

Document: ACCOBAMS-SC14/2021/Doc17
Distribution: 19/11/2021

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

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

Presented by Joan Gonzalvo, coordinator of the Common dolphin Conservation Management Plan (CMP) in ACCOBAMS Area

Issue: progress report regarding Common dolphin CMP in ACCOBAMS Area

1. Action requested

The Scientific Committee is invited to:

- a. **note** the progress report regarding Common dolphin CMP in ACCOBAMS Area;
- b. **provide** advice on future actions to be undertaken.

2. Background

During MOP6 (Monaco, 2016) ACCOBAMS Parties have agreed to develop Conservation Management Plans (CMPs) for species/populations within the region following an agreed approach and template (Resolution 6.21).

The 2020-2022 work programme requested the Secretariat and the Scientific Committee to develop/revise/implement relevant Conservation Management Plans (CMP) for cetacean species.

Four CMP are currently being drafted: Fin whale, Risso's dolphin, Bottlenose dolphin and Common dolphin. Respective drafts will be presented to ACCOBAMS Parties at the upcoming MOP8 in 2022 (Malta).

DRAFT

**ACCOBAMS/IWC CMP for
Mediterranean Common dolphins
(*Delphinus delphis*)**

Prepared by Joan Gonzalvo – Tethys Research Institute, Italy



DISCLAIMER:

This document is a revised version of a first draft presented at the SC18 (ACCOBAMS-SC12/2018/Doc25). This is an outline intended to facilitate discussion between experts. It is a *working document* in progress and does NOT represent by any means a final draft version of the CMP. A number of new publications have been produced and new studies have been undertaken since it was first drafted. Some of them have been added in this newer version and others will be taken under consideration, discussed and incorporated during a drafting workshop that will be organized in March 2022, where scientists involved in common dolphin research in the Mediterranean will be invited and will be able to collaborate towards a draft final CMP.

CONTRIBUTORS

(more to be added as the draft develops; the list below refers to contributions made until now; some affiliations may need editing)

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CONTENTS

Contents/index to be completed at later stage

EXECUTIVE SUMMARY

(to be written when the plan will be ready)

INTRODUCTION

WHY A CONSERVATION MANAGEMENT PLAN IS NEEDED

To be completed at later stage, including the following:

- Why is active management needed for the identified cetacean population, threat or critical habitat?
- Why is a CMP the most appropriate management tool to achieve the stated conservation objectives?

This section should include:

- The scope, context and policy setting of the CMP.
- A detailed map of the known distribution of the population/critical habitat
 - If a CMP is being designed for a particular threat the map should include an outline of the area where the threat is encountered by the target cetacean population.
 - If the CMP is being designed for a particular critical habitat, the map should include the extent of the critical habitat.
- This section should also reference any current or previous conservation management actions relating to the draft CMP including conservation plans, legislation as well as any relevant peer reviewed papers or related documentation.

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; there is a new assessment of the "inner Mediterranean subpopulation", not considering the Alboràn Sea (which was included in the previous Red List assessment by Bearzi et al., is in press)).

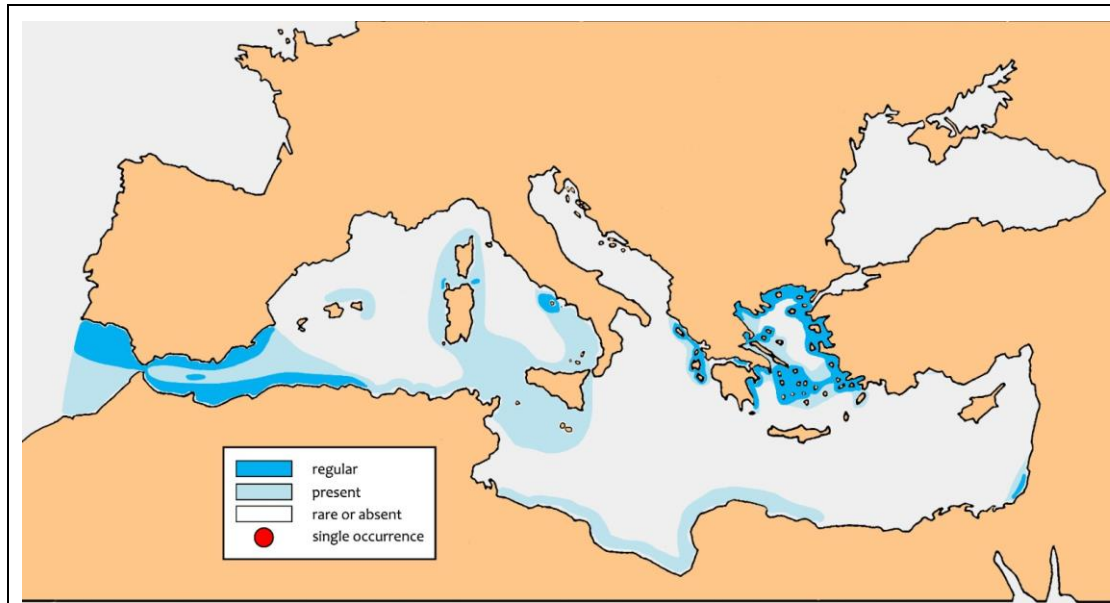


Fig.1. Presumed distribution of common dolphin (*Delphinus delphis*) populations in the ACCOBAMS area. In blue areas where the specie is considered as regular, in cyan where considered present and in white rare or absent. Taken from ACCOBAMS, 2021. *Conserving Whales, Dolphins and Porpoises in the Mediterranean 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

TABLE OF RANGE STATES AND INCLUDE WHETHER MEMBERS OF ACCOBAMS AND/OR IWC

OVERALL GOAL OF THE CMP

To maximise the success of a plan and ensure that required changes are identified promptly; the measurable short, medium and long-term objectives should be identified. Thus, the monitoring of the target population, human activities affecting it, mitigation measures, and the effectiveness of those measures is essential.

Objectives of a CMP will not only relate to the conservation of the population but also to the interests of relevant stakeholders.

Insert the overall short, medium- and long-term objectives of the CMP.

LEGAL FRAMEWORK

To be provided by ACCOBAMS Secretariat?

GOVERNANCE

To be developed in accordance with other species CMPs

3.1 COORDINATION OF A CMP

As a CMP may cover a large geographical area and involve several jurisdictions, it is important to establish an appropriate management structure for the CMP that identifies key stakeholders, their roles and responsibilities and the interaction between them during the development, implementation and review stages of the plan.

Insert an outline of the governance framework under which the CMP would be conducted, from the development stage through to the implementation and review stages.

3.2 TIMELINE FOR A CMP

To be defined

SCIENTIFIC BACKGROUND BIOLOGY AND STATUS OF MEDITERRANEAN COMMON DOLPHINS

BIOLOGY AND STATUS OF MEDITERRANEAN COMMON DOLPHINS POPULATION STRUCTURE

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 DQ β 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 levels 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; Quérrouil 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.

ABUNDANCE AND POPULATION TRENDS

To be completed

The ACCOBAMS Survey Initiative (ASI) aerial surveys carried out in 2018 (ASI, 2020) 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 IUCN assessment to be published in Dec 2021). Few groups 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 Alboran Sea and the adjacent North Atlantic waters (Cañadas & Hammond 2008, Cañadas & Vázquez 2017).

DISTRIBUTION AND MOVEMENTS

To be completed

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).

BASIC BIOLOGY

To be completed

INFORMATION GAPS/NEEDS

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

To be completed

CRITICAL HABITATS

To be completed

ATTRIBUTES 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).

THREATS, MITIGATION MEASURES AND MONITORING

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		
Bycatch in other fishing gear	Set nets and purse seines fishing	Moderate	Mortality and/or serious injury	Moderate		
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,	High		
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		
Overfishing	Prey depletion caused by overfishing. Especially relevant in the case of purse seining targeting epipelagic fish	Moderate to strong	Malnutrition, habitat displacement	High to Moderate		
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		

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		
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		
Climate change	Production of greenhouse gases	Weak or Moderate	May influence distribution and abundance of prey, and induce thermal stress.	Moderate		

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.

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)

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.

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.

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).

(FOOF FOR THOUGHT) There are a few studies now showing that common dolphin might be an ecological specialist of epipelagic high energy fish. IF this

is the case, then it would explain why reduction of this type of prey could lead to a decline in dolphins as suggested. There are also recent studies modelling the biomass consumption of this type of prey by common dolphins (in the Atlantic, so not the Med), so it could even be possible to make some prediction of how much of this prey is required to keep healthy common dolphin populations. Maybe we could add some words here about this?

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

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).

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)

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; Pirodda 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)

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 recent 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.

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) TO BE DEVELOPED

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

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).

ACOUSTIC TRAUMA

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.

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.

CONTAMINATION OF CETACEANS AND THEIR PREY

MARINE LITTER

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.

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).

These actions are considered realistic and effective.

At this early drafting stage some of the actions have been well specified, generally including the information listed below, where relevant, while some others are simply briefly introduced and will be further developed at a later stage after collecting contributions from other experts and discussing them in a dedicated workshop to be held sometime around March 2022 (possibly in coordination with the bottlenose dolphin CMP preparatory workshop).

1. Description (including concise objective, threats to which relevant and how, rationale, target data or activity, method, implementation timeline **to be updated at the 2022 D.delphis CMP workshop since many actions were first drafted in 2018**);
2. Actors (responsible for implementation and relevant stakeholders);
3. Evaluation (actors responsible);
4. Priority (importance to the plan and feasibility);
5. Budget (where appropriate).

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.

COORDINATION (*COORD*)

ACTION COORD-01: ESTABLISHMENT OF A CMP FOR MEDITERRANEAN COMMON DOLPHINS COORDINATOR AND STEERING COMMITTEE (MedDdSC)

DESCRIPTION

- **Specific objectives:** to ensure timely progress is made on implementation of the CMP and the specific actions prescribed in it, and 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 the historical range of Mediterranean fin whales.
- **Rationale:** this CMP is complex and considerable coordination is essential for it to be effective. 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 Coordinator and Steering Committee, with the required logistical and financial support. Ideally, the Coordinator will be based in (but operationally independent of) an office capable of providing some level of support. While logistical and other support from a host institution should be paid for at an appropriate rate, it would not be appropriate for overheads to be charged on all actions funded.

It will be necessary for a broader stakeholder steering committee to be established as soon as possible, with specific terms of reference and *modus operandi*. One of the first tasks of the Steering Committee will be to assess the need for national or Sub-coordinators in each of the range states.

- **Timeline:**

	WHAT	WHO	WHEN
(1)	Identification of host institution and agreement on hosting conditions	Interim CMP for Mediterranean Common Dolphin Steering Committee (IMedDdSC)	First quarter 2020
(2)	Development of detailed job description and conditions of work based on the tasks outlined below	IMedDdSC	First quarter 2020
(3)	Identification of initial funds	IMedDdSC	Last quarter 2019 – first quarter 2020
(4)	Recruitment of co-ordinator	IMedDdSC	First quarter 2020
(5)	Co-ordinator begins work (initial 3-year contract)	Co-ordinator	Second quarter 2020
(6)	Development of proposed terms of reference and <i>modus operandi</i> for stakeholder Steering Committee	ACCOBAMS, IWC, IMedDdSC, funders	Second quarter 2020
(7)	Appointment of Steering Committee	ACCOBAMS, IWC, IMedDdSC, funders	Second or third quarter 2020

- **Tasks of CMP for Mediterranean Common Dolphins Coordinator in conjunction with Steering Committee:**
 - To assess the need for the establishment of sub-areas and subarea coordinators for the implementation of the Mediterranean Common Dolphins CMP, as it has been done for the Mediterranean bottlenose dolphin CMP. These areas to be defined, may be the same that for *T. truncatus* or not necessarily, although the

- former option may facilitate coordination between both CMPs in some actions likely to overlap.
- Alternatively, to assess the need for national Sub-coordinators in each range state.
 - To promote and explain the CMP and progress with its implementation to relevant 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 the Mediterranean Common Dolphin CMP Fund including, where necessary, assigning contracts to ensure that the Actions of the CMP are undertaken and completed.
 - To liaise with relevant authorities to facilitate any permitting required to undertake Actions of the CMP.
 - 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.
 - To develop a database or databases and coordinate the collation, in an appropriate electronic format, of relevant data and information on human activities, the environment and common dolphins, as far as possible in a GIS context. IN COORDINATION WITH SIMILAR DATABASES FOR OTHER CETACAN SPECIES (no need to re-invent the wheel)
 - To maintain and update the existing list of international and national regulations and guidelines relevant to the conservation of Mediterranean common dolphins.
 - To produce concise annual progress reports on the implementation of the CMP.
 - To arrange for periodic expert review of the CMP and the development of new or modified actions as appropriate (every 2 years?)
 - To develop a Common Dolphin CMP website as a resource for researchers, stakeholders and the general public. CONSIDERATION FOR DOING A UNIQUE WEBSITE DEDICATED TO THE EXISTING CMP FOR CETACEANS IN THE REGION IN COORDINATION WITH OTHER CETACEAN CMP STEERING COMMITTEES IN THE REGION

ACTORS

- **Responsible for coordination of the action:** the IMedDdSC to identify the host institution, obtain initial funding and appoint the Coordinator; ACCOBAMS and IWC to appoint the broader stakeholder Steering Committee for the CMP.
- **Stakeholders:** as listed above under 'Tasks'.

EVALUATION RESPONSIBLES

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

PRIORITY

- **Importance:** Essential
- **Feasibility:** High (with political support)

BUDGET CONSIDERATIONS

- Recruitment process (e.g. advertising, travel and subsistence for IMedDdSC and shortlisted candidates).
- Host institution annual costs (needs to be negotiated by IMedDdSC).
- Salary of Coordinator (level, tax and benefits issues).

- Initial working budget for Coordinator (travel and subsistence including visits to range states and meetings with stakeholders).

ACTION COORD-02: REVIEW OF THE MEDITERRANEAN IMMAs AND EVALUATION OF COMMON DOLPHIN PRESENCE, THREATS AND CONSERVATION NEEDS

DESCRIPTION

- **Specific objectives:** to ensure timely progress is made on implementation of the most adequate conservation measures for common dolphins in Mediterranean sites of recognized importance for marine mammals
- **Rationale:** The IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force was created in 2013 by the International Committee on Marine Mammal Protected Areas (ICMMPA), the International Union for Conservation of Nature's (IUCN) World Commission on Protected Areas (WCPA) Marine Vice Chair, and members of the IUCN Species Survival Commission (SSC), to help support a global profile for the role of marine mammals in protected areas. The MMPA Task Force aims to provide a stronger voice for the MMPA constituency within the IUCN. The goal of the Task Force is to facilitate mechanisms to encourage collaboration, sharing of information and experience, accessing and disseminating knowledge and tools for establishing, monitoring, and managing MMPAs. The Task Force promotes effective spatial solutions and best practices for marine mammal conservation within MMPAs. For the period 2016-2021, the MMPA Task Force is rolling out a tool to apply criteria to begin to identify a worldwide network of Important Marine Mammal Areas (IMMAs) and to enhance their protection. Important Marine Mammal Areas — referred to as 'IMMAs' — are defined as discrete portions of habitat, important to marine mammal species, that have the potential to be delineated and managed for conservation. IMMAs may merit place-based protection and/or monitoring, or simply reveal additional zoning opportunities within existing MPAs. From 24 to 28 October 2016, the first IMMA Regional Workshop for the Mediterranean was held in Chania (Island of Crete, Greece) with the primary objective to identify and delineate IMMAs. Starting with initial Areas of Interest (Aoi) submitted before and during the meeting, 41 candidate IMMAs (cIMMAs) were identified and proposed through an expert-based process utilizing selection criteria. In total 26 IMMAs were accepted for full status by the review panel, after receipt of revisions or additional information that was required before their confirmation as IMMAs meeting the IUCN Task Force criteria.
- **Target:** In coordination with the MMPA Task Force the MedDdSC should review the information related to these 26 IMMAs and identify those in which common dolphins are considered regularly present in order to define the most adequate actions to be undertaken in order to trigger conservation action for the species and their critical habitats (e.g., Gulf of Corinth).
- **Timeline:**

	WHAT	WHO	WHEN*
(1)	Establishment of contacts with IUCN MMPA Task Force to obtain the information available for all Mediterranean 26 IMMAs	CMP for Mediterranean Common Dolphins Steering Committee (MedDdSC)	1 st quarter 2021
(2)	Preliminary review of the information obtained and establishing of contacts with experts working in those sites	MedDdSC	1 st quarter 2021
(3)	Location of funds	MedDdSC	1 st quarter 2021
(4)	Recruitment of co-ordinator for this task	MedDdSC	2 nd quarter 2021
(5)	Co-ordinator begins work in collaboration with local experts	Co-ordinator	2 nd and 3 rd quarter 2020
(6)	Identification of IMMAs relevant to common dolphin conservation, identification of threats and most relevant conservation measures for the species in these sites	ACCOBAMS, IWC, MedDdSC, funders	4th quarter 2021 1 st quarter 2022
(7)	Incorporation of the derived information in the regional CMP	ACCOBAMS, IWC, MedDdSC, funders	Within 2022 (see 7.2 Reporting Process)

*The timeline above could be anticipated if the task to be executed by the MedDdSC was undertaken earlier by the interim IMedDdSC

ACTORS

- **Responsible for coordination of the action:** MedDdSC together with the IUCN MMPAs Task Force
- **Stakeholders:** International and regional bodies, range state officials, local authorities and communities in selected areas, NGOs.

EVALUATION RESPONSIBLES

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

PRIORITY

- **Importance:** High
- **Feasibility:** High (in agreement with IUCN MMPAs Task Force)

BUDGET CONSIDERATIONS

- TO BE DEVELOPED

ACTION COORD-03: ESTABLISH AN INTERACTIVE REGIONAL NETWORK OF GROUPS INVOLVED IN COMMON DOLPHIN RESEARCH AND CONSERVATION

DESCRIPTION

- **Specific objectives:** Facilitation of information and data exchange as well as active research cooperation between neighboring states
- **Rationale:** Wide ranging animals do not recognize political borders; therefore, the study of a 'population' occurring within the limits of one state is fragmented by definition. In many cases political/military constraints hamper regional coordination, yet the active involvement all Mediterranean states in the CMP is essential in order to define the true extent of occurrence of the common dolphin populations throughout the region, as well as unique threats and to unify regional mitigation measures.

ACTORS

- **Responsible for coordination of the action:** MedDdSC
- **Stakeholders:** Research groups involved in common dolphins research and conservation in the Mediterranean.

EVALUATION RESPONSIBLES

- ACCOBAMS, IWC.
- Regular (*e.g.* biennial or triennial)

PRIORITY

- **Importance:** High
- **Feasibility:** Moderate (High, if political/communication issues can be overcome)

BUDGET CONSIDERATIONS

- TO BE DEVELOPED

PUBLIC AWARENESS, EDUCATION AND CAPACITY BUILDING (PACB)

ACTION PACB-01: DEVELOP A STRATEGY TO INCREASE EDUCATION, PUBLIC AWARENESS AND STAKEHOLDERS ENGAGEMENT

DESCRIPTION

- **Specific objective:** Raise awareness throughout the Mediterranean on the conservation status of common dolphins through the development of a strategy 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, as well as guidelines on how to behave when encountering them at sea or stranded.
- **Rationale:** While in some countries capacities exist and public awareness is adequately addressed, through effective educational programs and multimedia campaigns, and the presence of charismatic cetacean fauna in the region is recognized, this is not the case in all the Mediterranean states.
- Citizen science campaigns can provide extensive qualitative coverage and important information on the presence of this species that can be utilized to identify hotspot areas and better focus research efforts. Hence, it is important to develop initiatives to try to engage the public's interest and involvement in Mediterranean common dolphin science and conservation. In order to successfully do this and maximise the collection of data from opportunistic observations the most up-to-date multimedia communication tools should be used, including also social media platforms as well as more traditional communication means (e.g., journals, newspapers, radio and TV).
- **Target:** Since the strategy is to be tailored for each State, the 'targeted' may vary between countries, while in some other there will be an overlap. Nevertheless, some of the targeted audiences for these strategies will include: nautical tourism companies, coast guards, marinas and port authorities, shipping companies representatives (some shipping lines may pose interesting data collection platforms), fishermen cooperatives and representatives, whale watching operators, NGOs, research institutes, education centres as well as local authorities. The Common Dolphin CMP website as a resource for researchers, stakeholders and the general public will play an important role (see Actions COORD-01)

- **Timeline:**

	WHAT	WHO	WHEN
(1)	Preparation for a small expert workshop to develop a strategy for the public awareness effort	MedDdSC (appointed by 3 rd quarter 2020) – see Action COORD-01	December 2020
(2)	Workshop	Workshop participants (see methods below)	1 st quarter 2021
(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 MedDdSC	Timeline to be defined during workshop

- **Methods:** the MedDdSC will be coordinating a workshop in which the following key aspects of the strategy will be defined:
 - Identification of issues to be addressed and identification of the target groups in each state.

- Evaluation/review of any previous education and awareness campaigns to identify priority actions and materials to be developed, keeping in mind specific needs for different audiences targeted.
- Identification of the most adequate communication channels depending on states and on targeted audiences.
- Development of the space and structure necessary within The Common Dolphin CMP website so it can host basic resources for researchers, stakeholders and the general public (See COORD-01).
- Creation of a mechanism to guarantee the timely adoption of the developed strategies, definition of a timetable for the execution of the different actions, including some follow up 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.
 - Scientists familiar with the Mediterranean common dolphin situation.
 - Researchers with success stories on citizen sciences programmes familiar with the effective use of data provided opportunistically by the general public and non-scientist collaborators.
 - Public awareness experts from each country.
 - Experts on communication tools the maximize the audience to be reached by the campaigns to be developed within the strategy defined at the workshop.

ACTORS

- **Responsible for co-ordination of the action:** MedDdSC (appointed by 3rd quarter 2020) – see Action COORD-01
- **Responsible for carrying out the action:** to be determined at workshop (may differ among States)
- **Stakeholders:** all those identified relevant to each country (not necessarily the same)

ACTION EVALUATION

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

PRIORITY

- **Importance:** high
- **Feasibility:** high

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)

ACTION PACB-02: DEVELOP A STRATEGY FOR BUILDING CAPACITY IN RANGE STATES

DESCRIPTION

- **Specific objective:** To assure that individuals and organisations in responsible positions within each of the range states have the motivation, skills and resources needed to function effectively in implementing this plan.
- **Rationale:** The degree of knowledge and expertise throughout the region is not uniformly distributed. The transfer of necessary skills is a key step in the process of successfully implementing this CMP. Training efforts should be diverse and target different aspects of the conservation process; by providing the knowledge needed to conduct adequate research and monitoring activities on the species and their ecosystems, but also by giving tools to effectively translate the newly acquired information on species distribution and conservation needs into both legislative and regulatory actions that will lead to direct conservation actions on Mediterranean common dolphins.
- **Target:** As for PACB-01 this strategy is to be tailored for each State, the 'targeted' may vary between countries, while some countries may be in need of very specific capacity building actions (i.e., training), some other States may be in a privileged position and play an active role in providing training opportunities for some of their Mediterranean neighbours. The Common Dolphin CMP website, assuming that it would include also a database of cetacean experts, may also help in identifying researchers with the right profile and needed expertise for each capacity building action (see Actions COORD-01)

- **Timeline:**

	WHAT	WHO	WHEN
(1)	Identification of the States with a more urgent need for capacity building and the priority/basic skills to be developed	MedDdSC (appointed by 3 rd quarter 2020) – see Action COORD-01	December 2020
(2)	Identification of a Capacity Building coordinator within the MedDdSC	MedDdSC	1 st quarter 2021
(3)	Design of training packages for different cetacean research (e.g., photoidentification, strandings management and sampling protocols) and conservation tools	MedDdSC supported occasionally by National organizations to adapt the training programs to each local realities as necessary	To be accomplished within 2021
(4)	Execution of the training programs	Experts previously identified by MedDdSC and coordinated by the Capacity Building coordinator	From 2022

ACTORS

- **Responsible for co-ordination of the action:** MedDdSC (appointed by 3rd quarter 2020) – see Action COORD-01
- **Responsible for carrying out the action:** Capacity Building coordinator (ideally) from within the MedDdSC
- **Experts with the skills required for each training program**
- **Stakeholders:** all those identified as the best possible candidates for each training program (non necessarily the same always)

ACTION EVALUATION

- ACCOBAMS, IWC.
- Follow-up and evaluation mechanisms to be defined by MedDdSC in order to help the trainees to implement the newly acquired skills in their respective fronts.

PRIORITY

- **Importance:** high
- **Feasibility:** high

BUDGET CONSIDERATIONS

- TO BE DEVELOPED

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

ACTION RES-01: DETERMINE MEDITERRANEAN COMMON DOLPHIN POPULATION STRUCTURE

DESCRIPTION

Common dolphin is increasingly rare in the Mediterranean Sea, and current available studies only cover a limited range of its confirmed presence. Considering the observed population structure, there is the possibility of the presence of further population fragmentation within the considered range unknown at the moment.

The objective is to assess genetic isolation/continuity among different Mediterranean populations, with the rationale of whether or not to consider them as distinct Ecological Management Units.

To support further genetic and ecological marker analyses:

- Coordination between groups in collecting samples (both from biopsies and strandings) from underrepresented areas.
- Coordination among museum collections
- Coordination among research groups and operators to report sightings in a joint platform

These analyses would be best implemented in the framework of Basin-wide project. Timeline dependent on the availability of material from all studied populations.

ACTION RES-02: ESTIMATE ABUNDANCE AND MAP THE DISTRIBUTION OF COMMON DOLPHINS IN THE MEDITERRANEAN

DESCRIPTION

A previous ACCOBAMS collaborative effort to estimate abundance and map the distribution of Cuvier's beaked whales in the Mediterranean was a great success that led to a recent publication (Cañadas et al., 2018). The results are also being used in a re-assessment of the IUCN Red-List status of this species in the Mediterranean. A similar collaborative effort with the participation of many researchers from many riparian countries is in the "organization of data" phase, which up to date includes 758,759 km on effort and 1635 sightings of common dolphins. More data is expected to still be included. Multiplatform and multiyear survey data will be used to analyse the distribution and abundance of common dolphins across the Mediterranean Sea; a novel approach combining heterogeneous data gathered with different methods to obtain a single density index for the region. This challenging task will require much time to be effectively executed. So far, the process is stuck, as those involved are giving priority and concentrating their efforts to other remunerated jobs. Funding should be made available to fuel this important initiative. Data gathered during the recently executed ASI may be merged with the already existing pool of data facilitated by different by numerous researchers throughout the Mediterranean.

Smaller scale population estimates will be also relevant in key Mediterranean areas for the species. This information is essential in order to follow trends and assure that known and unknown threats, climatic and/or anthropogenic are cumulatively sustainable. Methods may vary from mark-recapture estimates (photoidentification), to distance sampling methodology (i.e., boat-based surveys, aerial surveys from planes or from unmanned aerial vehicles following fixed transects)

ACTION RES-03: DESCRIBE UNDERWATER BEHAVIOR AROUND TOWED BOTTOM TRAWL NETS AND PURSE SEINERS IN AREAS WHERE THESE INTERACTIONS ARE PRESENT

DESCRIPTION

- **Specific objective:** to document underwater behavior and thereby collect direct evidence for depredation and avoidance of entrance into the net. Another expected outcome would be the elucidation of whether this foraging mode is practiced all the time or is it less prevalent during the season(s) when the more conventional prey (sardines, anchovy) is abundant.
- **Rationale:** In Israel, from preliminary investigations of stomach analysis, as well as from direct above water observations, common dolphins are known to associate with trawlers. They however seem to be much less prone to be trapped inside the net. On the other hand, some trawl skippers are lately complaining that common dolphins damage their nets. The rationale would be (a) to back the claims of the fishermen and to help them receive compensation; (b) to better evaluate the consequences of the call to abolish trawling altogether, in case there is partial dependence on their existence.
In the Alboran Sea a strong interaction between common dolphins and purse seines has been also reported
- **Target:** Bottom trawl fisheries in areas where interaction with common dolphins has been reported.
- **Methodology** would involve underwater cameras fixed to the net and aimed fore and/or aft, prior to lowering the net for the tow. Hydrophones to record acoustic behaviour may also be used. The relevant threats are bycatch and ill feelings of fishermen with possible retribution.

ACTORS

- **Responsible for coordination of the action:** MedDdSC
- **Responsible for execution of the action:** Local researchers/research groups (e.g., IMMRAC, Israel)
- **Stakeholders:** local authorities, bottom trawlers representatives and fishermen communities in selected areas, NGOs.

EVALUATION RESPONSIBLES

- ACCOBAMS, IWC.
- At the end of a 2-year study

PRIORITY

- **Importance:** Moderate
- **Feasibility:** High (in agreement with IUCN MPAs Task Force)

BUDGET CONSIDERATIONS

- TO BE DEVELOPED

ACTION RES-04: DEFINITION OF THE EXTEND OF OCCURRENCE OF COMMON DOLPHIN IN DIFFERENT ZONES THROUGHOUT THE MEDITERRANEAN BY COMPARING EXISTING PHOTOIDENTIFICATION CATALOGUES

DESCRIPTION

- **Specific objective:** to document extend of occurrence of common dolphin population units scattered throughout the Mediterranean
- **Rationale:** Different common dolphin populations are being studied throughout the Mediterranean with considerable survey and photoidentification (photo-id) effort; coordination between groups working in the same or neighbouring areas to share photo-id catalogues would help shed light on the home ranges and extend of occurrence for the species, which would also help defining adequate conservation measures. Action directly related to COORD-03

ACTORS

- **Responsible for coordination of the action:** MedDdSC
- **Responsible for execution of the action:** Research groups conducting photo-id effort on Mediterranean common dolphins
- **Stakeholders:** Those involved in citizen science programs opportunistically provided photo-id data

EVALUATION RESPONSIBLES

- ACCOBAMS, IWC.
- Regular review of the existing catalogues in a collaborative manner among research groups (every 2-years).

PRIORITY

- **Importance:** High
- **Feasibility:** Moderate (depending on how successful are the actors in collaborating)

BUDGET

- TO BE DEVELOPED

ACTION RES-05: ANALYSIS OF COMMON DOLPHINS' ACOUSTIC VARIABILITY IN ORDER TO HIGHLIGHT SUB-POPULATION GEOGRAPHIC SEGREGATION

DESCRIPTION

- **Specific objective:** To study the acoustic behaviour of common dolphins within the Ionian Sea areas, in order to highlight any possible differentiation linkable to the potential geographical segregation within this sub-basin, that may imply genetic differentiation and the need of dedicated conservations measures.
- **Rationale:** Genetic analysis suggests that population structure between Greek Ionian and Western Mediterranean evolved recently. The adaptation to different environments and/or foraging strategies may have been the driving factors for this differentiation, and it is likely to have been reinforced by a recent bottleneck (Moura et al., 2013a) that affected the Ionian common dolphins (Bearzi et al., 2003) in the last decades. Nevertheless, there is not information about a potential genetic structure across Eastern Mediterranean Sea. Collection of genetic samples could be a way to evaluate any further genetic differentiation, and the consequent level of conservation of the species within the Eastern Mediterranean Sea (See action RES-01). The common dolphin is a highly vocal species with a rich acoustic behaviour and the analysis of acoustic variability has been shown to be a useful not invasive technique for highlighting geographical differentiation, which may be due to little exchanges of individuals among areas (Azzolin, 2008; Azzolin et al., 2013; Papale et al., 2013a,2013b; Azzolin et al., submitted). In this regards a study of geographical variability of the acoustic behaviour of common dolphin across the species distribution range would also help to shade light on individual's differentiation/exchange.
- **Method:** To achieve an even distribution of acoustic data, data collection would be carried out for 1 year in different areas.

ACTORS

- **Responsible for coordination of the action:** MedDdSC
- **Responsible for execution of the action:** Reseach groups applying acoustic methods to their efforts on Mediterranean common dolphins (see evaluation responsables below)
- **Stakeholders:** Local authorities, Management bodies

EVALUATION RESPONSIBLES

- ACCOBAMS, IWC.

PRIORITY

- **Importance:** High
- **Feasibility:** High

BUDGET

- TO BE DEVELOPED (Mostly related to data collection, boat, equipment, fuel, personnel, etc. in different areas of the Ionian Sea and data analysis)

ACTION RES-06: IMPACT OF AMBIENT NOISE ON COMMON DOLPHINS' COMMUNICATION ABILITY

DESCRIPTION

- **Specific objective:** To study if elevated noise conditions would result in modifications of common dolphin whistle acoustic characteristics (call pattern changes).
- **Rationale:** Increased ambient noise levels can reduce the ability of common dolphins to perceive acoustic signals (masking) and may cause alterations in the animals' vocalizations as well as negative impacts on communication.
- **Method:** Using bottom recorders, acoustic data collection would be carried out for 1year on hotspots of common dolphins' occurrence in the Mediterranean, potentially characterized by different levels of ambient noise and seasonal changes. Simultaneously, boat-based visual and acoustic surveys will be carried out to characterize with certainty common dolphins' whistles in the investigated areas.

ACTORS

- **Responsible for coordination of the action:** MedDdSC
- **Responsible for execution of the action:** Research groups applying visual and acoustic methods to their efforts on Mediterranean common dolphins (see evaluation responsible below)
- **Stakeholders:** Local authorities, Management bodies

EVALUATION RESPONSIBLE

- ACCOBAMS, IWC.
- University of Torino, IAS-Capo Granitola, University of Rome, other local partners.

PRIORITY

- **Importance:** High
- **Feasibility:** High

BUDGET

- TO BE DEVELOPED

MONITORING (*MON*)

TO BE DEVELOPED

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 past 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 showed 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 visit the Archipelago. This is presumably caused by the area's decreased carrying capacity, due to over fishing. Monitoring of local fishing fleet and ecosystem modelling approaches indicated an especially adverse impact by purse seiners, making up 3% of the total fishing fleet but removing on average 33% of the total biomass captured by local fisheries (Gonzalvo et al., 2011). Moreover, it is this kind of fishing gear the one that has the highest impact on common dolphin prey (Bearzi et al., 2008). Fishery management measures are needed to reduce current over-exploitation, protecting marine biodiversity, ensuring continued ecosystem services, in addition to preserving artisanal fisheries and bringing long-term benefits to the local community. This may pose also an example to be replicated in other areas facing a similar scenario.
- 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) and immediate action should be taken to mitigate anthropogenic impacts known or suspected to have a negative impact on cetaceans in the Gulf. As stated above, fisheries management measures aimed at the recovery of depleted fish stocks (particularly of common dolphin key prey) have been identified as a priority in the Ionian Sea. Such measures should be implemented and enforced without delay in the Gulf of Corinth, 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.
- **Target:** Regional and 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	MedDdSC (appointed by 3 rd quarter 2020) – see Action COORD-01	December 2020
(2)	Workshop (engagement of all stakeholders in the development of measures making them part of the conservation/management strategy)	Workshop participants (see methods below)	1 st quarter 2021
(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 MedDdSC	Timeline to be defined during workshop

- **Methods:** the MedDdSC 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 PACN-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 scientist .
 - 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

ACTORS

- **Responsible for co-ordination of the action:** MedDdSC (appointed by 3rd quarter 2020) – see Action COORD-01
- **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)

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)

ACTION MIT-02: PROMOTION OF SUSTAINABLE FISHERIES PRODUCTS**DESCRIPTION**

- **Specific objective:** Promote the implementation of adequate fisheries management actions in order of making them more sustainable by encouraging consumers to be more attentive to the way they consume fish and how sustainable it is (e.g., how was caught, where comes from)
- **Rationale:** Sustainability must become an important factor driving seafood sales, perhaps even more so than brand and price. Ideally, shoppers should only consume food from sustainable sources to ensure ocean longevity. In order to achieve that proactive responsible attitude by consumers, the adequate messages must be effectively and clearly presented. By changing the general public attitudes, the authorities will be more likely to listen to marine conservation strategies and conservation plans.
- **Target:** Regional and national and local authorities, fishing industries representatives, fishermen cooperatives, general public/consumers, NGOs (see also Actions PACB-01 and MIT-01)

EXECUTIVE SUMMARY OF ACTIONS

STAKEHOLDER ENGAGEMENT PUBLIC AWARENESS AND EDUCATION

Strategy and information on stakeholder engagement, public awareness and any education activities that will be undertaken during the CMP implementation stage

REPORTING PROCESS

Any CMP needs to be reviewed periodically so that the actions called for can be adjusted as appropriate in response to new information or changed circumstances. Once a coordinator has been appointed and a steering committee is functioning, it is expected that a regular review and revision process will be implemented. It is suggested that this CMP would be reviewed every two years and that an in-depth review would be conducted every four years.

Insert process for reporting on CMP progress to the IWC (including a timeframe).

ACTIONS

COORDINATION ACTIONS

Nr.	Action	Importance	Feasibility	Crossref.
COORD-01	Establishment of a CMP for Mediterranean Common Dolphins Coordinator and Steering Committee (MedDdSC)	ESSENTIAL	HIGH	
COORD-02	Review of the Mediterranean IMMAs and evaluation of common dolphin presence, threats and conservation needs	HIGH	HIGH	CORD-01
COORD-03	Establish an interactive regional network of groups involved in common dolphin research and conservation	HIGH	MODERATE	RES-01

CAPACITY BUILDING AND PUBLIC AWARENESS ACTIONS

Nr.	Action	Importance	Feasibility	Crossref.
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PACB-01	Develop a strategy to increase education, public awareness and stakeholders engagement	HIGH	HIGH	CORD-01
PACB-02	Develop a strategy for building capacity in range states	HIGH	HIGH	

RESEARCH ACTIONS ESSENTIAL FOR PROVIDING ADEQUATE MANAGEMENT ADVICE

Nr.	Action	Importance	Feasibility	Crossref.
RES-01	Determine Mediterranean common dolphin population structure	HIGH	HIGH	COORD-03
RES-02	Estimate abundance and map the distribution of common dolphins in the Mediterranean	HIGH	HIGH	COORD-03
RES-03	Describe underwater behaviour around towed bottom trawl nets and purse seiners in areas where these interactions are present	MODERATE	HIGH	
RES-04	Definition of the extend of occurrence of common dolphin in different zones throughout the Mediterranean by comparing existing photo-id catalogues	HIGH	MODERATE	COORD-03
RES-05	Analysis of common dolphins' acoustic variability in order to highlight sub-population geographic segregation	HIGH	HIGH	
RES-06	Impact of ambient noise on common dolphins' communication ability	HIGH	HIGH	

MONITORING ACTIONS (TO BE DEVELOPED)

Nr.	Action	Importance	Feasibility	Crossref.

MITIGATION MEASURE ACTIONS

Nr.	Action	Importance	Feasibility	Crossref.
MIT-01	Promotion and implementation of fisheries management measures to reduce overfishing and preserve marine ecosystems	HIGH	MODERATE	MIT-02

MIT-02	Promotion of sustainable fisheries products	HIGH	MODERATE	PACB-01
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