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PROGRESS REPORT REGARDING OTHER SPECIES CONSERVATION MANAGEMENT PLANS (CMP) IN ACCOBAMS

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Note of the Secretariat:

The concept of Conservation and Management Plans (CMP), developed under the framework of the International Whaling Commission, was adopted by Parties during MOP6. Initial drafts of Conservation Management Plans for four species were prepared and presented by experts of the ACCOBAMS Scientific Committee during its 12th Meeting in 2018. The overall goal of those CMPs is to manage human activities that affect fin whales, Risso's dolphins, bottlenose dolphins and common dolphins in the Mediterranean Sea, in order to maintain a favorable conservation status throughout their historical range, based on the best available scientific knowledge.

The present document compiles progress reports on CMP, presented during the 12th Meeting of the ACCOBAMS Scientific Committee in November 2018. It aimed at providing the Parties with the progress reports regarding CMP of those four species, keeping in mind that those versions still need to be completed with contributions from key players in the ACCOBAMS area. In this respects, expert workshops have been organized end of 2019 for drafting fin whales and Risso's Dolphins CMP.

Expert drafting workshops for Bottlenose and common dolphins CMP will be organized in autumn 2020.

I- STATUS REPORT ON DRAFT CONSERVATION MANAGEMENT PLAN ON COMMON DOLPHIN

II- STATUS REPORT ON DRAFT CONSERVATION MANAGEMENT PLAN ON BOTTLENOSE DOLPHIN

I - STATUS REPORT ON DRAFT CONSERVATION MANAGEMENT PLAN ON COMMON DOLPHIN

DRAFT

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

Prepared by Joan Gonzalvo

DISCLAIMER: This document is a draft outline intended to facilitate discussion during the meeting of the ACCOBAMS Scientific Committee, to be held in Monaco, in November 2018. It is a work in progress and does NOT represent a final draft version of the CMP, particularly as contributions from key players in the ACCOBAMS area are still missing and could not be integrated during the preparation of this preliminary draft.

It is expected that a drafting workshop will be organized in spring 2019, where scientists involved in common dolphin research in the Mediterranean will be invited and will be able to collaborate towards a draft final CMP that will also be considered by the IWC Scientific Committee in May 2019 before submission to the ACCOBAMS Meeting of Parties and the IWC for consideration.

CONTRIBUTORS

(more to be added as the draft develops)

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CONTENTS

Contents/index to be completed at later stage

EXECUTIVE SUMMARY

(to be written when the plan will be ready)

1 INTRODUCTION

1.1 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 as Least Concern (Hammond et al., 2008), but its Mediterranean subpopulation is classified as Endangered (Bearzi, 2012; Bearzi et al., 2003).

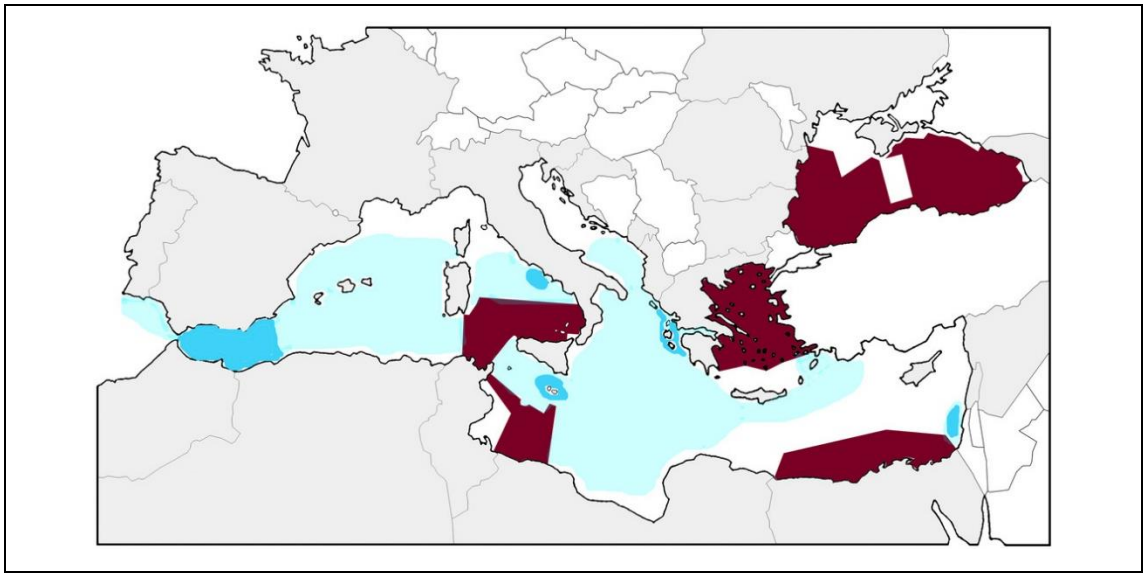

Fig.1. Presumed distribution of common dolphin *(Delphinus delphis)* populations in the ACCOBAMS area. In blue areas where the specie is considered as regular, in cyan where considered present, in white rare or absent, and in brown no data *Taken from Notarbartolo di Sciara G., Birkun A., Jr. 2010. Conserving whale, dolphins and porpoises in the Mediterranean and Black Seas: an ACCOBAMS status report, 2010. ACCOBAMS, Monaco. 212p.* **NEEDS TO BE UPDATED**

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

1.2 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.

2 LEGAL FRAMEWORK

To be provided by ACCOBAMS Secretariat?

3 GOVERNANCE

To be developed in accordance with other species CMPs currently also in progress (e.g., bottlenose dolphin, Risso's dolphin)

3.1 3.1 COORDINATION OF A CMP

As a CMP may cover a large geographical area ad 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 3.2 TIMELINE FOR A CMP

To be defined

4 SCIENTIFIC BACKGROUND BIOLOGY AND STATUS OF MEDITERRANEAN COMON DOLPHINS

4.1 BIOLOGY AND STATUS OF MEDITERRANEAN COMON DOLPHINS POPULATION STRUCTURE

4.1.1 population structure

In the eastern North Atlantic the common dolphin is renowned for showing low levels of population structure (e.g. Natoli et al., 2006; Amaral et al., 2007; Mirimin et al., 2011; Moura et al., 2013) 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 Alboran Sea and the Eastern Mediterranean, represented mainly by samples from the Ionian Sea (Natoli et al., 2008; Moura et al., 2013a). Although significant, FST values are relatively small (microsatellite FST = 0.052, mtDNA FST = 0.107, p-values=0.001), there are shared haplotypes between the regions, and 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 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 Black Sea and the Mediterranean (again, with evidence for directional gene flow westwards; Natoli et al., 2008), and further separation of dolphins in the Korinthiakos Gulf (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 ongoing 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 likely 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. Therefore, without more comprehensive sampling across the Mediterranean regions, our current understanding of population structure might be biased by local demographic histories.

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., 2017; 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 signatures and stable isotopes were also observed between 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). 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).

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, submitted) showed that Mediterranean dolphins are well differentiated from those sampled in the Atlantic and also 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, submitted). 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; Bencatel et al., 2017). 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

To be completed

Comprehensive basin-wide estimates of density and abundance are largely lacking for common dolphins across the whole Mediterranean Region. Line transect ship surveys of the Alboran Sea in 1991-92 produced an estimate of 14736 (CV = 0.38; 95% CI = 6923–31 366), with a density of 0.16 dolphins/km^2, but no estimates were made for this species elsewhere in the western Mediterranean due to the low number of sightings (Forcada & Hammond, 1998).

The abundant qualitative data and limited quantitative data that are available for the Mediterranean common dolphins were sufficient to infer a reduction in population size of more than 50% over a three-generation period (i.e., the past 30-45 years; Reeves and Notarbartolo di Sciara, 2006). On the basis of this decline, the Mediterranean population of common dolphin is classified as 'Endangered' in the IUCN Red List of Threatened Animals. The species is also listed in Appendix I and II of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), in Appendix II (Strictly Protected Fauna Species) of

the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), and in Annex IV of the EU Habitats Directive (Council Directive 92/43/EEC).

4.1.3 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) and around the Maltese Islands (Vella, 2005). Long-term monitoring has been carried out around the islands of Malta (Vella, 2005), Lampedusa, Italy (Habitat Directive Reporting, 2014; Pace et al., 2015), Ischia, Italy (Mussi et al., 2016; Pace et al., 2015), the Inner Ionian Sea Archipelago (Bearzi et al.,2003, 2008; Piroddi et al., 2011) and Gulf of Corinth (Bearzi et al., 2011,2016; Santostasi et al., 2016, 2018) Greece, and in the Alboran Sea (Cañadas & Hammond, 2008). However, information on occurrence, distribution and habitat use in the Mediterranean Sea remains fairly sparse, with little published data.

Common dolphin is 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, 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.

4.1.4 basic biology

To be completed

4.1.5 Information Gaps/needs

To be completed

4.2 CRITICAL HABITATS

To be completed

4.3 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).

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		
Bycatch in other fishing gear	Set nets and purse seines fishing	Weak	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. Specially relevant in the case of purse seining targeting epipelagic fish	Strong or Moderate	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	Weak or Moderate	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 green house gases	Weak or Moderate	May influence distribution and abundance of prey	Low		

5.1.1 bycatch in bottom trawl nets

In Israel, where bottom trawlers – common dolphins interactions have been reported, no entrapment in trawl nets, has been ever witnessed or directly documented for this species (IMMRAC, pers comm.). One report by skipper of two entrapped dolphins that answer the description of common dolphins but could not be confirmed. Indirect evidence of one beached individual that seemed to have dined just before drowning. Although many would like to see this bottom-habitat destructive fishing mode phased out, 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 drifnetting fleet, mainly concentrated in the island of Ponza with 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) 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. unpublished data). Although no dolphin fishing bycatch has been documented, the impact of this mortality factor on the common dolphin subpopulation 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

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 navy and fishing use, seismic exploration and offshore platforms could affect occurrence and behavior of the species. Even if no data are still present 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). As other dolphin species, they could decrease some activities relevant for their survival such as resting and feeding or move from high impacted areas.

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). 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

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). 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 a multiple 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)

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 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 be also studies.

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) TO BE DEVELOPED

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. TO BE DEVELOPED

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

5.2.4 Noise pollution

5.2.5 Overfishing

Incorporation of fishery controls in MPA management to preserve ecosystem function. Establishment of no-take 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.

5.2.6 Contamination of cetaceans and their prey

5.2.7 Marine litter

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).

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 some time around spring 2019 (if possible in coordination with other cetacean species CMP preparatory workshops).

1. Description (including concise objective, threats to which relevant and how, rationale, target data or activity, method, implementation timeline);
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.

6.1 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 *modus operandi* 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 Force2 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 MPA).
- **Timeline:**

	WHAT	WHO	WHEN*
(1)	Establishment of contacts with IUCN MMPA Task Force to obtain the information available for all Mediteranean 26 IMMAs	CMP for Mediterranean Common Dolphins Steering Committee (MedDdSC)	1st quarter 2021
(2)	Preliminary review of the information obtained and establishing of contacts with experts working in those sites	MedDdSC	1st quarter 2021
(3)	Location of funds	MedDdSC	1st quarter 2021
(4)	Recruitment of co-ordinator for this task	MedDdSC	2nd quarter 2021
(5)	Co-ordinator begins work in collaboration with local experts	Co-ordinator	2nd and 3rd 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 1st 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 ANS 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

6.2 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 3rd quarter 2020) – see Action COORD-01	December 2020
(2)	Workshop	Workshop participants (see methods below)	1st 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	Timeline to be defined during workshop

		coordination with MedDdSC	

- **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 (non 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 3rd quarter 2020) – see Action COORD-01	December 2020
(2)	Identification of a Capacity Building coordinator within the MedDdSC	MedDdSC	1st 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

6.3 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 Units of Conservation.

To support further genetic 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 researches 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 IN AREAS WHERE THIS INTERACTION IS 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.
- **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. 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 MMPAs 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:** Reseach groups conducting photo-id effort on Mediterranean common dolpins
- **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., 2013) that affected the Ionian common dolphins (Bearzi et al., 2003) in the last decades. Nevertheless, there is not information about a genetic differentiation within the all Eastern Mediterranean areas. To collect genetic sample could be a way to evaluate any further genetic differentiation, and the consequent level of conservation of the species within the Eastern Mediterranean Sea, in particularly within the Ionian 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 commons dolphin within the Ionian Sea in both Italian and Greek side would also help to shade light on individual's differentiation/exchange within the investigated area.
- **Method:** To achieve an even distribution of acoustic data, data collection would be carried out for 1 year in different areas of the Ionian Sea: Gulf of Corinth, Gulf of Taranto (North Western Ionian Sea), Northern Eastern Ionian Sea, Southern Western Ionian Sea.

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 dolpins (see evaluation responsibles below)
- **Stakeholders**: Local authorities, Management bodies

EVALUATION RESPONSIBLES

- ACCOBAMS, IWC.
- Life and System Biology Department of the University of Torino, Gaia Research Institute Onlus. Department of Biology University of Bari, Jonian Dolphin Conservation, STIIMA National Research Council of Bari

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)

6.4 MONITORING *(MON)*

ACTION MON-01: LONG RANGE PASSIVE ACOUSTIC MONITORING OF COMMON DOLPHIN THROUGHOUT THE MEDITERRANEAN

DESCRIPTION

- **Specific objective**: To carry out long range passive acoustic monitoring within the whole Mediterranean in order to verify the presence and occurrence of the species concurrently studies primarily through visual surveys, and consider acoustics as a tool to distinguish management units in combination with other source of data (genetic, morphological, etc).

ACTORS

- **Responsible for coordination of the action:** MedDdSC
- **Responsible for execution of the action:** Research groups/individuals conducting with the expertise to undertake the action
- **Stakeholders**: shipping companies, fisheries authorities, nautical tourism companies, ports authorities and coastguards.

EVALUATION RESPONSIBLES

- ACCOBAMS, IWC.

PRIORITY

- **Importance**: Moderate
- **Feasibility**: Moderate

BUDGET

- TO BE DEVELOPED

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 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 a specially 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.
- An 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 3rd 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)	1st 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 the 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 pro-active 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)

7 EXECUTIVE SUMMARY OF ACTIONS

7.1 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

7.2 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).

7.3 ACTIONS

7.3.1 Coordination actions

Nr.	Action	Impor-tance	Feasibi-lity	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

7.3.2 Capacity building and public awareness actions

Nr.	Action	Impor-tance	Feasibi-lity	Crossref.
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	

7.3.3 Research actions essential for providing adequate management advice

Nr.	Action	Impor-tance	Feasibi-lity	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 COMMON DOLPHIN UNDERWATER BEHAVIOR AROUND TOWED BOTTOM TRAWLS**	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	

7.3.4 Monitoring actions

Nr.	Action	Impor-	Feasibi-	Crossref.

		tance	lity	
MON-01	Long range passive acoustic monitoring of common dolphin throughout the Mediterranean	MODERATE	MODERATE	RES-04

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

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II - STATUS REPORT ON DRAFT CONSERVATION MANAGEMENT PLAN ON BOTTLENOSE DOLPHIN

Conservation Management Plan for the Mediterranean Bottlenose dolphin (*Tursiops truncatus*) – 10.10.2018 (draft)

by Guido Gnone (MBCP Coordinator)

INTRODUCTION

The bottlenose dolphin (*Tursiops truncatus*) is a cosmopolitan dolphin, distributed in all the oceans of the world, excepted the polar and sub-polar waters. The IUCN classifies this species in the "Least concern" category on a global level, while in the Mediterranean Sea it is considered Vulnerable (Reeves and Notarbartolo di Sciara, 2006).

Thanks to its behavioural flexibility and opportunistic behaviour, which make this dolphin able to exploit new resources and bypass impediments, the bottlenose dolphin seems not to be in an endangered status on a Mediterranean level. However the lack of data available, especially in the southern portion of the basin, and the scattered knowledge of the species abundance also in the north, could hide a negative trend in the species presence and. It is therefore urgent to fill up the knowledge gaps, identify outstanding potential threats and to put in place a consistent Conservation Management Plan (CMP) to consolidate the conservation status of the species and prevent future problems. The long term conservation experience teaches that it may be very difficult to intervene to protect a species when its decline is highly manifested, while prevention is much safer, cheaper and successful. An effective CMP should be developed and implemented before populations become critically endangered (Donovan *et al*., unpublished).

The present CMP will try to draw up the best possible management procedure of the Common bottlenose dolphin (meta)population of the Mediterranean sea, starting from the available present knowledge but with a perspective view to a time when the knowledge gaps will be filled and the CMP will be updated to fit these.

The main challenge will be to develop and implement an effective CMP in an area (the Mediterranean Sea) which, in spite of its geographical continuity, is fragmented in countries and continents with different conservation cultures, making more difficult to implement a fully shared management program.

Taking this into account, we tried to develop a CMP which could be **simple and feasible** in its implementation, starting from the regulatory framework already in force in most of the countries involved and trying to get the best from the current context.

The main potential threats identified for the target species are the contraction and degradation of the habitat, overfishing and conflict with fishermen, contamination of the food chain and epidemics. For each of this threat we identified mitigation actions, acting on three main items: political and regulatory, stakeholder engagement, and education and awareness (which should also include the valorisation of the natural environment). At the present state we did not identify any concrete, field activity which could further contribute to the conservation of the Mediterranean bottlenose dolphin (meta)population.

Fundamental component in the CMP implementation will be the **Monitoring system**, which will be based on the ACCOBAMS zonation (subareas), with a strong effort to connect the local realities in a solid network, coordinated by a Steering Committee and its Coordination Centre. The network will have to guarantee the continuity of the system over space and time, favouring the implementation of the mitigation actions (from the centre to the periphery) and monitoring data flow (from the periphery to the centre).

The monitoring network should be able to verify the goodness and feasibility of the mitigation actions and to observe possible changes in the presence and abundance of the target species. The system activity will also allow to identify and prioritize the knowledge gaps, in order to plan specific research campaigns.

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THE TARGET SPECIES (*Tursiops truncatus*)

The common bottlenose dolphin (*Tursiops truncatus* Montagu, 1821) is a cosmopolitan Delphinidae; its distribution is usually contained within the 45th parallel in both hemispheres, in tropical and temperate waters, but in the North Atlantic it can reach the 65th parallel (Rice, 1998; Wells and Scott, 1999). This wide distribution is associated with a remarkable morphometric differentiation among populations, which led to 20 species classified in the 1960s (Hershkovitz, 1966). Today most authors identify the majority of the forms in two species: the common bottlenose dolphin (*Tursiops truncatus* Montagu, 1821) widely distributed worldwide, and the Indo-Pacific bottlenose dolphin (*Tursiops aduncus* Ehrenberg, 1833) with an Indo-Pacific distribution (Ross and Cockcroft, 1990; Hale et al., 2000). A third species, with a limited distribution in Southern Australia and Tasmania, was recently proposed as a separated species with the common name of Burrunan dolphin (*Tursiops australis* sp. Nov.) (Charlton-Robb et al., 2011). Within the species *Tursiops truncatus*, the presence of two genetically different ecotypes, one with primarily coastal habits and the other with primarily offshore habits, has been described by various authors in different areas of the world (Ross, 1977, 1984; Walker, 1981; Duffield et al., 1983; Hersh and Duffield, 1990; Van Waerebeek et al., 1990; Mead and Potter, 1995; Hoelzel, 1998).

Bottlenose dolphins are found in a wide variety of habitats, and habitat use by resident populations differs between locations. This heterogeneity in habitat preference is associated with a behavioural flexibility; these dolphins are able to display a variety of tactics and strategies to capture different preys in different habitats, ranging from individual to highly coordinated group hunting techniques (Wells and Scott, 2002). These local specializations are most probably culturally transmitted through a matrilineal route (Barros and Odell 1990; Kopps et al. 2014), allowing a more efficient exploitation of local resources and a transgenerational update to changes. The plasticity in foraging behaviour is accompanied with a plasticity in the pattern of association, a flexible social model which was defined as “fission–fusion society” (Connor et al. 2000).

As part of this opportunistic behaviour, bottlenose dolphins can learn to get the fish from trawls, gillnets and fish cages for aquaculture as an integral part of their feeding strategies. This behaviour can generate a partial dependence on human activity, triggering conflicts with fishermen and is a concern in many areas of the world including the Mediterranean Sea (Chilvers and Corkeron, 2001; Lauriano et al., 2004; Diaz Lopez, 2006; Gonzalgo et al., 2008; Barros and Odell, 1990; Blasi and Boitani, 2012; Brotons et al., 2008; Corkeron et al., 1990; Fertl and Leatherwood, 1997; Pace et al., 2003).

The bottlenose dolphin is considered a commonly occurring species in the Mediterranean Sea (Pilleri and Gihr, 1969; Cagnolaro et al., 1983; Notarbartolo di Sciara and Demma, 1994) and occurs in most coastal waters of the basin (Bearzi and Fortuna, 2006). No differing ecotypes of bottlenose dolphin have been described in the Mediterranean Sea. According to Notarbartolo di Sciara and Demma (1994) the Mediterranean population is more related to the inshore ecotype, because of its shallow water habits, while Cañadas et al. (2002), reporting the distribution of the bottlenose dolphin off southern Spain, suggested a closer link with the

offshore Atlantic ecotype. Gnone et al. (2005) investigated the distribution of bottlenose dolphin strandings along the Italian peninsula over a period of 18 years (1986–2002) and found a strong positive correlation with the extent of the continental shelf facing the coast line, suggesting that bottlenose dolphins tend to be more abundant in shallow water areas, within the 100m isobath. However the presence of different ecotypes in the Mediterranean Sea cannot be excluded at this stage, since very few genetic studies have been conducted in the basin; Natoli et al. (2005) investigated the genetic diversity of bottlenose dolphin populations along a continuous distributional range from the Black Sea to the eastern North Atlantic and found clear population structures over the geographical range, coinciding with transitions between habitat regions. Laran and co-authors reported of an offshore distribution of a large number of individuals detected during aerial surveys (Laran et al., 2017).

The bottlenose dolphin is regularly present in the Pelagos Sanctuary (the SPAMI located in the NW portion of the basin, across Italian, French waters, including the principality of Monaco). About 1000 individuals were estimated to live within this area in 2006 (Gnone et al. 2011), with an heterogeneous distribution over the continental shelf (within 200 m depth). The dolphins here show a clear philopatric behaviour, performing maximum displacements of about 50 km (on average). Local specializations, possibly in the feeding techniques, seem to produce a segregation between neighbouring dolphins and a clusterization of the (meta)population in discrete geographical units or subpopulations (Gnone et *al*., 2011). The connectivity through the units seems to retrace the landscape traits and its habitat breakages (Carnabuci *et al*., 2016). This kind of distribution of the species along the continental may represent a model for the distribution of the bottlenose dolphin in the Mediterranean Basin.

The shallow water preference of the bottlenose dolphin in the Mediterranean waters seems be related to the feeding habits of the species, preying mostly on benthic and demersal fishes (Voliani and Volpi, 1990; Orsi Relini et al., 1994; Miokovi ć et al., 1999; Blanco et al., 2001).

The Mediterranean Bottlenose dolphin population has been classified as Vulnerable by the IUCN in its report on the Status of Cetaceans in the Mediterranean and Black Sea (Reeves and Notarbartolo di Sciara, 2006). *Tursiops truncatus* is also listed in the Annex II of the Habitats Directive (Council Directive 92/43/EEC), as a Species of Community Interest. According to *Bearzi et al*. (2004) deliberate killing, overfishing (prey depletion), and habitat degradation may have caused a considerable reduction (about 50%) of the bottlenose dolphin population in the northern Adriatic Sea. Bearzi and Fortuna (2006) and Bearzi et al. (2008) suggest a similar reduction should be applicable to the whole of the Mediterranean basin, with a current total population of less than 10,000 animals, representing a decrease of about 30% in the last 60 years. These results should be taken as the best possible estimate considering the extreme data shortage, especially in the southern portion of the Mediterranean Sea.

According to a survey carried out in 2013, through a questionnaire distributed to all the subarea coordinators within the ACCOBAMS framework, (see annex 1) the bottlenose dolphin would be regularly present in all the subareas of the basin (fig. 1), with different trends in abundance. The main potential threats for the bottlenose dolphin conservation would be overfishing, chemical pollution and boat traffic (the survey was actually testing the perception

of the subarea coordinators, despite the shortage of the data available so the results should be taken in this respect).

In table 1 are resumed the abundance estimates for some bottlenose dolphin geographical units within the Mediterranean Sea (Bearzi and Fortuna, 2006, integrated with data from Gnone et *al*., 2011; Lauriano *et al*., 2014)

Geographic Area	**Study area** (km2)	**Sampled area**	**Years**	**Density** (animals / km2)	**N**	**CV**	**95% CI**	**Estimation method**	**Source**
Strait of Gibraltar	500	in- & offshore	2005	0.51	258	0.08	226-316	Mark-recapture (closed population)	De Stephanis *et al*., 2005
Alboran Sea (Spain)	11,821	in- & offshore	2000-2003	0.049	584	0.28	278–744	Distance sampling & GAMs	Cañadas & Hammond, 2006
Almeria (Spain)	4,232	in- & offshore	2001-2003	0.066	279	0.28	146–461	Distance sampling & GAMs	Cañadas & Hammond, 2006
Asinara island National Park (Italy)	480 2004	inshore	2001	0.05	22	0.26	22–27	Mark-recapture (closed population)	Lauriano *et al*., 2003
Balearic Islands & Catalonia (Spain)	86,000	in- & offshore	2002	0.088	7,654	0.47	1,608-15,766	Distance sampling	Forcada *et al.,* 2004
Alboran sea and Murcia	17,987	in- & offshore	2004-2005	0.072	1288	-	-	Distance sampling & GAMs	Cañadas, unpublished
Gulf of Vera (Spain)	6,164	in- & offshore	2003-2005	0.042	256	0.31 1	88–592	Distance sampling & GAMs	Cañadas, unpublished
Valencia (Spain)	32,270	in- & offshore	2001-2003	0.041	1,333	0.31 739-	2,407	Distance sampling	Gomez de Segura *et al.,* 2006

Tunisian waters	~ 750	inshore	2001 & 2003	0.19	-	-	-	Distance sampling (uncorrected)	Ben Naceur *et al.,* 2004
Lampedusa island (Italy)	200	inshore	1996-2000	-	140				
Israeli Mediterranean coast (Israel)	-	inshore	1999-2004	-	85				
Ionian Sea (Greece)	480	inshore	1993-2003	-	48				
Amvrakikos Gulf (Greece)	400	inshore	2001-2005	0.38	152	-	136-186		
Central Adriatic Sea (Kornati & Murtar Sea, Croatia)	300	inshore	2002	-	14				
North-eastern Adriatic Sea (Kvarneric, Croatia)	800	inshore	1990-2004	-	120				
North-eastern Adriatic Sea (Kvarneric, Croatia)	1,000	inshore	1997	0.06	113				
North-eastern	2,000	inshore	2003	0.05	102				

Adriatic Sea (Kvarneric, Croatia)									
North Adriatic Sea (Gulf of Trieste, Slovenia)	600	inshore	2002-2004	0.08	47				
Pelagos Sanctuary	87,500	in- & offshore	2006	-	1,023	-	848-1234	Mark-recapture (closed population)	Gnone *et al.*, 2011
Western Mediterranean Sea		in- & offshore	2010-2011	0.005	1,676	0.3825	804-3492	Distance sampling (aerial survey)	Lauriano *et al.*, 2014

Tab. 1 - Summary of abundance of bottlenose dolphins in the Mediterranean basin from Bearzi and Fortuna, 2006 (integrated with data from Gnone et *al*., 2011; Lauriano *et al*., 2014).

CMP GOALS

The present CMP will try to draw up the best possible management of the Common bottlenose dolphin (meta)population of the Mediterranean Sea, starting from the available present knowledge. According to the experience of the authors, the CMP implementation will start with simple and feasible objectives, taking advantage of already in force structures/systems whenever possible and adjusting the route along the way, according to the results produced.
The present goal of the bottlenose dolphin CMP (Tt-CMP) is to keep the Common bottlenose dolphin Mediterranean (meta)population to the present level (distribution, density, abundance - see the attributes) or (if future findings may suggest) to a higher level that could guarantee the subsistence of the same (meta)population despite potential negative events such as epidemics, climatic change, striking pollution events (oil spills) or other.

- Aim for the species
    - To keep at present level or higher (if needed for save conservation)
- Aim for the environment
    - To prevent further habitat constriction, deterioration, fragmentation
    - To prevent further anthropization of the bottlenose dolphin habitat
    - To prevent further decrease of fishery resources
    - To decrease the pollution level of the food chain
- Aim for stakeholders
    - To prevent environment deterioration
    - To promote environment valorisation
    - To keep the fishery resources at the present level or higher
    - To promote safer (less polluted) fish consumption

In order to optimize the costs and improve the results, the Tt-CMP should be developed and implemented together and consistently with the CMPs of other Cetacean species on a Mediterranean level, as each species may serve as a control for the others. The results over time and space should be compared to identify possible deviations in the presence of the each different species.

GOVERNANCE

The Tt-CMP will be organized following the ACCOBAMS zonation for the Mediterranea area and related subarea coordinators (fig. 1, tab. 1). In order to facilitate the role of the coordinators, the subareas have been designed trying to overlap their limits with the political borders.
The implementation of the Tt-CMP guidelines and actions will follow a centre-periphery flow (from the Coordinator centre to the subareas), while the data flow for the monitoring activity will follow a periphery-centre flow (from the subareas to the Coordinator centre).

Fundamental subjects of the Tt-CMP are the following:

- Steering Committee

- Coordination centre
- Tt-CMP Coordinator
- Tt-CMP subarea coordinators
- Scientific Committee

Steering Committee

The SC is composed by the Tt-CMP coordinator and the subarea coordinators. The SC checks that the Tt-CMP is implemented according to the original goals. It approves the annual report and possible adjustments of the Tt-CMP aims according to the contents of the same report, after listening to the technical opinion of the Scientific Committee.

Tt-CMP Coordination centre

It is an operational tool of the Steering Committee and is coordinate by the Tt-CMP Coordinator. Its role is to coordinate the monitoring network, validate the data and process the Annual report to be submitted to the Steering Committee.

Tt-CMP Coordinator

He/She coordinates and supervise the Coordination Centre and the proper implementation of the Tt-CMP, linking the activity of the different subareas and promoting the data flow to and from the subareas.

Scientific Committee

It is an independent body that gives a scientific evaluation of the annual report of the Tt-CMP and may suggest possible adjustments of the same Tt-CMP goals and actions.

CMP subarea coordinators

The subarea coordinators have to promote the right implementation of the Tt-CMP (and related actions) in their subarea of competence (from the centre to the periphery). At the same time they have to favour the data flow of the Monitoring system from to the periphery to the Coordinator centre. The subarea coordinators are part to the Steering Committee.

Annual report

Is the main document produced by the Tt-CMP (based on the Tt-CMP actions and monitoring activity) and has to work as a rudder for the Tt-CMP implementation and adjustment over time. The Annual Report is processed by the Coordination Centre (under the direction of the Tt-CMP Coordinator) on the base of the monitoring activity. It must be approved by the same Steering Committee after the technical opinion of the Scientific Committee

Adjustment process

On the base of the Annual Report redaction and approval, the Steering Committee may decide adjustments in the Tt-CMP goals and consequent actions.

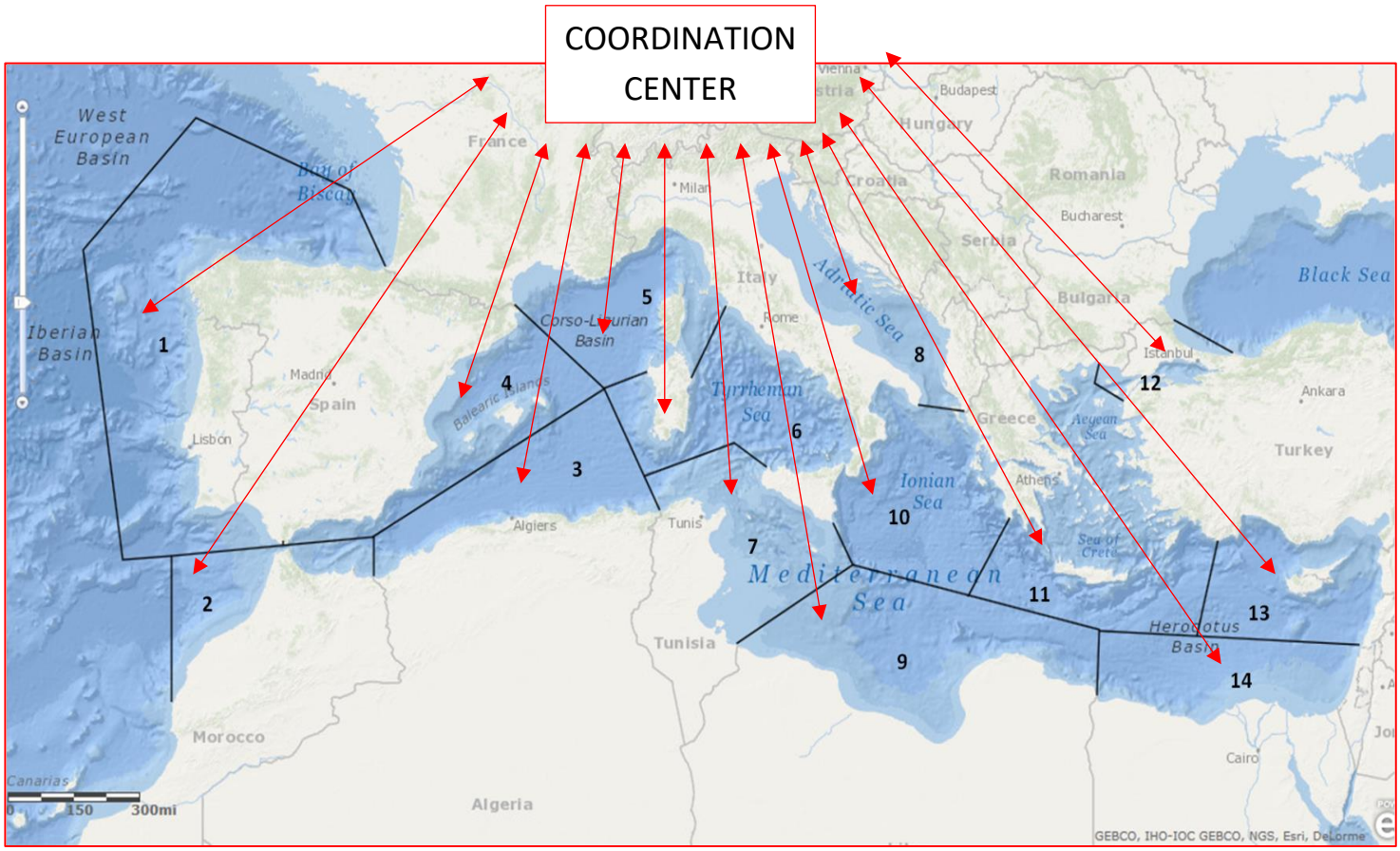


Fig. 1 – The ACCOBAMS zonation in 14 subareas (see tab. 2 for subarea coordinators)

	GENERAL COORD.	NATIONALITY	AFFILIATION	EMAIL
	Guido Gnone	Italy	Fond. Acquario di Genova	ggnone@acquariodigenova.it
SUB-AREA	SUBAREA COORD.			
1	Marina Sequeira	Portugal	ICNF	Marina.Sequeira@icnf.pt
2	Sadia Belcaid	Morocco	INRH	sadiabelcaid@hotmail.com
	Said Benchoucha	Morocco	INRH	bench2468@yahoo.fr
3	Assia Henda	Algeria		henda_assia@yahoo.fr
4	Ana Cañadas (est)	Spain	ALNILAM	anacanadas@alnilam.com.es
	Manuel Gazo (west)	Spain		manelgazo@submon.org
5	Léa David (est)	France	écoOcéan Institut	lea.david2@wanadoo.fr
	Guido Gnone (west)	Italy		ggnone@acquariodigenova.it
6	Giancarlo Lauriano	Italy	ISPRA	giancarlo.lauriano@isprambiente.it

7	Medhi Aissi	Tunisia		mehdi.aissi@gmail.com
8	Drasko Holcer	Croatia	Blue World Institute	Drasko.Holcer@blue-world.org
9	Ibrahim Benamer	Lybia		benamer.ly@gmail.com
	Almokhtar Saied	Lybia		mok405@yahoo.com
10	Joan Gonzalvo Villegas	Spain	Tethys Res. Institute	joan.gonzalvo@gmail.com
11	Ayhan Dede	Turkey	Instanbul University	aydede@istanbul.edu.tr
12	Bayram Öztürk	Turkey	Instanbul University	ozturkb@istanbul.edu.tr
13	Milad Fakhri	Lebanon		milosman@cnrs.edu.lb
14	Mahmoud Fouad	Egypt		mahmoud_ncs@yahoo.com

Tab. 2 – The subareas coordinators according to the ACCOBAMS zonation (see fig. 1).

THREATS

The Bottlenose dolphin, thanks to its behavioural flexibility and opportunistic attitude, was able to adapt to a changing and anthropizing environment to survive to the present time. Despite a possible decline in abundance, the species is still present along most of the Mediterranean coasts. Still it is possible to identify potential threats to its good conservation status, based on literature available and precautionary principles.

Following a survey conducted in 2013 within the ACCOBAM framework (see annex 1) through the subarea coordinators (see tab. 1) and asking to rank the potential threats for the bottlenose dolphin in their area of competence, overfishing, chemical pollution and boat traffic were indicated as the most impacting threats for the species.

Conflict with fisherman (possibly resulting in deliberate killing) and bycatch are a problem in many areas of the basin.

Epidemics may represent an unpredictable phenomenon that can affect severely some demographic units or subpopulation.

- Habitat change, reduction and fragmentation

  In the Mediterranean context the bottlenose dolphin seems to find its favourite habitat over the continental shelf, being the only Mediterranean dolphin sighted mostly in shallow waters <200m. This species seems to be able to exploit all the shelf waters right to the coast line (Gnone *et al*., 2011) but The presence of man in its original habitat has strongly increased in the last century, due to the new potential of exploitation produced by the industrial revolution and its technological conquests, first of all the petrol engine and its progressive implementation in fishing industry, maritime transport and tourism. As a consequence, the presence of man in the original bottlenose dolphin habitat has increased greatly together with the weight (impact) of its activity on the same habitat. This has

produced a change in the marine environment and most probably a reduction of the habitat potentially exploitable by the bottlenose dolphin. In particular we here refer to the rapid growth of maritime traffic, which has probably reached its peak in the last decades. In the summer, touristic season, pleasure boating may reach very high level in some portion of the coastal marine band, producing a (temporary) reduction and fragmentation of the habitat potentially exploited by the bottlenose dolphin in its vital activities, such as foraging and breeding (David, 2001; Papale *et al*., 2011). In some areas, where the continental shelf is very narrow, pleasure boating may almost saturate the bottlenose dolphin habitat, breaking its continuity and forcing the animals to aggregate in other areas. The impact is given by acoustic pollution produced by the engines but also (and may be more heavily) by the direct harassment of the boats (especially high speed boats). The continuous traffic of boats can make a wide portion of habitat poorly productive, since the animals have to keep continuous attention to vessels to avoid collisions and harassment. The potential threats increase as the speed of the boats increases, forcing the possibility of the dolphins to get safely away. However, since touristic activity are not traditionally associated to negative impact to wild animals, there is no limitation to the presence of pleasure boating, neither limitation to the speed of the boats (with very few exceptions). Even the Marine Strategy does not mention pleasure boating has a potential impact for wild marine population and no limitations are foreseen in this respect. Still the impact of pleasure boating in some sensitive areas of the bottlenose dolphin habitat may be significant and a further (and uncontrolled) development of this human activity should be of concern in the Tt-CMP.

- Overfishing and decrease of fish resources

  The new technologies in marine fishery also produced a great increase in the exploitation potential of the marine resources during the last century. This, together with the new techniques for fish conservation and transportation, has produced a strong increase in the fish request and consumption. Overfishing has produced a drastic reduction of some fish stocks, overexploited with new and more efficient fishing techniques, possibly including some bottlenose dolphin preys such as the Mediterranean hake (*Merluccius merluccius smiridus*) (Orsi Relini *et al*., 2002), which is usually fished with trawlers. However the bottlenose dolphin has learned to feed opportunistically on trawlers wake, taking advantage of the collection action of the net. In this context it may be difficult to understand if the advantage coming from the opportunistic feeding on trawlers could overcome the negative effect of overfishing (see also mitigation actions).

- Conflict with fishermen and bycatch

  As a consequence of their opportunistic attitude, bottlenose dolphins may be perceived as competitors or stealers by the fishermen. Furthermore their opportunistic action on nets (gillnets) can cause damages to the fishing gear and exacerbate the conflict (Diaz Lopez, 2006; Snape *et al.*, 2018). Fishermen may therefore adopt brutal solutions to discourage the dolphins and protect their fishing activity. Deliberate killing, as the most

extreme solution, could impact on small demographic units. Bycatch may also be a consequence of the opportunistic activity of the dolphins on the fishing gears.

- Pollution of the food chain
  Preying mostly on benthic and demersal fish, bottlenose dolphins are exposed more than other Cetaceans to chemical pollution from persistent organic pollutants, through bioaccumulation and biomagnification mechanisms. High level of PCB, DDT and heavy metals were found in the tissues of bottlenose dolphins sampled in the Mediterranean Sea, when compared with Atlantic individuals (Marsili and Focardi, 1997; Aguilar *et al*., 2002; Fossi and Marsili 2003; Storelli *et al*., 2007; Shoham-Frider *et al*., 2009; Romanić *et al*., 2014). These pollutant may cause a decrease of the fitness of the individual on a long term, causing immunodeficiency, decreased fertility and an increase in neonatal mortality (since the mother will release pollutants with lactation). The pollution of the food chain may therefore take part in decreasing the survival potential of the bottlenose dolphin Mediterranean (meta)population.

- Epidemics
  Epidemics such as Morbillivirus can cause mortality in bottlenose dolphin, especially on those individuals already debilitated by malnutrition and/or pollution from persistent organic pollutants. Local demographic units could be severely impacted by these epizootic outbreaks (Birkun, 2006).

KNOWLEDGE GAPS

To be able to implement a consistent Tt-CMP it will be needed to fill some knowledge gaps. According to Carnabuci and co-authors (2016) the Bottlenose dolphins is distributed over continental shelf with distinct geographical units or (sub)populations, residing in a certain area and with a local specialization on the habitat. For a proper Tt-CMP implementation and monitoring it is crucial to identify these units, their geographical borders and their size consistency on a Mediterranean level. At the present time these knowledges are partially

available only for a few units, mostly (but not only) in the northern portion of the Mediterranean Sea (see tab. 1).

New knowledges in this regard may come from some recent research projects, such as TursioMed. TursioMed is aimed at assessing the conservation status of the bottlenose dolphin in the Mediterranean Sea. The project is based on a Mediterranean network, using a Web-GIS platform as a common tool and support for data sharing (www.intercet.it). This project may also represent o fruitful experience for implementing the Tt-CMP monitoring system (see **Monitoring system** section).

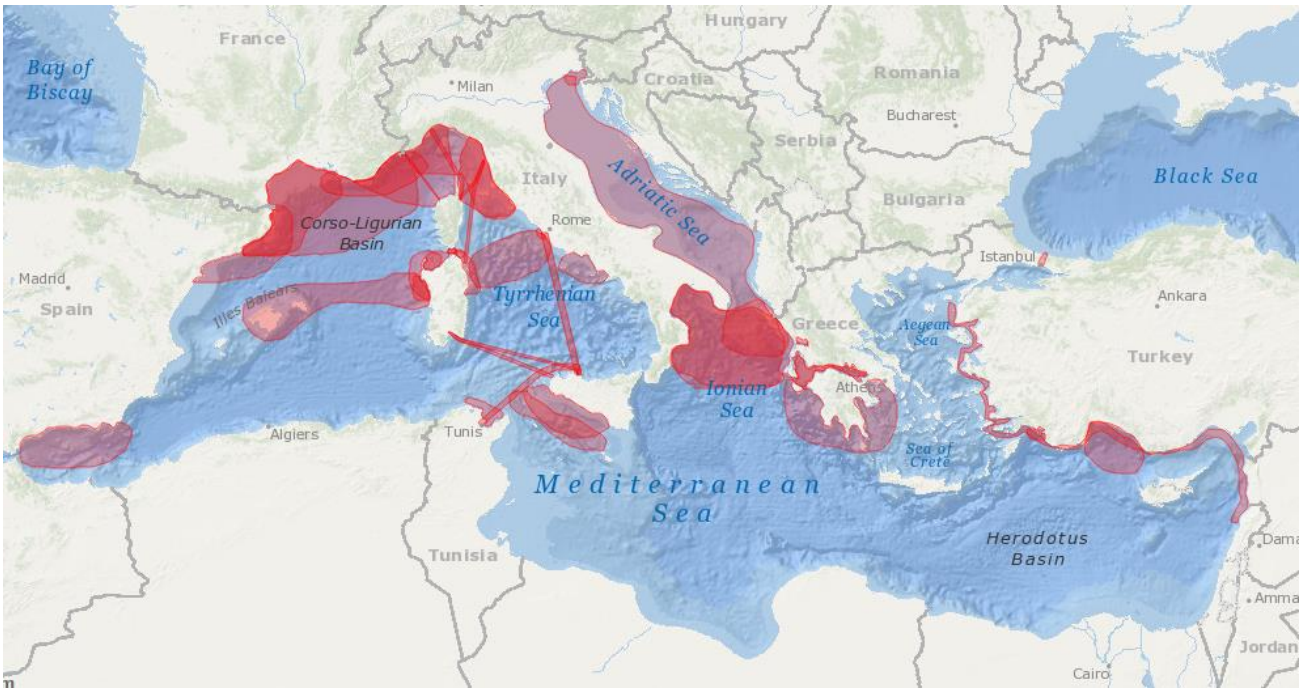


Fig. 2 – the study areas covered by the TursioMed project.

REGULATORY FRAMEWORK

One of the main challenge of the Tt-CMP is to manage and protect the bottlenose dolphin in an area (the Mediterranean Basin) were many different cultures and traditions coexist on the same sea coasts. This can make quite difficult to overcome the regional and national regulatory framework to establish a general management and conservation strategy for the target species.

However there are at least some agreements and conventions that can give continuity and homogeneity to the conservation effort (see below). Despite the fact that only one of these was designed specifically for Cetaceans protection (ACCOBAMS), most of them have targets

that support Cetacean conservation on a certain level (see also the paragraph on the Marine Strategy Framework Directive).

- CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Washington Convention). The convention entered in to force in 1975 and is aimed at ensuring that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild. The Convention has 183 parties all over the globe (see fig. 3).

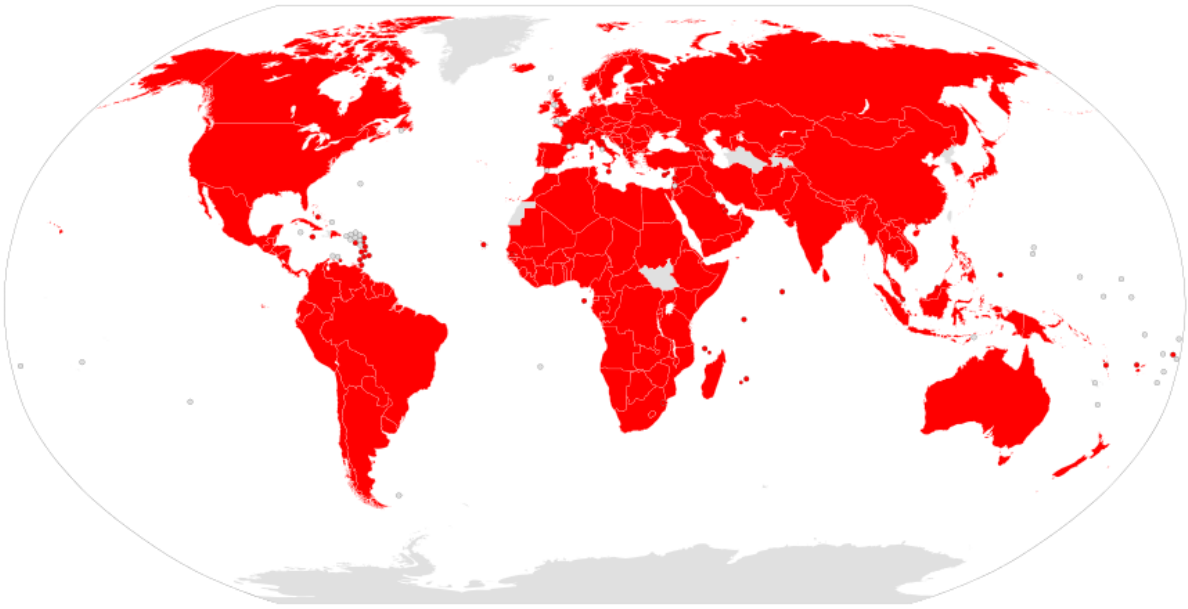


Fig. 3 - Parties to the CITES treaty (183)

- The Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. It is a regional convention adopted in 1976 to prevent and abate pollution from ships, aircraft and land based sources in the Mediterranean Sea. The Convention has 22 contracting parties, including all the Mediterranean countries (fig. 4)

Fig. 4 - Barcelona Convention contracting parties (22)

- The Bern Convention on the Conservation of European Wildlife and Natural Habitats. It is a binding international legal instrument in the field of Nature Conservation. The Convention came into force in 1982 and has 51 parties, including four in Africa. The appendices to the Bern Convention served as the model for the annexes to the Habitats Directive (see below).

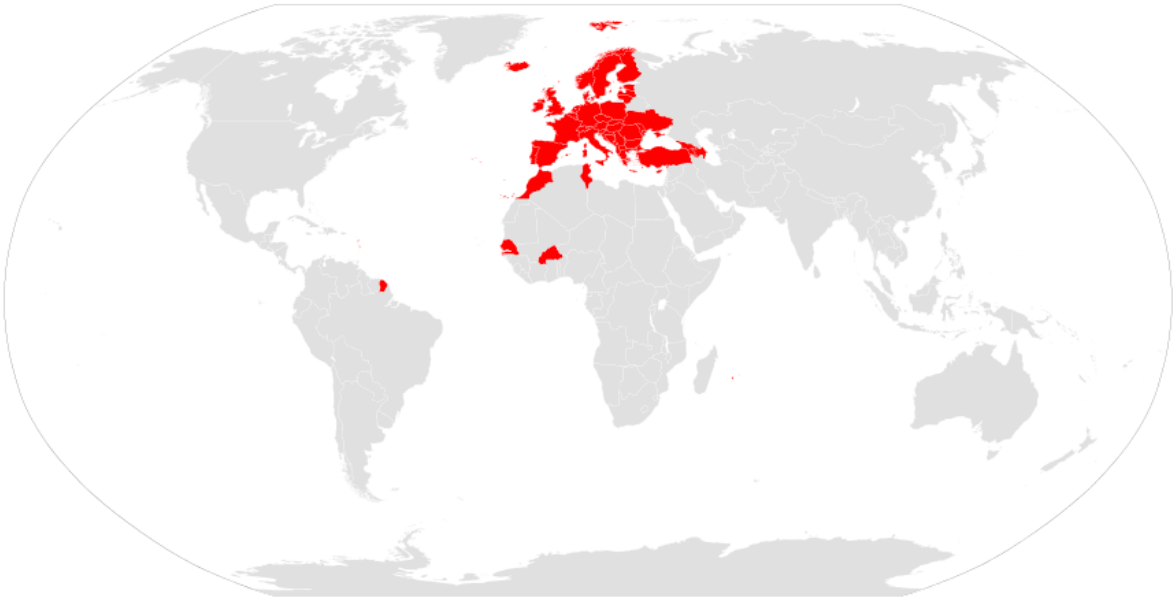


Fig. 5 – Bern Convention contracting parties (51)

- CMS (Bonn Convention) – The Convention on the Conservation of Migratory Species of Wild Animals. The Convention entered in to force in 1983 and is aimed at protecting the migratory animals and their habitats; CMS has 126 parties. The Mediterranean

bottlenose dolphin (*Tursiops truncatus*) is listed in Appendix II since 1991, while the Black Sea bottlenose dolphin (*Tursiops truncatus ponticus*) is listed in Appendix I since 2009.

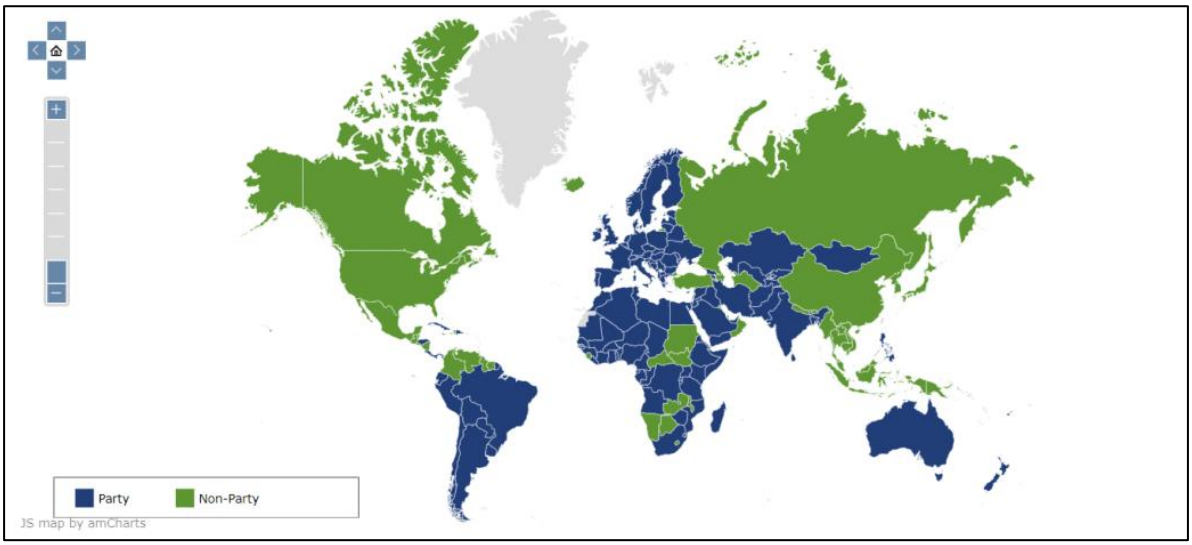


Fig. 6 – CMS contracting parties (126)

- Habitats Directive - Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora. It is a European Union directive adopted in 1992 as an EU response to the Berne Convention. Its goal is to protect nature and wildlife through a network (Natura 2000) of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). *Tursiops truncatus* is listed in Annex II of the Directive (species requiring designation of Special Areas of Conservation).

Fig. 7 – The EU countries (28) cover a good portion of the northern Mediterranean Sea.

- ACCOBAMS - Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic Area. The Agreement entered into force in 2001 as a legal conservation tool to reduce threats to Cetaceans by improving knowledges. ACCOBAMS has 24 parties which include almost the totality of the Mediterranean and Black Sea countries.

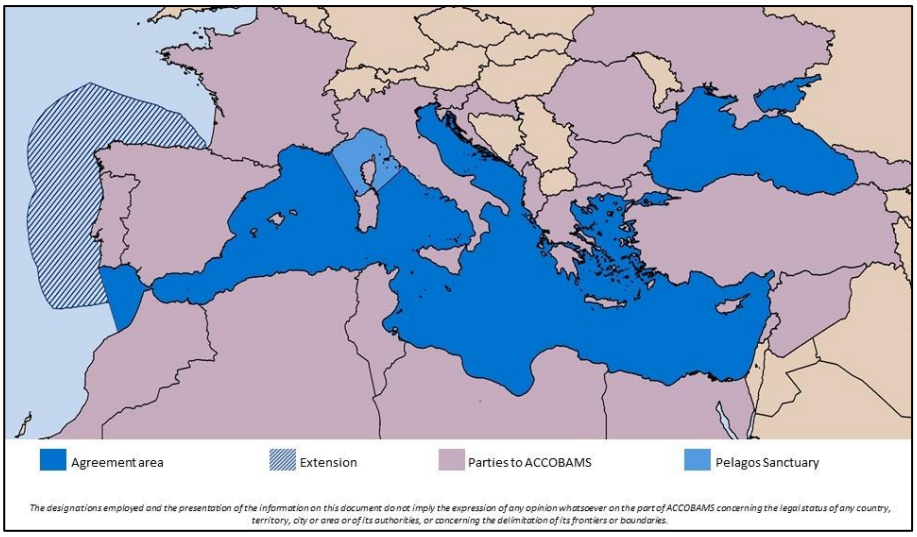


Fig. 7 - ACCOBAMS parties include almost the totality of the Mediterranean countries.

- Marine Strategy Framework Directive (MSFD)
  The MSFD is a EU directive adopted in 2008 and aimed at achieving or maintaining Good Environmental Status in European seas and has descriptors (see below) that should be able to target most of the threats identified by the Tt-CMP (with the only

possible exception of the harassment caused by pleasure boating where a specific awareness action may be needed - see **Threats** and **Mitigation actions** sections).

Marine strategy Framework Directive (descriptors)

- **Descriptor 1: Biodiversity**
  The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.

- **Descriptor 2: Non-indigenous Species**
  Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.

- **Descriptor 3: Commercial Fish and shellfish**
  Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.

- **Descriptor 4: Food Webs**
  All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.

- **Descriptor 5: Eutrophication**
  Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.

- **Descriptor 6: Sea-floor Integrity**
  Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

- **Descriptor 7: Hydrographical Conditions**
  Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.

- **Descriptor 8: Contaminants**
  Contaminants are at a level not giving rise to pollution effects.

- **Descriptor 9: Contaminants in Seafood**
  Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.

- **Descriptor 10: Marine Litter**
  Properties and quantities of marine litter do not cause harm to the coastal and marine environment

- **Descriptor 11: Energy incl. Underwater Noise**
  Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

MITIGATION ACTIONS

Following the structure of the Tt-CMP, based on the zonation of the ACCOBAMS area (fig. 1. see also the **Governance** section), the mitigation actions will be implemented in each subarea with the support (and under the supervision) of the subarea coordinator (from the Coordination centre to the periphery), following the procedures established by the Steering Committee.
At the present state of the knowledge no concrete actions are foreseen to meet the goals of the Tt-CMP, believed that a strict compliance of the regulations already in force should guarantee the protection of the Bottlenose dolphin (meta)population at the present level. The mitigation actions are directed on three main items: a) political and regulatory, b) stakeholder engagement, c) education and awareness, which should also include the valorisation of the natural environment.

- **Habitat change, reduction and fragmentation**
  a. Political and regulatory
     - Promote a stricter regulation regarding pleasure boating, acting on local, national and supranational level (with special reference to navigation speed).
     - Avoid a further anthropization of the coasts limiting the construction of new marinas, acting on local, national and supranational level (MSFD – descript. 1, 11).
  b. Stakeholder engagement
     - Local, national and supranational decision makers.
     - Port Authorities and Coast Guard.
     - Boaters and related trade associations.
     - Whale watching operators
     - Research organizations
     - MPA and ASPIM
     - NGOs
     - EAZA (European Association of Zoos and Aquaria)
     - Schools (see education and awareness)
  c. Education, awareness and valorisation
     - Develop and promote an education and awareness campaign focused on the bottlenose dolphin (booklets, leaflets, posters, etc.) to be disseminated to and through the stakeholders (ecology, threats and relationships with man). The

awareness campaign should also be aimed at valorising the marine environment, outputting the importance of the Cetacean fauna in this regard.
    - Develop an education and awareness campaign to outline and promote a sea tourist who is correct and respectful of the sea environment and its fauna , with special focus on Cetaceans and potential impact of human activity on its habitat.

- **Overfishing and decrease of the fish resources**
    a. Political and regulatory
        - Promote a stricter compliance of the regulations already in force to guarantee a sustainable fish taking (fishing stop, maximum size of the net, minimum size of the fish, etc.), acting at local, national and supranational level (MSFD - descript. 3, 4).
    b. Stakeholder engagement
        - Local, national and supranational decision makers
        - Fishermen and related trade associations
        - Port Authorities and Coast Guard
        - Research organizations
        - MPA and ASPIM
        - NGOs
        - EAZA (European Association of Zoos and Aquaria)
        - Schools (see education and awareness)
    c. Education, awareness and valorisation
        - Work in strict relationship with fishermen and related trade associations to promote sustainable fish taking and limit overfishing.
        - Develop and promote an education and awareness campaign focused on the bottlenose dolphin (booklets, leaflets, posters, etc.) to be disseminated to and through the stakeholders (ecology, threats and relationships with man). The awareness campaign should also be aimed at valorising the marine environment, outputting the importance of the Cetacean fauna in this regard.

- **Conflict with fishermen and bycatch**
    a. Political and regulatory
        - Promote a stricter compliance with the regulations already in force that prohibit harming Cetaceans to limit as far as possible deliberate killing by fishermen, acting at local, national and supranational level.
        - Promote possible reimbursement for damaged fishing gears (after verification of the origin of the damage), acting at local, national and supranational level.
    b. Stakeholder engagement
        - Local, national and supranational decision makers
        - Fishermen and related trade associations

- Port Authorities and Coast Guard
- Research organizations
- MPA and ASPIM
- NGOs
- EAZA (European Association of Zoos and Aquaria)
- Schools (see education and awareness)

c. Education, awareness and valorisation

- Work in strict relationship with fishermen to mitigate the conflict with the dolphins and develop new (feasible) methods to limit the damages on the fishing gears.
- Develop and promote an education and awareness campaign focused on the bottlenose dolphin (booklets, leaflets, posters, etc.) to be disseminated to and through the stakeholders (ecology, threats and relationships with man).

- **Pollution of the food chain**

a. Political and regulatory

- Promote a stricter compliance with the regulations already in force that ask to keep contaminants levels in the marine environment and sea food within safety limits (MSFD - descript. 8, 9).

b. Stakeholder engagement

- Local, national and supranational decision makers.
- Port Authorities and Coast Guard.
- Zoo Prophylactic Inst.
- Research organizations.
- MPA and ASPIM.
- NGOs
- EAZA (European Association of Zoos and Aquaria)
- Schools (see education and awareness).

c. Education, awareness and valorisation

- Develop and promote an education and awareness campaign focused on the Bottlenose dolphin (booklets, leaflets, posters, etc.) to be disseminated to and through the stakeholders (ecology, threats and relationships with man). The awareness campaign should also be aimed at valorising the marine environment, outputting the importance of the Cetacean fauna in this regard.

- **Epidemics**

Epidemics are quite unpredictable events that may affects demographic units or (sub)population, causing the death of a certain percentage of individuals. It may be very difficult to prevent this kind of events or even to mitigate their effects. However a (sub)population in good health (in terms of the quality of the habitat, good food supply, low contaminants levels) has higher probability to support and overcome an

epidemics event. The best mitigation action in relation to this threat is then to act successfully on habitat deterioration and constriction, overfishing and contaminants pollution. The collection and analysis of data on stranded animals should allow to recognize these events and possibly to identify the pathogenic agent (see **Monitoring system** section).

MONITORING SYSTEM

Monitoring is a fundamental component of the Tt-CMP, to assess the conservation status of the target species, to evaluate the goodness and effectiveness of the mitigation measures implemented and to identify the knowledge gaps. The Tt-CMP Monitoring system should be able to observe possible trend or deviation in the attributes selected for the target species and to report these to the Coordination Centre, which works as an operational tool of the Steering Committee.

To perform this functions it is important that the data collected on a local level could be aggregated in a network being able to produce results on a Mediterranean scale. Following the zonation of ACCOBAMS (fig. 1), with its 14 subareas and coordinators (tab. 2), a monitoring network will be implemented. The subarea coordinators will have a critical role in promoting the flow of data from their zone of competence to the Coordination Centre. The data collected in each subarea will be shared and aggregated on a Web-GIS platform, which will serve as a common tool for the network implementation and activity.

At least in the starting phase of the Tt-CMP, we should expect an inhomogeneous covering of the Mediterranean area; especially in the southern portion of the basin some areas may have no data available. The system however will allow to monitor the data production over space/time and possibly to plan and support specific local campaigns to fill the gaps. At the same time the monitoring system will allow to plan scientific research on specific items such as genetic, toxicology, pathology, other.

Within the network material and methods for data collection should be normalized as possible and the results produced over time (possibly on a yearly base) should be consistent enough to be compared in historical series, to observe possible trends and deviation in the attributes. The data will be analysed at subarea and basin level, according to the survey effort performed. The Monitoring system should be able to detect a deviation in the attributes of 20-30% in 7-10 years.

It would be important that the monitoring and research systems developed for the Bottlenose dolphin could be integrated as much as possible with the research and monitoring system designed and implemented for the other Cetacean species, to optimize the CMPs costs (especially in data collection) and to improve the results (as each species may work as a control for the others).

The data collected on free ranging animals should be integrated with the data coming from stranded animals to identify possible epidemics and their causes. This will involve a further work of connection with local stranding network.

Monitoring system

- Structure
    - 14 subareas according to the ACCOBAMS zonation (see fig. 1)
    - 14 subareas coordinators (see tab. 2)
    - 1 Coordination Centre (operational tool of the Steering Committee)
- Attributes (see also tab. 3)
    - Distribution area of the target species (km^2)
    - Habitat exploited (theoretical %)
    - Density (Encounter Rate, sightings/km)
    - Abundance estimate of the geographical/demographic units under observation (mark-recapture preferred)
- Data collection (minimum needs)
    - Surveys should be conducted on a yearly base
    - Surveys should be conducted on random track or linear transects
    - The effort track of the research platform should be always recorded
    - Geographical position of each sighting should be recorded together with:
        - Species
        - Number of individuals
        - Number of new-borns and calves
        - Association with human activity (trawlers, gillnets, other)
    - Photo-ID data on the geographical/demographic units under observation should be collected
- Data analysis
    - Data should be analysed on an yearly base
    - Data should be analysed according to the survey effort per cell unit (2X2 km)
    - In each cell the minimum effort needed for standard analysis should be ≥ 4 km/year
    - Abundance should be calculated for the geographical units identified.
    - In order to be able to compare the estimates over time and space it is recommended to use analogous methodology (mark-recapture methodology through photo-ID may produce more accurate estimates on local units).
    - It would be good to have a homogeneous geographical distribution of the demographic units monitored (possibly at least one unit for each subarea).

The photo-ID data may allow to fill some knowledge gaps on the target species: identify the demographic units and their geographical borders, investigate the movements of the individuals, the structure and connectivity of the (meta)population network, demography and reproductive parameters, other.

SUB-AREA[1]	SURFACE[2] (km^2)	EFFORT[3] (km)	COVER[4] (%)	DISTRIBUT. AREA[5] (km^2)	HABITAT EXP.[6] (%)	DENSITY[7] (ER)	ABUNDANCE EST.[8]

1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
MED							

Tab. 3 – The attributes should be measured and analysed for each subarea of the ACCOBAMS zonation and for the all Mediterranean area.

[1] The Med subarea according to the ACCOBAMS zonation (see fig. 1)

[2] The surface (km^2) of the same subarea

[3] The effort (km) within the same sub-area

[4] The effort cover (in %, based on the cell units 2X2 km) within each sub-area

[5] The extension (in km^2) of the target species presence and distribution within the sub-area

[6] The ratio between the potential habitat extension and the extension of the habitat exploited by the target species (in relation to the effort covering).

[7] The density measured as an Encounter Rate (sightings/effort) of the target species in the surveyed cells

[8] The geographical unit/s id

with

Tt - CMP (gen. diagram)

GOALS

- To keep at present level or higher (if needed for save conservation)
- To prevent further habitat constriction, deterioration, fragmentation
- To prevent further anthropization of the BD habitat
- To prevent further decrease of fishery resources
- To decrease the pollution level of the trophic chain
- To prevent environment deterioration
- To promote environment valorization
- To keep the fishery resources at the present level or higher
- To promote safer (less polluted) fish consumption

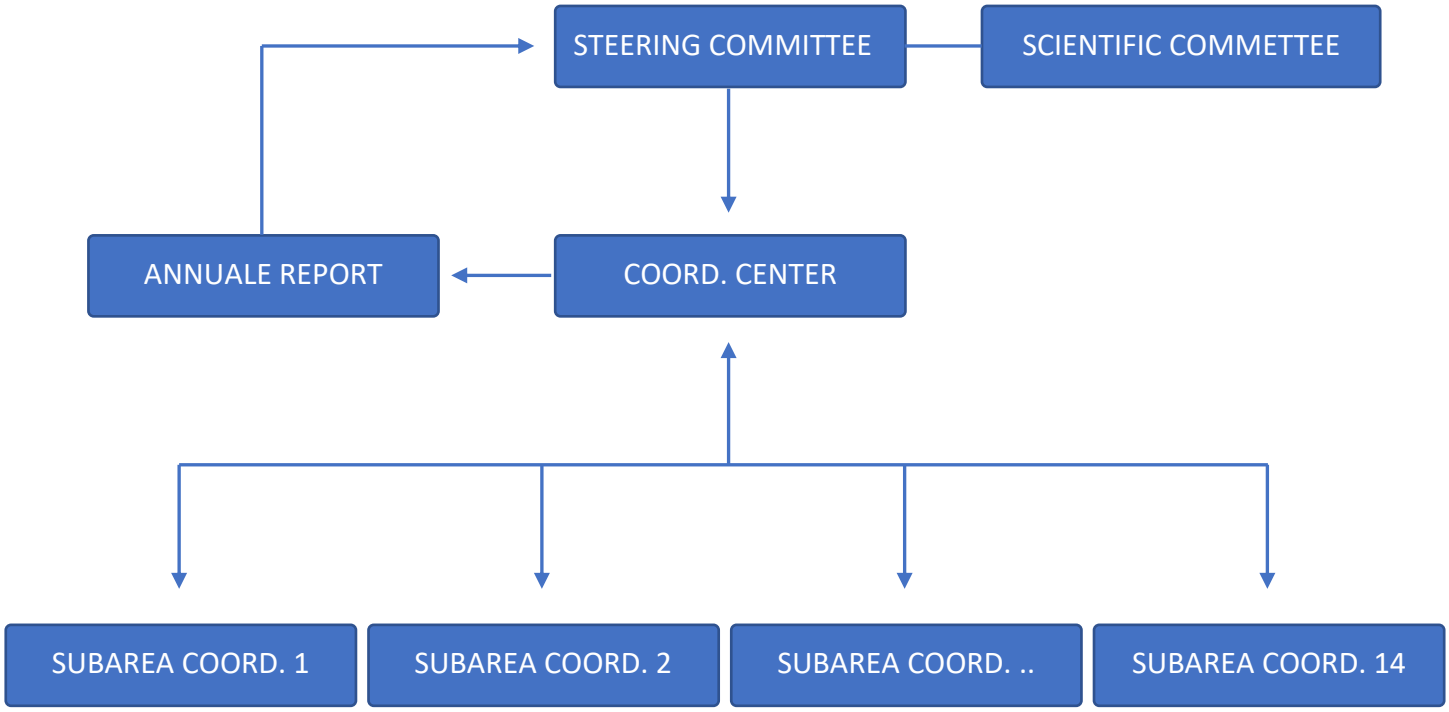
GOVERNANCE

- Steering committee
- General coordinator
- Coordination center
- Subarea coordinators
- Annual report

THREATS

- Habitat change, reduction and fragmentation
- Overfishing and decrease of fish resources
- Conflict with fishermen and deliberate killing
- Pollution of the trophic chain
- Epidemics

Tt - CMP (governance)



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ANNEX 1 – SURVEY RESULTS 2013

SUB-AREA		1	2	3	4	5	6	7	8	9	10a	10b	11	12	13
COORDINATOR		M. Sequeira	A. Cañadas	Z. Boutiba	M. Gazo	L. David	G. Lauriano	M. N. Bradai	D. Holcer	I. Benamer	J. Gonzalvo	A. Dede	B. Öztürk	A. Öztürk	D. Kerem
Is *Tt* present in your sub-area?															
Regularly present		X	X		X	X	X		X	X	X	X	X	X	X
Occasionally present															
Absent															
No idea															
What is the trend?															
Increasing		X				X									
Decreasing												X	X		
Stable			X		X		X				X				X
No idea									X	X				X	
Can you give a size estimate?															
Yes (please give a number)		7989	1160			>1000	600		?	43			150		500
No idea					X						X	X		X	
What are the main threats	Av.														
Overfishing (11)	1,4	3	1		2	2			1	1	1	1	1	1	1
Pleasure boating (11)	2,8	1	3		3	3	3		2	5	2	2	4	3	
Chemical Pollution (11)	2,4	1	2			4	1		3	3	3	4	2	2	1
By catch (9)	2,6	3			1	1			3	4		3	3	4	1
Acoustic pollution (1)	4,0				4										
Habitat degradation (1)	1,0						1								
Trawlers destructive activity (1)	4,0														4
Blast fishing (1)	2,0									2					
Oil/gas industry (1)	4,0														4
No idea (0)															

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