procedure of *Spectrum Geo Limited's* seismic acquisition project.

2018 Protection of the Cetacean Migration Corridor as a *Marine Protected Area.*

2018 *Repsol's* withdrawal of six applications for "Nordeste" hydrocarbon research permits in the Gulf of Lion.

2019 *Cairn Energy's* withdrawal of two applications for "Nordeste" hydrocarbon research permits in the Gulf of Lion.

2019 Resolution of termination of the environmental assessment procedure of *OGS'* seismic acquisition project *MedSalt-2* (Majorca/Ibiza).

2019 Protection of the Cetacean Migration Corridor as a *Specially Protected Area of Mediterranean Importance* (SPAMI) of the Barcelona Convention.

2021 *Vitol E&P BV's* withdrawal of four applications for "Nordeste" hydrocarbon research permits in the Gulf of Lion.

Figure 5: Shelved hydrocarbon exploration projects in the Levantine-Balearic marine subdivision. *Source: OceanCare (using data from MITECO).*

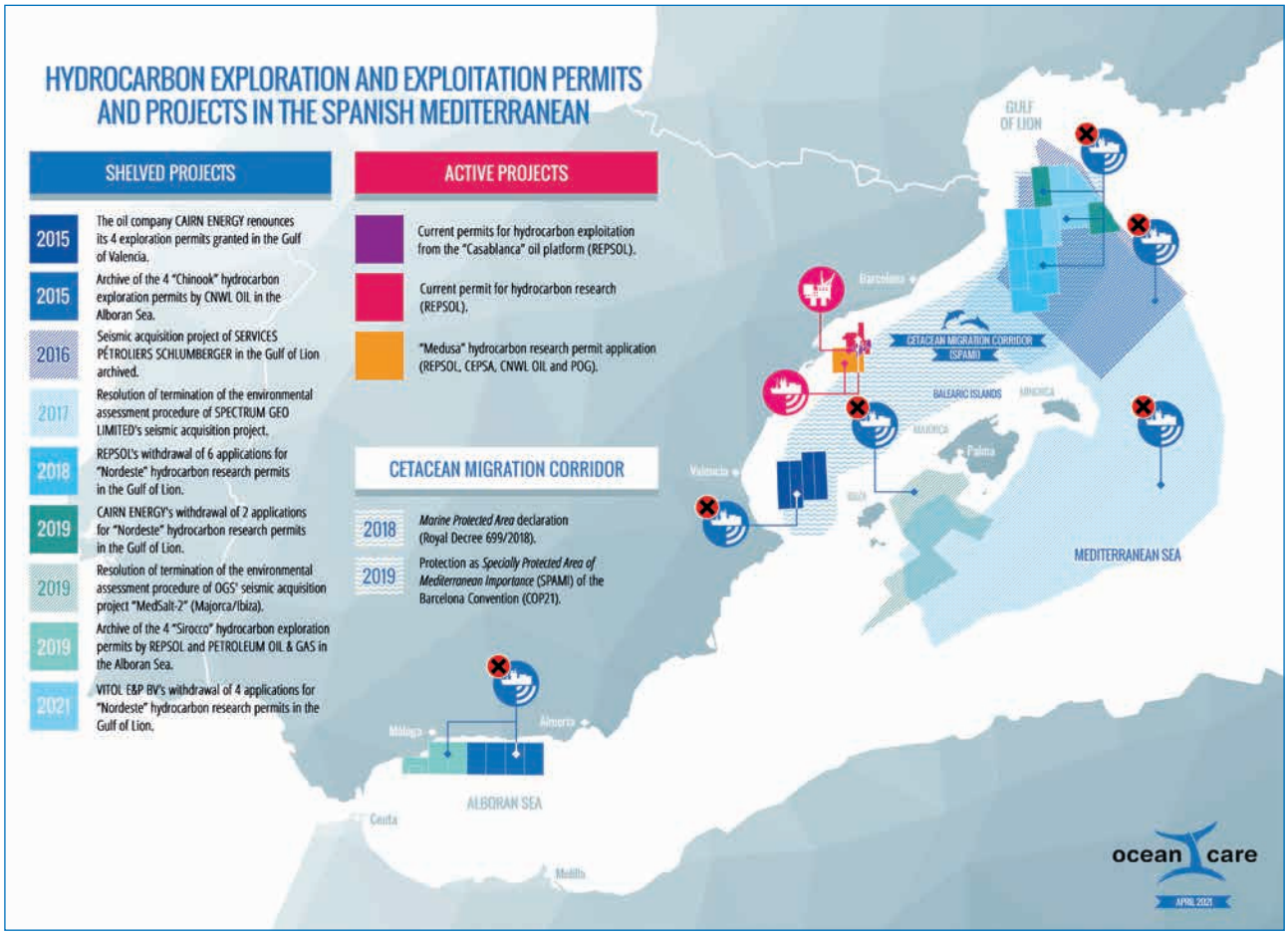


Figure 6: Shelved and active hydrocarbon exploration and exploitation permits and projects in the Spanish Mediterranean. *Source: OceanCare (using data from MITECO).*

As can be seen in Figures 5 and 6, the planned areas of many hydrocarbon projects overlap with areas of great ecological value including the CMC. To ensure that there is no decline in the conservation status of the species present in this MPA, a preventive protection regime was established by Royal Decree 699/2018 forbidding certain activities in the CMC. Any type of hydrocarbon extraction activity (except for those related to research or exploitation permits already in force) is now prohibited. The use of active systems to carry out seabed geological research either by means of exploratory drilling, geophysical surveys with active sound sources such as airguns, boomers, sparkers, and other high amplitude active sonar sources such as multibeam and side scan systems is also prohibited (except those related to permits of investigation or exploitation already in force).

It should be noted that this prohibition does not extend to the areas surrounding the CMC and that there are hydrocarbon exploration projects which are still subject to an authorization procedure by the Spanish authorities (see Figure 7) as well as oil exploitation concessions in force in those areas.

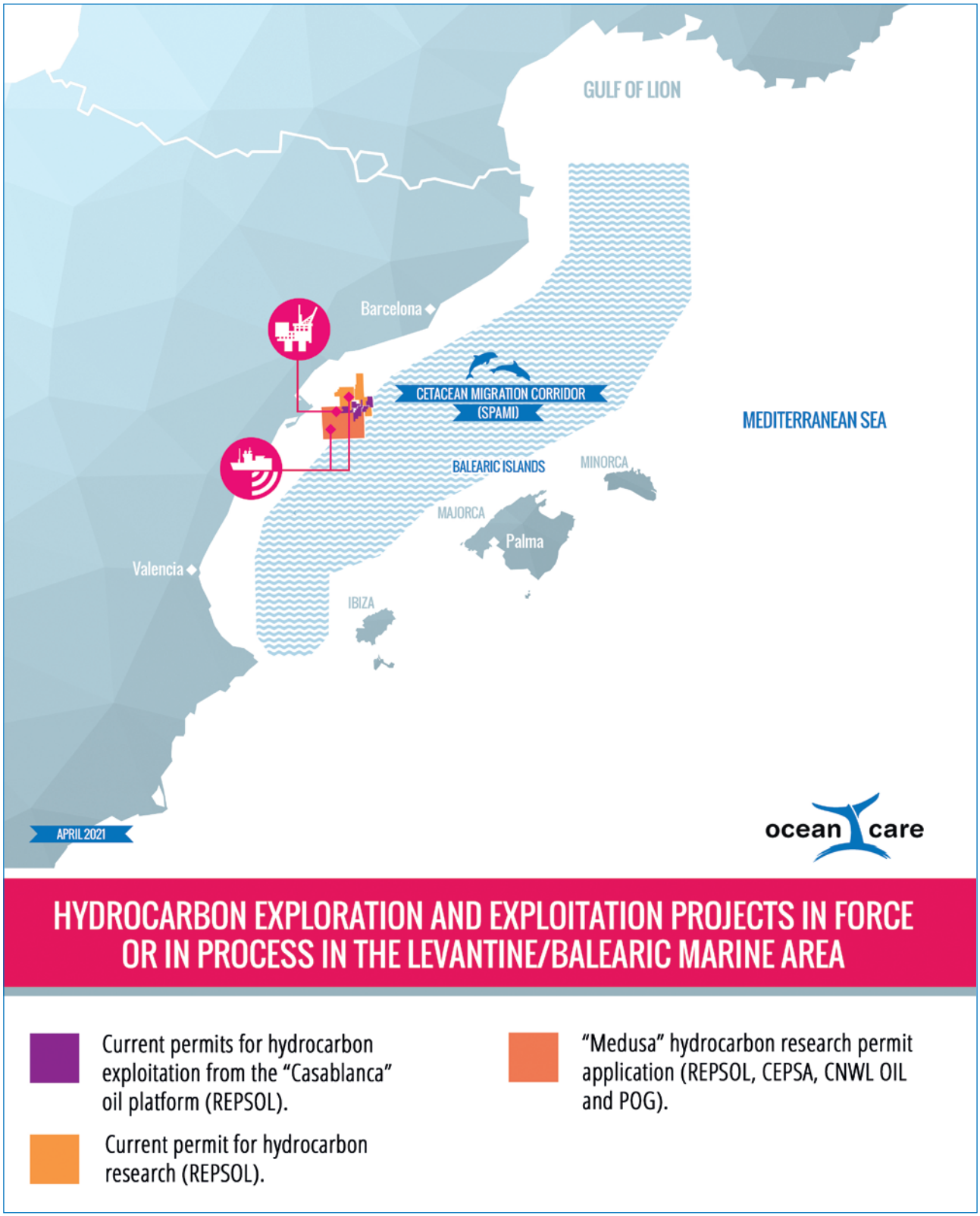


Figure 7: Hydrocarbon Exploration and Exploitation Projects in Force or in Process in the Levantine-Balearic marine subdivision (April 2021). *Source: OceanCare (using data from MITECO).*

B: VESSEL TRAFFIC

The CMC is exposed to heavy vessel traffic, including cargo vessels passing through or approaching ports, transport and passenger ferries between the mainland and the Balearic Islands, and fishing boats and leisure boats including yachts (see Table 1 and Figures 8-12).

Table 1: Number of merchant and cruise ships in Spanish Mediterranean ports
**Data for 2020 is not representative of normal activity because of COVID-19 and related reductions in transport*

PORT AUTHORITIES		2018	2019	2020*
ALICANTE	Merchant ships	678	653	546
	Cruise ships	54	43	1
	Total	**732**	**696**	**547**
ALMERÍA	Merchant ships	1,934	2,103	1,220
	Cruise ships	38	25	2
	Total	**1,972**	**2,128**	**1,222**
ALGECIRAS BAY	Merchant ships	28,913	29,070	18,317
	Cruise ships	0	0	5
	Total	**28,913**	**29,070**	**18,322**
BALEARIC ISLANDS	Merchant ships	49,506	52,116	30,497
	Cruise ships	860	820	39
	Total	**50,366**	**52,936**	**30,536**
BARCELONA	Merchant ships	8,209	8,101	6,724
	Cruise ships	829	800	71
	Total	**9,038**	**8,901**	**6,795**
CARTAGENA	Merchant ships	2,052	2,002	1,971
	Cruise ships	151	167	10
	Total	**2,203**	**2,169**	**1,981**
CASTELLÓN	Merchant ships	1,855	1,754	1,629
	Cruise ships	1	5	0
	Total	**1,856**	**1,759**	**1,629**
CEUTA	Merchant ships	11,136	11,077	7,218
	Cruise ships	11	7	0
	Total	**11,147**	**11,084**	**7,218**
MÁLAGA	Merchant ships	1,465	1,582	1,103
	Cruise ships	299	288	41
	Total	**1,764**	**1,870**	**1,144**
MELILLA	Merchant ships	1,775	1,605	905
	Cruise ships	1	1	0
	Total	**1,776**	**1,606**	**905**
MOTRIL	Merchant ships	1,328	1,291	523
	Cruise ships	29	32	0
	Total	**1,357**	**1,323**	**523**
TARRAGONA	Merchant ships	2,497	2,482	2,189
	Cruise ships	57	63	1
	Total	**2,554**	**2,545**	**2,190**
VALENCIA	Merchant ships	7,528	7,688	6,780
	Cruise ships	194	203	12
	Total	**7,722**	**7,891**	**6,792**
TOTAL SHIPS		**121,400**	**123,978**	**79,804**

Data sources: Puertos del Estado. Ministerio de Transportes, Movilidad y Agenda Urbana:
- *Statistical Yearbook 2018 of the State-Owned Port System*
  http://www.puertos.es/es-es/estadisticas/RestoEstad%C3%ADsticas/anuariosestadisticos/Paginas/2018.aspx
- *General summary of port traffic: December 2019, General summary of port traffic: December 2020.*
  http://www.puertos.es/es-es/estadisticas/Paginas/estadistica_mensual.aspx

Passenger traffic between various ports on the mainland (Barcelona, Valencia, Denia) and the ports of the Balearic Islands (Palma and Alcudia in Majorca; Mahón and Ciutadella in Menorca; Ibiza and Formentera), as well as between the island ports themselves, is regular and intense, especially during the holiday season (Figure 8).

Figure 8: Main passenger traffic routes between the Balearic Islands and mainland Spain. Blue lines indicate annual number of passengers in thousands. *Source: National Atlas of Spain of the National Geographic Institute (https://www.ign.es/web/resources/docs/IGNCnig/ANE/Capitulos/17_Transportes.pdf).*

Other ferry routes also ply the waters of the CMC, such as those linking Barcelona and several Italian ports (e.g., Genoa, Civitavecchia, Porto Torres), the islands of Corsica and Sardinia, and ports in Morocco (such as Nador and Tanger Med). There are also routes between French cities (e.g., Toulon, Sete) and Balearic ports (Alcudia, Mahón) as well as Moroccan cities (Nador).

Although, as can be seen in Table 1, due to COVID-19, cruise ship traffic in the area plummeted in 2020, in previous years cruise ship traffic was intense, especially during the holiday season, in various ports on the peninsular coast, notably Barcelona and Palma, but also Valencia, Mahón and Ibiza.

Merchant ship traffic is also very intense in the ports close to CMC waters (see Figure 9). This is largely international in nature. The ports of Barcelona and Valencia stand out in this respect (both in terms of the number of ships and the total capacity of cargo transported) but the cumulative merchant activity of the different Balearic ports is also significant. The ports of Tarragona, Castellón and Alicante also account for not insignificant volumes of merchant traffic.

The port of Valencia has a high percentage of freight traffic, mainly specialising in container ships, compared to passenger traffic. The opposite is the case in the ports of the Balearic Islands. The port of Barcelona is more balanced in this respect, although passenger port traffic is somewhat higher (as a percentage) than freight traffic. At smaller ports such as Tarragona and Castellón practically all activity is related to freight traffic.

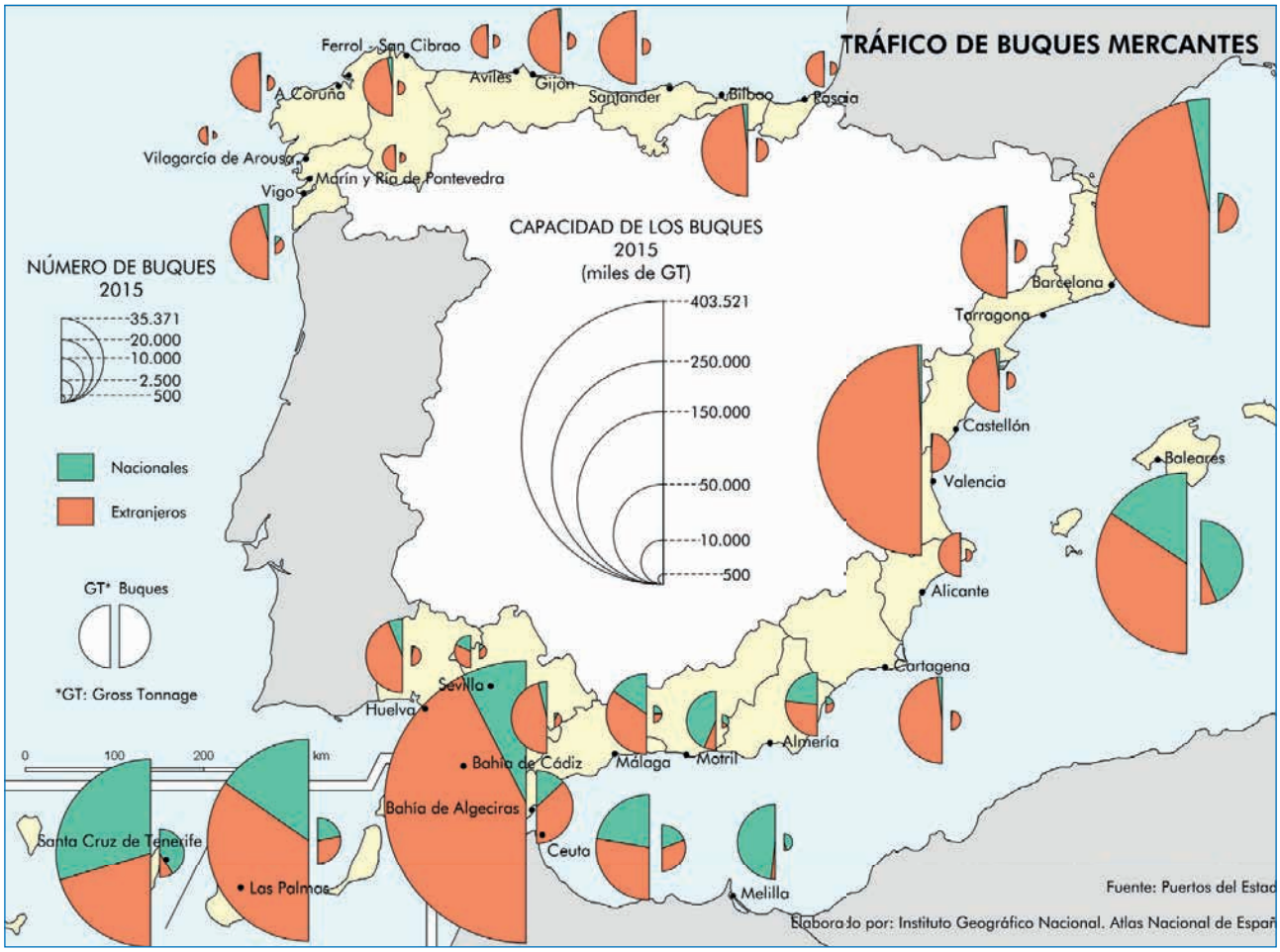


Figure 9: Merchant shipping traffic in Spanish ports. Orange indicates foreign merchant ships and green indicates Spanish merchant ships. Size of semi-circle indicates capacity of ships in thousands of Gross Tonnage. *Source: National Atlas of Spain of the National Geographic Institute (https://www.ign.es/web/resources/docs/IGNCnig/ANE/Capitulos/17_Transportes.pdf).*

Fishing activity is important but takes place mainly in waters closer to the coasts of the mainland and the islands, with a relatively low percentage of activity in CMC waters (see Figure 10).

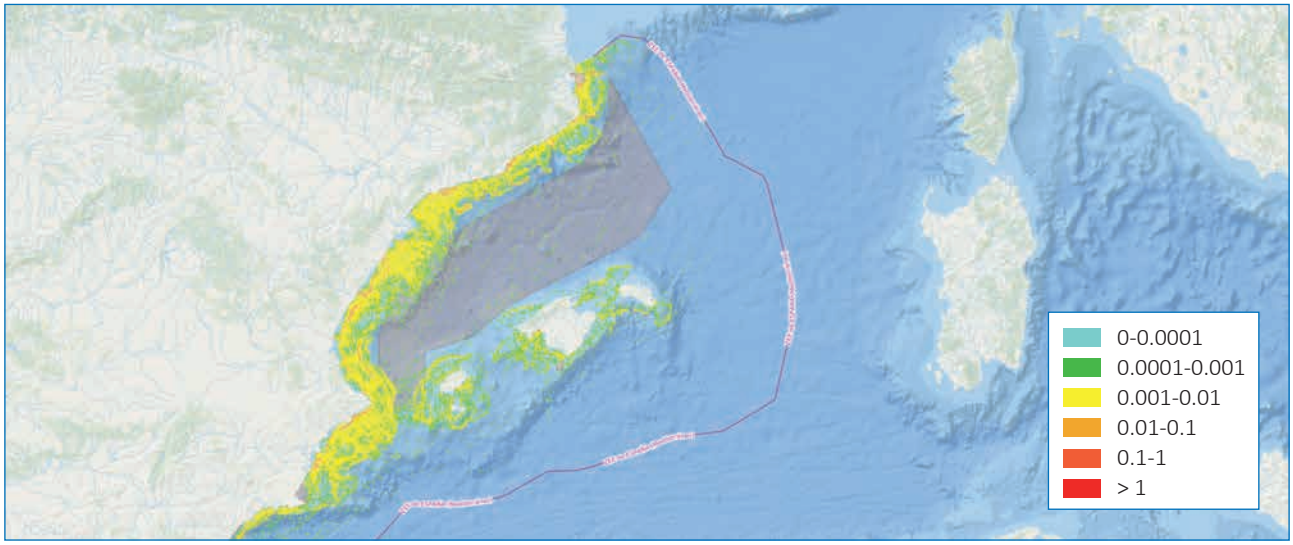


Figure 10: Average fishing vessels density (number of ships/km²) in the CMC and adjacent areas (summer 2016). *Source: InfoMAR (http://infomar.cedex.es/visor.html).*

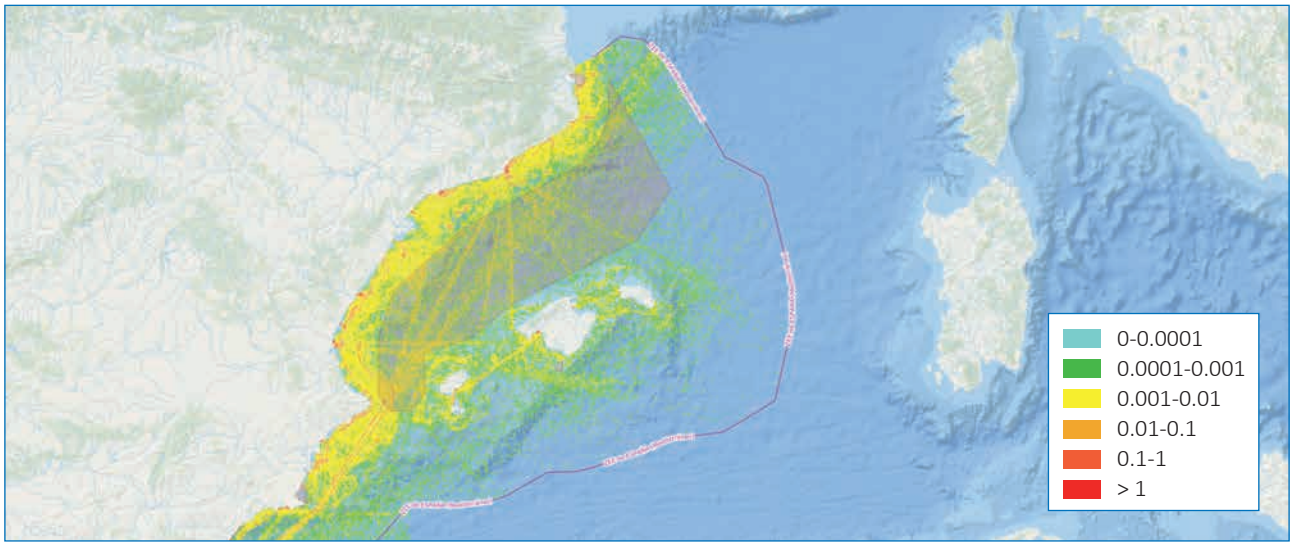


Figure 11: Average ship density (number of ships/km²) in the CMC and adjacent areas (summer 2016). *Source: InfoMAR (http://infomar.cedex.es/visor.html).*

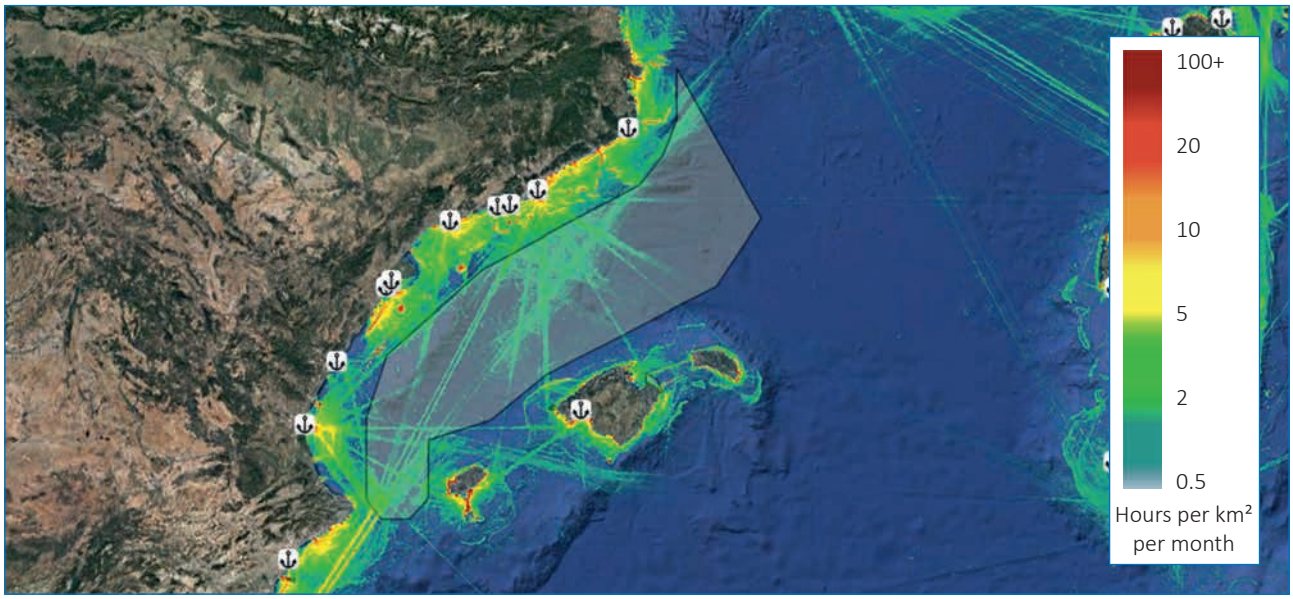


Figure 12: Average ships (all kinds) density (hours per km² per month) in the CMC and adjacent areas (2020 average). *Source: EMODnet (https://www.emodnet-humanactivities.eu/view-data.php).*

The impact of vessel traffic is not limited only to the production of underwater noise, but also includes greenhouse gas emissions as well as the risk of fatal collisions with marine wildlife, particularly with large whales and sea turtles. The potential to address these cumulative impacts needs to be reviewed. Measures such as the reconfiguration of shipping routes and/or speed reductions will result in both a lower risk of collisions and lower emissions.

According to ACCOBAMS, "*the area around the Balearic Islands and the main shipping routes radiating from Ibiza, Majorca 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*"[29]. Several studies have highlighted "(…) *the relevance of the waters around these islands for cetaceans and particularly sperm whales and fin whales. Reports of collisions in all three islands and the intensity of ferry traffic clearly highlight the need for an intensified monitoring effort*".

The International Whaling Commission (IWC) has also identified the Balearic Islands as a Mediterranean High Risk Area for fin and sperm whales to suffer ship strikes[30].

It is widely recognised that reducing the speed of ships is, among the different operational measures available, the one that can contribute in the most cost-effective way to reducing the environmental impact of maritime transport. In fact, this measure makes it possible to reduce, very significantly and with immediate effect, CO_2 emissions, atmospheric pollutants such as sulphur oxides (SO_X), nitrogen oxides (NO_X) and black carbon, as well as underwater noise and the risk of collisions with marine fauna.

Recent studies have shown that:

- Reducing the speed of boats by 10% would reduce their fuel consumption by 19%.
- Although the specific level of CO_2 emission reduction depended on the type of ship, in general the analysis indicated that baseline CO_2 emissions could be reduced by around 13% and 24%, if the vessels reduced their speed by 10% and 20% respectively[31].
- Similarly, it is estimated that a 10% and 20% reduction in speed across the whole fleet would result in a reduction in fuel consumption and NO_X and SO_X emissions of around 13% and 24% respectively[32].
- With respect to collisions with cetaceans, a 10% reduction in speed reduces lethal ship strikes by around 50%, though this estimate is less certain than that for noise emissions[33].
- By slowing down, a 10% reduction in speed would reduce underwater sound energy from shipping by around 40%[32,33]. A 20% reduction in ship speed would reduce it by around 67%[32].

As reflected in several resolutions endorsed by ACCOBAMS, speed, rather than the shape or displacement, of vessels is the most significant factor in ship strikes[34].

A large percentage of vessels sailing in the CMC's waters do so at very high speeds, which entails a high risk of collision with large cetaceans, as well as increasing other negative environmental impacts.

For example, the average design speed of passenger-only ferries is between 14.5 and 26.2 knots. In the case of medium and large cruise ships it is between 19 and 22 knots. Bulk carriers and chemical tankers (with a dwt[xvi] of >10,000) are travelling between 13.8 and 14.7 knots; liquified gas tankers between 14.2 and 19.2 knots. Container ships with more than 1,000 TEU[xvii] travel at speeds between 19 and 24.6 knots[35].

At present, only the Strait of Gibraltar in the Spanish Mediterranean has a critical navigation area due to the presence of cetaceans (see Figure 13).

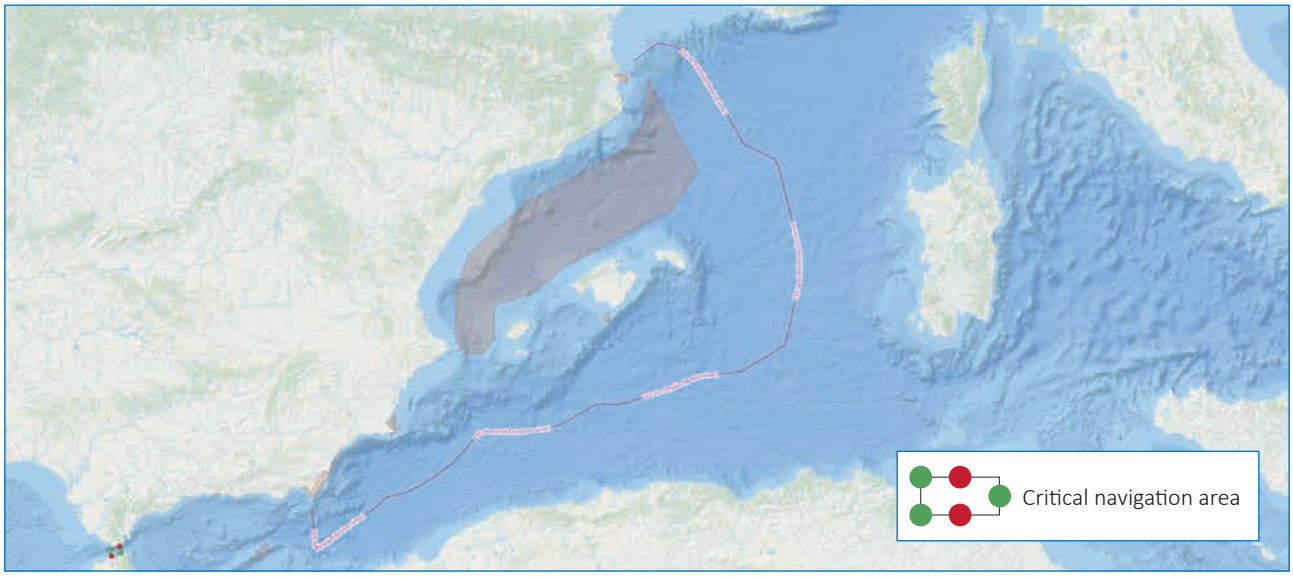


Figure 13: Only the Strait of Gibraltar has a critical navigation area due to the presence of cetaceans in the whole Spanish Mediterranean. *Source: InfoMAR (http://infomar.cedex.es/visor.html).*

xvi dwt = dead weight tonnage
xvii TEU = twenty-foot equivalent unit

C: RESEARCH ACTIVITIES INVOLVING ACTIVE ACOUSTICS, EXPLOSIONS AND SONAR

Information on activities such as research campaigns conducted by national research institutions or from other nations does not show up on EMODNET or InfoMAR but needs to be obtained from the relevant authorities that have the capacity to issue permits, such as the MITECO, the Ministry of Agriculture, Fishing and Food, the Ministry of Science and Innovation, the Ministry of Foreign Affairs, European Union and Cooperation, the Ministry of Defence, etc.

Research involving active acoustics or other invasive techniques should be considered as a potential threat. The management plan process should clearly identify what research is essential for filling in critical data gaps for management. All potentially harmful research that is not a priority for conservation should not be permitted.

D: MILITARY OPERATIONS AND RESEARCH

Although the CMC SPAMI is not among the top priority areas for military research by NATO's Centre for Maritime Research and Experimentation (CMRE), we must bear in mind that any passage of major military vessels such as aircraft carriers using high-frequency active sonar (HFAS) and frigates operating their MFAS on routine mode would have a negative impact on marine life in the area.

The use of low- or mid-frequency active sonar by navies for detecting submarines is an activity that generates wide-ranging and high-risk noise. While in the event of war it is unlikely that such activities would be restricted, manoeuvres and training exercises should be subject to a precautionary approach and to international environmental decisions. Resolution 12.14 adopted by the Parties to CMS, for example:

"calls on Parties and invites non-Parties to adopt whenever possible mitigation measures on the use of high intensity active naval sonars until a transparent assessment of their environmental impact on marine mammals, fish and other marine life has been completed and as far as possible aim to prevent impacts from the use of such sonars, especially in areas known or suspected to be important habitat to species particularly sensitive to active sonars (e.g. beaked whales) and in particular where risks to marine species cannot be excluded, taking account of existing national measures and related research in this field" [27].

According to the available data, there are permanent military exercises overlapping part of the CMC surface and in adjacent areas (see Figure 14).

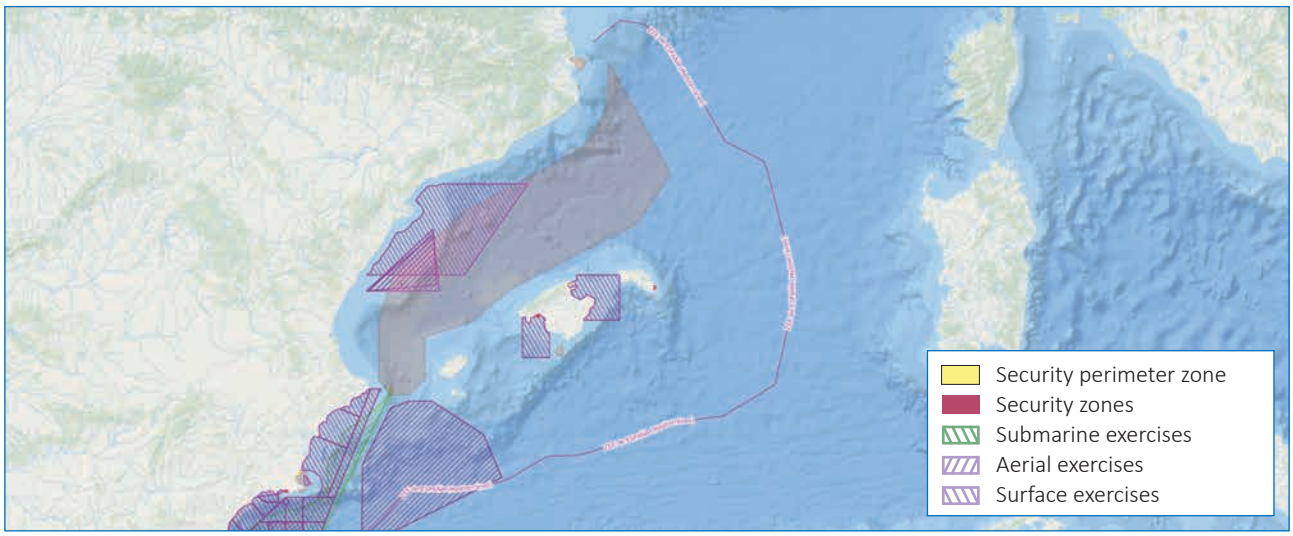


Figure 14: Permanent air force and surface military exercises in the CMC and adjacent areas. *Source: InfoMAR (http://infomar.cedex.es/visor.html).*

In recent years, a number of military activities have been carried out in the Spanish Mediterranean. Although these manoeuvres have not taken place in the CMC, the noise emitted could, potentially, reach the CMC or impact animals migrating to/from there. Most of them have taken place in the Estrecho and Alborán marine subdivision including the NATO exercise 'Dynamic Mariner/Flotex-19' which took place from 7th to 18th October 2019, from Cadiz to the Alborán Sea and involved 26 surface ships, two submarines and 21 aircraft[xviii].

The most recent large manoeuvres carried out by the Spanish Navy took place in February 2020; exercise 'Gruflex' in the Bay of Cadiz involving six ships. Manoeuvres were then suspended for a few months because of the COVID-19 pandemic. The 'Marsur-20' exercise, referred to as "reference manoeuvres in the training cycle", took place in October 2020 in the waters of the Gulf of Cadiz and the Strait of Gibraltar, with only four ships[xix]. Afterwards, it was announced that manoeuvres would resume in the following months, mainly in the Bay of Cadiz, although sometimes reaching the Strait of Gibraltar. The 'Marbifex' exercise and the 'MAR-ASW 21' anti-submarine warfare exercise were planned for May 2021 (involving a submarine, frigates and escorts)[xx]. The 'Flotex' exercise, which usually takes place every year, is planned for October 2021 and it is one of the largest manoeuvres, with the involvement of aircraft carriers, frigates and several squadrons.

Of a smaller nature was the 'Balearex-19' (from 5th to 19th November 2019), which consisted of a landing on Ibiza from an aircraft carrier[xxi]. Another landing, known as 'Eagle Eye', took place on 20th January 2020, in Malaga and the Alborán Sea, with only one frigate and the rest of the aircraft being land-based[xxii].

Regarding national defence and public security activities in the CMC, Royal Decree 699/2018 establishes that *"Collaboration between the affected ministerial departments within the General State Administration will be promoted in order to ensure that activities whose sole purpose is national defence and public security are carried out, to the extent that this is reasonable or feasible, in a manner compatible with the objectives of this royal decree, so that decisions that may eventually be taken in relation to the development of national defence and public security activities are not taken without obtaining the opinion of the Ministry for the Ecological Transition, at least in the elaboration of military protocols"*.

Spain has previously taken decisive action regarding this issue when the use of military sonar around the Canary Islands was banned in 2004[xxiii] following several atypical mass strandings of beaked whales which were linked to naval exercises that had taken place in the area .

The ban on the use of military mid- and low-frequency active sonar systems in waters within 50 nautical miles around the Canary Islands has successfully prevented any further atypical whale strandings since it was imposed, and it has been recommended that similar bans are put in place in the Mediterranean to protect beaked whale populations[37]. Such an approach, including defined buffer-zones as well as a transparent consultation process between navies and the MPA management authorities, is recommended for the CMC.

E: ACTIVE ACOUSTICS IN YACHTING AND FISHING

With regards to noise generated by commercial and recreational fishing activities, the common use of active acoustic devices such as echo-sounders and sonar is of concern as they can have an important impact on a number of species including cetaceans (odontocetes in particular) as their biosonar systems use the same frequencies. Fish finders and echo-sounders are generally a local disturbance, since the sonar does not travel far, as it is commonly projected downwards and uses high frequencies that have limited range. However, many

xviii https://www.infodefensa.com/es/2019/10/08/noticia-armada-espanola-liderara-fuerza-reaccion-rapida.html
xix https://www.diariodecadiz.es/noticias-provincia-cadiz/Marsur-20-maniobras-militares-aguas-Cadiz_0_1510649126.html
xx https://www.diariodecadiz.es/noticias-provincia-cadiz/Fuerzas-Armadas-maniobras-cadiz-coronavirus_0_1560745420.html
xxi https://www.periodicodeibiza.es/pitiusas/ibiza/2019/11/06/1118723/buque-insignia-armada-espanola-protagonizara-desembarco-historico-ibiza.html
xxii https://www.elespanol.com/espana/20200220/espana-musculo-militar-malaga-escalada-tension-marruecos/468704303_0.html
xxiii https://www.boe.es/boe/dias/2004/04/27/pdfs/A16643-16645.pdf

of the sonars on recreational boats are activated automatically when the engine and GPS are turned on, and cannot be turned off, which is problematic for impacting marine life. Fishing vessels also contribute engine and propeller noise. Acoustic deterrent devices intended for preventing bycatch and depredation in fisheries are not currently in use in the area but could be a potential threat if they are used in the future.

F: GAS PIPELINES AND SUBMARINE CABLES

Pipe-laying and cable-laying operations involving dynamic positioning systems, with high amplitude noise produced by thrusters are also noise sources.

The preparation and installation of pipelines may involve explosions and other industrial activities like trench making with dredging machines that, potentially, produce dangerous noise levels and which require an EIA. Underwater noise caused by all the activities in this kind of project must be studied. However, this is something that has not been done before, for example when the underwater section of the MedGaz pipeline (Algeria-Europe gas pipeline, via Spain) or the Denia-Ibiza-Majorca gas pipeline were laid.

The existing infrastructure of most relevance is the ENAGAS gas pipeline that supplies the Balearic Islands with natural gas from the Spanish peninsula. Its construction took two years and was finished in September 2009[xxiv]. It starts onshore at the town of Denia in Valencia and has two underwater sections. One connects Denia with Ibiza and the other Ibiza with Majorca (see Figure 15). A total of 268 km out of 330 km are submarine. The maximum depth is almost 1000 m. Wherever possible the pipeline was buried. Special measures are in place to monitor interactions with bottom trawling fisheries.

There is also a gas pipeline to the "Castor" gas storage platform in Castellón which is no longer in operation due to seismic risk.

There are no plans for future gas pipelines between the Balearic Islands and the Peninsula.

Figure 15: Current underwater gas pipelines in the Levantine-Balearic marine subdivision. *Source: ENAGAS.*

Submarine cable laying, maintenance and retrieval operations are activities that could potentially produce underwater noise and should, therefore, be considered in the CMC SPAMI management plan.

On 14 August 2012, Red Eléctrica de España (REE) which operates the national electricity grid in Spain, brought into service the submarine interconnection linking the electricity systems of Majorca and Menorca with that of the Iberian Peninsula (see Figure 16).

xxiv https://www.youtube.com/watch?v=WCyPVoP3BjM

This high-voltage direct current submarine interconnection of 250 kV is 237 km long and runs along the seabed between Sagunto (Valencia) and Santa Ponsa (Majorca) reaching a maximum depth of 1,485 m.

The four Balearic Islands are also interconnected with each other. Majorca is linked both to Menorca and Ibiza and the latter with Formentera. The Majorca-Menorca subsystem is linked by a 132 kV inter-connection, while the Ibiza-Formentera subsystem is linked by two 30 kV interconnections. The 132 kV electrical connection between Majorca and Ibiza is the longest in the world in alternating current and the deepest of this type as it runs through depths of up to 800 m.

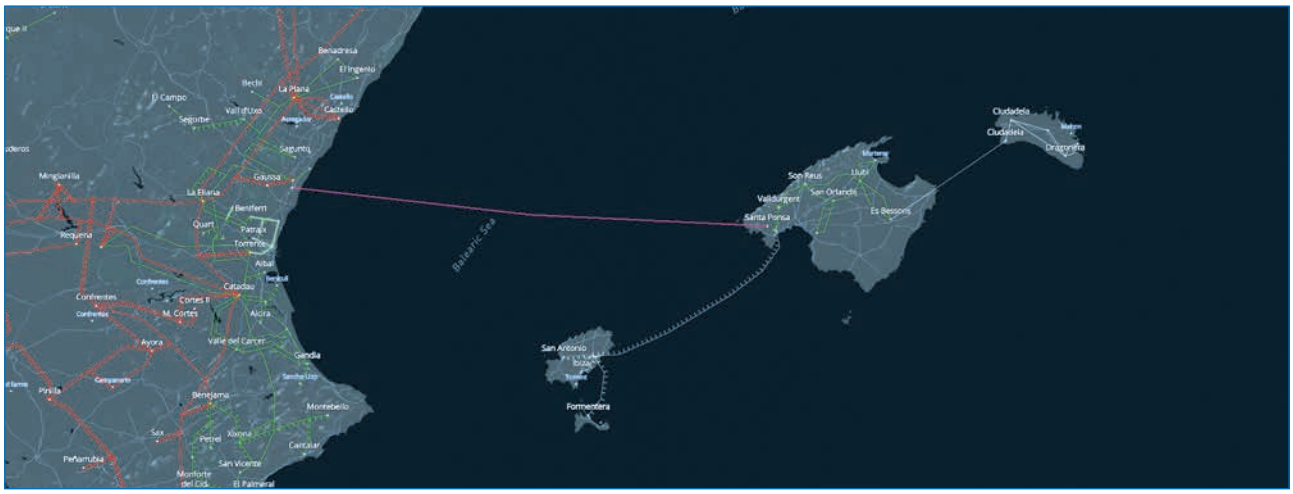


Figure 16: Current electric interconnections in the Levantine-Balearic marine subdivision. *Source: ENTSO-e (https://www.entsoe.eu/data/map).*

There are some new electric subsea interconnections planned to increase the stability of the Balearics electrical system. One is a new Ibiza-Formentera 132 kV connection, double circuit. Length: 37.2 km (27.15 km underwater). Work is intended to start in 2021 and will be completed in 2024. Another project which has already been planned is a second interconnection between Majorca and Menorca. The EIAs for these projects did not explicitly give details regarding ocean noise.

In recent years, there has been much debate about the possibility of building a new subsea interconnection between the Spanish mainland and the Balearic Islands. If the decision is taken to implement it, its potential underwater noise impacts must be taken into account when they are subject to an EIA.

Figure 17 shows the telecommunication cables network in the CMC and adjacent areas.

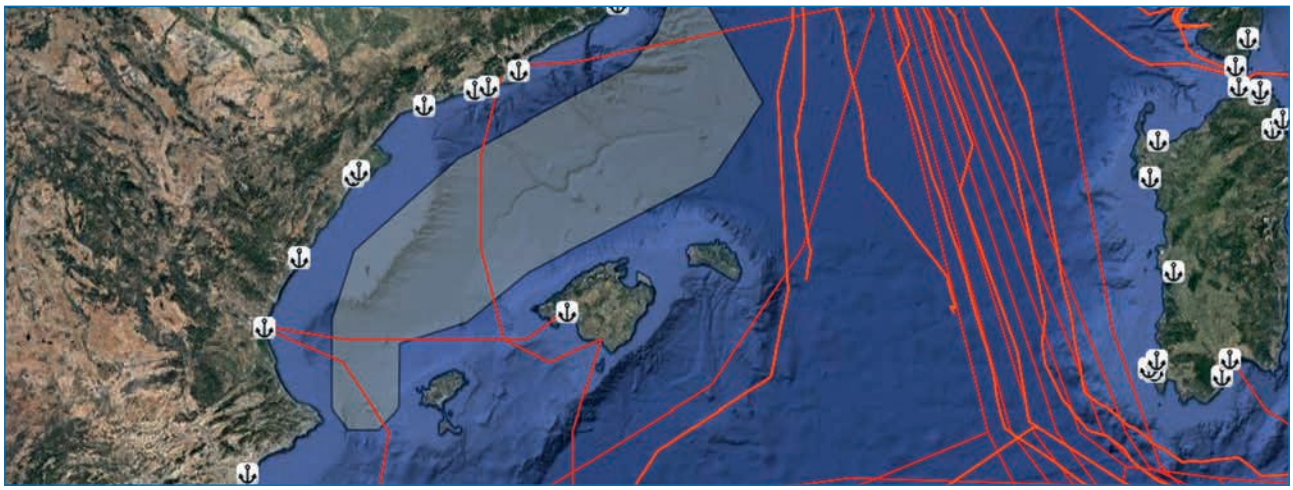


Figure 17: Telecommunication cables network in the CMC and adjacent areas. *Source: EMODnet (https://www.emodnet-humanactivities.eu/view-data.php).*

G: PILE DRIVING AND OFFSHORE RENEWABLE ENERGY

It should be a standard requirement that the development and production of new renewable energy sources as part of a "Blue Economy", is guided, monitored and subject to EIAs, Strategic Environmental Assessments (SEAs) and Marine Spatial Planning processes. Specific consideration needs to be given to activities planned in protected areas including the CMC, and noise emission should be highlighted as an issue of particular concern.

Underwater noise from construction, operation and dismantling of marine renewables plants must be considered, as noise travels very far and very efficiently underwater. Noise can affect the marine ecosystem for tens to hundreds of kilometres.

In shallower areas, wind turbines are being installed with structures mounted on fixed foundations (bottom fixed). There are three basic types, and the depth where they are to be installed and the characteristics of the sea floor will determine which is used: 1) The "Monopile", is a simple structure composed of a large steel cylinder driven directly into the seabed; 2) The "Gravity base" foundation is a large structure generally made of concrete and steel that remains anchored to the seabed thanks to its own weight; 3) The "Jackets" type, is a concept which has been used by the O&G industry on drilling platforms at great depths. It consists of a tower with a steel structure on three or four legs with jackets that facilitate anchoring the structure to the seabed.

Pile driving is an activity that involves high levels of underwater noise. Since pile driving interacts with the seabed, the noise travels not only through the water but also through the ocean floor. Marine life can be affected by the water-borne portion of the noise, but bottom-dwelling creatures can also be affected by the vibration through the seabed. Negative effects have been demonstrated on cetaceans, fish and invertebrates [9].

Figure 18 shows the exploitable areas for offshore wind energy in the Levantine-Balearic marine subdivision in relation to the CMC. The CMC SPAMI is mostly in deep offshore waters but does, nevertheless, include areas of continental shelf where potentially noisy infrastructure development activities, such as pile driving for bottom-fixed wind energy installations, could take place.

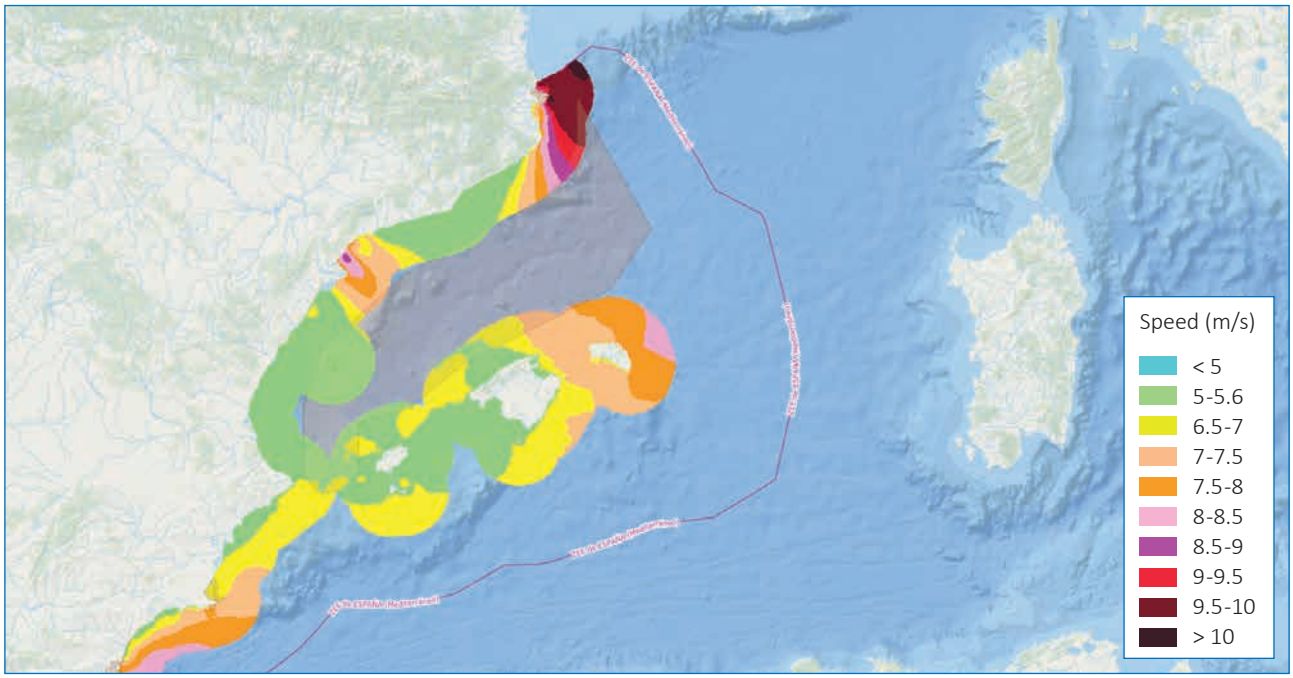


Figure 18: Exploitable areas for offshore wind energy in the Levantine-Balearic marine subdivision. *Source: InfoMAR (http://infomar.cedex.es/visor.html*

Although it seems unlikely that offshore wind farms will be planned in the deepest waters of the CMC, the installation of floating wind turbines could be possible in shallower waters and is more likely in areas closer to the coast.

The Strategic Environmental Study of the Maritime Spatial Plans (POEM) of the Directorate General for the Coast and Sea of the MITECO identifies four areas that could be of maximum interest for the development of wind energy in the maritime area of the Levantine-Balearic marine subdivision[38]. These areas are as follows: the marine strip off the coast of Girona, particularly in the area adjacent to Cap de Creus; a smaller area to the north and east of the Ebro Delta; the marine strip between the northwest and southeast of the island of Menorca; and, finally, the southern area of the subdivision, off the coasts of Murcia and Almeria (see Figure 19). In these areas, five polygons (Priority Use Zones) have been identified for offshore wind energy, four of which are very close to the CMC, especially the one located in the area adjacent to Cap de Creus and, to a lesser extent, the three in areas close to Menorca.

In any case, in the specific part of the POEM corresponding to the Levantine-Balearic marine subdivision, the installation of offshore wind energy is not completely ruled out in the CMC; it would be an area in which, due to its high ecological value, the installation of wind turbines would be subject to greater restrictions but would not be completely excluded, as is the case with Special Protection Areas (SPAs) within the Natura 2000 network.

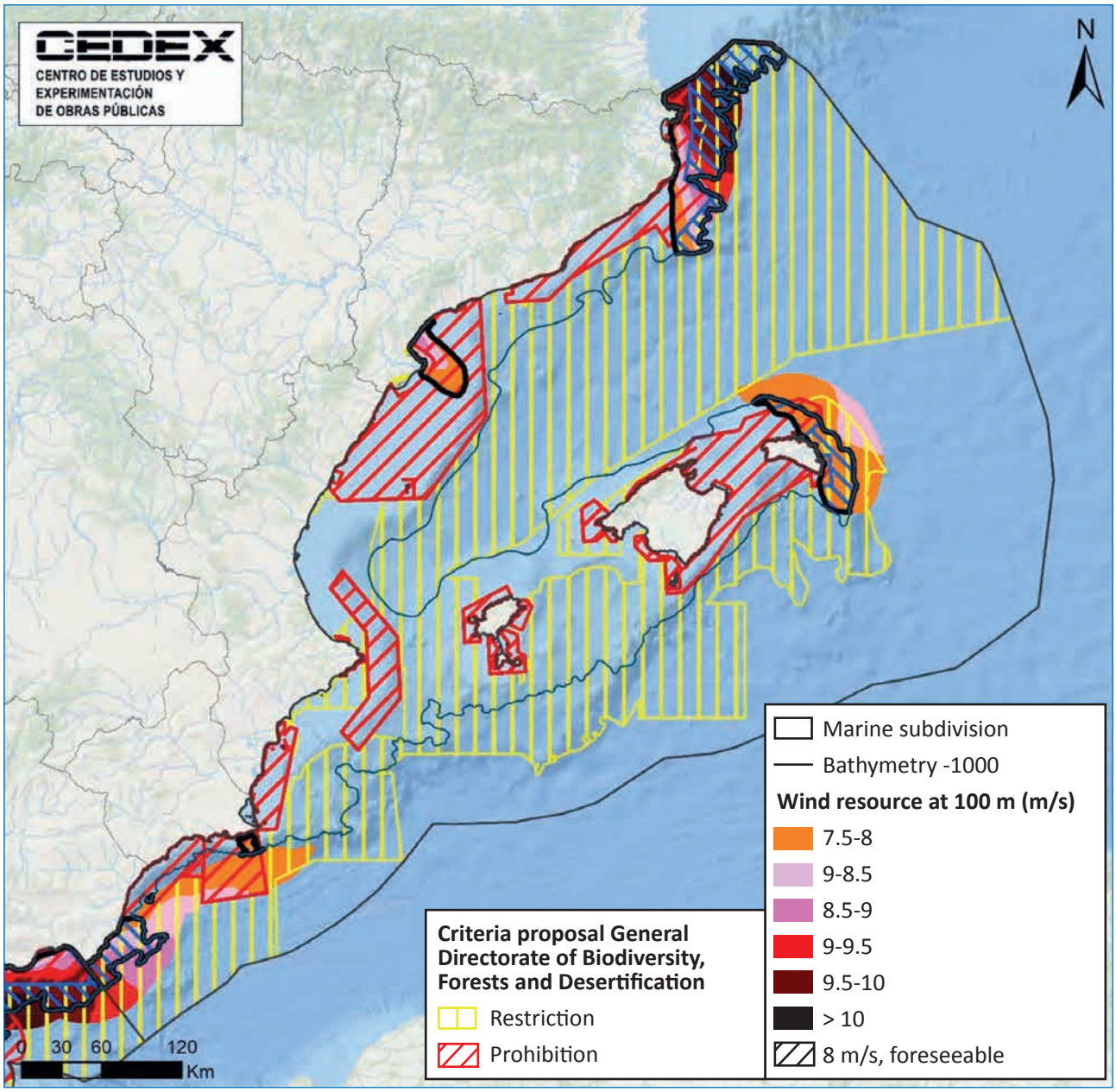


Figure 19: Viable areas for the development of offshore wind energy in the Levantine-Balearic marine subdivision.
Source: Centro de Estudios y Experimentación de Obras Públicas, CEDEX.

Any noise emitted during the installation and, subsequently, during the operation of floating wind farms could have an impact in the CMC and would need to be assessed in an EIA.

Floating wind platforms can be classified into three types: 1) float-stabilised structures or barges (the platform is floating on the surface of the water and is anchored to the seabed by cables that prevent the wind turbine from capsizing); 2) Tension Leg Platform (TLP) structures (the wind turbine rests on a platform supported by four solid, high-strength cables anchored to the seabed; the cables are tensioned, and it is this tension that maintains the buoyancy and position of the turbine under any type of load); and 3) spar buoys (the wind turbine is supported on a cylindrical steel or concrete column, completely submerged, which is ballasted with a counterweight to stand upright and provide stability to the wind turbine and to withstand the loads produced by the wind and waves).

Semi-submersible floating wind turbines have been deployed in some of the roughest seas of the Atlantic where they survived 17m waves. Just one tug is needed to place the turbine and they can be used in all different sediment types. The anchors, which are required to attach the floating platform to the seabed, are fully retrievable and no effect on marine life has been observed at the prototype wind farm, WindFloat, off the Portuguese coast, although this should be evaluated more thoroughly both in Portugal and in other areas[6].

The effects on marine life of anchoring these floating platforms, however, depend on the type used. Different anchoring systems can be used to hold the floating substructure and the wind turbine in place, such as gravity bases, suction caissons or driven or drilled piles. Suction caissons are the most commonly used anchoring system: the wind turbine support rests on three legs that penetrate the seabed, using suction caissons, also known as "inverted-bucket structures", which create a vacuum that together with the external pressure helps the anchorage to penetrate the seabed. Drag anchors, because they rely on their own weight and do not require drilling, are silent, but they disturb a large surface area and have a large impact on the seabed.

On the other hand, there is the potential impact of catenary mooring lines that attach and fasten the floating platforms to their anchorages on the seabed and provide them with the necessary stability to withstand strong waves. This system is the most common, as the catenary lines allow controlled movement of the platforms and are low cost. Due to the large number of mooring lines required and the fact that the catenary radius is usually large, they can have a considerable impact over a wide area. The TLP system with taut vertical cables decreases the area occupied by mooring lines, so the negative impact can be minimised, but there is some concern regarding the use of a large number of vertical mooring lines in important baleen whale habitats, as they could cause these whales to collide or become entangled. All these elements would need to be assessed during the relevant EIA[6].

According to the "Estudio Estratégico Ambiental del Litoral Español (EEALE) para la Instalación de parques eólicos marinos" (Strategic Environmental Study of the Spanish Coastline for the Installation of offshore wind farms), approved by the joint Resolution of 16 April 2009 of the General Secretariat for Energy and the General Secretariat for the Sea, the emission of noise is an important aspect during the construction phase, both for the wind turbines and for the laying of the submarine cables[39]. Once operating, noise emitted by the wind turbines also needs to be considered as it could have an impact on the fauna living in the vicinity or using the area as a passage during migrations, as in the case of cetaceans. However, while recognising that there is a lack of comprehensive information on the influence of offshore wind farms on cetacean transit areas, it is advisable to address the identification of specific impacts at the various stages of the permit process for specific projects.

The European Commission "Guidance document on wind energy developments and EU nature legislation"[40] states: "*High levels of underwater noise are associated with the pile driving of monopile and jacket-pin-pile foundations. (...) Installations of gravity bases, caissons, or floating foundations are not without underwater-noise emissions. This is because there may be a need for seabed preparations involving dredging-type activity, and associated vessel noise is unavoidable. However, impulsive noise is absent from these methods [unless associated with unexploded ordnance (UXO) clearance], and noise levels are understood to be very low (relatively*

speaking) for all such alternative foundation designs. There is no doubt that the noise reduction achieved through use of non-piled foundations is advantageous for marine mammals. However, there will be practical and commercial considerations for projects using non-piled foundations, and it is also necessary to consider the inadvertent consequences of decisions to use them. For example, gravity bases have a larger footprint than any driven foundation. They therefore have the potential to have greater effects on benthic habitats, both directly through habitat loss and via hydrodynamic changes. Such effects must be carefully evaluated in appropriate assessments where relevant".

Apart from offshore wind energy, it appears that the energy potential of other marine renewable energy sources, such as wave energy, is low in this area, even in near-shore areas (see Figure 20) and would not be feasible for application in the CMC. In the Levantine-Balearic marine subdivision, taking into account the maximum seasonal power, corresponding to the winter months (December, January and February), the areas available for exploitation according to existing technology are very small, and are mostly located to the north of Menorca, in a narrow strip to the east of Majorca and in a very limited area to the north of Catalonia.

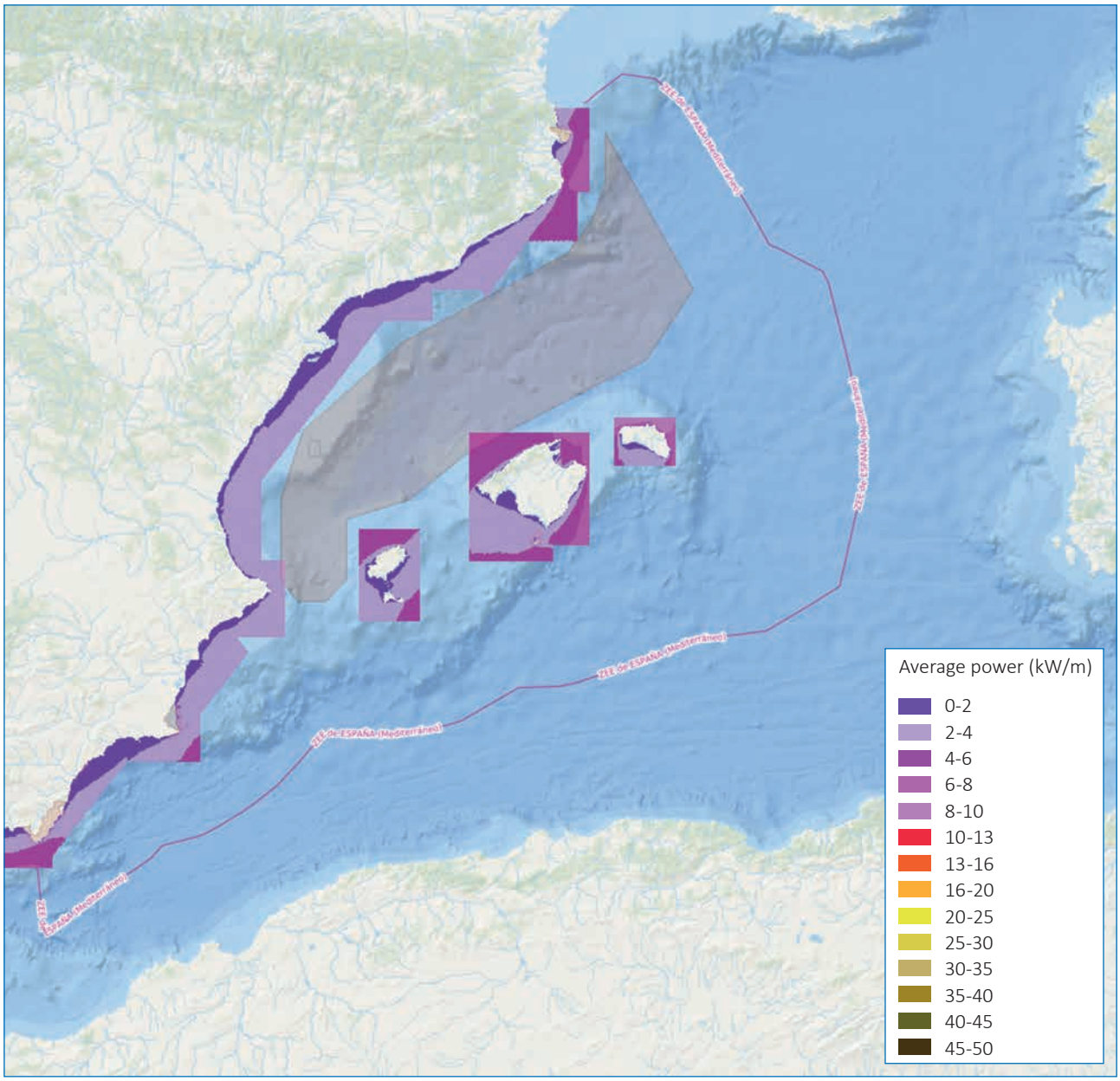


Figure 20: Potential areas for wave energy in the Levantine-Balearic marine subdivision. *Source: InfoMAR.*

H: DUMPING

The Army and the Navy dumped expired ammunition off the Spanish coast until the practice was banned. There is no official data on the amount and type of ammunition dumped.

The dump sites, officially called "Deep-sea bomb disposal areas and explosives dumps", were in use until 1 January 1995, when Spain started complying with the London Convention[xxv]. Two of the Spanish dumps recognised by the Armed Forces are in the Mediterranean: the so-called M-134, a two-mile radius circle at a distance of four miles from Cartagena, and M-135, a rectangle in the vicinity of the Columbretes Islands, a small, protected archipelago halfway between the coast of Castellón and the Balearic Islands[xxvi]. See Figures 21 and 22.

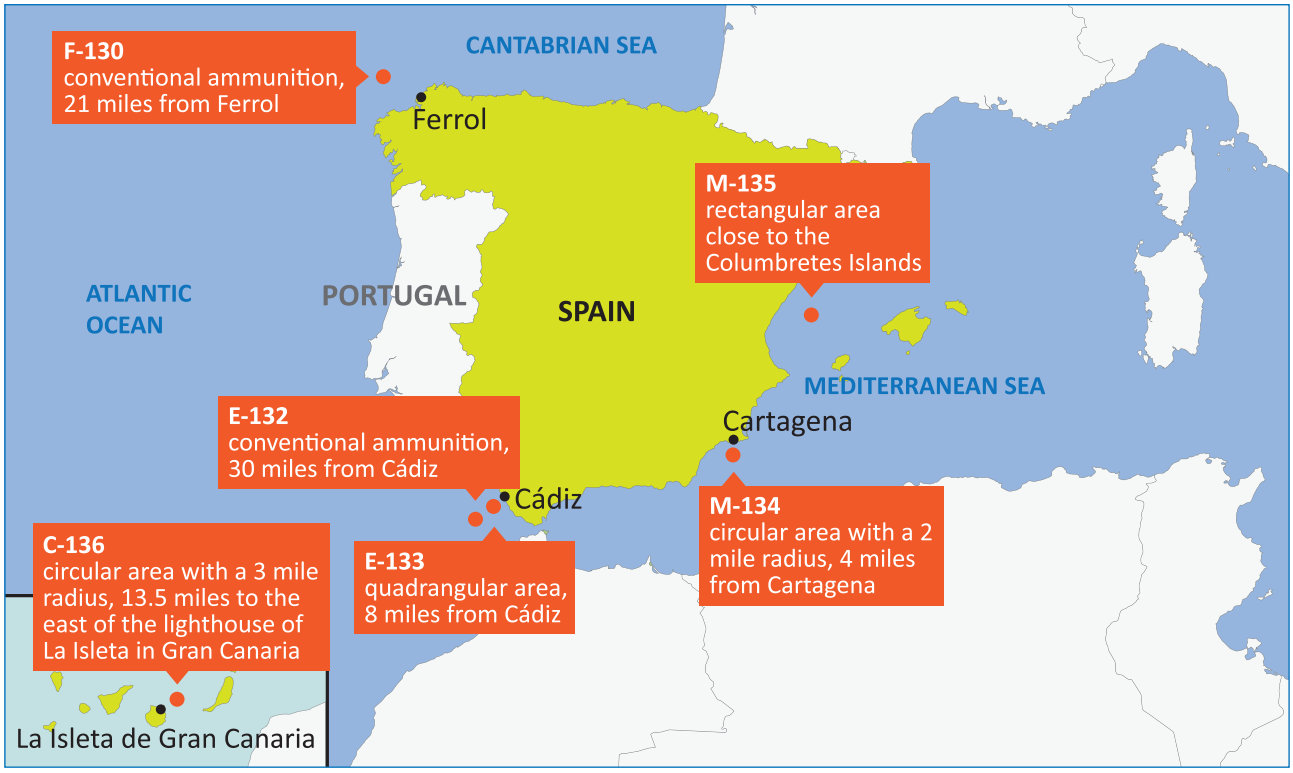


Figure 21: Unexploded ordnance dumps in Spanish waters recognised by the Armed Forces. *Source: El País - Materia (http://esmateria.com/2014/02/04/las-fuerzas-armadas-tienen-seis-vertederos-de-explosivos-en-aguas-espanolas/).*

Figure 22: Areas where munitions have been dumped. *Source: EMODnet (https://www.emodnet-humanactivities.eu/view-data.php).*

xxv Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972
xxvi http://esmateria.com/2014/02/04/las-fuerzas-armadas-tienen-seis-vertederos-de-explosivos-en-aguas-espanolas/

Operational Objective 2: Ensure positive and active involvement of relevant stakeholders in the Management of the CMC SPAMI

Setting up a Management Body, Stakeholder Advisory Body and Scientific Advisory Body

Management Body

In Annex 1 a document is provided with suggestions for the setting up of a Management Body, Stakeholder Advisory Body and Scientific Advisory Body for the CMC (Figure 23). The document proposes different options for the CMC Management Body and OceanCare recommends a full consideration of Option A and Option B, either of which could be a successful starting point:

Option A. Collaborative management approach — putting together a Management Body comprised of two or more of the following: local community members, scientists who have worked with cetaceans in the MPA, conservation NGOs, other stakeholders, national and regional governments.

Option B. Management Body installed from national government, with strong representation of regional/local governments and local community/stakeholder, NGO and scientific advisory bodies that have some power of review and the ability to make decisions.

Stakeholders should include local communities, scientists and governments, working together to come up with their vision of the ideal situation.

Whichever management body option is chosen, a framework should be set up to include:

- a clear and agreed set of arrangements for effective partnerships at various levels (specific responsibilities should be given to specific people or groups);
- a willingness of all relevant players to adhere to the nine characteristics of good governance (see Annex 1) and to work together as a team toward an agreed goal or list of objectives; and
- a means to mediate differing interests to reach a broad consensus on what are in the best interests of all parties and, where possible, on policies and procedures[41].

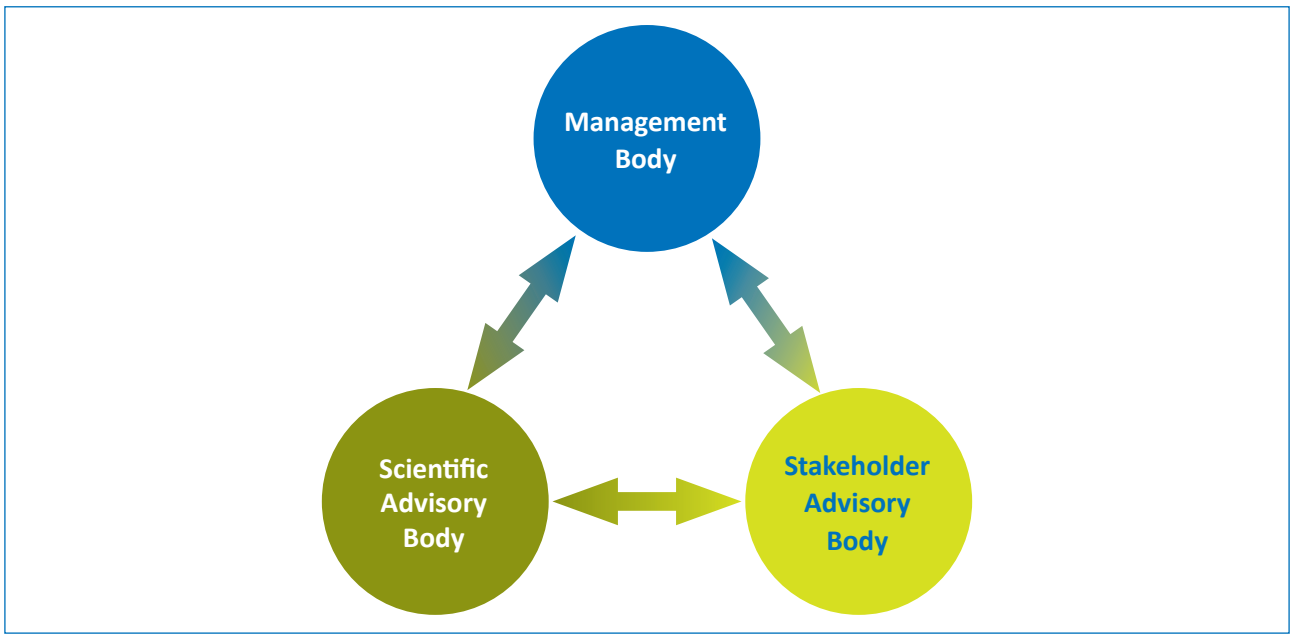


Figure 23: How the CMC Management Body, Stakeholder Advisory Body and Scientific Advisory Body could interact with each other

Scientific Advisory Body

A strong Scientific Advisory Body with substantial input and influence over final decisions is essential. The Scientific Advisory Body should participate in or co-lead the monitoring efforts that will be necessary to determine effectiveness and compliance, and it will then be able to respond with continuing recommendations. Recommending precautionary approaches for uncertainty and instituting mitigation strategies will be the central role of the Scientific Advisory Body.

Ideally, one or more scientists from the Scientific Advisory Body would also serve on the Management Body and participate in the meetings of the Stakeholder Advisory Body (see below). This could give more traction to the science, allow scientists to explain their findings more directly to senior managers and stakeholders, and provide a route toward greater acceptance.

Stakeholder Advisory Body

The Stakeholder Advisory Body would include local communities, and its role can range from providing input to management to overseeing the management. In some cases, of course, the stakeholders can be part of the Management Body with ultimate responsibility for all decisions. No matter which option(s) are taken, considerable effort should be made to choose stakeholders to form the team. Training should be given so that they not only understand their role but so that they can engage in discussions on the key topics related to science and management to make informed decisions. The principles of marine habitat conservation and sustainable use of the ocean should be part of that training.

As with the Scientific Advisory Body, one or more key stakeholders would also serve on the overall Management Body, representing the interests in a democratic way that is conducive to reaching agreement on many issues.

Ideally, scientific and stakeholder representatives on the overall Management Body should be members in full standing (not just observers or token representatives).

Consultation Processes

Consultation provides a valuable process to solicit ideas and participation, both to seek and share information before decisions are made. Consultation should be the *modus operandi* between the Management Body, Stakeholder Advisory Body and Scientific Advisory Body. Frequent formal and informal consultations can be carried out in written form or in the context of a formal or informal meeting/workshop. It is a primary role of the Management Body to ensure that there are frequent consultations, and that the information and views obtained are registered and considered.

Consultation informs management bodies of MPAs that they are not alone in their work. Besides consultations, the Management Body, with its Stakeholder Advisory Body and Scientific Advisory Body, will become part of the network of Spanish MPA management bodies. The Management Body of the CMC can also join MedPAN[xxvii] and other MPA manager networks, and can participate in conferences of the International Committee on Marine Mammal Protected Areas (ICMMPA). In effect these networks and conference outreach also become ways to engage in informal consultation.

CMC SPAMI Stakeholder Communication Strategy

The CMC SPAMI is a challenging marine site to manage given the intensity and complexity of human activities that characterise the Western Mediterranean Basin. As it is such a vast offshore area, the success of any management measure will largely depend on the collaboration between relevant authorities and all

xxvii MedPAN is the network of MPA managers in the Mediterranean

stakeholders. The following steps are recommended for communicating effectively with stakeholders and the public:

i. Identify all stakeholders involved directly or indirectly in the management and use of the CMC SPAMI

ii. Identify best stakeholder communication pathways

Different communication protocols and tools may be necessary for different purposes. A strong emphasis should be put on identifying communication pathways based on online mapping and communication systems used by navigators, fishers, researchers and any vessel approaching the CMC (e.g., Maxsea©, Navionics©, Google Ocean, etc.).

iii. Produce a CMC SPAMI Stakeholder Communication Strategy Roadmap

The Management Body and Stakeholder Advisory Body will work together to produce the Roadmap.

iv. CMC SPAMI stakeholder capacity development

The issues of noise pollution and vessel strikes are likely to be quite abstract or unknown for most stakeholders of the CMC SPAMI. To ensure that relevant stakeholders have the necessary information, an appropriate capacity development programme can be a useful tool.

v. Raise public awareness

Raising awareness about the CMC SPAMI is not only a matter of informing the public about the biodiversity conservation strategies and policy but engaging them to be part of the change. Informative material should be published and disseminated regarding the existing natural values present in the area, the main pressures and impacts threatening these values, and the content and proposals of the Management Plan so that public awareness increases and the public is encouraged to participate in protecting the area. Educational programmes can also be delivered in schools and social centres.

vi. Citizen science activities

There is potential for diverse citizen science activities to take place in the CMC SPAMI run by experienced conservation organisations / institutions which have previously shown the potential of such programmes as drivers for continuous long-term monitoring.

Operational Objective 3: Establish a long-term Monitoring Plan

Monitoring is the essential feedback mechanism for an adaptive management plan to attain its objectives. The monitoring and surveillance of large offshore MPAs pose a series of important economic and logistic challenges. Monitoring Plans need to operate smoothly and continuously for decades with the collection and analysis of key data on a long-term basis.

Monitoring could include:

Determining the conservation status of cetacean species and other pelagic species present in the MPA and surrounding areas

This action is necessary to provide the CMC SPAMI Monitoring Plan with a baseline for analysing trends in conservation status, abundance, seasonal distribution, and habitat use of cetaceans and other pelagic species within the CMC. This can be achieved by conducting a series of acoustic and visual surveys (including aerial

surveys to obtain marine mammal abundance estimates), as well as by using telemetry tracking of cetaceans and other species. It needs to be stressed that all studies should involve non-invasive techniques such as passive acoustic monitoring and photo-identification.

As well as gathering data for the CMC SPAMI itself, it would be useful to complement this with data from the areas adjacent to the CMC. Cetaceans are wide-ranging animals and information regarding the location of animals outside the CMC will be relevant for decisions taken for the MPA.

Electronic Monitoring Systems (EMS) can help overcome some economic and logistic challenges. The main challenge is keeping up to date with the new products and instrumentation available[xxviii].

Mapping human activities and interests in the CMC SPAMI and its contiguous waters

Information on existing and planned infrastructure, jurisdictional boundaries, activities in the area (shipping, fishing, research, cables, pipelines, platforms, etc.) can be accessed through online tools[xxix] or in reports, such as those produced for the EU's MSFD and Maritime Spatial Planning Directive (maritime transport, fishing, research, cables, pipelines, rigs, etc.). Some activities will be highly seasonal and so both the spatial and temporal extent need to be mapped. Activities that could be developed in the future should also be considered e.g. the development of renewable energy infrastructure or wildlife watching tourism (an activity that is commonly introduced or enhanced when a protected area focuses on marine mammals).

Characterising the acoustic properties of the CMC SPAMI

Obtaining a baseline of noise in different areas of the CMC SPAMI will be an essential starting point for the Monitoring Plan to conduct analyses on future trends and, thereby, inform the Management Plan on the effectiveness of its management measures, as well as to inform the MSFD efforts in relation to Indicator D11C2 (spatial distribution, temporal extent and levels of anthropogenic continuous low-frequency sound).

Monitoring activities should be in line with the guidance provided by TG Noise for the implementation of MSFD requirements as well as fulfilling the provisions laid out in Article 16 of the Habitats Directive. This monitoring should certainly include ambient noise levels.

This action aims at collecting passive acoustic data to be used to calibrate modelling efforts. Modelling should be developed to predict noise maps and the results should be ground-truthed to assess how good or bad the model is and to subsequently correct deviations to calibrate the model and improve its output. Data collection and modelling are needed for this region as part of the MSFD requirements.

It is important to have an understanding of the spatial and temporal acoustic qualities of different parts of the CMC when it comes to zoning and/or restrictions. Natural sound levels should also be characterised for comparison. The better we understand the acoustic qualities, the better we can establish spatial and temporal measures for noise pollution mitigation.

Overall shipping density and shipping routes should be determined bearing in mind that in the CMC there are increased recreational sailing and ferry passages in the summer months. Navigation routes need to be analysed so that potential maritime traffic regulations and tools can be implemented.

Shipping noise propagation as a result of bathymetric and oceanographic features, as well as the risk of vessel strike in the area should be determined. Fin whales, one of the key species in the CMC, are of particular

xxviii For more information about Electronic Monitoring technologies, see: https://www.fisheries.noaa.gov/insight/electronic-monitoring-explained

xxix For example: http://infomar.cedex.es , www.socib.es and https://www.emodnet-humanactivities.eu/view-data.php

concern as they carry out a North-South seasonal migration which can bring them into the path of East-West traffic routes from the mainland to the Balearic Islands for both commercial and ferry operations. Highlighting the seasons and specific locations when there is a high risk of collision for this species and others, including sperm whales, is key.

4.3 Develop a LEGAL FRAMEWORK for the management of the CMC SPAMI

4.3.1 Background

On June 30, 2018, Royal Decree 699/2018, of June 29, was published in the Official State Gazette (BOE), declaring the Mediterranean Cetacean Migration Corridor a Marine Protected Area, approving a preventive protection regime, and requesting its inclusion in the List of Specially Protected Areas of Mediterranean Importance (SPAMI) within the framework of the Barcelona Convention[xxx].

This Royal Decree consists of two articles. Article 1 contains the declaration of protection and describes the extension, limits and contents of the protected area; Article 2 specifies the preventive protection regime applicable to this MPA.

Royal Decree 699/2018.

Article 1 – Declaration of the Mediterranean Cetacean Migration Corridor as a Marine Protected Area.

1. The marine area "Mediterranean Cetacean Migration Corridor" is declared a Marine Protected Area (MPA) in accordance with the provisions of article 33 of Law 42/2007, of December 13, on Natural Heritage and Biodiversity and in article 27.1 of Law 41/2010, of December 29, on the protection of the marine environment as well as in application of article II, point 3, section c) of the Agreement for the Conservation of Cetaceans of the Black Sea, the Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) and of Article 3 of Annex 2 of the said Agreement.

2. The area occupies an estimated area of 46,385.70 km², according to the European Terrestrial Reference System (ETRS89), UTM Projection, Zone 31; the cartography of this area declared as a MPA is included in Annex I.

3. The area includes the entire marine space, including the waters in which it is integrated, the seabed, the sub-seabed, and the existing natural resources within the limits established by the following geographic coordinates

Coordinates for the proposed marine area:

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

xxx https://www.boe.es/eli/es/rd/2018/06/29/699

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

Article 2- Preventive protection regime

1. In order to ensure that there is no decline in the conservation status of the species present in this area, the application of a preventive protection regime is approved. This preventive protection regime will consist of the following measures:

a) The use of active systems to carry out underground geological research will not be allowed (either by means of probes, compressed air or controlled explosions or by means of underground drilling) in the area included in article 1, except those related to permits of investigation or exploitation already in force.

b) Any type of hydrocarbon extractive activity will be prohibited, except for those related to research or exploitation permits[xxxi] already in force.

There has, therefore, been a preventive protection regime in force since June 21, 2018, which will remain in force, according to the third final provision of Royal Decree 699/2018, until the approval of the corresponding management plan.

Royal Decree 699/2018.

Third Final Provision. Validity.

The measures established in this Royal Decree shall remain in force until the approval of the corresponding management plan, which is to be established within a maximum period of three years from the moment in which this marine space is included in the SPAMI List.

According to the Second Additional Provision of the Royal Decree 699/2018, the management plan must also adapt to the marine strategy for the Levantine-Balearic marine subdivision.

Royal Decree 699/2018.

Second Additional Provision. Adaptation to the marine strategy for the Levantine-Balearic marine subdivision.

The measures established in the corresponding management plan will be adapted, if necessary, to the provisions of the program of measures of the marine strategy for the Levantine-Balearic marine subdivision, elaborated in accordance with the prescriptions of Law 41/2010, of December 29.

xxxi It is noted that these permits allow the holder to undertake research, drilling and extraction activities.

4.3.2 Recommendations to include in the CMC Management Plan

Taking into account the current situation regarding the preventive protection regime and the other considerations presented, the following guidelines, prohibitions and limitations should be included in the CMC Management Plan to reduce anthropogenic noise and other kinds of pollution in the area.

4.3.2.1 Recommendations related to noise-generating activities

a) Environmental Impact Assessments (EIAs) prior to noise-generating activities

The guidelines for undertaking EIAs prior to noise-generating activities developed and adopted by the Parties to the CMS shall be transposed into Spanish law and become part of the standardized licencing procedure.

b) Prohibition of extractive industries

We propose banning in the entire MPA any type of activity related to:

- the exploration or exploitation of all types of hydrocarbons,
- the exploration or exploitation of any type of mineral resources,
- sub-seabed storage of all types of materials or substances, including hydrocarbons, radioactive material and carbon dioxide.

These prohibitions would be consistent with the provisions of Article 2 of Royal Decree 699/2018, which establishes the preventive protection regime currently in force.

c) Avoid laying of submarine cables and pipelines

In its third additional provision, Royal Decree 699/2018 states that the laying of submarine cables will be done following the terms provided for in international law.

> ***Royal Decree 699/2018.***
>
> ***Third Additional Provision. International law***
>
> *The application of the provisions of this royal decree shall be carried out without prejudice to the freedoms of navigation, overflight and laying of submarine cables in the terms provided for in international law, especially the United Nations Convention on the Law of the Sea and other international agreements and their resolutions of application.*

As far as possible, and in accordance with paragraphs 2 and 3 of Article 79 “Submarine cables and pipelines on the continental shelf” of the UN Convention on the Law of the Sea (see below), the layout of submarine cables and pipelines should not run through the MPA. When this cannot be avoided, there must be compliance with strict parameters (which need to be established) in order to eliminate or minimise the negative effects on the ecosystem.

United Nations Convention on the Law of the Sea

Article 79

Paragraph 2

Subject to its right to take reasonable measures for the exploration of the continental shelf, the exploitation of its natural resources and the prevention, reduction and control of pollution from pipelines, the coastal State may not impede the laying or maintenance of such cables or pipelines.

Paragraph 3

The delineation of the course for the laying of such pipelines on the continental shelf is subject to the consent of the coastal State.

d) Prohibition of pile-driving

Pile-driving should be prohibited within the CMC and adjacent areas because of the noise levels associated with it and the risk to species in the CMC. Due to the high ram energies that are needed to drive the piles to final embedment depth, a considerable amount of noise is emitted into the water column and substrate, with sound pressure levels in the water at source clearly exceeding 200 dB.

Alternative technologies with less of an environmental impact during construction should be promoted.

e) Moratorium on military manoeuvres

We propose that a moratorium on military manoeuvres involving underwater explosions and the use of low- and mid-frequency active sonar is put in place.

Royal Decree 699/2018 does not expressly prohibit activities related to military manoeuvres. The Fourth Additional Provision of the Royal Decree refers to the need for activities, whose sole purpose is national defence and public safety, to be carried out in a manner compatible with the objectives of the present Royal Decree and that MITECO be consulted in advance.

Despite these precautions expressed in the Fourth Additional Provision of Royal Decree 699/2018 (see below), we believe that the negative, critical and irreversible environmental impact of underwater explosions and the use of active sonar in military manoeuvres has been proven. Given the extraordinary ecological importance of the CMC, these activities should be expressly and clearly prohibited by the Management Plan. Furthermore, the establishment of a buffer zone as a mitigation measure for impulsive noise should also be included. The moratorium on sonar use and certain military manoeuvres in the Canary Islands provides a relevant example which could be applied to the CMC.

Royal Decree 699/2018

Fourth Additional Provision. National defence activities and public safety.

Collaboration will be promoted among the ministerial departments affected within the General State Administration in order to ensure that activities, whose sole purpose is national defence and public safety, are carried out, to the extent that this is reasonable or feasible, in a manner compatible with the

objectives of this royal decree; in such a way that the decisions that can be adopted in relation to the development of national defence and public security activities are not taken without seeking the opinion of the Ministry for Ecological Transition, at least in the preparation of the military protocols.

f) Strict requirements for scientific research

We propose that, in agreement with what is established in Article 2.1.a) of Royal Decree 699/2018, a clear and explicit prohibition of the use of active (sound-emitting) systems to carry out underground geological research (either by means of probes, compressed air or controlled explosions, or underground drilling) should be included in the Management Plan for the CMC.

Other kinds of scientific research activities, including Controlled Exposure Experiments (CEEs) or Behavioural Response Studies (BRSs), should only be carried out in the MPA if and when they use study techniques and/or exploration technologies which have been scientifically proven to be completely safe for the marine environment and its inhabitants, and which are not incompatible with the conservation objectives established for the MPA. All projects must go through the EIA procedure as well as being authorised by the corresponding General Directorate of MITECO.

g) Regulation of shipping

The CMC is of great ecological value and of fundamental importance for the survival of many cetaceans and other marine animals in the Western Mediterranean. Given the presence of numerous species protected by national and international legislation, it is highly recommended that maritime navigation in the protected area is limited or even avoided as far as possible at least in certain areas and/or times and that any navigation that takes place is done with maximum vigilance and at a reduced speed.

The CMC meets the requirements to be declared an IMO Particularly Sensitive Sea Area (PSSA). It is an area of the marine environment that merits special protection through action by the IMO because of its significance for recognised ecological or socio-economic or scientific attributes and which may be vulnerable to damage by international maritime activities.

A PSSA designation is not a stand-alone measure and it can only be achieved in connection with one or more of the IMO's associated protective measures (APM), for example, a routing system such as an "Area to be avoided" (ATBA) or a "Precautionary Area". APMs are indispensable to a PSSA as they define the means by and the extent to which a PSSA is protected against environmental threats posed by international shipping. Therefore, any PSSA application that an IMO Member Government intends to submit to the appropriate IMO body must contain a proposal for at least one APM.

We propose that the entire CMC be declared a PSSA by the IMO at the request of the Spanish Government and, if possible, also included in the international PSSA project in the North-Western Mediterranean that Spain, Italy, France and Monaco are developing as agreed during the last ACCOBAMS COP in November 2019[xxxii]. After its zoning is carried out, MITECO, in cooperation with the General Directorate of Merchant Shipping of the Ministry of Transport, Mobility and Urban Agenda (MITMA), will coordinate the necessary interdepartmental actions to include the required safeguards to guarantee the appropriate conservation of the natural components subject to protection in the regulation of this PSSA. Of course, this would include a declaration of ATBAs and/or other appropriate APMs within the PSSA.

xxxii See ACCOBAMS COP19 report, point 131: https://accobams.org/wp-content/uploads/2019/04/MOP7.Doc38_Final-Report-MOP7.pdf

Possible ship traffic revisions should be evaluated to incorporate a new Traffic Separation Scheme (TSS) to minimize shipping route footprints as well as traffic concentrations within the CMC. This is particularly important for Balearic crossings that occur from several mainland points: Barcelona, Tarragona, Castellón, Valencia, and Denia.

For authorized transits or those that cannot be avoided, it is proposed to establish a compulsory maximum speed of 10 knots. A speed limit of 10 knots would drastically reduce the risk of fatal collision with cetaceans[xxxiii]. It would also reduce noise emissions and is an efficient and cost-effective measure to achieve very significant reductions in emissions of carbon dioxide (CO_2), the main greenhouse gas, and toxic air pollutants such as SO_x, NO_x and particulate matter (PM).

Note: In areas or particular routes where implementing speed restrictions is not feasible, a real-time **whale location system** to warn mariners of nearby whales presenting a ship strike hazard should be implemented. OceanCare is currently funding a multi-stakeholder research project locating sperm whales in Greek waters. It involves real-time data transmission to ship captains and coast guards to develop a system for reducing the risks of ship strikes. Once tested and implemented, this project could be replicated within the CMC SPAMI. See Annex 2.

We propose that the Government, through the appropriate administrative channel, should initiate the process so that the recommendation contained in the previous paragraphs is presented to the Maritime Safety Committee (MSC) and the Committee for the Protection of the Environment (MEPC) of the IMO so that it can be adopted internationally.

h) Prohibition of noise-generating fishing activities

The use of active acoustics in fisheries including Acoustic Deterrent Devices (ADDs), such as pingers, or Acoustic Harassment Devices (AHDs) and sonars should be limited to work under license or should be prohibited.

i) Prevention of other forms of noise pollution

The use of active sonar systems or any other sounds that could disturb the quiet of the animals should be prohibited unless being used for security or emergency reasons.

4.3.2.2 Recommendations related to other (non-noise) threats

j) Prohibition of unsustainable and destructive fishing activities

We propose the exclusion of fishing practices which are unsustainable regarding target fish stocks and non-target, vulnerable and protected species, and/or which destroy habitat. We recommend that only a limited number of vessels be authorised to fish in the MPA and that incentives are provided so that fishers can actively take part in monitoring and research in the protected area. Likewise, we recommend that Electronic Monitoring Systems are used to ensure a 100% observer coverage of fishing activities.

Sport fishing should be managed so that it is carried out sustainably and so that habitat alteration by practices such as chumming is kept to a minimum. Scientific studies should be carried out to determine the status of

xxxiii In May 2014, the IMO adopted a TSS on the Pacific Coast of Panama to enhance maritime safety and create a safer environment for the humpback whales that breed near the canal's entrance. The TSS is intended to enhance navigational safety by reducing collisions, other marine accidents and the risk of vessel collisions with humpback whales. Along with the TSS the IMO adopted a seasonal recommendatory 10-knot maximum speed limit to reduce the risk of ship collisions with humpback whales.

target species so that effective closed seasons according to species can be established if necessary. An effective licensing system with appropriate control and sanction mechanisms is also recommended.

k) Regulation of tourist activities and wildlife watching

Recreational activities such as tourism, and cetacean and other wildlife watching taking place in the protected area will be subject to the specific regulations applicable in each case, specifically Royal Decree 1727/2007, of December 21, which establishes protection measures for cetaceans[xxxiv], and Law 41/2010, of December 29, in its article 3, section 4[xxxv].

Commercial tourism companies operating in the protected area must have a permit issued by MITECO. In this permit, specific conditions may be established if these are considered necessary to guarantee the favourable conservation status of habitats and species.

Operations permitted shall be in line with the standards laid out in the ACCOBAMS Noise Guidelines (as adopted within Resolution 7.13) and the ACCOBAMS High Quality Whale Watching Certification[xxxvi]. Those tourism companies operating under permit should be required to record all wildlife sightings in a database.

l) Prevention of oil and chemical pollution and dumping

The prevention of marine pollution caused by ships whose transit is authorised will be carried out in accordance with the provisions of the international agreements of which Spain is a signatory, specifically MARPOL and the Barcelona Convention, and with the prescriptions contained in Spanish legislation on pollution control and in Law 41/2010, of December 29.

Any type of spill in the protected area will be prohibited.

It is proposed that, following agreement between the ministries concerned and after consulting the IMO, the sulphur content of the fuel used by ships in the CMC be restricted to the level for Sulphur Emission Control Areas (SECA), i.e. a maximum of 0.1%. An enforcement of regulations for NO_x emissions should also be established in the area.

m) Avoidance of plastic spills and container loss

In the wake of large-scale incidents caused by cargo ships whereby hazardous cargo has leaked into the environment (including plastic pellets), it has become clear that this issue is falling through the cracks of global governance, particularly when it comes to maritime transportation and the loss of containers at sea[xxxvii]. The quantities of pellets and containers being lost each year worldwide are significant with devastating

xxxiv Article 52.3 of Law 42/2007, of 13 December, establishes the prohibition of intentionally killing, harming, disturbing or disturbing wild animals, especially those included in any of the categories mentioned in articles 53 and 55 of the same law. It is therefore urgent to adopt preventive and protective measures to avoid or minimise the impact of whale-watching activities, whether for tourism, scientific, recreational or educational purposes, or for any other circumstance in which humans come into contact with these animals. The rules of conduct approved by this royal decree specify the conduct that must be complied with, avoided or prohibited in order to avoid harming or disturbing cetaceans, in accordance with the aforementioned article 52.3 of the aforementioned Law 42/2007, of 13 December.

xxxv Article 3. section 4. Any activity that involves the handling of marine species of state competence included in the Spanish Catalogue of Threatened Species or in the annexes of Law 42/2007, of 13 December, on Natural Heritage and Biodiversity, and the observation of cetaceans regulated in Royal Decree 1727/2007, of 21 December, establishing measures for the protection of cetaceans, shall be subject to prior authorisation, which shall be granted by MITECO. This authorisation will be granted if the activity is considered compatible with the corresponding marine strategy, in accordance with the criteria established by regulation, following a report from the affected Autonomous Community in the case of activities to be carried out in natural areas declared by them under the provisions of Article 36.1 of Law 42/2007, of 13 December.

xxxvi http://www.whale-watching-label.com

xxxvii https://surfrider.eu/wp-content/uploads/2020/11/report-pellet-pollution-2020.pdf

environmental, social and economic implications[xxxviii]. Plastic pellets also enter the marine environment from terrestrial sources, for example pellets from a petrochemical plant in Tarragona have been found as far away as the Balearic Islands[xxxix].

Given the intense cargo shipping activities in the region, it is recommended that as an IMO member, Spain works towards a strengthening of obligations for relevant actors to ensure good operational practice, including packing, labelling, stowage, segregation and handling, as well as emergency response procedures to prevent pellet loss and safety measures to prevent container loss and potential emergency clean-up measures should an incident happen in the CMC. This form of transboundary pollution should be addressed by the IMO through the Action Plan to Address Marine Plastic Litter from Ships[xl].

n) Collection of marine debris and prevention of Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG)

To reduce the impact caused by marine debris and to raise awareness about this important environmental problem among the fishing sector, MITECO, in collaboration with the appropriate public administrations, will implement collection programmes and adequate management of the waste caught in fishing gear used by fishers operating in the CMC. The recommendations of the applicable agreements in the Mediterranean, e.g., the Waste Framework Directive[xli], Descriptor 10: Marine Litter of the MSFD[xlii] and the Port Reception Facilities Directive[42] should be taken into account. The Spanish government should follow the Voluntary Guidelines for the Marking of Fishing Gear developed by FAO[xliii]. As a future member of the Global Ghost Gear Initiative (GGGI) Spain will have access to the latest science, technology, expertise and best practice models to help with the implementation of regional and national action plans for tackling the problem of ghost fishing gear[xliv].

Ideally and where possible, any fishing gear deployed at sea should have a digital tracking component to identify the owner vessel and facilitate recovery and retrieval in case of loss. There should be a strong incentive for responsible and proper use of fishing gear as well as the use of good quality gear to increase efficiency and to improve working conditions and sustainability in general. It is therefore recommended that Spain supports the efforts currently being undertaken at IMO-level to make the marking of fishing gear and the reporting of gear loss mandatory under an amendment of MARPOL Annex V.

o) Surveillance, inspection and control tasks

It is MITECO's responsibility to establish the pertinent agreements with the competent departments, especially the Ministries of Agriculture, Fisheries and Food, Defence, Interior and Transport, Mobility and Urban Agenda, to guarantee the adequate development of the surveillance, inspection and enforcement of the measures in the conservation management plan and to follow through with any necessary prosecutions if infringements take place.

MITECO will determine the most appropriate way to carry out the necessary monitoring and inspections in the CMC.

The Maritime Safety and Rescue Society (SASEMAR or Salvamento Marítimo) is already involved in some environmental monitoring and may be an appropriate body for helping to carry out surveillance and management work within the CMC[xlv].

xxxviii https://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/
xxxix https://elpais.com/espana/catalunya/2021-06-27/el-viaje-a-baleares-de-los-microplasticos-de-la-petroquimica-de-tarragona.html
xl https://www.imo.org/en/MediaCentre/HotTopics/Pages/marinelitter-default.aspx
xli https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en
xlii https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/index_en.htm
xliii http://www.fao.org/responsible-fishing/marking-of-fishing-gear/voluntary-guidelines-marking-fishing-gear/en/
xliv https://www.ghostgear.org
xlv http://www.salvamentomaritimo.es/mares-limpios#nuestra-labor

4.3.3 Recommendations related to port sustainability in the area

All neighbouring ports are located outside of the CMC SPAMI's geographic scope. However, as port policies do influence shipping behaviour, and the latter has a direct impact on the CMC ecosystem, the following is proposed regarding port reception facilities for waste handling.[xlvi]

MARPOL requires signatories to the Convention to provide reception facilities for the waste from ships "*without causing them any undue delay*". The Port Reception Facilities Directive 2000/59/EC requires vessels to land the waste they produce during voyages to and between EU ports to port reception facilities[42]. It also requires ports to develop waste handling plans and provide port reception facilities to the ships using their port. It requires vessels to pay a fee for landing this waste and to notify the port of what waste it has in advance of arriving in port. The Directive is not very prescriptive and has led to a wide range of waste reception systems across Europe. Historically, many ships have found it easier and cheaper to discharge waste illegally at sea.

In 2018, the IMO adopted an Action Plan to Address Marine Plastic Litter from Ships agreeing on actions to be completed by 2025, which relate to all ships, including fishing vessels.

Spain should request an amendment to MARPOL Annex V to include specific quantitative and qualitative norms for port waste reception facilities. This could include infrastructure to safely discard used fishing gear.

Ships calling at Spanish ports should be required to pay a fee regardless of whether they use the facilities or not. Part of the costs could be charged based on the type and quantity of waste delivered. Fees could be reduced for ships designed to produce less waste. A prepay mechanism (added to the cost of fuel) for discharge could be another way to manage waste.

Ports should be encouraged to:

- Create incentives and structure for fishermen to bring back discarded nets found at sea, e.g. by providing discount rates on port fees or on the provision of electricity, when applicable;
- Equip all facilities with water fountains for refills of potable water, recycling bins, including for used batteries, cartridges and fluorescent light bulbs and make sure they are strategically located and appropriately labelled;
- Provide training and/or educate staff on established garbage management procedures and waste hierarchy (Prevent, Reduce, Reuse, Recycle, Valorise and Appropriate waste disposal);
- Encourage the use of reusable, and recyclable supplies;
- Adopt environmentally preferable purchasing and procurement policies.

xlvi For more details, OceanCare has developed a separate "Sustainable Port Strategy" which can be requested at: cbravovilla@oceancare.org

ANNEX 1 – Setting up a management body, stakeholder advisory body and scientific advisory body

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Background

Management bodies — those holding authority and responsibility for an MPA and for executing a Conservation Management Plan — can be divided into four main governance types (Borrini-Feyerabend *et al*. 2013):

1. governance by government: Federal, national or sub-national ministry/agency in charge; government-delegated management (e.g., an NGO);
2. shared governance: collaborative or joint management (pluralist management board; transboundary management with various levels across international borders);
3. private governance: by individual owner; by non-profit organizations (NGOs, universities, cooperatives); by for-profit organizations (individuals or corporate);
4. governance by Indigenous peoples and local communities: Indigenous peoples' conserved areas and territories; conserved areas declared and run by local communities.

Governance by government is the most common and this includes government-delegated management in some countries. Among more than 110 marine protected areas (MPAs) in 19 Mediterranean countries, for example, MedPAN, the network of MPA managers, records 124 NGOs and institutions that either have direct responsibility for managing an MPA or are involved in the development of MPAs (Gallon *et al*. 2019).

In Mozambique, Bazaruto Archipelago National Park is run under contract with African Parks, an NGO, which operates land-based protected areas (PAs) and game parks in South Africa (Hoyt, pers. comm., Notarbartolo di Sciara & Hoyt 2020). In Canada, a number of MPAs and PAs such as 'Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site', referred to as 'Gwaii Haanas' have shared governance between government and indigenous people and the local community (Agardy 2010).

MPAs, as a conservation tool, are a few decades old, and most MPAs for marine mammals are even more recent. Setting up an MPA management body starts with defining the goals and rationale of the MPA and in view of the marine mammals found and threats to their existence (Notarbartolo di Sciara 2007; Hoyt 2011). An MPA must have a monitoring program to assess management effectiveness and check performance to recommend changes (Kelleher 1999) and periodic reviews (Pomeroy *et al*. 2004, 2005). The process can be summarized (Hoyt 2011, 2018; Hoyt, in prep for 2022) as follows:

1. engaging stakeholder involvement from the beginning and throughout the process;
2. formulating clear management objectives for the proposed MPA;
3. creating a management body to achieve those objectives;
4. developing a management plan, subject to periodic re-examination and revision;
5. conducting management training as needed;
6. conducting research for baseline numbers, inventory, status and monitoring purposes;
7. promoting and offering educational programs for the local community, and users of the MPA including visitors;
8. developing effective enforcement regimes with a good record of compliance; and
9. conducting periodic management reviews and other evaluations to assess whether objectives are being met.

The last provision is essential to the long-term success of an MPA. Without such evaluations, even MPAs that start out with considerable success may decline in value and fail. The process of creating a functioning MPA takes time — several years or more. Even after an MPA is fully functioning, it remains a work in progress —

subject to changing conditions (environmental including climate change and other anthropogenic factors) and periodic review and renewal. Learning as you go along, in a process called adaptive management, gives an MPA management body flexibility and permission to make changes to determine best practices (Pomeroy *et al*. 2005) (Fig. 5.6).

Yet it is important to note that an MPA management body cannot 'manage' whales and other marine mammals per se. Instead, the management body works toward having influence over humans and the threats that they present to marine mammals and the overall ecosystem. Thus, a manager, or management body, aims to help reduce threats and protect the conditions deemed to be favorable for marine mammals, i.e., maintaining healthy seas (Hoyt, in prep. for 2022).

The goal of ecosystem health means that the starting point for an effective MPA is an area that includes consideration of the larger ecosystem including prey species and that is attentive to the threats to marine mammals and the human challenges to conservation (Hoyt 2011). However, all MPAs need to focus on what is manageable and on their specific objectives. An MPA protecting critical habitat for migration, for example, would not normally be responsible for prey populations. Of course, MPAs can have multiple objectives.

Setting up the management body

The job of the Management Body for the Mediterranean Cetacean Migration Corridor will be to manage and implement its Conservation Management Plan (CMP). What should the Management Body look like? Is there an ideal structure or approach?

Even if an ideal could be determined in the abstract, it would not be a good idea to proceed without local community and stakeholder participation. What can be done in advance is to propose *options* for a Management Body, looking at two main scenarios, and to view these in comparison with existing methods used in Spain.

Option A. Collaborative management approach — putting together a Management Body comprised of two or more of the following: local community members, scientists who have worked with cetaceans in the MPA, conservation NGOs, other stakeholders, national or local government.

Option B. Management Body installed from national or local government, with strong local community/ stakeholder, NGO and scientific advisory bodies that have some power of review and the ability to make decisions.

These options can be placed on the table for government, local community and other stakeholders to start the discussion. The selection of the option can have a fixed time period or be open-ended, subject to, say, 5-year review. It is essential, however, that the stakeholders including local communities and the scientists, along with government, work together to come up with their vision of the ideal situation. Getting the right players to the table ensures that all or a majority of stakeholders are buying into the process. This gives robustness and confidence to the Management Body and to the process that will be undertaken.

For any of these options to work, however, it is essential to pay attention to 'good governance' (see Table 1 below). Incorporating the nine characteristics of good governance in one of the Options above requires a framework to be set up along the following lines (Day, unpubl. 2019):

- a clear and agreed set of arrangements for effective partnerships at various levels (even if responsibilities are shared as in some of the Options, there must be specific responsibilities given to specific people or groups, i.e. point person(s);
- a willingness of all relevant players to adhere to the nine characteristics of good governance (Table 1) and to work together as a team toward an agreed goal or list of objectives; and
- a means to mediate differing interests to reach a broad consensus on what are in the best interests of all parties and, where possible, on policies and procedures.

Table 1 – Nine Characteristics of Good Governance

1. **Participation** All men and women irrespective of their social or cultural differences are able to have a voice in effective decision-making and to participate constructively, either directly or through legitimate intermediate organisations that represent their interests.
2. **Rule of law** Legal frameworks should be fair and enforced impartially, particularly the laws on human rights and Indigenous rights.
3. **Transparency** Transparency is built on the free-flow of information including the effective and transparent sharing of decision-making powers. Processes, organisations and information are directly accessible to those concerned with them, and sufficient information is made widely available to understand and monitor each of them.
4. **Responsiveness** All organisations and processes aim to serve all interested parties.
5. **Consensus orientation** Good governance mediates differing interests to reach a broad consensus on what is in the best interests of all parties and, where possible, on policies and procedures.
6. **Equity** All men and women, irrespective of their social or cultural interests, have opportunities to maintain or improve their well-being.
7. **Effectiveness and efficiency** Processes and organisations produce results that meet needs while making the best use of the available resources.
8. **Accountability** Decision-makers in government, Indigenous communities, the private sector and civil society are accountable to their constituents as well as to the broader public. This accountability differs depending on the organisations and whether the decision is internal or external to an organisation.
9. **Strategic vision** Leaders in government, Indigenous communities, the private sector and civil society have a broad and long-term perspective and an understanding of the historical, cultural and social differences in which that perspective is grounded; they also have a willingness to work towards an agreed vision.

(adapted from UNDP (1997) Governance for Sustainable Human Development. UN Development Programme)

Setting up scientific and stakeholder advisory bodies

The role of science in the Mediterranean Cetacean Migration Corridor will be central to the success of the MPA. In view of the technical nature of understanding the transmission of noise and mitigating its impacts on sperm whales and other cetaceans, a strong Scientific Advisory Body with substantial input and influence over final decisions is essential. The Scientific Advisory Body should also participate in or co-lead the monitoring efforts that will be necessary to determine effectiveness and compliance, and it will then be able to respond with continuing recommendations. Migratory paths, if not entire habitats, may move temporally and/or spatially in response to changing conditions. Considerations may need to be made for areas outside the MPA, in view of the characteristics of sound

transmission. It has also been noted that other marine wildlife with various sensitivities to noise will use the MPA as residents or in transiting to breeding or feeding areas, including loggerhead and other marine turtles, tuna, sharks and seabirds. Determining the sensitivities of various other species as well as recommending precautionary approaches for uncertainty and instituting mitigation strategies will be the central role of the Scientific Advisory Body. Ideally, one or more scientists would also serve on the Management Body and participate in the meetings of the Stakeholder Advisory Body (see below). This could give more traction to the science, allow scientists to explain their findings more directly to senior managers and stakeholders, and provide a route toward greater acceptance.

For the Stakeholder Advisory Body which would include the local community/ies, the role can range from providing input to management to overseeing the management. In some cases, of course, the stakeholders can be part of a Management Body with ultimate responsibility for all decisions. No matter which option(s) are taken, considerable effort should be made to choose stakeholders to form the team. Training should be given so that they not only understand their role but so that they can engage in discussions on the key topics related to science and management to make informed decisions. The principles of marine habitat conservation and sustainable use of the ocean should be part of that training.

As with the Scientific Advisory Body, one or more key stakeholders would also serve on the overall Management Body, representing the interests in a democratic way that is conducive to reaching agreement on many issues.

Ideally, scientific and stakeholder representatives on the overall Management Body should be members in full standing (not just observers or token representatives).

In summary, all of these associated actions and decisions can only be enhanced and sustained if they are effectively managed through a sound governance framework. That framework includes real and transparent sharing of decision-making powers; an active and central role in PA management for scientists, conservation NGOs, local communities and stakeholders; and improved synergies of the conservation capacities of different interested parties (IUCN-WCPA, 2003).

Consultation Processes

Consultation provides a valuable process to solicit ideas and participation, both to seek and share information before decisions are made. Consultation should be the modus operandi between the Management Body, Stakeholder Advisory Body and Scientific Advisory Body. It should be a regular, formal process, as part of bringing in new ideas and revisions to plans. And it should also be informal. Frequent formal and informal consultations can be done in written form or in the context of a formal or informal meeting/workshop. It is a primary role of the Management Body to ensure that there are frequent consultations, and that the information and views obtained are registered and considered.

Consultation informs management bodies of MPAs that they are not alone in their work. Besides consultations, the Management Body, with its Stakeholder Advisory Body and Scientific Advisory Body, will become part of the network of Spanish MPA management bodies. But also, the Management Body of the Mediterranean Cetacean Migration Corridor can join MedPAN and other MPA manager networks, and can participate in conferences of the International Committee on Marine Mammal Protected Areas (ICMMPA). In effect these networks and conference outreach become ways to engage in informal consultation.

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ANNEX 2 – SAvE Whales acoustic observatory

The acoustic observatory of the SAvE Whales research program, under the name SWAN (SAvE Whales Acoustic Network), provides real-time acoustic detection and localization of vocalizing sperm whales from their regular clicks while diving to depths up to 1000 m. The *in situ* part of SWAN consists of 3 acoustic stations (SWAN1, SWAN2 and SWAN3). The received sounds are locally processed in each acoustic station, and the processing results along with other data are telemetered to the detection and localization center based at FORTH/Heraklion for further analysis. The detection and localization results are automatically forwarded for notification of ships in the area of interest through a website.

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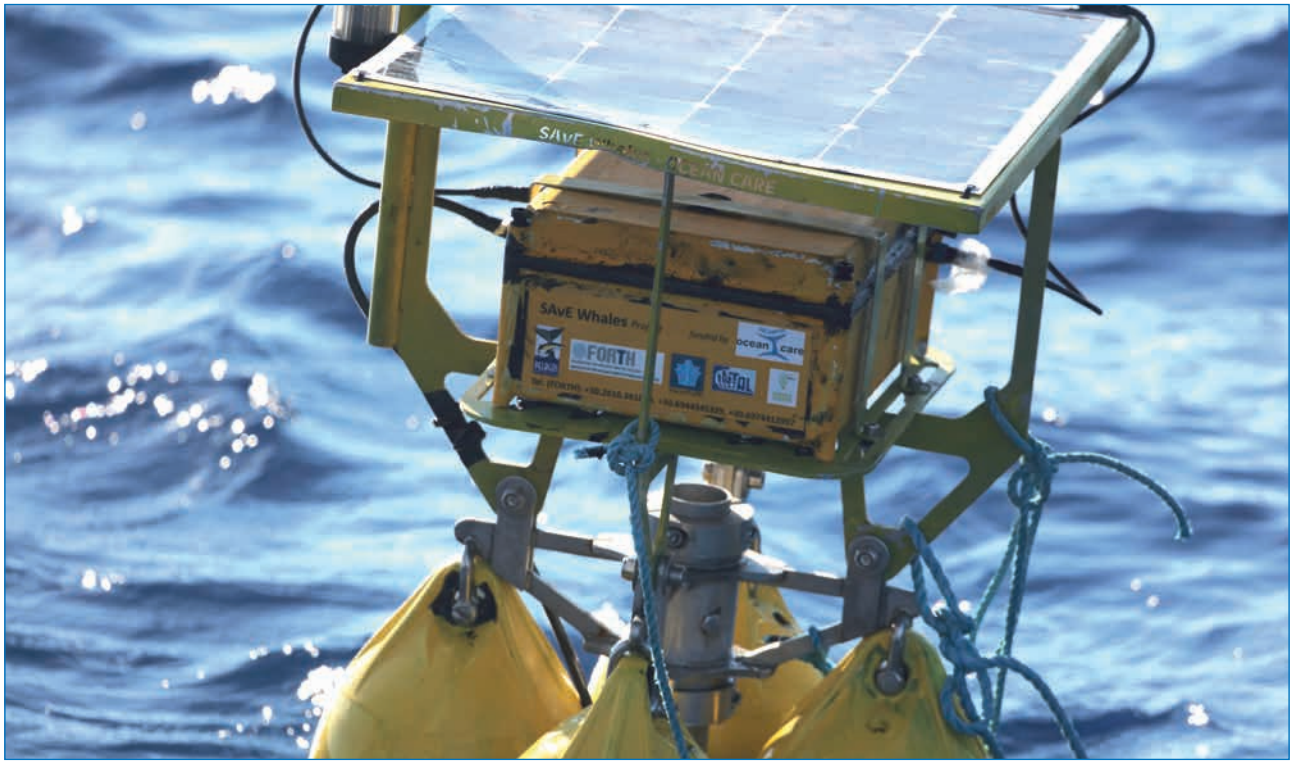

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Each acoustic station consists of a surface buoy anchored in deep water, from which a low-noise broadband hydrophone with depth sensor is suspended at a depth of about 100 m. The acoustic stations are equipped with onboard processing, storage, communication and GPS units and have power autonomy relying on solar panels. Two-way communication with the receiving station is obtained through mobile internet; this allows for data telemetry and also for remote station control. The three acoustic stations are deployed about 1 km apart forming a large-aperture array which results in high localization accuracy. The synchronization between the stations is achieved through GPS/PPS.

The data telemetered to the detection and localization center at FORTH are travel times of recorded impulsive sounds along with hydrophone depths, synchronization data, GPS fixes and various condition variables. Upon reception at FORTH these data are quality-checked and subjected to detection analysis to reveal regular click patterns. The data from the various stations are combined for 3D localization (range, depth, azimuth estimation) of the vocalizing animal(s). The localization relies on the exploitation of direct and surface-reflected arrivals using a Bayesian framework which also allows for the estimation of localization uncertainties. This type of localization can be carried out up to ranges of about 10 km, whereas simple detection (without localization) can be carried out over larger areas, ranges typically up to 20 km depending on oceanographic conditions.

The SWAN observatory was deployed and operated for the first time for 3 months in summer 2020 in Sougia Bay (SW Crete). During that period other species of echolocating odontocetes, aside from sperm whales, such as dolphins and beaked whales, were also detected but not localized, since localization relies heavily on the characteristics of the targeted sound, to be taken into account both in the design of the hydrophone arrays and in the development of the analysis methods. The system potentially could localize such species as well; however, not in its current form. Further research, feasibility studies and pilot deployments would be needed before reaching conclusions for the localization of species other than sperm whales. A second deployment/ operation phase of the SWAN observatory is planned for summer 2021.

Before any attempt to deploy the system in a new area, a systematic study (addressing oceanographic conditions, cetacean distributions, migration patterns, array size, geometry, performance etc.) should be carried out, and, last but not least, official deployment permits by the local authorities should be applied for.

The multinational inter-disciplinary 'SAvE Whales' project combines expertise from the fields of marine biology, underwater acoustics, applied mathematics, computer networking, informatics and real-time marine traffic data, and has the objective to save endangered sperm whales from being struck by [large] ships. 'SAvE Whales' stands for '**S**ystem for the **Av**oidance of ship-strikes with **E**ndangered **Whales**'.

The project aims to develop and test an automated system that listens for sperm whales, locates them across busy routes of shipping traffic and provides captains with real-time information allowing them to avoid collisions. The system will also be generating data, which can be useful for learning more about these animals and the impacts of human activities in their habitat, helping in this way to develop a more effective conservation approach. The pilot field phase started in 2019 in Greek waters and shall be completed by the end of 2021.

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- Pelagos Cetacean Research Institute (PCRI)
- Institute of Applied and Computational Mathematics (IACM) - Foundation for Research and Technology – Hellas (FORTH)
- Centro de Investigação Tecnológica do Algarve (CINTAL)
- MarineTraffic, the world's leading provider of ship tracking
- Green2Sustain pcc, environment and sustainability consultants

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