# PROGRESS REPORT REGARDING COMMON DOLPHIN CONSERVATION MANAGEMENT PLAN (CMP) IN ACCOBAMS AREA

Prepared by Joan Gonzalvo – Tethys Research Institute, Italy

DISCLAIMER:

This document is a revised version of a draft presented at the SC14 (ACCOBAMS-SC14/2021/Doc17). This new version includes all actions that were produced during a workshop held in Monaco in March 2022 (participants, in alphabetical order: Ayaka Amaha Ozturk, Antonella Arcangeli, Rimel Benmessaoud, Greg Donovan, Caterina Fortuna, Manel Gazo, Tilen Genov, Daniela S. Pace, Simone Panigada, Elena Papale, Patrizia Patti, Aviad Scheinin). A few sections need to be finalized and literature needs to be checked and updated, which will be done after the feedback provided during the SC15 meeting to produce the final definitive version.

## CONTRIBUTORS

*(those participating in the workshop, back in May 2022, to be added if not listed below)*

**Antonella Arcangeli**, ISPRA BIO Dep. - Environmental conservation and monitoring, Italy

**Marta Azzolin,** Life and System Biology Department, University of Torino, Italy; Gaia Research Institute Onlus, Greece

**Giovanni Bearzi**, Dolphin Biology and Conservation, Italy

**Rimel Benmessaud**, Department of Fisheries and Environmental Engineering (GHE), National Agronomic Institute of Tunisia (INAT)

**Ana Cañadas**, Alnilam Research and Conservation, Spain

**Roberto Carlucci**, Department of Biology, University of Bari – LRU CoNISMa, Italy

**Greg Donovan**, UK

**Caterina Fortuna**, ISPRA, Italy

**Tilen Genov**, Morigenos—Slovenian Marine Mammal Society, Piran, Slovenia

**Joan Giménez**, Institut de Ciències del Mar (ICM-CSIC), Barcelona, Spain

**Dan Kerem,** Israeli Marine Mammals Research & Assistance Center (IMMRAC), Israel

**Andre E. Moura**, Museum and Institute of Zoology PAS, Gdańsk, Poland

**Barbara Mussi**, Oceanomare Delphis Onlus, Italy

**Ada Natoli**, UAE Dolphin Project, Dubai, UAE. Zayed University, Dubai, UAE

**Paola Nicolosi**, Natural History Museum, University of Pisa, IT

**Ayaka Amaha Ozturk**, Faculty of Aquatic Sciences, İstanbul University; Turkish Marine Research Foundation (TUDAV)

**Daniela Silvia Pace,** Department of Environmental Biology, Sapienza University of Rome, Italy

**Simone Panigada**, Tethys Research Institute, Italy.

**Elena Papale**, Institute for the study of Anthropogenic impacts and Sustainability in marine Environment (IAS), National Research Council, Italy; Department of Life Science and Systems Biology, University of Torino, Italy

**Patrizia Patti**, EcoMarine, Malta

**Aviad Scheinin**, Morris Kahn Marine Research Station, Department of Marine Biology, Leon H. Charney School of Marine Sciences, University of Haifa; Israeli Marine Mammals Research & Assistance Center (IMMRAC), Israel

**Carlotta Vivaldi**, Oceanomare Delphis Onlus, Italy

## CONTENTS

## EXECUTIVE SUMMARY

(to be written when the plan will be final, following a uniform format in accordance with other CMPs in progress)

# 1 INTRODUCTION

## 1.1 WHY A CONSERVATION MANAGEMENT PLAN IS NEEDED

To be completed at later stage, being consistent with the other three CMP currently at hand, namely CMPs for the fin whale, Risso's and Bottlenose dolphins

The common dolphin *Delphinus delphis* is globally classified by IUCN as Least Concern (Hammond et al., 2008), but its Mediterranean population is classified as Endangered (Bearzi, 2012; Bearzi et al., 2003, 2021-Inner Mediterranean Subpopulation)

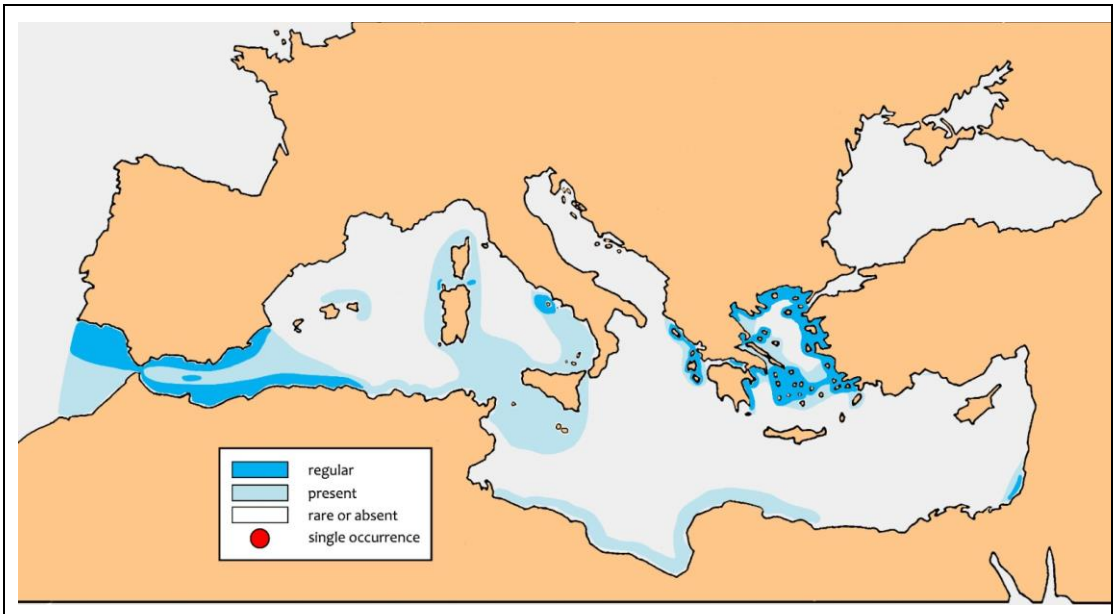


Fig.1. Presumed distribution of common dolphin *(Delphinus delphis)* populations in the ACCOBAMS area. In blue areas where the specie is considered as regular, in cyan where considered present and in white rare or absent. *Taken from ACCOBAMS, 2021. Conserving Whales, Dolphins and Porpoises in the Mediterranean Sea, Black Sea and adjacent areas: an ACCOBAMS status report (2021). By: Notarbartolo di Sciara G., Tonay A.M. Ed. ACCOBAMS, Monaco. 160 p.*

International collaboration on the conservation and management actions developed in this plan will be necessary. Support by both ACCOBAMS and the IWC will be key and will require co-operation by many stakeholders, ranging from local and national governments, through intergovernmental bodies to industry and NGOs.

This CMP follows the IWC template also adopted by ACCOBAMS (ACCOBAMS-MOP6/2016/Doc37/Annex12/Res6.21). This should be considered a dynamic and prone to changes document and therefore should go periodically through expert review for the development of new or modified actions as appropriate

## 1.2 OVERALL GOAL OF THE CMP

The overall goal of this CMP is to ensure the long-term survival of common dolphins in the Mediterranean Sea by addressing threats to their population and their habitats. Therefore, it involves a multi-faceted approach that includes different conservation measures presented here. In an attempt for balancing the needs of the species with those of human communities, activities and industries that share the same ecosystem, the needs and interests of stakeholders will be taken into account, to the extent possible, whilst recognising that favourable conservation status for the species is the ultimate goal and the highest priority. The management actions listed below are based on scientific data, while following the 'precautionary principle'.

## 2 LEGAL FRAMEWORK

Protection of Common Dolphins and other cetacean species is mandated by a variety of national, regional and international legislative instruments (for a review of the international legal framework for marine mammal conservation in the Mediterranean Sea; see Scovazzi 2016).

The common dolphin is listed in Appendices I and II of Convention on the Conservation of Migratory Species of Wild Animals (The Bonn Convention), in Appendix II of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), in Appendix II of CITES, and in Annex 2 of the Protocol on Specially Protected Areas and the Biological Diversity in the Mediterranean of the Barcelona Convention, which calls to conserve species through maintenance of viable populations and recovery of threatened species through the creation of specially protected areas and specially protected areas of Mediterranean importance.

*Delphinus delphis* is considered a species of community interest listed in the Habitat Directive 92/43 EEC under annex IV Article 17. The Habitats Directive on the Conservation of natural habitats and of wild fauna and flora is an European Union directive adopted in 1992 as an EU response to the Bern Convention, with the goal of protecting nature and wildlife through a network (Natura 2000) of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

Marine mammals protection regulations, therefore including the common dolphin, are also present at national level in many countries around the Mediterranean. The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area, which entered into force in 2001 as a legal conservation tool to reduce threats to cetaceans by improving knowledge, has 24 parties which include almost all of the Mediterranean and Black Sea countries.

The Pelagos Sanctuary, created in 1999 specifically to protect cetaceans, is still far from effective as a tool for cetacean conservation (Notarbartolo di Sciara et al. 2008), and common dolphins have become rare in this area. Present MPAs do not offer meaningful protection to common dolphins in the inner Mediterranean: their spatial scales, protection levels and enforcement would need to be greatly increased to grant protection to the species (Bearzi et al. 2021).

Moreover, four Mediterranean Important Marine Mammal Areas (IMMAs; Notarbartolo di Sciara et al. 2016), introduced by the IUCN Marine Mammal Protected Areas Task Force, in Ischia and Ventotene, Ionian Archipelago, Gulf of Corinth, and Coastal Shelf Waters of the Southeastern Levantine Sea, have the common dolphin as the main or one of two main cetacean species of interest (https://www.marinemammalhabitat.org/imma-eatlas/) but such designations, so far, have not translated into conservation action.

# 3 GOVERNANCE

Section to be developed in accordance with other species CMPs

## 3.1 COORDINATION OF A CMP

## 3.2 TIMELINE FOR A CMP

# 4 SCIENTIFIC BACKGROUND BIOLOGY AND STATUS OF MEDITERRANEAN COMON DOLPHINS

## 4.1 BIOLOGY AND STATUS OF MEDITERRANEAN COMMON DOLPHINS POPULATION STRUCTURE

### 4.1.1 POPULATION STRUCTURE

In the eastern North Atlantic the common dolphin shows low levels of population structure (e.g., Natoli et al., 2006; Amaral et al., 2007; Mirimin et al., 2011; Moura et al., 2013a) compared to other small cetacean species (e.g. Natoli et al., 2004; Fontaine et al., 2007; Gaspari et al., 2007, 2015; Louis et al., 2014). However, in the Mediterranean Sea, despite the limited geographic range, there is evidence for population structure, and recent studies in the neighbouring Atlantic waters do not exclude potential demographic/stock structure.

In the Mediterranean basin, genetic analysis based on nuclear (microsatellite loci) and mitochondrial DNA markers (control region), show a clear population division between the Alboran Sea and the Eastern Mediterranean, represented mainly by samples from the Ionian Sea (Natoli et al., 2008; Moura et al., 2013a). Although significant, $F_{ST}$ values are relatively small (microsatellite $F_{ST}$ = 0.052, mtDNA $F_{ST}$ = 0.107, p-values=0.001), there are shared haplotypes between the regions, and there is evidence for some level of directional gene flow from the Ionian to the Alboran seas (Natoli et al., 2008). The separation between the Atlantic and Ionian populations, is further supported by differences in the frequency of mtDNA haplotypes (Tonay et al., 2020) and varieties of MHC DQβ and β-casein genes (Moura et al., 2013b), suggesting the potential for some adaptation to local environments. There is further evidence for separation between the Black Sea and the Mediterranean (again, with evidence for

directional gene flow westwards; Natoli et al., 2008; Tonay et al., 2020), and further separation of dolphins in the Gulf of Corinth (Moura et al., 2013a), though sample sizes are low in both cases.

A comprehensive assessment of the common dolphin population structure within the Mediterranean is made difficult by the scarcity of samples from many regions (Moura et al., 2013a), due to a presumably population decline (Piroddi et al., 2011) and lack of survey effort in some areas. Simulation analyses suggest that the population structure between the Alboran and Ionian Seas likely evolved recently and has possibly been reinforced by a recent demographic bottleneck event (Moura et al., 2013a). The timing of this recent bottleneck was estimated to 50 generations before present, consistent with a proposed anthropogenic influence (Bearzi et al., 2003). Furthermore, there is some preliminary evidence suggesting the possibility of introgressive gene flow from striped dolphins (*Stenella coeruleoalba*) in Greek waters (Antoniou et al., 2018), which could further confound studies of genetic differentiation involving samples from this region. An individual hybrid with bottlenose dolphin (*Tursiops truncatus*) has also been described in Spain (Espada et al., 2019). Therefore, without more comprehensive sampling across the Mediterranean regions, our current understanding of population structure might be biased by local demographic histories and low sample sizes.

Samples from the Alboran Sea show no clear genetic differentiation from the contiguous Atlantic populations (Natoli et al., 2008; Moura et al., 2013a). Nevertheless, several lines of evidence suggest the possibility of some level of demographic/stock structure. Analysis of contaminant load shows clear difference between Alboran Sea and Atlantic populations for several indicators (Borrell et al., 2001), and there is also evidence for different feeding ecology based on stable isotopes and stomach contents (Silva, 1999; Giménez et al., 2018; Marçalo et al., 2018). Analyses of whistle characteristics, also separate the two basins with relatively high accuracy (Papale et al., 2014). Similar differences between contaminant levelss and stable isotope profiles were also observed among samples from different locations along the Atlantic European coast (e.g., Caurant et al., 2006; Pusineri et al., 2007; Quérouil et al., 2010), suggesting the potential for some level of local site-fidelity at shorter time scales than those typically detected by analyses of genetic structure.

Research on individual kinship structure in the Atlantic population, suggested the occurrence of some level of natal site-fidelity, with dispersal being female biased (Ball et al., 2017). This is an unusual pattern for mammals, but consistent with previous estimates of population level gene flow for this species, which also suggested female biased gene flow (Natoli et al., 2008), as well as documented long-distance movements (Genov et al. 2012). This bias was hypothesised to be related to intraspecific competition for resources (Ball et al., 2017), which could be relevant in determining priority conservation areas given that the current decline of this species in the Mediterranean has also been attributed to changes in prey availability (Piroddi et al., 2011; Cañadas & Vázquez, 2017).

Morphological analyses also provide strong indication for some level of demographic/stock structure. Multivariate analyses of skull measurements clearly distinguish between Atlantic, Mediterranean and Black Sea samples, with Black Sea being particularly divergent (Amaha, 1994; Westgate, 2007). Along the Eastern North Atlantic coast, differences in certain skull measurements were also found, particularly between specimens from the Iberian coasts and those from further north (Murphy et al., 2006). More recently, 2D and 3D geometric morphometrics using 195 museum specimens from nine marine areas (Nicolosi & Loy, 2021) showed that Mediterranean dolphins are well differentiated from those sampled in the Atlantic and presented the highest variability in shape. They also showed a distinction between the southern (Sicily, North Africa) and northern Mediterranean (Tyrrhenian Sea), with northern Mediterranean dolphins characterized by a slender cranium and a narrower occipital region (Nicolosi & Loy, 2021). A similar difference found in striped dolphins (*Stenella coeruleoalba*) was suggested to be related to feeding specializations (Loy et al., 2011).

Data on individual movement from field efforts is extremely limited, but there are individual records of long-distance female dispersal (Genov et al., 2012), as well as some level of site-fidelity in the productive waters around the Isle of Ischia (Mussi et al., 2002), although sightings of this species appear to have reduced in recent years (Mussi et al., 2016).

Several studies on common dolphin habitat preferences, carried out in the eastern North Atlantic and Alboran Sea have consistently showed a preference for coastal productive regions, supplied with small to medium sized pelagic fish (Cañadas et al., 2002; Cañadas & Hammond, 2008; Moura et al., 2012; Correia et al., 2015, 2019; Bencatel et al., 2017; Giralt et al., 2019). Areas where common dolphin sightings are frequent could therefore reflect the presence of local suitable habitat, and should therefore be considered as primary targets for further biological monitoring.

In addition to the areas mentioned above, where evidence for demographic/stock structure exist, samples from the coasts of Liguria, Southwest Sardinia, West Sicily, Southern Tyrrhenian, Greek Ionian, Levantine and Black sea would greatly improve our understanding of the population structure and status of this species in the Mediterranean. Observations of this species have been relatively frequent for those regions in previous surveys (Mussi et al., 2002; Bearzi et al., 2003; Gannier, 2005), but this could have changed in more recent years. For this purpose, museums and/or local stranding networks might be an ideal source of samples, as they require minimal disturbance of wild dolphins, and several methods currently exist to obtain data from degraded samples.

In conclusion, morphological and molecular studies (including genetics, stable isotopes and contaminant analyses) indicate the existence of some level of population structure in the Mediterranean common dolphin and further evidence for some degree of demographic/stock structure. However, sampling is low for some regions and a more geographically comprehensive sampling scheme is needed. Such population structure could be associated with patches of suitable

habitat, and robust understanding of the geographic boundaries of such populations is thus of paramount importance. These should be carefully considered to plan effective conservation measures in the region, to ensure that all subpopulations are identified and properly protected.

### 4.1.2 ABUNDANCE AND POPULATION TRENDS

The ACCOBAMS Survey Initiative (ASI) aerial surveys carried out in 2018 (ASI, 2020; see https://accobams.org/wp-content/uploads/2019/04/MOP7.Inf33_ASI-Technical-Reports.pdf) suggest low abundance across most of the subpopulation's range, and absence or near-absence of common dolphins across most of the Mediterranean Sea, except the Alboran Sea (Bearzi et al. 2021). Few groups of were encountered in each of the five inner Mediterranean strata where the species was recorded, and no groups were encountered at all in the remaining six strata (ASI, 2020). The estimates from ASI have not been corrected for perception and availability bias and may be underestimates, also considering that some areas off the North African coast were not surveyed. Nevertheless, the overall abundance is still likely to be low. While the low encounter rate resulted in high imprecision, a sum of mean estimates for the inner Mediterranean Sea (excluding the Alboran Sea, see Bearzi et al. 2021 for rationale) yielded an estimated total of 5,200 common dolphins (95% CI 1,890–14,305; Bearzi et al. 2021). West of the Almería-Orán thermohaline front, common dolphin abundance is much higher than in the rest of the Mediterranean Sea, and the species is still relatively abundant in the Alboràn Sea and the adjacent North Atlantic waters (Cañadas & Hammond 2008, Cañadas & Vázquez 2017).

Common dolphins appear to be absent or occur at very low densities in sectors of the Mediterranean where they were formerly regularly seen. The species is
almost completely absent from the Adriatic Sea, Gulf of Vera, Balearic Sea, the southeastern Tyrrhenian Sea off the island of Ischia and the Sicily Channel off
Malta where they used to be abundant (Bearzi and Genov, 2021). Likewise, common dolphins used to occur regularly in the Inner Ionian Sea Archipelago, western Greece, where declined dramatically since the mid-1990s (Bearzi et al., 2006, 2008). However, the species still persists in eastern Ionian Sea waters, although at low densities, but roaming over a wider area and moving occasionally into the Inner Ionian Sea Archipelago (Giovos et al., 2016; Gonzalvo and Costa, 2016). Only a few individuals remain in the semi-enclosed Gulf of Corinth, Greece (Frantzis and Herzing, 2002; Bearzi et al., 2016), where common dolphins occur only in mixed-species groups with striped dolphins (Bonizzoni et al. 2019), and their subpopulation has been assessed as Critically Endangered (Bearzi et al., 2020). Contrarily to what happen in the Ionian, common dolphins are still regularly observed in the Aegean Sea (Bearzi and Genov, 2021). They are rarely encountered in several Mediterranean areas where survey effort has been intensive, such as the Pelagos Sanctuary and the waters off southern France (Bearzi and Genov, 2021).

The most eastern population of common dolphins in the Mediterranean Sea inhabits the southern coastal waters of Israel, where they occur year round and typically comprise relatively large groups (mean ± SD: 21.5 ± 13.3; Brand et al., 2021), and closed population mark-recapture models estimated a total abundance of 25 (95% CI 24 – 37) individuals in 2016 that declined to only 15 (95% CI 15 – 15) individuals in 2021 (Mevorach et al., 2022).

### 4.1.3 DISTRIBUTION AND MOVEMENTS

In the past, this species was widely distributed throughout the Mediterranean basin and, until the 1960s, was considered the most abundant cetacean species. During the past decades, however, the species declined throughout the region Bearzi et al., 2003 with notable strongholds remaining only in the Alboran Sea (Cañadas & Hammond, 2008; Cañadas & Vázquez 2017). Their occurrence declines steeply east of the Almería-Orán thermohaline front, which led to the “inner” Mediterranean subpopulation being assessed separately from the Alboran Sea (Bearzi et al. 2021).

Common dolphin was reported to be rare compared to other pelagic species in the middle latitudes of the western Mediterranean Sea (Balearic Sea and central Tyrrhenian Sea, Arcangeli et al., 2017: out the coast of Lazio Region, Italy, Pace et al., submitted). In the central Tyrrhenian even if rarely recorded, the presence of the species was however confirmed over a long time period since early ‘90s (Arcangeli et al., 2012). In the southern Tyrrhenian basin, including the Messina strait, the species is instead reported to be more abundant (Pace et al. 2015, 2016; Santoro et al., 2015) but with a significant steady decline around the Island of Ischia since 2000 (Pace et al., 2016). A latitudinal gradient in the frequency of mixed group with striped dolphin was recognised (Arcangeli et al., 2017) and likely linked with the decrease of specimens that in the upper latitudes tend to depend on striped dolphin pods.

The recent ACCOBAMS Survey Initiative (ASI) in 2018 resulted in few or no records of common dolphins in most parts of the Mediterranean (apart from the Alboran Sea), including the Balearic Sea, the Gulf of Lion, the Pelagos Sanctuary, the Adriatic Sea and the Levantine basin. The species occurs more regularly in the northern and eastern Aegean Sea (Frantzis *et al.* 2003, Alan et al. 2018, Milani *et al.* 2019, Pietroluongo et al. 2020), and off the south-western coast of Turkey. A local population has been observed in the coastal Mediterranean waters off southern Israel (Kerem *et al*. 2014, Brand et al. 2019). Otherwise, common dolphins appear rare in, or completely absent from, the inner Mediterranean areas for which information is available (Bearzi & Genov, 2021). Little is known about movements, but long-distance movement has been documented (Genov et al. 2012).

### 4.1.4 BASIC BIOLOGY

To be completed

#### 4.1.5 INFORMATION GAPS/NEEDS

- Continued basin-wide monitoring (ASI) for regional abundance
- Local abundance estimates in various areas
- Genetic population structure
- Toxicological status assessment

### 4.2 ATRIBUTES OF THE POPULATION MONITORED

description of the attributes of the population that will be monitored (e.g.: abundance (relative and/or absolute), reproductive rates, survivorship, health, prey status, range) and an evaluation of the feasibility of detecting trends with current methods given that changes occur (e.g. using power analyses)

## 5 THREATS, MITIGATION MEASURES AND MONITORING

### 5.1 ACTUAL AND POTENTIAL ANTHROPOGENIC THREATS

Table 1: Summary of information on actual and potential threats to Mediterranean common dolphins

| Actual/potential threat | Human activity | Strength of evidence | Possible impact | Priority for action | Relevant actions* | Party Responsible |
|---|---|---|---|---|---|---|
| **Directly lethal threats** | | | | | | |
| Bycatch in bottom trawl nets | Trawl net fishing | Weak | Mortality and/or serious injury | Low to Moderate | MON-01<br>MON-03<br>MON-04<br>MIT-02 | |
| Bycatch in other fishing gear | Set nets and purse seines fishing | Moderate | Mortality and/or serious injury | Moderate | MON-01<br>MON-03<br>MON-04<br>MIT-02 | |
| Acoustic Trauma | Production of loud noise by industrial activities including those related to oil and gas extraction, military activities, general ship traffic incl. nautical tourism, regulated or un-regulated dolphin watching and research activities | Strong or moderate | Temporary or even permanent threshold shift, sound masking, temporary or permanent displacement from breeding or feeding areas, | Moderate | RES-04<br>MON-03<br>MON-04 | |
| **Sub-lethal threats** | | | | | | |
| Noise pollution | Gas industry, construction, shipping and boat traffic incl. nautical tourism, regulated or un-regulated dolphin watching and research activities | Weak | Temporary displacement from key habitats, disruption of the dolphin's natural behaviours and stress. | High to Moderate | RES-04<br>MON-03<br>MON-04 | |
| Overfishing | Prey depletion caused by overfishing. Especially relevant in the case of purse seining targeting epipelagic fish | Moderate to strong | Malnutrition, habitat displacement | High | MON-01<br>MIT-01 | |
| **Other threats** | | | | | | |
| Contamination of cetaceans and their prey | Chemical pollution from industrial and development activities on land spreading into the sea or release of chemicals directly into the sea, including oil spills | Moderate to High | Leading to compromised health that may affect reproduction (e.g., affecting hormonal balance or production) and survival (e.g. through reduced immune response) | Moderate to High | PACB-01<br>MON-03<br>MON-04 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Marine litter | Marine litter is the solid portion of the material discarded or disposed in the marine and coastal environment and can directly threaten many marine organisms and habitats | Weak or Moderate | Ingestion of marine litter can have detrimental consequences, such as physical injuries, reduced mobility and predation success, digestive tract blockages, and malnutrition | Moderate | PACB-01<br>MON-03<br>MON-04 | |
| Physical disturbance | Intrusive marine activities including oil and gas developments, coastal developments, fishing, dolphin watching, nautical tourism and recreational/sports boating and research | Moderate | Avoidance, displacement, interruption of life cycle activities, detrimental effects at the population level | Moderate to High | PACB-01<br>MON-02<br>MIT-03<br>MIT-04 | |
| Climate change | Production of greenhouse gases | Weak or Moderate | May influence distribution and abundance of prey, and induce thermal stress. | Moderate | PACB-01<br>MON-02<br>MON-03 | |

*****Coordination acions are considered relevant for addressing all threats

### 5.1.1 BYCATCH IN BOTTOM TRAWL NETS

In Israel, where interactions with bottom trawlers have been reported, no entrapment in trawl nets, has ever been witnessed or directly documented for this species (IMMRAC, pers comm.). One report of two entrapped dolphins corresponding to the description of common dolphins was obtained from a boat skipper but could not, be confirmed. Indirect evidence exists of one stranded individual with evidence of recent feeding and with bycatch being a potential cause of death. There is some evidence suggesting that a year-round presence of the local common dolphin population may be dependent on foraging in association with this kind of fishing gear when its natural schooling prey does not abound or is absent.

### 5.1.2 BYCATCH IN OTHER FISHING GEAR

Pelagic driftnets have been prohibited and their use limited by EU regulations since 2002. However, the illegal use of driftnets targeting swordfish and bluefin tuna is still a concern in some Mediterranean countries. All of these operations

are known to cause marine mammals and sea turtles mortality. For instance, in the Tyrrhenian Sea there is still an active illegal driftnetting fleet, mainly concentrated in the island of Ponza with a few additional boats from Ischia (Oceanomare Delphis, unpublished data).
Despite the European Commission's intention to adopt a universal moratorium on driftnet fishing in EU waters, currently there are legal driftnets in the Mediterranean: driftnets of limited length and relatively small mesh size to catch small/medium sized species (those using nets < 2.5 km in length and not targeting species in the Annex VIII of EC regulation n. 1239/98). Despite their historical presence, the knowledge on these fisheries is still scarce and scattered. A recent study on the small scale driftnet fishery indicated that: i) the use of thin yarns and a mesh opening of less than 80 mm (or 70 mm according to a stricter approach) would allow the survival of most traditional métiers while preserving sensitive and protected species; ii) the requirement to carry on board a single gear type should be included in the regulatory framework; and iii) driftnet use within 3 miles of the coast would greatly reduce the risk of interactions with sensitive species (Lucchetti et al. 2017).

Direct interactions between common dolphins and main fishing fleets in the Alboran Sea were evaluated in a total of 111 observed fishing trips (70 in trawlers and 41 in purse seiners). No bycatch was recorded, however non-lethal interactions between dolphins and the gear were detected (Giménez et al. 2021). Although no dolphin fishing bycatch has been documented, the impact of this mortality factor on the common dolphin population in the Alboran Sea should not be ignored because 77 of 694 stranded common dolphins (11.1%) in the area had diagnostic signs of interactions with fisheries. These interactions are described to frequently occur along the coast of Malaga (Fernández-Maldonado, 2016) where the species is more abundant (Cañadas and Hammond, 2008)

(some references missing from list at the end of this document)

### 5.1.3 ACOUSTIC TRAUMA

No direct evidence exists for the Mediterranean, however (Jepson et al. 2013) showed that acoustic trauma is a threat to this species. See below for more detail.

### 5.1.4 NOISE POLLUTION

Noise must be considered a critical threat in Mediterranean waters for common dolphins. Intense marine traffic, especially in the Alboran Sea and Sicily Channel, industrialized coastal areas, sonar for military activities and fishing use, seismic exploration and offshore platforms could affect occurrence and behaviour of the species. Even if no data are currently available about the impact of noise on the species in the basin, common dolphins have been observed to modify their vocal emission, increasing the maximum frequency of

their whistles when exposed to high anthropogenic noise levels masking the same frequencies in the eastern Atlantic (Papale et al., 2015). Furthermore, a recent study on the effects of concurrent ambient noise levels on social whistle calls produced by bottlenose dolphins (*Tursiops truncatus*) in the western North Atlantic reported that increases in ship noise resulted in higher dolphin whistle frequencies and a reduction in whistle contour complexity (Fouda et al., 2018). The noise-induced simplification of dolphin whistles may reduce the information content and decrease effective communication, parent–offspring proximity or group cohesion.

In addition, as other dolphin species, common dolphins could decrease some activities relevant for their survival, such as resting and feeding, deviate from normal activity, including changes in swimming speed and breathing/diving activity and avoidance of an area, or even strand. For example, a group of common dolphins mass stranded in 2008 in UK waters, possibly following a “two-stage process” where a large group of normally pelagic dolphins initially entered a coastal bay (possibly to avoid a perceived acoustic threat) and then, after 3–4 days, a second acoustic or other type of disturbance event occurred, causing them to strand *enmasse* (Jepson et al., 2013). The international naval activities that took place in very close temporal and spatial proximity to this mass stranding were the only established cause of cetacean mass strandings which cannot be eliminated and was ultimately considered the most probable (but not definitive) cause (Jepson et al., 2013).
Physiological responses on the hearing abilities, such as temporary or permanent reductions in hearing sensitivity (auditory threshold shifts), and symptoms associated with decompression sickness, are of particular concern. Chronic exposure may also cause stress reactions.

### 5.1.5 OVERFISHING

Unsustainable fishing has been implicated in dramatic ecological changes in the Mediterranean Sea (Sala 2004), where it has caused the decline of many fish stocks (Caddy and Griffiths, 1990; De Walle et al, 1993; Caddy, 1997; Coll et al., 2010). Some of the Mediterranean fish stocks that have been over-exploited include important prey species of common dolphins (Lleonart 2005; Vasilakopoulos et al., 2014). In recent years, as major fish stocks collapsed (Pauly et al., 2002, 2003) and human demand for seafood increased, competition between marine mammals and fisheries for same food resources has been cited as a source of concern (Plagányi and Butterworth, 2002; Kaschner and Pauly, 2005). Popular arguments point to marine mammals as a source of competition for marine fisheries in reducing valuable fish stocks (Jackson, 2007; Gerber et al., 2009). While some studies hypothesized the decline of several marine mammal species due to reduced prey availability (Demaster et al., 2001; Boyd et al., 2006; Bilgmann et al., 2008), they failed to demonstrate it. In the Mediterranean Sea, increased overexploitation of small pelagic fish (sardines and anchovies) has been suggested to be one of the major reasons of the decline of common dolphins throughout the region (Bearzi et al., 2003; Cañadas and Hammond, 2008), but such link has been difficult to be investigated. Behind the difficulty of assessing such interaction is the

complexity of studying marine ecosystems and the difficulties to monitor and track changes and responses in complex systems (Trites et al., 2006).

(some references missing from list at the end of this document)

### 5.1.6 CONTAMINATION OF CETACEANS AND THEIR PREY

Contamination through the food web may expose common dolphins to the effects of chemical pollutants (Borrell *et al.* 2001, Aguilar *et al.* 2002, Jepson *et al.* 2016). Despite serious implications for reproduction, the population-level impacts are still poorly understood (Murphy *et al*. 2018).

### 5.1.7 MARINE LITTER

Marine litter is the solid portion of the material discarded or disposed in the marine and coastal environment (Coe and Rogers 1997; Galgani et al. 2013) and can directly threaten many marine organisms and habitats. Ingestion of marine litter can have detrimental consequences, such as physical injuries, reduced mobility and predation success, digestive tract blockages, and malnutrition (Laist 1997; Derraik 2002; Gall and Thompson 2015). The fragmentation of these artificial materials produces the release of micro-particles and toxic compounds and enhances their accumulation in the food chain, increasing the exposure for top predators (Cole et al. 2011; Fossi et al. 2012). Very limited knowledge is available on impacts of microplastics in common dolphins; however, a recent analysis on stranded and bycaught common dolphins in Irish waters reported that the incidence of ingestion of microplastics in this species was 2.5 times higher than in the Atlantic Ocean and on a global scale (Lusher et al., 2018).

Areas of potential higher risk of exposure of pelagic cetaceans to marine litter were recognised in offshore waters in the western Mediterranean Sea, especially during the spring and summer season when specific combinations between sources and dispersal dynamics for litter and favourable conditions for cetacean species occur (Arcangeli et al., 2018; Campana et al., 2018).

(references missing from list at the end of this document; need to incorporate info from Lambert C., Authier M., Dorémus G., Laran S., Panigada S., Spitz J., Van Canneyt O., Ridoux V. (2020): Setting the scene for Mediterranean litterscape management: The first basin-scale quantification and mapping of floating marine debris. Environmental Pollution 263: 114430)

### 5.1.8 PHYSICAL DISTURBANCE

Disturbance by boats, can determine short- and long-term changes in the behaviour and distribution of cetacean species such as bottlenose dolphin (e.g. Arcangeli and Crosti, 2009; Bejder et al., 2006; Pirotta et al., 2015), fin whale (e.g. Jahoda et al., 2003; Pennino et al., 2016) and also common dolphin (Neumann & Orams, 2006; Stockin et al., 2008; Meissner et al., 2015). Campana et al. (2015, 2017) observed that common dolphin was recorded in locations with relatively lower vessel abundance, suggesting a negative response of the animals towards vessels and a displacement in less disturbed areas. As discussed by Gill et al. (2001), the intensity of the response of a species to disturbance is however not a direct indication of its vulnerability: a stronger response may in fact indicate the possibility that the animals can change areas by moving to less impacted regions, still featuring adequate ecological conditions. Conversely, animals living under pressure can reduce the disturbance by applying short-term behavioural changes, but probably having negative effects over a longer period.

(references missing from list at the end of this document)

### 5.1.9 CLIMATE CHANGE

The potential effects of global climate change or ocean acidification on Mediterranean common dolphins cannot be neglected and need further investigation. Climate variation may deviate migratory patterns, destroy habitat (particularly in nutrient-rich seas), and drastically change ocean circulation, vertical mixing and overall climate patterns. There may be changes in nutrient availability, biological productivity, and the structure of marine ecosystems from the bottom of the food chain to the top. Therefore, as with many other taxa, climate change is expected to result in geographic range shifts of cetacean species as they track changes in temperature to remain within their ecological niches. Such changes in geographic range could have implications for the conservation and management of cetaceans.
For instance, a study by Cañadas and Vázquez (2017) related features of Mediterranean common dolphins ecology to climate change, focusing on distribution and density, by using two decades-long dataset on the species in the Alboran Sea and a time series of environmental changes. They found that at the small spatial scale of the Alboran Sea and Gulf of Vera, an increase in SST will potentially yield a reduction in suitable habitat for common dolphins, with a progressive reduction in density from east to west. The effect that climate change may have on the species at a larger scale or, at least in other small-scale areas with high density of common dolphins or offering critical habitat for the species should also be studied.

## 5.2 MITIGATION MEASURES AND MONITORING

Any active species conservation effort requires that human activities, as well as the animals, be monitored over time to evaluate the effectiveness of mitigation measures (i.e., whether the existing threats stationary, worsening or lessening)

Mitigation measures are presented below to address key threats (those with priority considered as high or moderate)

### 5.2.1 BYCATCH IN BOTTOM TRAWL NETS

Identification of the factors triggering this kind of interaction and evaluation of possible modifications in the fishing gear or in the fishing routines to minimise the incidence of this interaction.
Acoustic deterrent devices (ADD) have been used in both static and trawl gear to varying success in the Atlantic (Murphy et al., 2013). In the Irish tuna trawl fishery, changes in operational procedures (e.g., lowering the trawl headline and cessation of fishing activities when dolphins were in the vicinity) have been applied as a bycatch mitigation technique, producing a decrease in the incidental capture of common dolphins (Murphy et al., 2013).
TO BE DEVELOPED FURTHER

### 5.2.2 A ROBUST ESTIMATE BYCATCH IN OTHER FISHING GEAR

A robust estimate of bycatch rates across all fisheries and areas of the Mediterranean is needed. To achieve this, not only must there be greater sampling effort using independent observers, remote electronic monitoring, or some other means, but also fishing effort itself needs to be better quantified, including information on fishing gear/activity with appropriate spatial and temporal resolution, target prey species, immersion duration of gear and area swept, net dimensions (total length of set nets, aperture of trawl), fishing locations, and use of mitigation devices (presence/absence, type, setting interval) (ASCOBANS, 2015).

### 5.2.3 ACOUSTIC TRAUMA

No direct evidence exists for the Mediterranean, however (Jepson et al. 2013) showed that acoustic trauma is a threat to this species.

### 5.2.4 NOISE POLLUTION

Investigation and monitoring of behavioural responses of common dolphins to anthropogenic sound with the potential to cause disturbance is needed and any significant effects of noise should be considered in models to define possible consequences at population level of such disturbance.

### 5.2.5 OVERFISHING

Incorporation of fishery controls in MPA management to preserve ecosystem function. Establishment of no-take and/or fisheries restricted areas in common dolphin critical habitat, at least for fishing gears known to deplete common dolphin prey (e.g., purse seiners) and severely damage the coastal

environment (e.g. bottom trawlers). Implementation of extensive stock assessments for fish and cephalopod species eaten by common dolphins, including non-commercial species and studies of diet. Illegal fishing activities to be eradicated in the critical habitat of the common dolphin.

Conservation of the endangered common dolphin population in the Alboran Sea may be difficult or even unrealistic with only a spatial solution based on marine protected areas because common dolphin distribution and fishing effort largely overlap. A recent study (Giménez et al., 2021) proposes to combine an area-based approach (i.e., marine protected areas) with a cetacean orientated threat-based approach where threat mitigation actions are implemented to preserve cetacean populations. According to it the addition of a threat-based approach may be more successful and cost-efficient than relying only on a conventional area-based approach.

### 5.2.6 CONTAMINATION OF CETACEANS AND THEIR PREY

TO BE DEVELOPED

### 5.2.7 MARINE LITTER

TO BE DEVELOPED

### 5.2.8 PHYSICAL DISTURBANCE

Speed limits, no-entry areas in common dolphin critical habitats, development and implementation of code of conduct/guidelines to be followed not only by dolphin watching operators but also to be promoted among tour boats and nautical tourism companies as well as among the large community of recreational boaters.

## 6 ACTIONS

The actions presented here are the key component of this CMP. While there may be some overlap, these have been incorporated under the following categories:

- co-ordination (COORD);
- public awareness and capacity building (PACB);
- research essential for providing adequate management advice or filling in knowledge gaps (RES);
- monitoring (MON);
- mitigation measures (MIT).

| | |
|---|---|
| COORD | COORD-01: ESTABLISHMENT OF A CMP FOR MEDITERRANEAN COMMON DOLPHINS COORDINATOR AND STEERING COMMITTEE (MedDdSC)<br><br>COORD-02: ESTABLISH AN INTERACTIVE REGIONAL NETWORK OF GROUPS INVOLVED IN COMMON DOLPHIN RESEARCH AND CONSERVATION |
| PACB | PACB-01: DEVELOP A STRATEGY TO INCREASE STAKEHOLDER PARTICIPATION, EDUCATION AND PUBLIC AWARENESS<br><br>PACB-02: DEVELOP A STRATEGY FOR BUILDING CAPACITY WHERE NEEDED |
| RES | RES-01: DETERMINE MEDITERRANEAN COMMON DOLPHIN POPULATION STRUCTURE (E.G., THROUGH GENETICS, ACOUSTIC ANALYSIS AND/OR OTHER VALID METHODS)<br><br>RES-02: ESTIMATE ABUNDANCE AND MAP THE DISTRIBUTION OF COMMON DOLPHINS IN THE MEDITERRANEAN<br><br>RES-03: DEVELOP AND/OR SUPPORT RESEARCH CAMPAIGNS IN POORLY COVERED AREAS TO FILL KNOWLEDGE GAPS IN RELATION TO RES-01 AND RES-02<br><br>RES-04: IMPACT OF AMBIENT NOISE ON COMMON DOLPHINS |
| MON | MON-01: MONITORING COMMON DOLPHINS - FISHERIES INTERACTION<br><br>MON-02: DEVELOP AND MAINTAIN EFFECTIVE LONG-TERM MONITORING PROGRAMMES AT LOCAL LEVEL TO ESTABLISH ABUNDANCE AND TRENDS THROUGH DEDICATED SURVEYS<br><br>MON-03: MONITORING THREATS HAVING AN IMPACT ON THE SPECIES AND MARINE ECOSYSTEMS<br><br>MON-04: DEVELOP AND MAINTAIN MONITORING OF STRANDINGS AT LOCAL/NATIONAL LEVEL |
| MIT | MIT-01: PROMOTION AND IMPLEMENTATION OF FISHERIES MANAGEMENT MEASURES TO REDUCE OVERFISHING AND PRESERVE MARINE ECOSYSTEMS<br>MIT-02: DEVELOPMENT, PROMOTION AND IMPLEMENTATION OF FISHERIES BYCATCH MITIGATION MEASURES<br><br>MIT-03: WIDER ADOPTION AND IMPLEMENTATION OF STANDARIZED CODES OF CONDUCT (IWC/ACCOBAMS/CMS) TO MITIGATE ADVERSE IMPACT OF DOLPHIN WATCHING |

| | |
|---|---|
| | MIT-04: COMPLIANCE WITH EXISTING ADOPTED MEASURES AND GUIDELINES |

These actions are considered realistic and effective.

The CMP for Mediterranean Common Dolphins Coordinator and Steering Committee (see Action CORD-01 below) will be responsible for developing detailed specifications for each action and assign costs as appropriate, and identify possible sources of funding.

Given the potential overlap with actual or potential CMPs for other species within the region, it is important that the relevant Steering Committees work together, as much of the work will be very similar if not identical.

## 6.1 COORDINATION *(COORD)*

### ACTION COORD-01: ESTABLISHMENT OF A CO-ORDINATOR AND STEERING COMMITTEE FOR THE CMP FOR MEDITERRANEAN COMMON DOLPHINS

*Co-ordination Action* Priority: High

### DESCRIPTION

- **Specific objectives:** (1) to ensure timely progress is made on implementation of the CMP and the specific actions described in it, and (2) to provide progress reports to appropriate bodies including: ACCOBAMS, CMS, IWC, range states and regional stakeholders, thereby maximising the chances of survival and maintaining a favourable conservation status throughout its range.
- **Rationale:** this CMP requires considerable co-ordination for it to be effective. Its implementation will depend on stakeholders in several countries and a broad range of expertise. A dedicated, well-supported coordinator and a similarly committed Steering Committee are essential.
- **Target:** appointment of a suitably qualified Co-ordinator and Steering Committee (initially an interim Steering Committee ISC and later the final Steering Committee) with the required logistical and financial support. The Tasks for the co-ordinator and interim steering committee are provided below.
- **Timeline:**

| | WHAT | WHO* | WHEN |
|---|---|---|---|
| (1) | Identification of a host institution for the CMP co-ordinator and agreement on hosting conditions | Interim Steering Committee (ISC), | First quarter (after the adoption of the CMP) |
| (2) | Development of detailed job description for the Co-ordinator and conditions of work based on the tasks outlined below | ISC, ACCOBAMS Secretariat | First quarter year1 |
| (3) | Identification of source of initial funds | ISC | Last quarter year1 |
| (4) | Recruitment of co-ordinator | ISC | First quarter year 2 |
| (5) | Co-ordinator begins work (initial 3-year contract) | Co-ordinator | Second quarter year 2 |
| (6) | Development of proposed terms of reference and modus operandi for the stakeholder Steering Committee (MedTtSC) | ACCOBAMS, IWC, ISC, funders | Second quarter year 2 |
| (7) | Appointment of MedTtSC | ACCOBAMS, IWC, ISC, funders and Co-ordinator | Third quarter year 2 |
| | * In each case with assistance from the ACCOBAMS Secretariat if required | | |

- **Tasks of CMP for Mediterranean Common Dolphins Coordinator in conjunction with the Steering Committee (with assistance from the ACCOBAMS Secretariat as required):**
  - To assess the need for the establishment of sub-area and/or national coordinators for the implementation of the Mediterranean Common Dolphin CMP based upon the identified units-to-conserve, recognising that the definition of such management units will take some time (RES-01).
  - To facilitate (and if necessary, adapt or modify existing) data-sharing agreements to ensure that data are made available in timely fashion to maximise their value for conservation (and see COORD-2).
  - To liaise with ACCOBAMS and its Scientific Committee to ensure appropriate interactions at regular intervals, including provision of data/results from the various actions to facilitate integration of the information on dolphins and humans to determine the timing of the periodic (normally every 6 years but potentially earlier

if a need is identified) expert reviews of the CMP and the development of new or modified actions or recommendations to the ACCOBAMS Meeting of Parties as appropriate.

- To liaise with relevant authorities to facilitate any permitting required to undertake Actions of the CMP.
- To produce concise annual progress reports on the implementation of the CMP for all stakeholders.
- To promote and explain the CMP and progress with its implementation to stakeholders, including:
  - International and regional bodies.
  - Range state officials.
  - Industry representatives including, fisheries, nautical tourism, coastal developers
  - Local authorities and communities in selected areas.
  - NGOs.
- To raise funds for and manage an ACCOBAMS Mediterranean Common Dolphin CMP Fund including, where necessary, assigning contracts to ensure that the Actions of the CMP are undertaken and completed.
- To maintain and update the existing list of international and national regulations and guidelines relevant to the conservation of Mediterranean Common dolphins.
- To work with the ACCOBAMS Secretariat to provide information for a web page on the Mediterranean Common Dolphin CMP within a section of the ACCOBAMS website dedicated to CMPs as a resource for researchers, stakeholders and the general public.

## ACTORS

- Responsible for coordination of the action: initially the ISC, then the co-ordinator and the ISC and finally the co-ordinator and the ISC, with assistance from ACCOBAMS [and IWC]
- Stakeholders: as listed above under ‘Tasks’.

## EVALUATION

- ACCOBAMS, IWC.
- Regular (e.g. biennial or triennial) meetings open to stakeholders.

## PRIORITY

- Importance: Essential
- Feasibility: High (with institutional support)

## BUDGET CONSIDERATIONS

- Recruitment process (e.g., advertising, travel and subsistence for ISC and shortlisted candidates).
- Host institution annual costs (needs to be negotiated by ISC).
- Salary of Coordinator (level, tax and benefits issues, if any).
- Initial working budget for Coordinator (travel and subsistence including visits to range states and meetings with stakeholders).

## ACTION COORD-02: ESTABLISH AN INTERACTIVE REGIONAL NETWORK OF GROUPS INVOLVED IN MEDITERRANEAN COMMON DOLPHIN RESEARCH AND CONSERVATION

*Co-ordination Action* Priority: High

### DESCRIPTION

- **Specific objectives:** (1) establish an interactive regional network of research groups involved in Common dolphin research, conservation, and public awareness; (2) facilitation of data exchange and research co-operation between neighbouring regions and public awareness initiatives; (3) support the existing research units of the network and facilitate (also with training activities) the genesis of new research units in the areas not covered.
- **Rationale:** as the Common dolphin dolphin is a widely distributed species, it is essential to have all of the regional groups that collect/hold data on a local level and raise local public awareness, connected in a collaborative network. Networking/data sharing/collaboration is essential for effective conservation of the species throughout the Mediterranean.
- **Target:** Establish a network that will enable the aims of the CMP and individual action to be most effectively met and implemented.
- **Methods:** Members of the network will agree to share the CMP aims (see RES-01, RES-02, MON-02,…) and follow agreed protocols for data collection, sharing and analysis (taking into account local situations as appropriate). Members will collect data to target the research objectives (RES-01, RES-02) and monitoring objectives (MON-01, MON-02). It is essential for effective conservation that data are shared and co-operatively analysed in an aggregated form - the value of uploading data on a common platform (such as Intercet?) with appropriate data safeguards to facilitate this will be evaluated. The members of the network will be involved in the implementation of PACB actions on a local level (see PACB-02).

- **Timeline:**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Draft an initial MoU to be discussed and approved by the potential network membership | Relevant CMP Coordinators and ACCOBAMS secretariat | 3 |
| (2) | Confirmation of network membership (MoU signing) | Relevant CMP Coordinators and ACCOBAMS secretariat | 6 |
| (3) | Identification of need for and source of initial funds | Relevant CMP Coordinators and ACCOBAMS secretariat | 10 |
| (4) | First Workshop/Training to agree on common protocols for data collection, data sharing and analysis. | Relevant CMP Coordinators and ACCOBAMS secretariat | 12 |
| (5) | Develop a template and elaborate a periodic (annual) report | Relevant CMP Coordinators and ACCOBAMS secretariat | 24 |

### ACTORS

- Responsible for co-ordination of the action: Relevant CMP Coordinators and interim Steering Committees in collaboration the ACCOBAMS secretariat

- Stakeholders: local research units being able to provide data to target RES-01, RES-02, MON-01, MON-02. Local groups being able to support PACB-02, MPAs, WW companies, “ARPA”,

## ACTION EVALUATION

- Evaluation by Relevant Coordinators and SC
    - Number of members actively participating to the network (annual report)
    - Distribution of the units in the network (annual report)
    - Data flow to the common platform (annual report)
    - Data covering on a Mediterranean level (annual report)

## PRIORITY

- Importance: high
- Feasibility: high

## 6.2 PUBLIC AWARENESS, EDUCATION AND CAPACITY BUILDING *(PACB)*

### ACTION PACB-01: DEVELOP (AND SUBSEQUENTLY IMPLEMENT) A STRATEGY TO INCREASE PUBLIC AWARENESS OF THE MEDITERRANEAN COMMON DOLPHIN CMP

*Public Awareness and Capacity Building Action* Priority: High

#### DESCRIPTION

- **Specific objective:** Raise awareness throughout the Range States on the existence of the Common Dolphin CMP with the objective of achieving or maintaining favourable conservation status. An overall common strategy will be tailored specifically for each range state, including the production of education and awareness materials providing key information on the species, its ecology and conservation needs, latest research findings, as well as guidelines on how to behave when encountering them at sea or stranded.

- **Rationale:** While in some Mediterranean countries there are effective educational programmes and multimedia campaigns to raise awareness about cetaceans, in many others there is a lack of such activities. There is an urgent need to fill this gap in the context of the objectives and prioritised actions of the CMP, several of which require collaboration of stakeholders (see below). Informing the relevant stakeholder groups is crucial to fully implement the conservation measures presented in this CMP.

- **Target:** The main targets of the awareness campaign include, in no specific order: the general public; schools and educational centres; NGOs; whale watching/dolphin watching operators and nautical tourism companies; shipping companies; marina and port authorities; fishing industry (large and small scale); oil and gas companies; Coast Guards and navies, local authorities. The strategy will be tailored by State and stakeholder group. for the different target audience, creating different contents for the general public, schools and relevant stakeholders. This action is to be executed by professionals and experts in communication and consideration should be given to the development of a dedicated central website (and see Actions COORD-01 and COORD-2).

- **Timeline**:

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Preparation for an expert workshop to develop the strategy | Relevant CMP Coordinators and ACCOBAMS secretariat | 9 |
| (2) | Workshop to develop the strategy and a prioritised list of actions | Workshop participants (see methods below) | 14 |
| (3) | Execution of the actions defined by the strategy established by workshop in agreement with all participants | National and regional actors organizations identified during workshop in coordination with the Steering Group | Timeline to be established at workshop |

- **Methods:**

  The workshop will:

  - Identify issues to be addressed and identification of the target groups in each state.

- Review/evaluate previous education and awareness tools/campaigns to assist in identifying priority actions and materials to be developed, in accord with the various stakeholder groups and national requirements.
- Identify most appropriate communication channels by stakeholder groups and national requirements, including consideration of a central resource website (See COORD-01).
- Develop a prioritised list of actions to implement (and evaluate the effectiveness) of the strategy, including resources required (personnel and costs) and a mechanism to update the strategy as necessary.

- Workshop participants should include:
  - Relevant CMP Co-ordinators and Steering Group members;
  - Representatives of the stakeholder groups;
  - Communication and public awareness professionals;
  - Scientists familiar with the CMP.
  - Researchers/groups with experience in developing existing awareness campaigns (including use of citizen science).

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

Costs associated with preparatory materials and holding of a workshop

## ACTORS

- Responsible for co-ordination of the action: Med DdSC – see Action COORD-01
- Responsible for carrying out the action: to be determined at workshop for each state/stakeholder group

## ACTION EVALUATION

- ACCOBAMS, IWC.
- Feedback system built into materials.

## PRIORITY

- Importance: Moderate
- Feasibility: High

## ACTION PACB-02: DEVELOP A STRATEGY FOR BUILDING CAPACITY WHERE NEEDED

*Public Awareness and Capacity Building Action* Priority: HIGH

### DESCRIPTION

- **Specific objective:** to develop a strategy or strategies consistent in message but specific to each range State and key stakeholders, for the timely production of a series of resources to build capacity of range states on data collection, analysis and design and implementation of conservation measures for common dolphins.
- **Rationale:** long-term systematic programmes to collect and analyse data on cetacean population attributes, human threats and mitigation and management measures are required to implement the CMP and meet national and international commitments but are not uniformly distributed throughout the Mediterranean Sea. This action will complement (and be undertaken in conjunction with) other actions including COORD-01, RES-01, RES-02, RES-03, MON-01, MON-02 to identify those areas where specific targeted and focused capacity building measures are needed.
- **Target:** to develop a strategy and initiatives to produce a variety of targeted research and management resources that will inform representatives of national authorities and other targeted stakeholders on the status of Mediterranean bottlenose This will include provision of resources to both establish new long-term projects and strengthen the existing ones, to facilitate the implementation of national and international research and conservation priorities, including those listed in the CMP.
- **Methods:** Specific research and management resources, ranging from basic to more advanced, will be provided both through theoretical lessons and practical sessions. To achieve this the ISC, taking into account the work being undertaken under the actions listed in the Rationale above, will oversee preparations for a small expert working group to determine a strategy for developing and disseminating building capacity materials, including:
    - Identification of priority target groups, by range state where appropriate, and identification of who will benefit from the capacity building actions and resources
    - Identification of existing/development of new research and management training modules/materials for cetaceans in general, with a specific emphasis on common dolphins, including, but not limited to, data collection, storage and analysis, policy and management frameworks. Consideration should be given to whether, and if so how, this material needs to be modified for any of the priority target groups.
- **Working group** members should include:
    - Coordinator of the CMP and representatives of the stakeholder Steering Committee.
    - Experts familiar with the Mediterranean bottlenose dolphin situation and familiar with other relevant actions (see list under Rationale)
    - Experts familiar with the research, management and conservation resources considered.
- **Timeline:**

| | WHAT | WHO | WHEN (months after start of CMP) |
|---|---|---|---|
| (1) | Identification of priority target groups, by range state where appropriate | CMP co-ordinator, ISC, local experts | 2 months |
| (1) | Identify potential resources (e.g., ACCOBAMS Training Modules, | CMP co-ordinator, ISC | 4 months |

| | | | |
|---|---|---|---|
| | University courses, internships) within and outside the Mediterranean. | | |
| (2) | Identification and modus operandi for a small expert working group to develop a strategy for building capacity, including identification of existing materials and development of new materials (and trainers) by range state and target group, measures to review success in light of agreed objectives | CMP co-ordinator, ISC then small working group | 12 months - ongoing |
| (3) | Implement the strategy and dedicated actions agreed under (2) following an established timeline (probably a staged process) | CMP co-ordinator, small working group, trainers | 12 months - ongoing |
| (5) | Assess and if needed update strategic plan according to indicators | CMP co-ordinator, DdSG | 24 months |

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

Costs associated with preparatory materials and holding of training sessions, both online and in situ.

## ACTORS

- Responsible for co-ordination of the action: the ISC to identify and establish the expert working group
- Responsible for carrying out the action: working group
- Stakeholders: to be determined

## ACTION EVALUATION

- ACCOBAMS, IWC.
- Feedback system built into materials.

## PRIORITY

- Importance: High
- Feasibility: High

## 6.3 RESEARCH ESSENTIAL FOR PROVIDING ADEQUATE MANAGEMENT ADVICE OR FILLING IN KNOWLEDGE GAPS *(RES)*

### ACTION RES-01: IDENTIFY THE GEOGRAPHICAL / MANAGEMENT UNITS OF COMMON DOLPHINS WITHIN THE MEDITERRANEAN AREA AND CHARACTERISE THEIR AREA OF OCCURRENCE

*Research Action* Priority: HIGH

#### DESCRIPTION

- **Specific objectives**: Identify the management units (units-to-conserve) for common dolphins throughout the Mediterranean Sea as the basis for the evaluation of status, threats and mitigation measures and evaluate the extent of any connectivity between Mediterranean individuals with those from the Black Sea and contiguous Atlantic waters.
- **Rationale:** Common dolphins are widely distributed throughout the Mediterranean Sea but there is sufficient evidence (e.g. from genetic analysis and other data) that common dolphins in the Mediterranean form several broadly demographically isolated 'units-to-conserve'. Understanding population structure and determining management units is essential to assess status and to assist in the prioritisation of threats and mitigation efforts to enable the meeting of the CMP objective to achieve favourable conservation status throughout its historical range. Defining management units requires information from a suite of techniques encompassing different approaches and time-frames including for example genetic and ecological markers (e.g. isotopes), acoustics, sightings and photo-identification. Once defined, it will be possible to allow an assessment of the conservation status (e.g. see RES-02) and help to prioritise threats and monitoring and mitigation efforts in each of the different management units throughout the ACCOBAMS region (e.g. see RES-04, MON-01 and MON-02).
- **Target:** Determine common dolphin management units (including characterisation to the extent possible of the habitat drivers leading to the spatio-temporal distribution) within the Mediterranean Sea (and potential links with the Black Sea or adjacent Atlantic waters). Given the disparity in available data throughout the Mediterranean this may be a staged process with the identification of management units in data rich areas occurring first whilst the collection of adequate data for areas with little or no data proceeds in accordance with RES-03 before management units for those areas can be determined.
- **Methods:** Existing information (e.g. from the techniques noted above) will be used to identify its suitability and adequacy for identifying management units and characterising habitat. Where information is lacking this will be identified and research programmes to collect the necessary data will be developed under RES-03 (this may include additional techniques e.g. environmental DNA as well as approaches already used). Experience has shown (e.g. within the IWC Scientific Committee) that an iterative approach is needed to finalise the definition of management units – even in data rich circumstances and it is likely that at least three such workshops will be needed if this action (critical to the ultimate success of the CMP) is to be completed relatively quickly.

(1) Compilation of existing information and availability of data on the spatio-temporal distribution of the species and research effort carried out across the study area, with an emphasis on trying to ensure that all of the known data for the region are made available (and see COORD-02), ideally in light of an agreed protocol to provide safeguards for data owners in respect of combined analysis of the datasets. This first step will make it possible to determine (a) the areas/periods for which sufficient data are available to determine at least 'draft' management units in some parts of the basin and (b) areas/periods in which additional sampling is necessary (RES-03).

(2) This information (and agreed analyses of the existing data) will be discussed at a first expert workshop to

(a) determine at least 'draft' management units for Common dolphins in the Mediterranean Sea where adequate data/analyses exist;

(b) develop additional analyses to help finalise these initial drafts at a second workshop and

(c) to assist with developing research programmes for poorly covered areas to enable management units to be defined and thus contribute to RES-03.

(3) At this first expert workshop, emphasis will be placed on receiving information from agreed (by the workshop Steering Group in conjunction with relevant scientists) analyses of:

(a) the available mark-recapture data to look at movements, connectivity, home ranges;

(b) the available sightings data with respect to spatial and temporal distribution (including gaps in these even where good effort exists)

(c) possible relationships between environmental variables and the presence/absence of Common dolphins using spatial modelling techniques;

(d) genetic data to determine if genetic signals can be identified that suggest population structure recognising that several analytical techniques and markers should be explored in light of their strength weaknesses in light of providing practical information on population structure to provide information on management units

(e) analyses of other available data (e.g., genetic, isotopes and acoustics) that may provide information on management units and/or associated habitat characterisation

(f) for each of (a)-(e) the Workshop will develop proposals for additional analyses as necessary to try to finalise management units for data rich areas at a Second Workshop.

(g) also in light of (a)-(f), the workshop will develop proposals for dedicated research to facilitate the identification of management units for data poor areas taking into account local conditions to the extent possible (in conjunction with RES-03) and recognising that a minimum of two years of data collection will be required and probably more.

(4) Hold a second expert workshop to (a) receive the results of the analyses identified at the first workshop to try to finalise management units to be used up to the next iteration of the CMP; and (b) receive any new information for data poor areas and provide additional advice if needed.

(5) Hold a Third workshop when it is deemed that sufficient data are available and have been suitably analysed for it to be successful in identifying management units for the remainder of the Mediterranean.

- **Timeline:** This will be an iterative process with the objective of completing the work before the next iteration of the CMP. The timeline is approximate and dependent on funding and cooperation amongst data holders

| | WHAT | WHO* | WHEN |
|---|---|---|---|
| 1 | Inventory of the organizations and institutions working on studies related to stock structure of bottlenose dolphins in the Mediterranean (especially but not only, | Steering Committee, CMP coordinator | 3 months after CMP adopted |

| | | | |
|---|---|---|---|
| | photo-identification, distribution, genetics) (and see COORD-2) | | |
| 2 | Approach all identified in (1) with respect to data sharing/ combined analyses in the context of the CMP, ideally with an agreed data sharing protocol (and see COORD-2) | CMP coordinator, Steering Committee | 6 months |
| 3 | Appoint workshop steering group to develop detailed agenda, list of participants, budget and expected papers/analyses/leaders for the First workshop | CMP coordinator Workshop Steering Group | 9 months |
| 3 | Identification of the funds for a workshop | ACCOBAMS | 1 year |
| 4 | Hold the First Workshop and submit report to ACCOBAMS SC | Workshop Steering Group | 2 years |
| 5 | Undertake and complete additional analyses identified at the First Workshop | CMP coordinator, analysts | 3 years |
| 5 | Data collection in data poor areas following the established protocol and sampling needs developed at the First Workshop and in conjunction with RES-03 | Research units in the network | Ongoing (up to three years of field work) |
| 6 | Hold Second Workshop with the objective of finalising the management units for the data rich areas and reviewing progress for data poor areas and submit report to ACCOBAMS SC | Research units in the network, CMP coordinator and Workshop Steering Group | 3 years |
| 7 | Provide progress report for ACCOBAMS MoP including any recommended management units | CMP coordinator | 3 years |
| 8 | Hold Third Workshop to determine where possible the management units for the data poor areas – the timing will depend on the success of the data collection/analyses | CMP coordinator and Workshop Steering Group | Before next CMP review |
| 9 | Periodic review of the management units to confirm its validity | | |

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

## ACTORS

- Responsible for coordination of the action: CMP coordinator, Networks partners
- Stakeholders: ACCOBAMS, Local and national authorities, scienfic community, NGOs, general public

## ACTION EVALUATION

PRIORITY

- Importance: high
- Feasibility: medium-high

## ACTION RES-02: ESTIMATE THE ABUNDANCE OF EACH MANAGEMENT UNIT IDENTIFIED IN RES-01 AND MAP THE DISTRIBUTION OF COMMON DOLPHINS IN THE MEDITERRANEAN

*Research Action* Priority: HIGH

### DESCRIPTION OF ACTION

- **Specific objective:** Estimate the abundance of each management unit (unit-to-conserve) identified in RES-01 of Common dolphins and provide updated information on the distribution in the Mediterranean in the Sea.
- **Rationale:** Knowledge of abundance (and associated demographic parameters) and distribution is essential to determine a reference level as part of determining the conservation status for each management unit (See RES-01), to understand the likely effects of human activities and to apply appropriate management measures for those. This will form the basis for designing the long-term monitoring discussed under MON-01 and contribute towards the ACCOBAMS LTMP. It will also be complementary to the requests of the Barcelona Convention (IMAP) and the Habitat Directive and Marine Strategy of the EU.
- **Target:** To estimate the abundance of Common dolphins for each identified management unit under RES-01 building upon the results from the ACCOBAMS Survey initiative and to update the density/distribution following the approach of Cañadas et al. (2018) for beaked whales.
- **Methods:** Existing data will be used to estimate the abundance of the species in the different management units (using a multi-platform approach based on the characteristics of each geographical area: distance sampling and passive acoustic monitoring will probably be the chosen methods, supplemented by information from mark-recapture and other studies). This will require development of a collaborative network (COORD-2) to share existing information and to establish a Mediterranean dataset (ideally through a single catalogue for photo-identification data or at least a protocol for regular cross-referencing of local catalogues). This and the development/promotion of the use of common protocols of data collection and analytical approaches will greatly assist future monitoring (see MON-01 and the ACCOBAMS LTMP) and obtaining good data for data poor areas (see RES-03). It should be noted that the management units will not all be defined at the same time as discussed under RES-01, with units being defined first for data rich areas (expected about 3 years after the adoption of the CMP).

The proposed steps to complete this Action are:

(1) Compilation of existing information and availability of relevant data for the species in each management unit with a view to creating a collaborative network to share existing information. This is related to COORD-02 and will also assist in identifying areas where additional data are required (RES-03).

(2) Whenever possible, (taking into account management unit size and location) priority will be given combining heterogeneous data gathered with different methods to obtain a single density index for management units and the region as well as obtaining abundance estimates by management unit. This challenging task will require much time to be effectively executed (expected results for mid 2024) and will be carried out primarily by Duke University.

(4) Targeted collection of new data using the most appropriate techniques will be undertaken to enable the abundance estimation for those management units in areas where information is lacking at the moment – initially this might be by distance sampling and passive acoustic monitoring (see RES-03).

(5) Once the first management units are defined, an expert workshop will be convened to carry out the abundance estimation of each management unit. It will also be valuable to review basin

wide estimates (e.g., ASI, and the ACCOBAMS LTMP) for comparison. A similar workshop will be held when the remaining management units are defined.

Implementation-timeline: This will be an iterative process

| | WHAT | WHO* | WHEN |
|---|---|---|---|
| 1 | Inventory of the organizations and institutions working on the species with relevant data and identifying available datasets (COORD-02) | CMP co-ordinator | 6 months after CMP |
| 2 | Collaborate with the work of the University of Duke on the updated distribution/density maps using heterogenous datasets | ASSOBAMS SC identified experts | Ongoing until work complete (exp.2024) |
| 2 | Develop a data sharing agreement/MoU and investigate the development of a single photoidentification catalogue and/or an arrangement for regular comparisons of local catalogues (COORD-02) | CMP co-ordinator, potential data sharers | 18 months |
| 3 | Plan for a specialist workshop to develop a proposal for implementing this Action, including methods to obtain data for poorly known areas (and see 2 above). Appoint workshop steering group to develop detailed agenda, list of participants, budget and expected papers/leaders. | CMP co-ordinator, potential data sharers, Steering Group | 24 months |
| 4 | Appoint workshop steering group to develop detailed agenda, list of participants, budget and expected papers/analyses/leaders for the First workshop to estimate abundance, ensuring participation from each defined management unit | CMP co-ordinator, workshop steering group | 36 months or whenever the units are agreed |
| 5 | Hold expert workshop to agree abundance estimates for each management unit (this may include Integration of results from different data sources and analytical methods and report to the ACCOBAMS SC | CMP co-ordinator, workshop steering group | 48 months |
| 6 | Dissemination and publication of the results about the abundance of each management unit in the ACCOBAMS region. | CMP co-ordinator, | |
| 7 | Follow steps (4), (5) and (6) whenever the remaining management units are defined | | |

## ACTORS

- Responsible for coordination of action: Appointed steering group
- Stakeholders: Network members (COORD-02), Range State Authorities, ACCOBAMS, IWC, NGOs.

## ACTION EVALUATION

- ACCOBAMS SC

## PRIORITY

- Importance: High
  Feasibility: High (once management units are defined; RES-01)

## ACTION RES-03: DEVELOP AND/OR SUPPORT RESEARCH CAMPAIGNS IN POORLY COVERED MEDITERRANEAN AREAS TO FILL COMMON DOLPHIN KNOWLEDGE GAPS IN RELATION TO RES-01 AND RES-02

Research Action Priority: High

### DESCRIPTION OF ACTION

- **Specific objective:** To collect data in poorly covered areas to fill the knowledge gaps required to identify management units (units-to-conserve) of common dolphins throughout the Mediterranean, characterise their areas of occurrence (RES-01) and estimate their abundance (RES-02) and ultimately monitor their status through the ACCOBAMS LTMP..
- **Rationale:** The objective of the CMP is to achieve favourable conservation status throughout the historical range of common dolphins that show a scattered, patchy distribution. For several areas within the Mediterranean there is little or no information on matters required for good conservation e.g., management units, distribution and abundance - these are necessary to determine status and assist in the development and implement and implementation of any needed mitigation measures. This action has been developed to fill those gaps either by establishing new research campaigns or supporting existing ones.
- **Target:** develop and/or support research campaigns in collaboration with national researchers, in order to fill necessary knowledge and data gaps.
- **Methods:** Collating of information, knowledge gaps and poorly covered areas identified in COORD-02, RES-01 and RES-02 and then developing and/or support research programme to fill these gaps.

  This will include:

  - Identification of local research groups or the establishment of new ones as necessary (and see COORD-02) to address the knowledge gaps
  - The identification of adequate method(s) to apply to address the knowledge gaps taking into account local conditions and ACCOBAMS guidelines (e.g., initial aerial campaign especially for offshore areas, photo-ID for any identified coastal areas, and see RES-01) – this may require one or a series of local workshops
  - The identification of resources (human, platform, material, fund) to implement these methods and build capacity when necessary (PACB-02)
  - Data collection and sharing (COORD-02)
- Timeline:

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Collate the knowledge gaps and uncovered areas | CMP Coordinator, Network (COORD-02), local/national research groups | After COORD-01 and 02 are finalised + 12 months |
| (2) | Develop new and/or support existing research campaigns (may require one large or several local workshops) | CMP Coordinator, local/national research groups | + 12 months and ongoing |
| (3) | Implement these campaigns and link to RES-01, RES-02, MON-01, COORD-02 | CMP Coordinator, local/national research groups, national institutions | Ongoing |

## INITIAL BUDGET ITEMS TO BE CONSIDERED

Consideration of funding opportunities to enable speedy implementation of research campaigns once identified

## ACTORS

- Responsible for co-ordination of the action: Co-ordinator & MedDdSC
- Stakeholders: local/national research groups, national institutions

## ACTION EVALUATION

By Coordinator & MedDdSC coinciding with the reporting scheduled in the timeline above

## PRIORITY

- Importance: High
- Feasibility: High

## ACTION RES-04: DETERMINE THE LEVEL OF IMPACT, IF ANY, OF ANTHROPOGENIC NOISE ON COMMON DOLPHINS IN THE MEDITERRANEAN

*Research Action* Priority: Moderate to High

### DESCRIPTION OF ACTION

- **Specific objective:** To investigate whether anthropogenic noise in the Mediterranean has a detrimental impact on common dolphins
- **Rationale:** Increasing noise levels from anthropogenic sources and acute noise events may have harmful short- and long-term consequences on common dolphins. It is thus essential to determine whether the potential threats are actual threats and if so to characterise and quantify the nature of any effects to determine effective mitigation actions.
- **Method:**
    - Building upon existing work by the ACCOBAMS SC, identify the various sources of anthropogenic noise in the Mediterranean, the main characteristics including frequency distribution and levels (from short to long time scales if appropriate), with a focus on frequencies and levels that are believed to be most sensitive for common dolphins
    - Again building upon existing work by the ACCOBAMS SC, develop 'local' sound maps (seasonal where appropriate) with a focus on the above characteristics e.g. using data obtained through PAM (Passive Acoustic Monitoring) in identified hotspot areas of common dolphin occurrence in the Mediterranean (RES-02)
    - Using the above maps and knowledge of common dolphin occurrence, undertake targeted simultaneous boat-based visual (to collect information on inter alia local density and behaviour) and acoustic surveys (including PAM and perhaps towed arrays to measure anthropogenic noise and dolphin calls) to allow analysis of potential variation in local distribution in density and behaviour in conjunction with variation in noise (this may require undertaking such surveys in 'low' and 'high' noise areas and/or seasons if there is insufficient variation in noise in a particular area/time). The exact behavioural data and abundance data protocols will need to be developed once the survey areas and times have been decided and taking account similar work elsewhere.
    - Review results and determine the likely effect of anthropogenic noise on common dolphins
- **Timeline:**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Definition of pilot hotspot area(s) and inventory of the potential anthropogenic noise sources | CMP coordinator and Dd Network | 3 |
| (2) | Development of equipment/personnel/funding needs, field protocols and analytical requirements by an expert Steering Group (perhaps in a small workshop) and task co-ordinators | Expert Steering Group | 6 |
| (3) | Cruise planning including timing, area(s), choice of vessels, equipment, personnel, funding and logistics including permits | CMP coordinator and Expert Steering Group | 12 |

| | | | |
|---|---|---|---|
| (4) | Deployment/recovering of acoustic instruments (PAMs) | Expert Steering Group | 18? |
| (5) | Vessel Surveys | Expert Steering Group | 18? |
| (6) | Data analysis and report generation | Analysts identified by Expert Steering Group | 24 |
| (7) | Workshop to review results and determine next steps including mitigation if required | CMP coordinator, Dd Network, ACCOBAMS SC | 26 |

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

Consideration of need for expert workshop (Step 2) and funding if deemed necessary. More significant funding will be needed to implement the research in the field and analyse the results

## ACTORS

- Responsible for co-ordination of the action: CMP coordinator, Secretariat and National Focal Points of relevant bodies.
- Stakeholders: Local and national authorities, Management bodies, ACCOBAMS, Scientific community, Representatives of the pressure

## ACTION EVALUATION

- Expert workshop (see Step 7)

## PRIORITY

- Importance: Moderate
- Feasibility: Moderate

## 6.4 MONITORING *(MON)*

### ACTION MON-01: MONITORING COMMON DOLPHINS - FISHERIES INTERACTION

*Monitoring Action* Priority: High

#### DESCRIPTION

- **Specific objective**: To monitor the interaction of common dolphins and fishing activities, namely bycatch and depredation, in each range state, following the standardized protocol.
- **Rationale:** Bycatch in fishing gears poses one of the most severe threats to cetaceans in the Mediterranean Sea, including the common dolphin. In some areas, it has been monitored regularly, while in others the effort has been limited. While local national initiatives are valuable, a basin-wide understanding on this issue would be important to ensure that bycatch levels are limited and do not go beyond a sustainable level (RES-02 and MON-02). There have been regional initiatives for bycatch monitoring and mitigation in selected pilot sites (e.g., MAVA Bycatch Project). Such initiatives should be continued and extended across the basin. A protocol by GFCM, which is currently being developed in the context of the MAVA project, can be easily adopted for the long-term monitoring in all range states.

  Depredation has serious socioeconomic implications for fishers, which occasionally might lead to the adoption of some retaliation measures among concerned fishers towards cetaceans. Moreover, it can also cause mortality in case of ingestion of fishing gear.
- **Target**: Fisheries related stakeholders (fishers of concerned metiers, fish cooperatives, national authorities on fisheries)
- M**ethods**
  - Design of monitoring program for fisheries interaction
  - Identification of observers by national/local authorities and the setup of an observer network (refer to MAVA Project)
  - Training of observers by Expert Group
  - Identification of fishers who will be collaborating for the data collection by onboard and/or questionnaire surveys (NOTE: Fishing metiers can be selected according to previous studies but they may change during the implementation of this action.)
  - Collecting data from the stranding networks (MON-04) for the evidence of bycatch and depredation
  - Evaluation of the damage caused by depredation for fishermen through regular monitoring of different fishing gears by onboard observations, questionnaire surveys and interviews. Interviews can also be carried out in ports where the landing takes place.

- **Timeline: (4 year duration)**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Establish a small Expert Group for this action | SC | 1st quarter year 1 |
| (2) | Monitoring program design | Expert Group | 2nd quarter year 1 |
| (3) | Identification and recruitment of observers, identification of fishers | National/local authorities | 3rd quarter year 1 |
| (4) | Observer training for data collection | Expert Group | 4th quarter year 1 |
| (5) | Actual monitoring in each range state | Observers | Year 2 |

| | | | |
|---|---|---|---|
| (6) | Data analysis and interim reporting (bycatch and depredation) | Expert Group and SC | End Year 2 |
| (7) | Actual monitoring in each range state | Observers | Year 3 |
| (6) | Data analysis, final reporting (bycatch and depredation) | Expert Group and SC | Year 4 |

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

- Cost for training observers (salary for experts, educational materials, etc)
- Cost for field work, such as onboard monitoring and port monitoring

## ACTORS

- Responsible for co-ordination of the action: Expert Group in liaison with SC
- Stakeholders: fisheries related stakeholders (commercial/recreational fishers, fisheries cooperatives, national/local authorities on fisheries)

## ACTION EVALUATION

To be proposed by the Expert Group.

## PRIORITY

- Importance: High
- Feasibility: Moderate

## ACTION MON-02: DEVELOP AND MAINTAIN EFFECTIVE LONG-TERM MONITORING PROGRAMMES AT LOCAL LEVEL TO ESTABLISH ABUNDANCE AND TRENDS THROUGH DEDICATED SURVEYS

*Monitoring Action* Priority: HIGH

### DESCRIPTION

- **Specific objective**: Ensure that effective long-term monitoring programmes are developed and maintained at the local level, in order to estimate abundance and allow for the detection of trends.
- **Rationale:** In addition to basin-level monitoring, it is vital to monitor local population numbers, to detect potential local declines and ensure an early warning system before potential declines are manifested throughout the basin. To detect trends, effective monitoring programmes need to be put in place. Such monitoring programmes should be standardised across the basin.
- **Target:** Develop new monitoring programmes in areas where the species is known to occur but where monitoring is lacking, and ensure the long-term continuity of existing and new monitoring programmes. Standardize methodologies for comparability.
- **Methods:** Existing results of action RES-01, RES-02 and RES-03 will be built upon. This will require:
  (1) Determine Mediterranean common dolphin population structure (e.g., through genetics, acoustic analysis and/or other methods (RES-01),
  (2) Map the distribution of common dolphins in the Mediterranean, to identify potential priority areas and data gaps (RES-02),
  (3) Where needed, develop and/or support research campaigns in poorly covered areas to fill knowledge gaps in relation to RES-01 and RES-02 (RES-03),
  (4) Identify areas for local monitoring programmes, based on available evidence (e.g. long-term study areas or areas of known occurrence),
  (5) Ensure financial support for new and existing long-term monitoring in key areas,
  (6) Establish new monitoring programmes, based on available best practice,
  (7) Carry out monitoring with regular reporting
  (8) Disseminate the results
- **Timeline:**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Identify areas for local monitoring programmes | Coordinator of CMP, in collaboration with Dd research groups | 0-3 |
| (2) | Ensure financial support for new and existing long-term monitoring in key areas | Coordinator of CMP, in collaboration with Dd research groups | 3-8 |
| (3) | Establish new monitoring programmes | Coordinator of CMP, in collaboration with Dd research groups | 8-14 |
| (4) | Carry out monitoring with regular reporting | Coordinator of CMP, in collaboration with Dd research groups | 14-∞ |
| (5) | Disseminate the results periodically | Coordinator of CMP, in collaboration with Dd research groups | 14-∞ |

- Tasks of Coordinator in conjunction with Steering Committee:
  - To raise funds for the establishment of an interactive regional network of groups involved in common dolphin research and conservation (COORD-02)

- To facilitate data-sharing to ensure that data are made available in a timely fashion to maximise their value for conservation.
- To produce concise annual progress reports on the implementation of the task
- To arrange for periodic expert review/workshop the existing information and the development of new or modified actions as appropriate

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

## ACTORS

- Responsible for co-ordination of the action: Coordinator of CMP
- Stakeholders: Research groups

## ACTION EVALUATION

- ACCOBAMS Scientific Committee

## PRIORITY

- Importance: High
- Feasibility: High

## ACTION MON-03: MONITORING THREATS HAVING AN IMPACT ON THE SPECIES AND MARINE ECOSYSTEMS

*Monitoring Action* Priority: HIGH

### DESCRIPTION

- **Specific objective**: Identify and monitor the main known and potential threats for the species and monitor the effect of mitigation measures over time
- **Rationale:** different threats could have an impact on common dolphin's, the level of which can vary among different areas and seasons. In order to effectively manage threats, it is essential to identify the more harmful threats, the high-risk areas/seasons, and to monitor the effect over time to early detect situation that require urgent mitigation action (to inform MIT-01, MIT-02, MIT-03) and to monitor the effectiveness of mitigation measures already in place (MIT-04).
- **Target:** with reference of the identified actual/potential threats for the species (e.g., chemical contaminants, marine litter, physical disturbance, climate change) priority risk areas/season are identified for threats having a spatially defined effect, and specific monitoring of the most harmful threats are established. This action integrates the action MON-01 on fishery interaction. In regards to the impact of ambient noise, specific monitoring protocol are provided based on the results and output of RES-04. The identified threat/s are monitored over time based on standard methods in order to assure the early detection of any changes that require urgent mitigation action (to inform action MIT-04) and to assess the effectiveness of mitigation measures.
- **Methods:** results of RES action will be integrated with risk analysis to identify the most harmful threats, at different spatial-temporal scales. In particular:
    - focusing on the relevant areas for the species (output of RES-01 and RES-02), compile or find existing information including Local Knowledge on human activities at sea that can have an impact on local dolphin's population (maps, density, position, type of activity, etc);
    - assess the level of impact of coastal based human activities (e.g., shipping, recreational power boat, regulated or unregulated dolphin watching, research activities and coastal development) based on risk assessment analysis and on outputs from RES-01 and RES-02 to categorise the more harmful threats for each area on which prioritise the monitoring activities based on standard methodologies;
    - in regards to chemical pollution, support the collection of standard information on contaminants on stranded animals (action MON-04) to monitor the impact on species and to identify eventual trends and/or areas at higher risk;
    - implement the seasonal based monitoring of marine litter (i.e. floating marine macro litter as indicator of litter distribution) to identify areas/seasons of accumulation to be overlapped with the important areas for the species (form output of actions RES-01, RES-02);
    - when long time series are available integrate the monitoring data on species (MON-02) with long term time-series of climate change indicators (e.g. SST) for the identification of any sign of potential climate related changes on species distribution or seasonality;
    - periodically inform action MIT-04 on the results of the monitoring.
- **Timeline:**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Acquire the GIS layers resulting from actions output of RES-01 and RES-02 | CMP coordinator and Tursiops Network | |
| (2) | Assess the level of impact of coastal based human activities in the important areas for the species and implement standard monitoring on the more harmful threats for each area | CMP coordinator and Tursiops Network | |

| | | | |
|---|---|---|---|
| (3) | Implement the monitoring of contaminants on stranded animals through the stranding network/s | CMP coordinator and Tursiops Network | |
| (4) | Implement a seasonal based standard monitoring of marine litter in the identified important areas for the species | CMP coordinator and Tursiops Network | |
| (5) | Integrate the monitoring data on species (MON-02) with long term time-series of climate change indicators | CMP coordinator and Tursiops Network | When long time series are available |
| (8) | Transfer results to action MIT-01 | CMP coordinator and Tursiops Network | |

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

## ACTORS

- Responsible for coordination of action: CMP coordinator, Secretariats and National Focal Points of relevant bodies.
- Stakeholders: ACCOBAMS (including the Follow up Committee) Stakeholders representatives of the main pressures sectors, local, regional and national management authorities…

## ACTION EVALUATION

- ACCOBAMS
- Regular meetings open to stakeholders.

## PRIORITY

- Importance: High
- Feasibility: Medium – High

## ACTION MON-04: DEVELOP AND MAINTAIN MONITORING OF STRANDINGS AT LOCAL/NATIONAL LEVEL

*Monitoring Action* Priority: HIGH

### DESCRIPTION

- **Specific objective**: Develop new stranding expertise and networks in areas where common dolphins are present, but no stranding research occurs and maintain and improve the existing stranding networks.

  Rationale: Throughout the Mediterranean Sea, common dolphins face numerous threats, the level of which can vary among different areas. Analysis of data obtained through stranding network schemes provide a valuable insight into impact of different anthropogenic stressors on the population. Understanding the main threats, mapping their temporal and spatial presence pattern and impact may provide opportunities for development of targeted mitigation actions. In areas where such researches are limited, maximizing the use of available data, that is those collected from stranding surveys, is extremely important.

  In order to effectively detect and manage threats, it is essential to monitor both natural and human-induced mortalities. Functioning stranding networks and timely analysis on the stranded specimens are crucial to understand trends in mortality, which enables early detection of emergency situations, such as mass mortality due to various causes such as epidemics. Stranding specimens also provide the evidence of fisheries interaction in the area (MON-01). General public can also participate a local stranding network by assisting the experts when and where such experts are limited. In this regard, PACB-01 and -02 play a significant role for this action.

- **Target:** To understand the main threats to the common dolphin populations across the Mediterranean Sea by means of high-quality stranding data. This will be achieved by new and upgraded existing stranding networks.

- **Methods:** The assigned action coordinator(s) should proceed with the
  (1) preparation of a list of existing stranding networks or groups collecting stranding information throughout the Mediterranean Sea. This may include rescue facilities, emergency response teams, fisheries monitoring schemes, opportunistic information sources like websites and social network platforms, etc. Short description on their activities and reports will be collected as well.
  (2) The assigned coordinators identifies areas where stranding network does not exist or function effectively based on the list prepared and their reports. They will contact national focal points and local partners for their support to develop stranding networks in those identified areas.
  (3) National/local workshops will be organized to establish stranding networks, inviting relevant authorities, local scientists and NGOs, with the support of the action coordinator(s). The workshops facilitates the training of data collection on strandings, in connection with PACB-01 and -02 and strengthen the networking between the groups.
  (4) A dedicated online platform will be created to facilitate the exchange of information between stranding networks and to receive advice from experts and other networks. Unusual patterns of strandings and emergency situations can be shared as well.

  (Note: All these activities can be facilitated for other cetacean species, not only common dolphins.)

- **Timeline:**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Assign coordinator(s) for this action | SC (ACCOBAMS SC or Secretariat for more general framework) | 0-3 |
| (2) | Preparation of the list of existing stranding networks or relevant schemes and collection of reports | Stranding Network Coordinator(s) | 4-6 |
| (3) | Evaluation of the list and identification of the gaps | Stranding Network Coordinator(s) | 7-9 |
| (4) | Preparation and implementation of the workshops for establishing stranding networks | Stranding Network Coordinator(s), national focal points, local partners, relevant authorities | 10-15 |
| (5) | Establishment and maintenance of a dedicated website for stranding networks | Stranding Network Coordinator(s), local partners involved in stranding networks | 3- |
| (6) | Yearly reporting of the stranding networks | Local partners involved in stranding networks, focal points | 13- |

- Tasks of Coordinator in conjunction with Steering Committee:
  - To carry out planning and preparation of the data collation activity
  - To compile and collate available data and carry out analysis
  - To report to CMP Steering Committee and produce a scientific report highlighting the main findings

## INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

## ACTORS

- Responsible for coordination of the action: assigned action coordinator(s) in coordination with the CMP steering group
- Stakeholders: Cetacean stranding and rescue networks

## ACTION EVALUATION

- By Coordinator & SC coinciding with the reporting scheduled in the timeline above

## PRIORITY

- Importance: High
- Feasibility: medium – high

## 6.5 MITIGATION MEASURES *(MIT)*

### ACTION MIT-01: PROMOTION AND IMPLEMENTATION OF FISHERIES MANAGEMENT MEASURES TO REDUCE OVERFISHING AND PRESERVE MARINE ECOSYSTEMS

### DESCRIPTION

- **Specific objective**: Adoption of fisheries management measures to reduce overexploitation of important fish stocks for Mediterranean common dolphins and preserve critical habitats for the species and marine ecosystems.
- **Rationale:** Once common and relatively abundant in the Inner Ionian Sea Archipelago common dolphins declined dramatically over the last couple of decades. From approximately 150 individuals using the Archipelago in 1996, only 15 were observed in 2007 (Bearzi et al., 2008). Monitoring of local fishing fleet and ecosystem modelling approaches showed that reduced prey availability, caused by overfishing of small pelagic stocks, induced this sharp decline (Bearzi et al., 2008; Piroddi et al., 2011; Gonzalvo et al.,2011). Continued survey effort in the Inner Ionian Sea Archipelago has shown a regular presence of common dolphin groups although at low frequencies. There is evidence indicating that these dolphins, formerly showing a strong site fidelity towards the Inner Ionian Sea Archipelago are now using a much wider area along the coastal waters of the Ionian Islands, and occasionally still visiting the Archipelago. This is presumably caused by the area's decreased carrying capacity, due to over fishing. Although this is just a case-study, a similar pressure from fisheries is likely to be suffered by the species in other Mediterranean area. A similar case, not too far away, poses the common dolphins in the Gulf of Corinth, which reportedly are Critically Endangered (Santostasi et al., 2018). Fishery management measures are needed to reduce current over-exploitation (targeting as a matter of priority those commercial fisheries known to cause food-web damage and deplete common dolphin prey, including purse seiners and trawlers), protecting marine biodiversity, ensuring continued ecosystem services, in addition to preserving artisanal fisheries and bringing long-term benefits to the local communities.
- **Target:** Regional national and local authorities, fishing industries representatives, fishermen cooperatives, general public/consumers, NGOs (see also Actions PACB-01 and MIT-02)

- **Timeline:**

| | WHAT | WHO | WHEN |
|---|---|---|---|
| (1) | Preparation workshop with all stakeholders involved in order to define the most urgent fisheries management measures | SC – see Action COORD-01 | 1st quarter year1 |
| (2) | Workshop (engagement of all stakeholders in the development of measures making them part of the conservation/management strategy) | Workshop participants (see methods below) | 2nd quarter year 1 |
| (3) | Execution of the actions defined by the strategy established by workshop in agreement with all participants | National organizations identified during workshop in coordination with SC | Timeline of the next steps to be defined during workshop |

- Methods: the SC will be coordinating a workshop in which the following key aspects of the strategy will be defined:
  - Identification of fisheries management measures needed.

- If more data is considered necessary, collaboration between stakeholders and scientist must be established together with a timeline for the study, presentation of results and evaluation.
- Identification of the most adequate education and awareness activities as well as communication channels depending on the stakeholders/audience (in coordination with PACB-01 and MIT-02)
- Creation of a mechanism to guarantee the timely adoption of the developed strategies, and re-evaluation after a period no longer than three years since the beginning of this process in order to be able to tune-up and update the strategy as necessary.

- Workshop participants should include:
  - Coordinator of the Mediterranean common dolphin CMP and representatives of the stakeholder Steering Committee.
  - Fisheries representatives
  - Regional, national and local authorities relevant to the management of the area and fisheries.
  - Scientists familiar with the Mediterranean common dolphin situation
  - Local and regional fisheries scientists.
  - Researchers with success stories in similar initiatives in the region
  - Public awareness experts
  - Experts on communication tools the maximize the audience to be reached by the campaigns to be developed within the strategy defined at the workshop.
  - NGOs

## BUDGET CONSIDERATIONS

TO BE DEVELOPED (mostly related to the set-up and execution of the workshop and to the production of education and awareness materials)

## ACTORS

- Responsible for co-ordination of the action: SC and coordinator
- Responsible for carrying out the action: Local, national authorities with advice and support to be determined at workshop
- Stakeholders: see above

## ACTION EVALUATION

- ACCOBAMS, IWC.
- Follow-up and evaluation mechanisms to be defined at the workshop

## PRIORITY

- Importance: high
- Feasibility: Moderate (High, with political will)

## ACTION MIT-02: DEVELOPMENT, PROMOTION AND IMPLEMENTATION OF FISHERIES BYCATCH MITIGATION MEASURES

*Mitigation Action* Priority: HIGH

### DESCRIPTION

- Specific objective: Develop, promote and implement measures aimed to reduce and, where possible, eliminate common dolphin bycatch in fishing gear.
- **Specific threats to be mitigated**: Bycatch in fishing gear.
- Rationale: Bycatch is a direct threat affecting the conservation status of the common dolphin. Specific mitigation measures need to be developed and implemented in order to reduce to a sustainable level (in relation to RES-01 and RES-02) and ultimately eliminate common dolphin bycatch.
- Target: Develop effective mitigation measures to reduce or eliminate common dolphin bycatch in fishing gear. Promote and implement the mitigation measures in relevant fishing fleets or areas.
- Methods: Existing results of action MON-01 and MON-02 will feed into this action, to better understand where bycatch may be occurring and at what levels. Existing mitigation schemes, which have already proven effective elsewhere for common dolphins, should be reviewed. With that information, mitigation measures should be developed in line with the specificity of the area, fishing gear and the mechanisms of bycatch, as well as the feasibility of implementation. This should include expert consultation as well as stakeholder engagement (fisheries).
- Timeline:

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| (1) | Determine where bycatch is occurring and at what level | CMP Coordinator | 0-4 |
| (2) | Review existing mitigation measures | CMP Coordinator | 4-7 |
| (3) | Develop mitigation measures | CMP Coordinator and experts | 7-19 |
| (4) | Promote the use of developed mitigation measures (stakeholder engagement) | CMP Coordinator | 19-25 |
| (5) | Implement mitigation measures | CMP Coordinator, fishers, local scientists | 25-37 |
| (6) | Monitor (MON-01) effectiveness of implemented measures | CMP Coordinator and experts | 37-∞ |
| (7) | Disseminate results | CMP Coordinator | 37-∞ |

- Tasks above to be taken by Coordinator in conjunction with Steering Committee:

### INITIAL BUDGET ITEMS TO BE CONSIDERED BY ISC

- Mitigation devices
- Training

### ACTORS

- Responsible for co-ordination of the action: Coordinator of CMP

- Stakeholders: Fishers, fishers cooperatives, national/local fishery authorities, Research groups (incl. species experts and experts on bycatch mitigation)

## ACTION EVALUATION

- ACCOBAMS Scientific Committee
- GFCM?
- IWC?

## PRIORITY

- Importance: High
- Feasibility: Moderate

## ACTION MIT-03: WIDER ADOPTION AND IMPLEMENTATION OF STANDARIZED CODES OF CONDUCT (IWC/ACCOBAMS/CMS) TO MITIGATE ADVERSE IMPACT OF DOLPHIN WATCHING

*Mitigation Action* Priority: MODERATE

### DESCRIPTION OF ACTION

- **Specific objective**: reduce the negative impacts of commercial dolphin watching activities thanks to efficient management of the activity through a suitable management framework and thanks to the implementation of relevant standardized codes of conduct (IWC, ACCOBAMS, CMS). To assess the implementation by Countries of all relevant Resolutions/Guidelines adopted in the framework of relevant bodies including ACCOBAMS, CMS, Barcelona Convention, IWC, Pelagos Agreement.
- **Specific threats to be mitigated**: harassment, physical disturbance, habitat displacement, behavioural alteration.
- **Rationale:** existing adopted measures and Guidelines need to be monitored to ensure compliance and ultimately benefit common dolphin conservation. Harassment risk begins when a vessel is deliberately closer than the minimum distance identified in common rules for commercial dolphin watching or when the vessel stays for a period longer than prescribed. This is especially true for swim-with cetacean activities. Moreover, direct interactions between swimmers and animals are demonstrated as presenting risks of animal violent behaviour and transmission of diseases.

  Additionally, individuals that are regularly approached (even in respect of the code of conduct) can have significant stress or can alter even significant behaviour (e.g., feeding activity) and this may lead to impact at the population level on medium to long term (Stockin et al., 2008) (Chronic impact vs acute impact).
- **Target:** Minimize the risk of whale watching activities having negative impacts on cetaceans, by the implementation of effective management strategies including the adoption and implementation of standardized codes of conduct (IWC, ACCOBAMS, CMS). Improve compliance with all the provisions of the relevant bodies including ACCOBAMS, CMS, Barcelona Convention, IWC, Pelagos Agreement.
- **Method:**
  - review and update guidelines/codes of conduct for sustainable cetacean-watching
  - review and update cetacean-watching certifications and other mitigation measures
  - analysis of the efficiency of cetacean-watching mitigation measures
  - increase international collaborations working for cetacean-watching mitigation (e.g., IWC, ACCOBAMS, ASCOBANS, NGOs, ...);
  - increase public and industry awareness about the issue and measures used to reduce this threat (PACB-01)
  - assess the efficiency of in place measures
  - consult National Reports of relevant bodies including ACCOBAMS, CMS, Barcelona Convention, IWC, Pelagos Agreement,
  - find way to enhance the implementation of existing measures (e.g., High Quality Whale Watching)
- **Timeline:**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 | Constitution of group of work and its coordinator | SC | 0-3 |
| 2 | inventory of relevant Resolutions/Guidelines adopted in the framework of relevant bodies including ACCOBAMS, CMS, Barcelona Convention, IWC, Pelagos Agreement… | CMP coordinator | 4-6 |
| 3 | Collection of available data for the efficiency assessment | CMP coordinator | 7-9 |
| 4 | Data collection about negative impacts of whale-watching activities on cetaceans | CMP coordinator | 10-12 |
| | Launching process to push for implementation | CMP coordinator | 13- |

## ACTORS

- Responsible for coordination of action: CMP coordinator, Secretariats and National Focal Points of relevant bodies.
- Stakeholders: Range State Governments, ACCOBAMS (including the Follow up Committee), IWC, cetacean watching industry, local authorities, NGOs.

## ACTION EVALUATION

- ACCOBAMS

## PRIORITY

- Importance: To be assessed
- Feasibility: High

## ACTION MIT-04: COMPLIANCE WITH EXISTING ADOPTED MEASURES AND GUIDELINES

*Mitigation Action* Priority: HIGH

### DESCRIPTION

- **Specific objective**: to assess the implementation by Countries of all relevant Measures / Resolutions / Guidelines adopted in the framework of relevant national and international bodies including ACCOBAMS, CMS, Barcelona Convention, IWC, Pelagos Agreement, GFCM, EU Directives…
- **Specific threats to be mitigated**: all Laws / Measures / Resolutions / Guidelines directed to address: depletion of resources, bycatch, harassment, noise, physical disturbance, micro and nano plastics and contaminants, …
- **Rationale:** Since decades human impact are known and several relevant bodies wrote measures in order to mitigate impact on the species and ecosystem as a whole. Many countries adopted measures and guidelines, but few are concretely and effectively implemented. This action intends to monitor existing adopted measures and Guidelines in order to ensure compliance and ultimately benefit Common dolphin conservation
- **Target:** improve compliance with all the provisions of the relevant national and international bodies including GFCM, EU Directives, ACCOBAMS, CMS, Barcelona Convention, IWC, Pelagos Agreement.
- **Method**:
    - consult National Reports of relevant bodies including GFCM, EU Directives, ACCOBAMS, CMS, Barcelona Convention, IWC, Pelagos Agreement,
    - find way to push for the implementation of existing measures and guidelines and to regularly check for possible improvement
- **Timeline:**

| | WHAT | WHO | WHEN (starting month being 0) |
|---|---|---|---|
| 1 | inventory of relevant Laws/ Measures / Resolutions / Guidelines adopted in the framework of relevant national and international bodies | CMP coordinator, national focal points | 0-3 |
| 2 | Inventory of implementation or lack of these L/M/R/G within the countries in the ACCOBAMS area | CMP coordinator, national focal points, MedDdSC | 4-9 |
| 3 | Inventory of the process to push for implementation when it is lacking | CMP coordinator, national focal points, MedDdSC | 10-12 months |
| 4 | Launching process to push for implementation | CMP coordinator, national focal points, MedDdSC | 13-18 (or/and at relevant MOP frequency) |

### ACTORS

- Responsible for coordination of action: CMP coordinator, Secretariats and National Focal Points of relevant bodies.
- Stakeholders: Range State Governments, ACCOBAMS (including the Follow up Committee), IWC, GFCM, industry, local authorities, NGOs, SC.

## ACTION EVALUATION

- ACCOBAMS

## PRIORITY

- Importance: High
- Feasibility: High

## 6.6 ACTIONS OVERVIEW

### COORDINATION ACTIONS

| Nr. | Action | Impor-tance | Feasibi-lity | Crossref. |
|---|---|---|---|---|
| COORD-01 | Establishment of a CMP for Mediterranean Common Dolphins Coordinator and Steering Committee (SC) | Essential | High (with institutional support) | RES-01 COORD-02 |
| COORD-02 | Establish an interactive regional network of groups involved in common dolphin research and conservation | High | High | RES-01 RES-02 MON-01 MON-02 PACB-02 |

### CAPACITY BUILDING AND PUBLIC AWARENESS ACTIONS

| Nr. | Action | Impor-tance | Feasibi-lity | Crossref. |
|---|---|---|---|---|
| PACB-01 | Develop a strategy to increase stakeholder participation, education and public awareness | Moderate | High | COORD-01 COORD-2 |
| PACB-02 | Develop a strategy for building capacity where needed | High | High | COORD-01 RES-01 RES-02 RES-03 MON-01 MON-02 |

### RESEARCH ACTIONS ESSENTIAL FOR PROVIDING ADEQUATE MANAGEMENT ADVICE

| Nr. | Action | Impor-tance | Feasibi-lity | Crossref. |
|---|---|---|---|---|
| RES-01 | Determine Mediterranean common dolphin population structure (e.g., through genetics, acoustic analysis and/or other valid methods) | High | Medium-High | COORD-02 RES-02 RES-03 RES-04 MON-01 MON-02 |
| RES-02 | Estimate abundance and map the distribution of common dolphins in the Mediterranean | High | High (once management units are defined) | COORD-02 RES-01 RES-03 |
| RES-03 | Develop and/or support research campaigns in poorly covered areas to fill knowledge gaps in relation to RES-01 and RES-02 | High | High | COORD-01 COORD-02 PACB-02 RES-01 |

| | | | | |
|---|---|---|---|---|
| | | | | RES-02 |
| RES-04 | Impact of ambient noise on common dolphins | Moderate | Moderate | RES-02 |

## MONITORING ACTIONS

| Nr. | Action | Impor-tance | Feasibi-lity | Crossref. |
|---|---|---|---|---|
| MON-01 | Monitoring common dolphins - fisheries interaction | High | Moderate | RES-02<br>MON-02<br>MON-04 |
| MON-02 | Develop and maintain effective long-term monitoring programmes at local level to establish abundance and trends through dedicated surveys | High | High | COORD-02<br>RES-01<br>RES-02<br>RES-03 |
| MON-03 | Monitoring threats having an impact on the species and marine ecosystems | High | Medium-High | RES-01<br>RES-02<br>MON-01<br>MON-02<br>MON-04<br>MIT-01<br>MIT-02<br>MIT-03<br>MIT-04 |
| MON-04 | Develop and maintain monitoring of strandings at local/national level | High | High | MON-01<br>PACB-01 |

## MITIGATION MEASURE ACTIONS

| Nr. | Action | Impor-tance | Feasibi-lity | Crossref. |
|---|---|---|---|---|
| MIT-01 | Promotion and implementation of fisheries management measures to reduce overfishing and preserve marine ecosystems | High | Moderate (High, with political will) | COORD-01<br>PACB-01<br>MIT-02 |
| MIT-02 | Development, promotion and implementation of fisheries bycatch mitigation measures | High | Moderate | RES-01<br>RES-02<br>MON-01<br>MON-02 |
| MIT-03 | Wider adoption and implementation of standarized codes of conduct (iwc/accobams/cms) to mitigate adverse impact of dolphin watching | To be assessed | High | PACB-01 |
| MIT-04 | Compliance with existing adopted measures and guidelines | High | High | |

# 7 REFERENCES

Pending final formatting and throughout checking for final draft

ACCOBAMS, 2021. Conserving Whales, Dolphins and Porpoises in the Mediterranean Sea, Black Sea and adjacent areas: an ACCOBAMS status report (2021). By: Notarbartolo di Sciara G., Tonay A.M. Ed. ACCOBAMS, Monaco. 160 p. Aguilar, A., Borrell, A., and Reijnders, P.J.H. (2002). Geographical and temporal variation in levels of organochlorine contaminants in marine mammals. Marine Environmental Research 53, 425–452.

Alan, V., Kaboğlu, G., Akçalı, B., Bengil, F., Ubay, B. and Güçlüsoy, H. (2018). Sightings of small delphinids in the southern Çandarlı Bay (Aegean Sea) between 2015 and 2018. Journal of Black Sea/Mediterranean Environment 24: 224–232.

Amaha, A. (1994). Geographic variation of the common dolphin, Delphinus delphis (Odontoceti: Delphinidae). Tokyo University of Fisheries.

Amaral, A. R., Sequeira, M., Martínez-Cedeira, J., & Coelho, M. M. (2007). New insights on population genetic structure of Delphinus delphis from the northeast Atlantic and phylogenetic relationships within the genus inferred from two mitochondrial markers. Marine Biology, 151, 1967–1976.

Antoniou, A., Frantzis, A., Alexiadou, P., Paschou, N., & Poulakakis, N. (2018). Evidence of introgressive hybridization between Stenella coeruleoalba and Delphinus delphis in the Greek Seas. Molecular Phylogenetics and Evolution.

Arcangeli, A., Marini, L., & Crosti, R. (2013). Changes in cetacean presence, relative abundance and distribution over 20 years along a trans-regional fixed line transect in the Central Tyrrhenian Sea. Marine Ecology, 34(1), 112-121.

Arcangeli, A., Campana, I., & Bologna, M. A. (2017). Influence of seasonality on cetacean diversity, abundance, distribution and habitat use in the western Mediterranean Sea: Implications for conservation. Aquatic Conservation: Marine and Freshwater Ecosystems, 27(5), 995-1010.

ASCOBANS. 2015. Report on Expert Workshop on the Requirements of Legislation to Address Monitoring and Mitigation of Small Cetacean Bycatch. Bonn, Germany, 21–23 January, 2015. ASCOBANS AC22/Inf.4.1.a. 37pp.

Ball, L., Shreves, K., Pilot, M., & Moura, A. E. (2017). Temporal and geographic patterns of kinship structure in common dolphins (Delphinus delphis) suggest site fidelity and female-biased long-distance dispersal. Behavioral Ecology and Sociobiology, 71.

Bearzi, G., Agazzi, S., Gonzalvo, J., Costa, M., Bonizzoni, S., Politi, E., Piroddi, C., Reeves, R.R. (2008). Overfishing and the disappearance of short-beaked common dolphins from western Greece. Endangered Species Research 5,1–12.

Bearzi, G., Bonizzoni, S., Agazzi, S., Gonzalvo, J., & Currey, R. J. (2011). Striped dolphins and short-beaked common dolphins in the Gulf of Corinth, Greece: Abundance estimates from dorsal fin photographs. Marine Mammal Science, 27(3), E165-E184.

Bearzi G., Bonizzoni S., Santostasi N.L., Furey N.B., Eddy L., Valavanis V.D., Gimenez O. (2016). Dolphins in a scaled-down Mediterranean: the Gulf of Corinth's odontocetes. Pp. 297-331 in Mediterranean Marine Mammal Ecology and Conservation (G. Notarbartolo di Sciara, M. Podestà and B.E. Curry, eds). Advances in Marine Biology, Vol. 75, Academic Press, Oxford.

Bearzi, G., Bonizzoni, S. & Santostasi, N.L. (2020). *Delphinus delphis* (Gulf of Corinth subpopulation) (errata version published in 2021). The IUCN Red List of Threatened Species 2020: e.T156206333A194321818. https://dx.doi.org/10.2305/IUCN.UK.2020-2.RLTS.T156206333A194321818.en.

Bearzi G., Genov T. (2021): Imperiled Common Dolphins of the Mediterranean Sea. in D. DellaSala, M. Goldstein, and M. J. Costello, editors. Imperiled: The Encyclopedia of Conservation. Elsevier, Amsterdam.

Bearzi, G., Genov, T., Natoli, A., Gonzalvo, J. & Pierce, G.J. (2021) *Delphinus delphis* (Inner Mediterranean subpopulation). The IUCN Red List of Threatened Species 2021: e.T189865869A189865884. https://dx.doi.org/10.2305/IUCN.UK.2021-3.RLTS.T189865869A189865884.en.

Bearzi G, Politi E, Agazzi S, and Azzellino A. (2006) Prey depletion caused by overfishing and the decline of marine megafauna in eastern Ionian Sea coastal waters (Central Mediterranean). Biological Conservation 127: 373–382.

Bearzi, G., Reeves, R. R., Notarbartolo-di-Sciara, G., Politi, E., Cañadas, A., Frantzis, A., & Mussi, B. (2003). Ecology, status and conservation of short-beaked common dolphins *Delphinus delphis* in the Mediterranean Sea. Mammal Review, 33, 224–252.

Bencatel, J., Álvares, F., Moura, A. E., & Barbosa, A. M. (2017). Atlas de Mamíferos de Portugal (1st ed.). Portugal: Universidade de Évora.

Bonizzoni, S., Furey, N.B., Santostasi, N.L., Eddy, L., Valavanis, V.D. and Bearzi, G. 2019. Modelling dolphin distribution within an Important Marine Mammal Area in Greece to support spatial management planning. Aquatic Conservation: Marine and Freshwater Ecosystems, 29, 1665–1680 https://doi.org/10.1002/aqc.3148.

Borrell, A., Cantos, G., Pastor, T. and Aguilar, A. (2001). Pollution by organochlorine compounds in common dolphins (*Delphinus delphis*) from the Atlantic and Mediterranean waters off Spain. Environmental Pollution 114, 265–274.

Brand, D., Edelist, D., Goffman, O., Hadar, N., Scheinin, A. and Kerem, D. (2019). Common dolphins, common in neritic waters off southern Israel, demonstrate uncommon dietary habits. Aquatic Conservation: Marine and Freshwater Ecosystems: https://doi.org/10.1002/aqc.3165.

Cañadas, A., de Soto, N.A., Aissi, M., Arcangeli, A., Azzolin, M., B-Nagy, A., Bearzi, G., Campana, I., Chicote, C., Cotte, C., Crosti, R., David, L., Di Natale, A., Fortuna, C., Frantzis, A., Garcia, P., Gazo, M., Gutierrez-Xarxa, R., Holcer, D., Laran, S., Lauriano, G., Lewis, T., Moulins, A., Mussi, B., di Sciara, G.N., Panigada, S., Pastor, X., Politi, E., Pulcini, M., Raga, J.A., Rendell, L., Rosso, M., Tepsich, P., Tomás, J., Tringali, M., & Roger, T. (2018). The challenge of habitat modelling for threatened low density species using heterogeneous data: The case of Cuvier's beaked whales in the Mediterranean. Ecological Indicators 85, 128–136.

Cañadas, A., & Hammond, P. S. (2008). Abundance and habitat preferences of the short-beaked common dolphin *Delphinus delphis* in the southwestern Mediterranean: implications for conservation. Endangered Species Research, 4, 309–331.

Cañadas, A., Sagarminaga, R., & García-Tiscar, S. (2002). Cetacean distribution related with depth and slope in the Mediterranean waters off southern Spain. Deep-Sea Research I, 49, 2053–2073.

Cañadas, A. & Vázquez, J.A. (2017). Common dolphins in the Alboran Sea: Facing a reduction in their suitable habitat due to an increase in Sea surface temperature. Deep Sea Research Part II: Topical Studies in Oceanography 141, 306–318.

Caurant, F., Aubail, A., Lahaye, V., Van Canneyt, O., Rogan, E., Lopez, A., … Bustamante, P. (2006). Lead contamination of small cetaceans in European waters - The use of stable isotopes for identifying the sources of lead exposure. Mar Environ Res, 62, 131–148.

Correia, A. M., Tepsich, P., Rosso, M., Caldeira, R., & Sousa-Pinto, I. (2015). Cetacean occurrence and spatial distribution: Habitat modelling for offshore waters in the Portuguese EEZ (NE Atlantic). Journal of Marine Systems, 143, 73–85.

Correia, A. M., Gil, Á., Valente, R., Rosso, M., Pierce, G. J., & Sousa-Pinto, I. (2019). Distribution and habitat modelling of common dolphins (*Delphinus delphis*) in the eastern North Atlantic. Journal of the Marine Biological Association of the United Kingdom, 99, 1443–1457.

Espada, R., Olaya-Ponzone, L., Haasova, L., Martín, E., & García-Gómez, J. C. (2019). Hybridization in the wild between *Tursiops truncatus* (Montagu 1821) and *Delphinus delphis* (Linnaeus 1758). PLoS one, 14, e0215020.

Fontaine, M. C., Baird, S. J. E., Piry, S., Ray, N., Tolley, K. A., Duke, S., … Michaux, J. R. (2007). Rise of Oceanographic Barriers in Continuous Populations of a Cetacean: the Genetic Structure of Harbour Porpoises in Old World Waters. BMC Biology, 5.

Forcada, J. & Hammond, P.S. (1998) Geographical variation in abundance of striped and common dolphins of the western Mediterranean. Journal of Sea Research, 39, 313–325.

Fouda, L., Wingfield, J. E., Fandel, A. D., Garrod, A., Hodge, K. B., Rice, A. N., Bailey, H. (2018) Dolphins simplify their vocal calls in response to increased ambient noise. Biology Letters 14 (10): 20180484. http://doi.org/10.1098/rsbl.2018.0484

Frantzis, A., & Herzing, D. L. (2002). Mixed-species associations of striped dolphins (*Stenella coeruleoalba*), short-beaked common dolphins (*Delphinus delphis*), and Risso's dolphins (*Grampus griseus*) in the Gulf of Corinth (Greece, Mediterranean Sea). Aquatic Mammals, 28, 188–197.

Gannier, A. (2005). Summer distribution and relative abundance of delphinids in the Mediterranean Sea. La Terre et La Vie, 60, 223–238.

Gaspari, S., Azzelino, A., Airoldi, S., & Hoelzel, A. R. (2007). Social kin associations and genetic structuring of striped dolphin populations (Stenella coeruleoalba) in the Mediterranean Sea. Molecular Ecology, 16, 2922–2933.

Gaspari, S., Scheinin, A., Holcer, D., Fortuna, C., Natali, C., Genov, T., … Moura, A. E. (2015). Drivers of Population Structure of the Bottlenose Dolphin (Tursiops truncatus) in the Eastern Mediterranean Sea. Evolutionary Biology, 42, 177–190.

Genov, T., Bearzi, G., Bonizzoni, S., & Tempesta, M. (2012). Long-distance movement of a lone short-beaked common dolphin Delphinus delphis in the central Mediterranean Sea. Marine Biodiversity Records, 5.

Giménez, J., Authier, M., Valeiras, J., Abad, E., Marçalo, A., Coll, M., ... & de Stephanis, R. (2021). Consumption rates and interaction with fisheries of Mediterranean common dolphins in the Alboran Sea. Regional Studies in Marine Science, 45, 101826.

Giménez, J., Cañadas, A., de Stephanis, R., & Ramírez, F. (2021). Expanding protected areas to encompass the conservation of the endangered common dolphin (Delphinus delphis) in the Alboran Sea. Marine environmental research, 168, 105305.

Giménez, J., Marçalo, A., García-Polo, M., García-Barón, I., Castillo, J. J., Fernández-Maldonado, C., … de Stephanis, R. (2017). Feeding ecology of Mediterranean common dolphins: The importance of mesopelagic fish in the diet of an endangered subpopulation. Marine Mammal Science.

Giovos, I., Ganias, K., Garagouni, M., & Gonzalvo, J. (2016) Social media in the service of conservation: A case study of dolphins in the Hellenic seas. Aquatic Mammals 42: 12–19.

Giralt Paradell, O., Díaz López, B., & Methion, S. (2019). Modelling common dolphin (*Delphinus delphis*) coastal distribution and habitat use: Insights for conservation. Ocean & Coastal Management, 179, 104836.

Gonzalvo, J., Moutopoulos, D.K., Bearzi, G., Stergiou, K.I., (2011). Fisheries mismanagement in a Natura 2000 area in western Greece. Fisheries Management and Ecology 18, 25–38.

Habitat Directive Reporting. 2014. http://ec.europa.eu/environment/nature/knowledge/rep_habitats/index_en.htm

Jepson PD, Deaville R, Acevedo-Whitehouse K, Barnett J, Brownlow A, Brownell Jr. RL, et al. (2013) What Caused the UK's Largest Common Dolphin (Delphinus delphis) Mass Stranding Event? PLoS ONE 8(4): e60953.

Jepson, P.D., et al. (2016). PCB pollution continues to impact populations of orcas and other dolphins in European waters. Scientific Reports 6, 18573.

Kerem, D., Goffman, O., Scheinin, A., Elasar, M., Hadar, N., Edelist, D. and Sonin, O. 2014. Status of small cetaceans in Israeli Mediterranean waters. Report SC/65b/SM09, IWC Scientific Committee meeting. Bled, Slovenia, 12-24 May 2014.

Louis, M., Viricel, A., Lucas, T., Peltier, H., Alfonsi, E., Berrow, S., … Simon-Bouhet, B. (2014). Habitat-driven population structure of bottlenose dolphins,Tursiops truncatus, in the North-East Atlantic. Molecular Ecology, 23, 857–874.

Loy, A., Tamburelli, A., Carlini, R., & Slice, D. E. (2011). Craniometric variation of some Mediterranean and Atlantic populations of Stenella coeruleoalba (Mammalia, Delphinidae): A three-dimensional geometric morphometric analysis. Marine Mammal Science, 27, E65–E78.

Lucchetti, A., Carbonara, P., Colloca, F., Lanteri, L., Spedicato, M.T., Sartor, P. (2017). Small-scale driftnets in the Mediterranean: Technical features, legal constraints and management options for the reduction of protected species bycatch. Ocean & Coastal Management. 135, 43-55. 10.1016/j.ocecoaman.2016.11.002.

Lusher, A. L., Hernandez-Milian, G., Berrow, S., Rogan, E., & O'Connor, I. (2018). Incidence of marinedebris in cetaceans stranded and bycaught in Ireland: Recent findings and a review ofhistorical knowledge. Environmental Pollution, 232:467-476.

Marçalo, A., Nicolau, L., Giménez, J., Ferreira, M., Santos, J., Araújo, H., … Pierce, G. J. (2018). Feeding ecology of the common dolphin (Delphinus delphis) in Western Iberian waters: has the decline in sardine (Sardina pilchardus) affected dolphin diet? Marine Biology, 165, 44.

Mevorach, Y., Scheinin, A., Galili, O., Santostasi, N.L. & Tchernov, D. (2022). Common dolphins (*Delphinus delphis*) in Israel: Unique dynamics of a critically endangered population. Frontiers in Marine Science, 9, 916950. https://doi.org/10.3389/fmars.2022.916950

Milani, C., Vella, A., Vidoris, P., Christidis, A. and Koutrakis, E. 2019b. Abundance, distribution and diet of the common dolphin, Delphinus delphis, in the northern Aegean Sea (Greece). Aquatic Conservation: Marine and Freshwater Ecosystems: https://doi.org/10.1002/aqc.3081.

Mirimin, L., Miller, R., Dillane, E., Berrow, S. D., Ingram, S., Cross, T. F., & Rogan, E. (2011). Fine-scale population genetic structuring of bottlenose dolphins in Irish coastal waters. Animal Conservation, 14, 342–353.

Moura, A. E., Natoli, A., Rogan, E., & Hoelzel, A. R. (2013a). Atypical panmixia in a European dolphin species (Delphinus delphis): implications for the evolution of diversity across oceanic boundaries. Journal of Evolutionary Biology, 26, 63–75.

Moura, A. E., Natoli, A., Rogan, E., & Hoelzel, A. R. (2013b). Evolution of Functional Genes in Cetaceans Driven by Natural Selection on a Phylogenetic and Population Level. Evolutionary Biology, 40, 341–354.

Moura, A. E., Sillero, N., & Rodrigues, A. (2012). Common dolphin (Delphinus delphis) habitat preferences using data from two platforms of opportunity. Acta Oecologica, 38, 24–32.

Murphy, S., Herman, J. S., Pierce, G. J., Rogan, E., & Kitchener, A. C. (2006). Taxonomic Status and Geographical Cranial Variation of Common Dolphins (Delphinus) in The Eastern North Atlantic. Marine Mammal Science, 22, 573–599.

Murphy, S., Law, R.J., Deaville, R., et al. (2018). Organochlorine contaminants and reproductive implication in cetaceans: A case study of the common dolphin. Pp. 3-38 in M.C. Fossi and C. Panti (eds). Marine Mammal Ecotoxicology. Academic Press.

Murphy, S., Pinn, E. H., & Jepson, P. D. (2013). The short-beaked common dolphin (*Delphinus delphis*) in the North-eastern Atlantic: Distribution, ecology, management and conservation status. In R. N. Hughes, D. J. Hughes, & I. P. Smith (Eds.), Oceanography and marine biology: An annual review (Vol. 51) (pp. 193–280). Boca Raton, Florida: CRC Press.

Mussi, B., Miragliuolo, A., & Bearzi, G. (n.d.). Short-Beaked Common Dolphins Around the Island of Ischia, Italy (Southern Tyrrhenian Sea).

Mussi, B., Miragliuolo, A., & Bearzi, G. (2002). Short-beaked common dolphins around the island of Ischia, Italy (southern Tyrrhenian Sea). In European Research on Cetaceans 16.

Mussi B., Airoldi S., Alessi J., Arcangeli A., Atzori F., Azzolin M., Bittau L., Buscaino G., Celona A., Fiori C., Giacoma C., Gnone G., Luperini C., Manconi R., Mangano R., Moulins A., Nuti S., Papale E., Rosso M., Tepsich P., Tringali M., Vivaldi C., Pace DS. (2016). Occurrence and distribution of short-beaked common dolphin (*Delphinus delphis*) in Italian waters: the power of networking. Report of the 1st International Workshop, Conservation and research networking on short-beaked common dolphin (*Delphinus delphis*) in the Mediterranean Sea, Ischia Island, Italy, 13-15 April 2016.

Natoli, A., Cañadas, A., Peddemors, V. M., Aguilar, A., Vaquero, C., Fernández-Piqueras, P., & Hoelzel, A. R. (2006). Phylogeography and alpha taxonomy of the common dolphin (Delphinus sp.). Journal of Evolutionary Biology, 19, 943–954.

Natoli, A., Cañadas, A., Vaquero, C., Politi, E., Fernandez-Navarro, P., & Hoelzel, A. R. (2008). Conservation genetics of the short-beaked common dolphin (Delphinus delphis) in the Mediterranean Sea and in the eastern North Atlantic Ocean. Conservation Genetics, 9, 1479–1487.

Natoli, A., Peddemors, V. M., & Hoelzel, A. R. (2004). Population structure and speciation in the genus Tursiops based on microsatellite and mitochondrial DNA analyses. Journal of Evolutionary Biology, 17, 363–375.

Nicolosi P. & Loy A. (2021). Geometric morphometric methods as complementary tools to investigate variability in common dolphins (Delphinus sp.) using museum specimens. Aquatic Conservation: Marine and Freshwater Ecosystems.

Notarbartolo di Sciara, G., Agardy, T., Hyrenbach, D., Scovazzi, T. & Van Klaveren, P. (2008). The Pelagos Sanctuary for Mediterranean marine mammals. Aquatic Conservation: Marine and Freshwater Ecosystems, 18, 367–391

Notarbartolo di Sciara G., Hoyt E., Reeves R.R., Ardron J., Marsh H., Vongraven D. and Barr B. (2016). Place-based approaches to marine mammal conservation. Aquatic Conservation: Marine and Freshwater Ecosystems 26 (Supplement 2): 85-100.

Pace, D.S., Mussi, B., Airoldi, S., Alessi J., Arcangeli, A., Atzori, F., Azzolin, M., Campana, I., Celona, A., Fiori, C., Giacoma, C., Gnone, G., Luperini, C., Mangano, R., Miragliuolo, A., Moulins, A., Nuti, S., Pellegrino, G., Rosso, M., Salvioli, F., Tepsich, P. Tringali, M. (2015). New insights on the presence and distribution of the endangered short-beaked common dolphin *Delphinus delphis* in Italian waters. Biologia Marina Mediterranea, 22, 262–263.

Pace, D.S., Mussi, B., Vella, A., Vella, J., Frey. S., Bearzi, G., Benamer, I., Benmessaoud, R., Gannier, A., Genov, T., Giménez, J., Gonzalvo, J., Kerem, D., Larbi Doukara, K., Milani, C., Murphy, S., Natoli, A., Öztürk, A., Pierce, G.J. (2016). Report of the 1st International Workshop “Conservation and Research Networking on Short-beaked Common Dolphin Delphinus delphis in the Mediterranean Sea”. Mediterranean Common Dolphin Working Group. Ischia Island, Italy, 13- 15 April 2016. 44pp. DOI 10.13140/RG.2.1.4801.3047

Papale, E., Azzolin, M., Cascão, I., Gannier, A., Lammers, M. O., Martin, V. M., … Giacoma, C. (2014). Macro- and micro-geographic variation of short-beaked common dolphin’s whistles in the Mediterranean Sea and Atlantic Ocean. Ethology Ecology & Evolution, 26, 392–404.

Papale, E., Gamba, M., Perez-Gil, M., Martin, V.M., Giacoma, C., (2015). Dolphins Adjust Species-Specific Frequency Parameters to Compensate for Increasing Background Noise. PLOS ONE 10(4): e0121711.

Pietroluongo, G., Cipriano, G., Ashok, K., et al.. 2020. Density and abundance of Delphinus delphis in waters south of Samos Island, Greece (Eastern Mediterranean Sea). Journal of Marine Science and Engineering 8(3): 218. https://doi.org/10.3390/jmse8030218.

Piroddi, C., Bearzi, G., Gonzalvo, J., & Christensen, V. (2011). From common to rare: The case of the Mediterranean common dolphin. Biological Conservation, 144, 2490–2498.

Pusineri, C., Magnin, V., Meynier, L., Spitz, J., Hassani, S., & Ridoux, V. (2007). Food and Feeding Ecology of the Common Dolphin (Delphinus delphis) in the Oceanic Northeast Atlantic and Comparison with its Diet in Neritic Areas. Marine Mammal Science, 23, 30–47.

Quérouil, S., Freitas, L., Cascão, I., Alves, F., Dinis, A., Almeida, J. R., … Santos, R. S. (2010). Molecular insight into the population structure of common and spotted dolphins inhabiting the pelagic waters of the Northeast Atlantic. Marine Biology, 157, 2567–2580.

Santoro, R., Sperone, E., Tringali, M. L., Pellegrino, G., Giglio, G., Tripepi, S., & Arcangeli, A. (2015). Summer distribution, relative abundance and encounter rates of cetaceans in the Mediterranean waters off Southern Italy (Western Ionian Sea and Southern Tyrrhenian Sea). Mediterranean Marine Science, 16(3), 613-620.

Santostasi N.L., Bonizzoni S., Bearzi G., Eddy L., Gimenez O. (2016). A robust design capture-recapture analysis of abundance, survival and temporary emigration of three odontocete species in the Gulf of Corinth, Greece. PLoS ONE 11(12): e0166650.

Santostasi N.L., Bonizzoni S., Gimenez O., Eddy L., Bearzi G. (2018). Common dolphins in the Gulf of Corinth are Critically Endangered. Aquatic Conservation: Marine and Freshwater Ecosystems. doi: 10.1002/aqc.2963

Scovazzi, T. (2016). The international legal framework for marine mammal conservation in the Mediterranean Sea. In: G. Notarbartolo di Sciara, M. Podestà, and B. E. Curry (eds), Advances in Marine Biology, pp. 387–416. Academic Press, Oxford.

Silva, M. A. (1999). Diet of common dolphins, Delphinus delphis, off the Portuguese continental coast. Journal of the Marine Biological Association of the United Kingdom, 79, 531–540.

Stockin, K. A., Lusseau, D., Binedell, V., Wiseman, N., & Orams, M. B. (2008). Tourism affects the behavioural budget of the common dolphin *Delphinus sp.* in the Hauraki Gulf, New Zealand. Marine Ecology Progress Series, 355, 287–295. http://www.jstor.org/stable/24871959

Tonay, A. M., Uzun, B., Dede, A., Öztürk, A. A., Danyer, E., Danyer, I. A., Bilgin, S., Öztürk, B., & Bilgin, R. (2020). Population genetic structure of the short-beaked common dolphin from the Black Sea and the Turkish Straits System. Mitochondrial DNA Part A, 31, 257–264.

Vasilakopoulos, P., Maravelias, C. D., Tserpes, D. 2014. The Alarming Decline of Mediterranean Fish Stocks, Current Biology 24(14):1643-1648. doi:10.1016/j.cub.2014.05.070

Westgate, A. J. (2007). Geographic Variation in Cranial Morphology of Short-Beaked Common Dolphins (Delphinus delphis) from the North Atlantic. Journal of Mammalogy, 88, 678–688.