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2023 Med QSR cetaceans (EO1) assessment

UNEP/MAP
Athens, 2023

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Note by the Secretariat

The 2023 MED QSR Roadmap and Needs Assessment was endorsed by COP 21 (Naples, Italy, December 2019) with Decision IG.24/4. It defines the vision for the successful delivery of the 2023 MED QSR, and outlines key IMAP-related processes, milestones and outputs to be undertaken, with their timelines.

The main assessment chapters of the 2023 MED QSR are based on assessments of Common Indicators (CI) and some Candidate Common Indicators (CCI) within Ecological Objectives (EO) for biodiversity and fisheries, pollution and marine litter and cost and hydrography clusters. Where feasible, and where the data allow, CIs are integrated within and across EOs.

As a contribution to the 2023 MED QSR biodiversity (EO1) and non-indigenous species (EO2) chapters, SPA/RAC has prepared six thematic assessment reports for benthic habitats, cetaceans, Mediterranean monk seal, seabirds, marine turtles and non-indigenous species (NIS).

This document provides the assessment of the state of cetaceans (GES assessment) under EcAp/IMAP EO1 which is focused on the three common Indicators (CI): CI3 – Species distribution, CI4 – Population abundance and CI5 – Population demographic characteristics. The methodological approach to GES assessment takes stock of the methodological work for cetaceans performed under IMAP.

The present proposal of the 2023 MED QSR related to cetaceans has been presented and discussed at the CORMON Biodiversity and Fisheries meeting (Athens, 9-10 March 2023). The conclusions and suggestions of the meeting were integrated in the current version that is submitted for review and discussion by the Meeting of the Integrated Ecosystem Approach Correspondence Groups (CORMONs) with a view of its finalization and consideration by the 10th Meeting of the EcAp Coordination Group to be held in September 2023.

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List of acronyms

ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
ALS	Aegean and Levantine Seas
AS	Adriatic Sea
ASI	ACCOBAMS Survey Initiative
CCHs	Cetacean Critical Habitats
CI	Common indicator
CI3	Common indicator 3 - Species distributional range
CI4	Common indicator 4 - Population abundance
CI5	Common indicator 5 - Population demographic characteristics
COP	Meeting of the Conference of the Parties - CITES
DDTs	Dichlorodiphenyltrichloroethane
EDCs	Endocrine Disrupting Chemicals
EEC	Environment - European Commission
EO	Ecological Objective
EO1	Ecological Objective 1
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GBIF	Global Biodiversity Information Facility
GES	Good Environmental Status
GFCM	General Fisheries Commission for the Mediterranean
GIS	Geographical Information System
ICES	International Council for the Exploration of the Sea
ICM	Ionian and Central Mediterranean
IMAP	Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria
IMMAs	Important Marine Mammal Areas

IMO	International Maritime Organization
IUCN	International Union for Conservation of Nature
MAP	Mediterranean Action Plan
MED QSR	Mediterranean Quality Status Report
MEDACES	Mediterranean Database of Cetacean Strandings
MSFD	Marine Strategy Framework Directive
OBIS	Ocean Biodiversity Information System Mapper
PBDEs	Polybrominated diphenyl ethers
PCBs	Polychlorinated biphenyls
POPs	Persistent Organic Pollutants
SPA/BD	Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean
SPA-RAC	Specially Protected Areas Regional Activity Centre
SPAMI	Specially Protected Areas of Mediterranean Importance
SST	Sea surface temperature
UN	United Nations
UNEP MAP	Mediterranean Action Plan of the UN Programme for Environment
WGBYC	ICES Working Group on Bycatch of Protected Species
WMS	Western Mediterranean Sea

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1. Key messages

1. The Mediterranean Sea harbours 25 cetaceans' species, which are subjects to various human pressures, which reflects on their conservation status.

2. At the present moment it is not possible to assess whether cetaceans' populations achieved Good Environmental Status (GES) under the EcAp/IMAP framework, since baseline/reference values for the GES assessment were only recently defined. However, the 2018 - 2021 IUCN Red-List Assessment shows that the most of cetacean populations in the Mediterranean Sea are significantly threatened, apart from the wide-spread species, such as common bottlenose dolphin (*Tursiops truncatus*) and striped dolphin (*Stenella coeruleoalba*), the status of which has improved since mid-2000.

3. In order to improve the current status of cetaceans in the Mediterranean, conservation efforts invested thus far should be intensified and be based on good cooperation between different sectors.

4. More emphasis should be given to the implementation of the existing conservation tools, such as guidelines for mitigation of certain pressures, best practices and spatial protection mechanisms, adopted under regional agreements; notably ACCOBAMS, the Barcelona Convention and GFCM.

2. Background information and methodology

2.1. Overview of Cetaceans in the Mediterranean Sea

5. The Mediterranean Sea harbours altogether 25 species and subspecies of cetaceans (dolphins, whales, porpoises), including 11 regular, three visitor and 11 vagrant species and subspecies (ACCOBAMS, 2021a) (Table 2.1). The presence and distribution of cetaceans is known to be a result of combination of environmental features, (i.e., physicochemical, climatological and geomorphological characteristics), biotic factors (i.e., prey distribution, predation, behavioural changes) and presence, spatial distribution and intensity of anthropogenic activities (Azzellino et al, 2007). In the Mediterranean Sea, the greatest species diversity is recorded in the Western Mediterranean sub-region.

Table 2. 1 : Cetacean species and subspecies occurring in the Mediterranean Sea. Based on: ACCOBAMS, 2021a and ACCOBAMS Resolution 8.12, 2022)

	Species/subspecies	English name	Sub-Region*/Presence	Habitat	IUCN Red List conservation status**
MYSTICETI	*Balaenoptera a. acutorostrata*	North Atlantic minke whale	Rare/absent: WMS, AS, ICM, ALS; less than one reported presence/single occurrence during the past 35 years		
	Balaenoptera b. borealis	Northern sei whale	Rare/absent: WMS, AS, ICM, ALS; Rare sightings and strandings have been reported from the western Mediterranean, in particular from Spain and France		

	Species/subspecies	English name	Sub-Region*/Presence	Habitat	IUCN Red List conservation status**
ODONTOCETI	*Balaenoptera p. physalus*	North Atlantic fin whale	Regular/present: WMS (offshore waters of the western and central portions of the region, from the Balearic Sea to the Ionian Sea), southern AS; Rare/absent: northern and central AS; ALS	oceanic, slope, neritic	Endangered
	Eschrichtius robustus	grey whale	Rare/absent: WMS, AS, ICM, ALS		
	Eubalaena glacialis	North Atlantic right whale	Rare/absent: WMS, AS, ICM, ALS; Single occurrences near Taranto (Italy) and the Bay of Castiglione near Algiers (both in 19th century)		
	Megaptera n. novaeangliae	North Atlantic humpback whale	Occasional: WMS, AS, ICM, ALS. Sighted with increasing frequency in the Mediterranean Sea, where they were once considered very rare. Most of the sightings have occurred in the North West Mediterranean.		
	Delphinus d. delphis	common dolphin	Regular/Present: WMS (Alboran Sea area and small part of the Tyrrhennian Sea), southern ICM, Aegean Sea; Rare/absent: AS, northern and central ICM, Levantine Sea	neritic, slope, oceanic	Endangered for the Inner Mediterranean subpopulation and Critically Endangered for the Gulf of Corinth subpopulation
	Globicephala m. melas	North Atlantic long-finned pilot whale	Regular/Present: WMS; Rare/absent: AS, ICM, ALS	oceanic, slope, neritic	Endangered for the Inner Mediterranean subpopulation and Critically Endangered for the Strait of Gibraltar subpopulation
	Globicephala macrorhynchus	short-finned pilot whale	Very rare/absent: WMS, AS, ICM, ALS		
	Grampus griseus	Risso's dolphin	Regular/Present: WMS, southern AS, Ionian Sea, ALS; Rare/absent: central and northern AS, southern ICM, southern ALS	slope, oceanic	Endangered
	Hyperoodon ampullatus	northern bottlenose whale	Very rare/absent: WMS, AS, ICM, ALS		
	Kogia sima	dwarf sperm whale	Very rare/absent: WMS, AS, ICM, ALS		
	Mesoplodon bidens	Sowerby's beaked whale	Very rare/absent: WMS, AS, ICM, ALS		
	Mesoplodon densirostris	Blainville's beaked whale	Very rare/absent: WMS, AS, ICM, ALS		
	Mesoplodon europaeus	Gervais' beaked whale	Very rare/absent: WMS, AS, ICM, ALS		
	Orcinus orca	orca	Regular: Gibraltar area; visitor elsewhere	neritic, slope, oceanic	Critically Endangered

Species/subspecies	English name	Sub-Region*/Presence	Habitat	IUCN Red List conservation status**
Phocoena p. phocoena	Atlantic harbour porpoise	Very rare in the Alborán Sea	neritic	Vulnerable
Phocoena p. relicta	Black Sea harbour porpoise	Presence limited to the North Aegean Sea	neritic	Endangered
Physeter macrocephalus	sperm whale	Regular/present: WMS, southern AS, ICM, ALS; Rare/absent: northern and central AS, the Strait of Sicily and portions of the Aegean Sea	slope, oceanic	Endangered
Pseudorca crassidens	false killer whale	Rare/absent: WMS, AS, ICM, ALS		
Sousa plumbea	Indian Ocean humpback dolphin	Very rare/absent: WMS, AS, ICM, ALS		
Stenella coeruleoalba	striped dolphin	Regular/present: WMS. Southern AS, northern and central ICM, ALS; Rare/absent: southern France, central and northern AS, southern ICM	oceanic, slope	Least Concern for the Mediterranean subpopulation and Endangered for the Gulf of Corinth subpopulation
Steno bredanensis	rough-toothed dolphin	Regular/present: eastern basin; vagrant elsewhere	oceanic, slope, neritic	Near Threatened
Tursiops truncatus truncatus	common bottlenose dolphin	Regular/Present: WMS, AS, ICM, ALS	neritic, oceanic	Least Concern for the Inner Mediterranean subpopulation and Critically Endangered for the Gulf of Ambracia subpopulation
Ziphius cavirostris	Cuvier's beaked whale	Regular/present: WMS, AS, ICM, ALS (Hotspots: the Alborán Sea; the northern Ligurian Sea; the northern Tyrrhenian Sea (including the Caprera Canyon); the Ionian Sea east of Sicily; a long, narrow belt connecting the southern Adriatic Sea running along the Hellenic Trench to the west of Cyprus, especially around Anaximander Seamount; and Levantine Sea waters off Lebanon and Israel); Rare/absent: north and central AS, southern Mediterranean along the coasts of Tunisia, Libya and Egypt	slope, oceanic	Vulnerable

* Mediterranean Sub-regions: WMS – Western Mediterranean Sea; AS – Adriatic Sea; ICM – Ionian and Central Mediterranean; ALS - Aegean and Levantine Seas

** ACCOBAMS Resolution 8.12, 2022

2.2. Methodological approach to assessing GES

2.2.1. Scope of 2023 MED QSR and improvements from 2017 MED QSR

6. The first integrated assessment based on IMAP, is the 2017 Mediterranean Quality Status Report (2017 MED QSR). Decision IG.23/6 on the 2017 MED QSR, adopted by the COP 20 in December 2017, underlined the gaps of the 2017 MED QSR and requested to overcome them to successfully carry out the 2023 MED QSR.

7. Overall, the 2017 MED QSR report for EO1 – Marine mammals was qualitative and narrative. One of the main reasons for such an approach was substantial lack of data and information. Indeed, the report identified the following groups of gaps:

- Lack of baseline information;
- Unbalanced research effort (geographic gaps, particularly in southern and eastern countries);
- No information at regional scale;
- Limited systematic monitoring, and subsequently no time series data, which would allow assessment of trends.

8. Furthermore, there were several GES assessments methodological uncertainties, notably unclear guidance on identification of baselines and determination of thresholds (both closely linked to lack of data).

9. The interrelations among Drivers, Pressures, State, Impact, Response (DPSIR) were also missing, including links between EO1 to other EOs, particularly since those EOs represent impacts and pressures which reflect on the GES of cetaceans under EO1.

10. The lessons learnt from the 2017 MED QSR were analysed and the new vision for 2023 MED QSR was adopted by COP 21 of the Barcelona Convention in the form of the DecisionDecision24/04 (Tirana) thatDecision envisages for 2023 MED QSR to:

(i) be more quantitative and less narrative than the 2017 Med QSR,
(ii) have interrelated links of status, pressures, and impacts,
(iii) where feasible to conduct integrated assessment across Ecological Objectives.

11. Besides this new vision, several new developments occurred since 2017, which are crucial for development of the 2023 MED QSR for EO1 – Biodiversity – Cetaceans. Methodologically, GES assessment elements for cetaceans were elaborated more clearly in the 21WG.514/Inf.11WG.514/Inf.11 on *Monitoring and Assessment Scales, Assessment Criteria, Thresholds and Baseline Values for the IMAP Common Indicators 3, 4 and 5 related to marine mammals.* Even more so, in the scope of the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) Survey Initiative project (ASI project)[1] . The first Mediterranean Sea level synoptic survey

[1] The "ACCOBAMS Survey Initiative"" (ASI) is a project developed, coordinated and implemented by the Permanent Secretariat of the ACCOBAMS, with the support of a Project Steering Committee composed of the Regional Activity Center for Specially Protected Areas (UNEP/MAP/SPA-RAC), the IUCN Center for Mediterranean Cooperation, the French Agency for Biodiversity, the Italian Institute for Environmental Protection and Research and the PELAGIS Observatory of the University of La Rochelle in France. The ASI is funded by the MAVA Foundation, the Prince Albert II of Monaco Foundation, the International Fund for

was conducted (2018 – 2019). The results of this effort contributed substantially to better understanding of the state of cetaceans in the Mediterranean.

2.2.2 Elements of GES assessment for the MED QSR 2023

Table 2. 2 : Description of GES definition, target, baseline, threshold and scale of assessment for CI3, CI4 and CI5

CI3 Species distributional range GES definition, target, baseline and threshold	CI4 Population abundance GES definition, target, baseline and threshold	CI5 Population demographic characteristics GES definition, target, baseline and threshold
GES DEFINITION		
The species are present in all their *natural* distributional range.	The species population has abundance levels allowing qualification to Least Concern Category of IUCN Red List or has abundance levels that are improving and moving away from the more critical IUCN category.	*State:* Decreasing trends in human induced mortality. *Pressure:* Appropriate measure implemented to mitigate incidental catch, prey depletion and other human induced mortality.
GES TARGET		
The distribution of marine mammals remains stable or expanding and the species that experienced reduced distribution in the past are in favourable status of conservation and can recolonise areas with suitable habitats.	*State:* Populations recover towards natural levels. *2017 Proposal:* No human-induced mortality is causing a decrease in breeding population size or density. Populations recover towards natural levels.	Species populations are in good condition: Low human induced mortality, balanced sex ratio and no decline in calf production. 2017 Proposal[2]: preliminary assessment of incidental catch, prey depletion and other human induced mortality followed by implementation of appropriate measures to mitigate these threats.
BASELINE/REFERENCE VALUE		

Animal Welfare, the Ministry of Ecological Transition of Spain, the French Agency for Biodiversity, the Ministry for the Protection of the Environment, the Territory and the Sea of Italy and the Government of the Principality of Monaco, but the project is also supported by all riparian countries through the mobilization of their national scientists. Conducted over three and a half years, the ASI aimed at establishing an integrated and coordinated monitoring system for cetaceans, by establishing a baseline framework to assess cetacean's abundance and distribution in the whole ACCOBAMS (Mediterranean/Black Sea macroregional level). ASI survey combines aerial- and vessel-based visual survey methods and passive acoustic monitoring (PAM), following the ASI regional protocol and methodology based on line-transect distance sampling.

[2] UNEP(DEPI)/MED WG.444/6/Rev.1. IMAP Common Indicator Guidance Facts Sheets (Biodiversity and Fisheries). 6th Meeting of the Ecosystem Approach Coordination Group, Athens, Greece, 11 September 2017

CI3 Species distributional range GES definition, target, baseline and threshold	**CI4 Population abundance GES definition, target, baseline and threshold**	**CI5 Population demographic characteristics GES definition, target, baseline and threshold**
GES DEFINITION		
The species are present in all their *natural* distributional range.	The species population has abundance levels allowing qualification to Least Concern Category of IUCN Red List or moving away and not approaching from the more critical IUCN Red Listing.	*State:* Decreasing trends in human induced mortality. *Pressure:* Appropriate measure implemented to mitigate human induced mortality.
UNEP/MAP PROPOSAL FOR THRESHOLDS		
The extent of the distribution of each species remains stable or expanding compared to a species distribution reference map. In particular, the extent of occurrence shows: 1) no decline in all sub-regions where the species was regularly found since last assessment, 2) no decline of number of locations or local putative populations, for the species within its distributional range.	Check IUCN Mediterranean Red Listing and if EN, CR, VU then maintain total abundance at or above reference levels. No decrease of >20% over 3 generations. *2017 Proposal:* No human-induced mortality is causing a decrease in breeding population size or density. Populations recover towards natural levels.	Species populations are in good condition: Low human induced mortality, balanced sex ratio and no decline in calf production. 2017 Proposal[2]: preliminary assessment of incidental catch, prey depletion and other human induced mortality followed by implementation of appropriate
GES TARGET		
The distribution of marine mammals remains stable or expanding and the species that experienced reduced distribution in the past are in favourable status of conservation and can recolonise areas with suitable habitats.	*State:* Populations recover towards natural levels.	
SCALE OF ASSESSMENT		
Regional(primary) and sub-regional level	Regional (primary) and sub-regional level	Regional
BASELINE/REFERENCE VALUE		
For the purposes of GES assessment, ACCOBAMS status report (2021) species distribution reference maps were used as the baseline for the assessment of the CI3 Species distributional range. This report takes into account results of ASI, as well as results of longer-term research and monitoring.	For the purposes of GES assessment, ACCOBAMS status report (2021) species population abundance design-based estimates were used as the baseline for the assessment of the CI4 Population abundance.	It is not possible to develop reference and threshold values at this point.
UNEP/MAP PROPOSAL FOR THRESHOLDS		
The extent of the distribution of each species remains stable or expanding compared to a species	Check IUCN Mediterranean Red Listing and if EN, CR, VU then maintain total abundance at or	

[2] UNEP(DEPI)/MED WG.444/6/Rev.1. IMAP Common Indicator Guidance Facts Sheets (Biodiversity and Fisheries). 6th Meeting of the Ecosystem Approach Coordination Group, Athens, Greece, 11 September 2017

distribution reference map. In particular, the extent of occurrence shows: 1) no decline (in all sub-regions where the species was regularly found since last assessment, 2) no decline of number of locations or local putative populations for the species within its distributional range.	above reference levels. No decrease of ≥20% over 3 generations.	
SCALE OF ASSESSMENT		
Regional(primary) and sub-regional level	Regional (primary) and sub-regional level	Regional

12. The assessment of the state of cetaceans (GES assessment) under EcAp/IMAP EO1, is foremostly focused on the three common Indicators (CI): CI3 – Species distribution, CI4 – Population abundance and CI5 – Population demographic characteristics. The methodological approach to GES assessment takes stock of the methodological work for cetaceans performed under IMAP, particularly the already mentioned 21WG.514/Inf.1121WG.514/Inf.11. The Decision IG.21/3 2013 **defines operational objectives** and **describes** what is **GES for each CI**, and 2017 Common Indicator Guidance Facts Sheets (Biodiversity and Fisheries) (IMAP 2017) elaborates in more detail **GES targets** (Table 2.2). It should be noted that for the CI5 specifically, the 21wg.514/Inf.11 proposes to move GES definitions for *State* and *Pressures* to CI12 and reformulate definition for CI5. However, for the Med QSR 2023 report, the currently valid elements were used, as elaborated under Table 2.2., with the future prospects to address CI5 GES redefinition in the scope of the next IMAP update. Furthermore, according to the 2021 UNEP/MAP, assessment of CI3 and CI4 is focused on eight **representative species**; one baleen whale (Mysticeti), two deep-diving toothed whales (Odnonceti) and ~~three~~3 large and five shallow-diving toothed whales (Odonoceti)~~mall cetacean species~~, and for CI5 on *Stenella coeruleoalba*, *Tursiops truncatus* and *Balaenoptera physalus* as proxy for functional groups (Table 2.3~~2~~). As for the **scale of monitoring**, which is supposed to result with the adequate data for GES assessment, there are in general two types/levels of monitoring prescribed:

- primary monitoring, which is performed at the regional level, synchronised between all countries (such as ASI) and once per reporting period,
- secondary monitoring, which is performed at sub-regional or national level, in the defined High-priority and Low-priority sub-regions.

Table 2. 3 : Representative cetacean species for the 2023 MED QSR GES assessment under EO1 – Biodiversity – CI3, CI4, CI5

Functional group	Species		
	CI3	CI4	CI5
Shallow-diving toothed whales (Odnonoceti)	*Globicephala melas* – Long finned pilot whale	*Globicephala melas* – Long finned pilot whale	
	Grampus griseus – Risso's dolphin	*Grampus griseus* – Risso's dolphin	

	Tursiops truncatus – common bottlenose dolphin	*Tursiops truncatus* – common bottlenose dolphin	*Tursiops truncatus* – common bottlenose dolphin
	Delphinus delphis – common dolphin	*Delphinus delphis* – common dolphin	
	Stenella coeruleoalba – striped dolphin	*Stenella coeruleoalba* – striped dolphin	*Stenella coeruleoalba* – striped dolphin
	Physeter macrocephalus – sperm whale	*Physeter macrocephalus* – sperm whale	
	Ziphius cavirostris – Cuvier's beaked whale	*Ziphius cavirostris* – Cuvier's beaked whale	
Baleen whales (Mysticeti)	*Balaenoptera physalus* – fin whale	*Balaenoptera physalus* – fin whale	*Balaenoptera physalus* – fin whale

~~Species~~	~~CI3~~	~~CI4~~	~~CI5~~
~~SMALL CETACEAN SPECIES~~	~~*Globicephala melas* – Long finned pilot whale~~	~~*Globicephala melas* – Long finned pilot whale~~	
	~~*Grampus griseus* – Risso's dolphin~~	~~*Grampus griseus* – Risso's dolphin~~	
	~~*Tursiops truncatus* – common bottlenose dolphin~~	~~*Tursiops truncatus* – common bottlenose dolphin~~	~~*Tursiops truncatus* – common bottlenose dolphin~~
	~~*Delphinus delphis* – common dolphin~~	~~*Delphinus delphis* – common dolphin~~	
	~~*Stenella coeruleoalba* – striped dolphin~~	~~*Stenella coeruleoalba* – striped dolphin~~	~~*Stenella coeruleoalba* – striped dolphin~~
~~LARGE CETACEAN SPECIES~~	~~*Balaenoptera physalus* – fin whale~~	~~*Balaenoptera physalus* – fin whale~~	~~*Balaenoptera physalus* – fin whale~~
	~~*Physeter macrocephalus* – sperm whale (Note: deep feeder)~~	~~*Physeter macrocephalus* – sperm whale (Note: deep feeder)~~	
	~~*Ziphius cavirostris* – Cuvier's beaked whale (Note: deep feeder)~~	~~*Ziphius cavirostris* – Cuvier's beaked whale (Note: deep feeder)~~	

13. For the purpose of 2023Med QSR, it was envisaged to use the results of the primary monitoring, which were available thanks to the ASI project.

14. For the **scale of assessment,** 21WG.514/Inf.11 proposes regional (Mediterranean Sea) level assessment for CI3 and CI4 for all species, and sub-regional/local level for CI5. However,~~although~~ the IMAP 2016 Guidelines Document, as well as 2018 Progress report on the implementation of Decision IG.22/7 on IMAP prescribe the sub-regional level of assessment for small cetaceans. There are 4 proposed Mediterranean sub-regions: Western Mediterranean, Ionian and Central Mediterranean, Adriatic Sea, Aegean and Levantine Seas (Figure 2.1.). For the preparation of the 2023 MED QSR, regional level was

used as primary, but also a more detailed scales of assessment for all cetacean species ~~small cetaceans~~ was elaborated~~chosen~~ both for CI3 and CI4. Namely, the hypothesis was that such an approach would facilitate definition of conservation measures and responsibilities for their implementation. In addition, the available data on cetaceans suggested that such a more detailed analysis could be possible. Finally, **baselines and threshold values** proposed in the 21WG.514/Inf.11 were mostly used. However, for CI3, as a baseline the distribution maps were used from the 2021 ACCOBAMS supported publication *Conserving whales, dolphins and porpoises in the Mediterranean Sea, Black Sea and adjacent areas: an ACCOBAMS status report*, prepared by Notarbartolo di Sciara and Tonay. Namely, this report takes into account not only ASI results, but decades long research and monitoring.

15. It should also be noted that the 21WG.514/Inf.11 emphasises that definition of baseline and threshold values for CI5 is not yet possible.

Figure 2. 1 : Proposed division of the Mediterranean region in 4 sub-regions. Source: Decision IG.20/4 of the Barcelona Convention COP 17. Prepared by: Stenella consulting, Croatia

2.2.3 Interrelations between EO1 and other EOs

16. As already indicated, the state of cetaceans assessed under EO1 is linked to drivers, pressures, impacts and responses, which are also partly assessed through the other EOs. These interrelations are also reflected in overlapping of ICM under EO1 and other EOs. The most evident example is the incidental catch (bycatch), which is analysed under CI12 of the EO3 – Fisheries, but at the same time this information serves as the input for CI5. The interrelations between EO1 (state of cetaceans assessment segment) and other EOs is explained in the qualitative way, in order to serve as a guide to integrated GES assessment.

2.2.4 Other assessments of the state of cetaceans in the Mediterranean

17. Availability of data is always an issue when it comes to the assessment of GES for biodiversity in general. Assuming that this may also be the case for cetaceans, if necessary and possible, other methods to assess the state of cetaceans in the Mediterranean were used.

2.2.5 Data acquisition

18. In the process of assessing common indicators CI3, CI4 and CI5, various data sources were collected and analysed. The starting points for understanding which data should be collected were defined thresholds and baseline reference value data obtained from the already mentioned 2021 *UNEP/MED and ACCOBAMS 2021 status report*. Accordingly, the main source of data were results of the ACCOBAMS Survey Initiative (ASI) data obtained from the survey carried out in summers 2018 and 2019. ASI is the first organised basin-wide research of cetaceans in the Mediterranean (aerial and vessel based survey) and it provides a comprehensive snapshot of distribution and abundance of cetacean species, as well as information about other threatened marine species (sea turtles, sea birds) and negative impacts (marine litter). However, ACCOBAMS survey was not able to cover the entire region, particularly parts of the southern and south-eastern Mediterranean.

19. In addition, for the assessment of CI3, the ACCOBAMS 2021 status report was used, since distribution maps displayed in this report also take account of results of long-term research and monitoring. GES or and other assessments could not be made without data. Hence, other relevant data sources were examined and displayed, notably data from OBIS - Ocean Biodiversity Information System Mapper, GBIF - Global Biodiversity Information Facility, INTERCET and Marine Mammal Protected Areas Task Force IMMA E-ATLAS for cetacean occurrence data as well as Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020 for species distribution data.

20. For the Population demographic characteristics (CI5) collated GIS data included available national strandings and bycatch data (MEDACES - Mediterranean database on cetacean strandings, French stranding network (Réseau National Echouage) and Italian centralised database on cetacean strandings hosted by the University of Pavia). Descriptive data related to CI5 (mainly bycatch) included ICES Working Group on Bycatch of Protected Species (WGBYC) latest 2021 Report (ICES, 2021) as well as The State of Mediterranean and Black Sea Fisheries (FAO, 2022) and Incidental catch of vulnerable species in Mediterranean and Black Sea fisheries (FAO, 2021). Additionally, for CI3 and CI4 various research papers and literature references were collected and consulted for the assessment of cetacean species distribution and abundance.

3. Drivers, Pressures, State, Impact, Response (DPSIR)

21. The six human economic activities represent the main drivers or sources of pressures to the cetaceans; agriculture; fisheries; tourism, sporting and recreational activities; energy sector and infrastructure; maritime traffic; urbanisation and industry (Table 3.1.). In addition, mariculture or marine farming is also present in the Mediterranean, but its relevance for cetaceans has not yet been determined.

Table 3. 1 : Overview of the economic sectors (drivers) causing most pressures and adverse effects on Cetaceans in the Mediterranean Sea. Based on analysis of pressures and impacts in the UNEP/MED WG.482/Inf.13, 2020 and threats to Cetaceans identified in ACCOBAMS

Drivers – human economic activities; sources of pressures for cetaceans	Pressures relevant for Cetaceans	Consequences for Cetaceans - impacts	Most sensitive/affected regular species, known so far
Agriculture	● Intensive use of pesticides and fertilisers – agricultural runoffs (including DDT, although banned since 1970s) ● Sea-water chemical pollution	● Accumulation of contaminants in Cetaceans - reduces the resilience to environmental pressures, including increased susceptibility to diseases	Combined with similar pressures coming from urbanisation and industry, contributed to Morbilivirus outbreaks – that particularly struck population of *Stenella coeruleoalba* in the Mediterranean
Fisheries	● Over-exploitation of marine resources ● Incidental catch (bycatch) or entanglement ● Disposal of used fishing gear (ghost nets) Pressure from cetaceans: depredation	● Injuries and mortality ● Distributional change/population reduction, dietary shift due to loss of prey	*Delphinus delphis* – bycatch, prey depletion *Grampus griseus* - entanglement in illegal pelagic driftnets and longlines *Stenella coeruleoalba* – bycatch in illegal pelagic drifnets *Steno bradensis* – bycatch in gillnets (Israel, Lebanon) *Tursiops truncatus* – bycatch and depredation in set nets

Drivers – human economic activities; sources of pressures for cetaceans	**Pressures relevant for Cetaceans**	**Consequences for Cetaceans - impacts**	**Most sensitive/affected regular species, known so far**
Tourism, sporting, recreational activities	● Intensive speed boats traffic (yachting) ● Anthropogenic underwater noise pollution ● Increased solid waste production and disposal (marine litter, microplastics) ● Sea-water chemical pollution ● Unsustainable cetaceans watching ● Disturbance	● Behavioural changes – seasonal re-distribution ● Injuries, possibly mortality	*Globicephala melas* (highest densities of the species in the Strait of Gibraltar, Alboran Sea, Gulf of Vera)
Energy sector and infrastructure	● In general, promotion of use of fossil fuels (gas and oil) = promotor of climate change ● Exploration (seismic surveys) and exploitation of fossil fuels ● Oil spills (accidents) and sea water chemical pollution ● Anthropogenic underwater noise pollution	● Injuries, mortality (strandings due to the impulsive anthropogenic noise) ● Behavioural changes	*Physeter macrocephalus* - anthropogenic noise from seismic surveys – Hellenic Trench *Ziphius cavirostris* – anthropogenic noise

Drivers – human economic activities; sources of pressures for cetaceans	**Pressures relevant for Cetaceans**	**Consequences for Cetaceans - impacts**	**Most sensitive/affected regular species, known so far**
Maritime traffic	• Intensive maritime traffic, particularly in sensitive areas with use of higher speed • Anthropogenic underwater noise pollution • Collisions with boats – ship strikes • Marine litter	• Injuries, mortality • Behavioural changes	*Balaenoptera physalus* - ship strikes, particularly in the northwestern Mediterranean *Physeter macrocephalus* – ship strikes in the Hellenic Trench *Ziphius cavirostris* – anthropogenic noise
Urbanisation and industry	• Increased wastewater quantities and wastewater discharges • Increased solid waste production and disposal (marine litter, microplastics) • Sea-water chemical pollution (PCB etc) and solid waste pollution	• Accumulation of contaminants in Cetaceans - reduces the resilience to environmental pressures, including increased susceptibility to diseases • Injuries and mortality due to indigestion of plastic	As with Agriculture

22. The most significant pressures to cetaceans in the Mediterranean are: bycatch and depredation, ship strikes, anthropogenic underwater noise, marine litter and chemical pollution. Climate change is also an important and continuous threat, and its actual impacts need to be further explored. The other pressure which is not that widespread and significant, but should be taken into account and be the subject to conservation measures is "unsustainable" cetacean watching. Pressures and impacts do not come and act alone. The most difficult task is to understand cumulative and synergistic effects.

23. The most common pressures on cetaceans come from the **interactions with fisheries**, notably incidental catch **or bycatch**. In general, such interactions mainly involve coastal fisheries and small cetaceans, such as common bottlenose dolphin (*Tursiops truncatus)* and common dolphins (*Delphinus*

delphis), but entanglement in the fishing gear, such as illegal pelagic driftnets also occur with larger cetaceans, such as sperm whale (*Physeter macrocephalus*) and Cuvier's beaked whale (*Ziphius cavirostris*) (ACCOBAMS; 2021). The use of driftnets targeting large pelagic fishes such as bluefin tuna, swordfish and albacore, has been banned in GFCM member countries, however the enforcement of this ban has been challenging despite the programmes in some countries to assist with gear change (ACCOBAMS, 2019[3]). The use of the illegal driftnets and effects on small cetaceans are particularly accentuated in the Western Mediterranean. On the other hand, tThe 2022 State of Mediterranean and Black Sea Fisheries Report (FAO, 2022) identified that small-scale fisheries using set gillnets and trammel nets in coastal areas have shown the greatest rates of interactions with cetaceans (Figure 3.1.). However, the FAO report emphasised the challenges of data availability and pointed out that the measured bycatch is fairly underestimated. The objectives of both the FAO – GFCM and ACCOBAMS Agreement are to improve the knowledge about the Cetaceans bycatch, identify hot-spots, implement and measure effectiveness of the bycatch mitigation measures.

24. Cetaceans, in particular odontocetes, can also impact fisheries by removing bait or caught fish from hooks, nets or traps, thus reducing commercial catches and sometimes damaging fishing gears. This impact is called **depredation**, and its scope and actual effect is still not known.

25. Another physically more obvious pressure is **ship strikes** which occur between large vessels and cetaceans, particularly fin whales and sperm whales. This pressure is directly related to the maritime traffic sector and it concerns not only conservation, but animal welfare and human safety. The Mediterranean is the area with the densest maritime traffic (Figure 3.2), accounting to 30% of the world's maritime traffic (Pedrotti et al, 2022). Some of the ship strikes hotspots known so far are the north-western Mediterranean (for fin whale) and Hellenic Trench (for sperm whale) (ACCOBAMS, 2021a).

[3] A report is prepared in 2017/2018 within the framework of the ACCOBAMS/GFCM Project on mitigating the interactions between endangered marine species and fishing activities supported by the MAVA Foundation. The document is presented to the ACCOBAMS MOP 7 in 2019

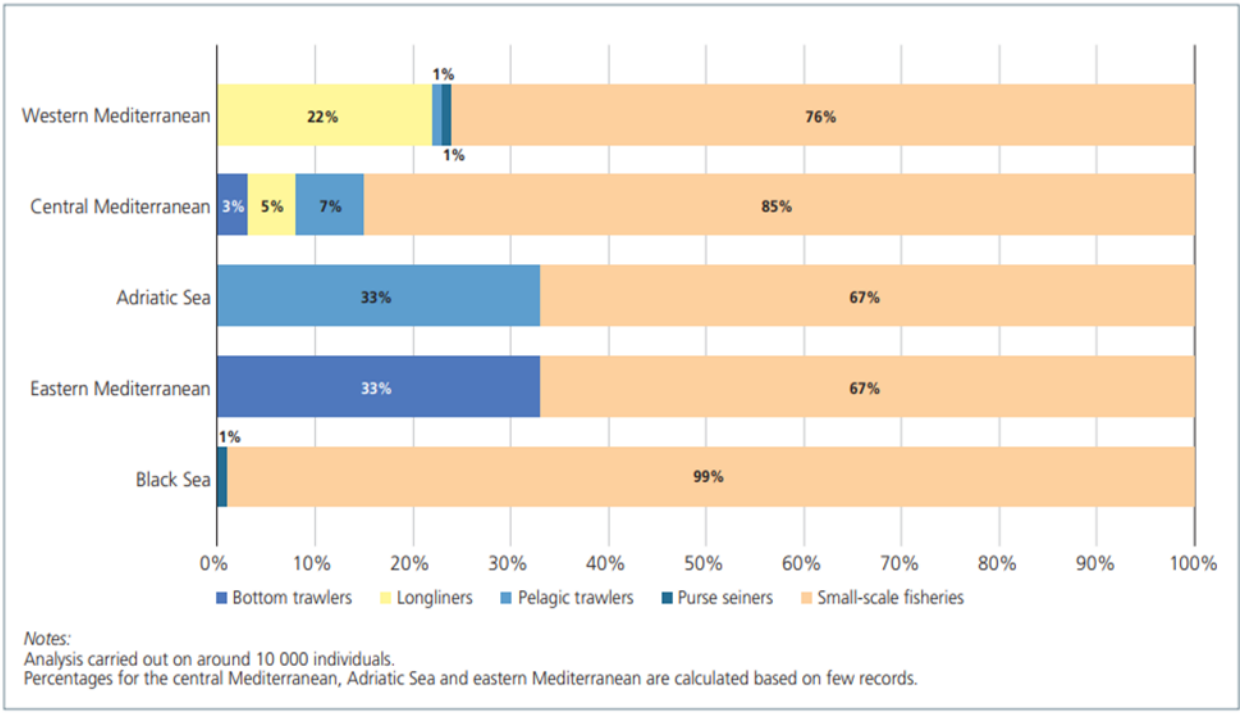

Figure 3. 1 : Relative contributions of main vessel groups to the total incidental catch of cetaceans by GFCM subregion, 2000–2022. Source: FAO, 2022

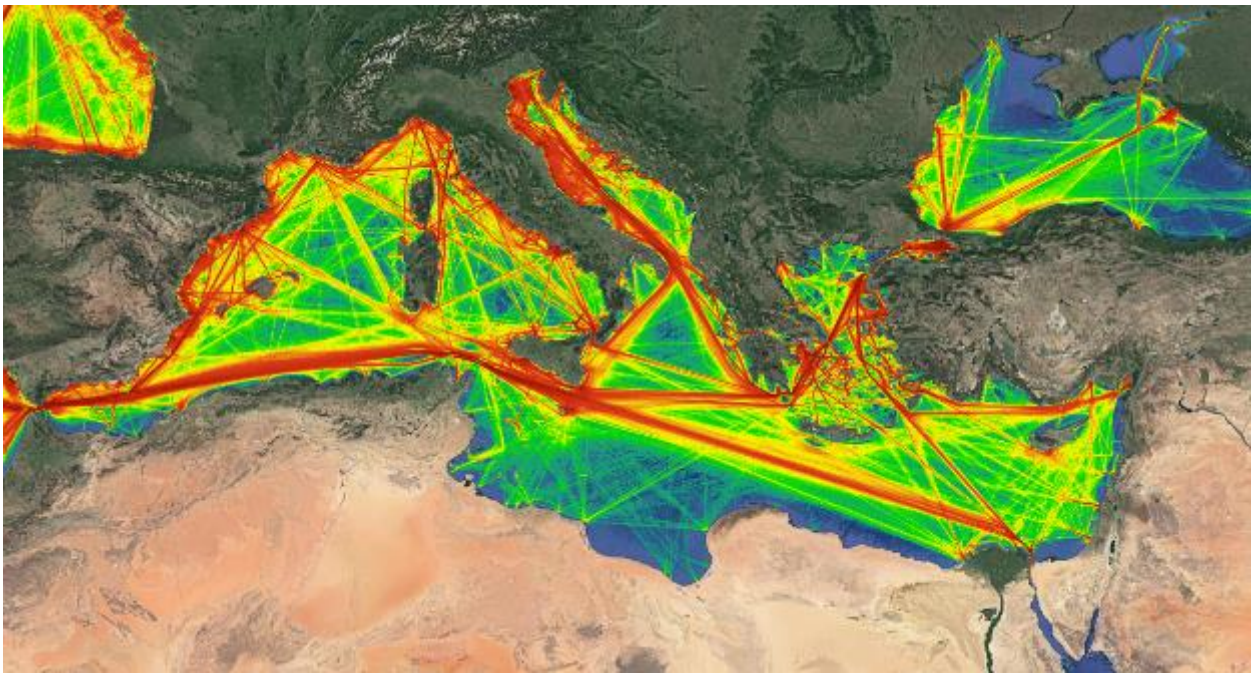

Figure 3. 2 : A snapshot of the maritime traffic in the Mediterranean Sea. Source: EMODNET, Marine traffic route density – annual totals 2019-2022; Prepared by: Stenella consulting, Croatia

26. The less visible, but yet, widely spread pressure is the **anthropogenic underwater noise**. The main sources of this noise are maritime traffic, energy sector and tourism, sporting and recreation. In addition, certain military activities, particularly naval exercises and use of sonars, produce the underwater

anthropogenic noise, which has already coincided with dramatic mass stranding of sensitive cetacean species, such as mass strandings of Cuvier's beaked whale in the Hellenic Trench (Frantzis, 1998, Frantzis, 2004 and Frantzis, 2015).

27. Identifying areas of high anthropogenic pressure on the marine environment is a key element for effective management and reducing impacts of anthropogenic noise. In the scope of the ACCOBAMS Agreement the first noise hotspots overview was prepared in 2016, and revised in 2022. The first report analysed various noise-producing activities, while the second report focused on impulsive noise sources, notably seismic surveys and relevant coastal works (ACCOBAMS, 2022). Although preparation of both reports was challenged by limited data availability and data reliability, it could be concluded that the noise generating activities are present in the large part of the Mediterranean Sea, with differences in spatial distribution. In the 2017 to 2021 period, seismic activities were more present in the Central and Eastern Mediterranean. It is also evident that impulsive noise-generating activities are carried out in areas which already have certain spatial protection designation and/or recognition as important habitats for cetaceans, such as in Specially Protected Areas of Mediterranean Importance (SPAMIs), in Cetacean Critical Habitats (CCHs) as identified by ACCOBAMS and Important Marine Mammal Areas (IMMAs) (Figure 3.3.). The updating of the Noise hotspots report is an ongoing process and it is already recommended that the next report expands its scope, particularly focusing on noise generated through shipping (low-frequency sound).

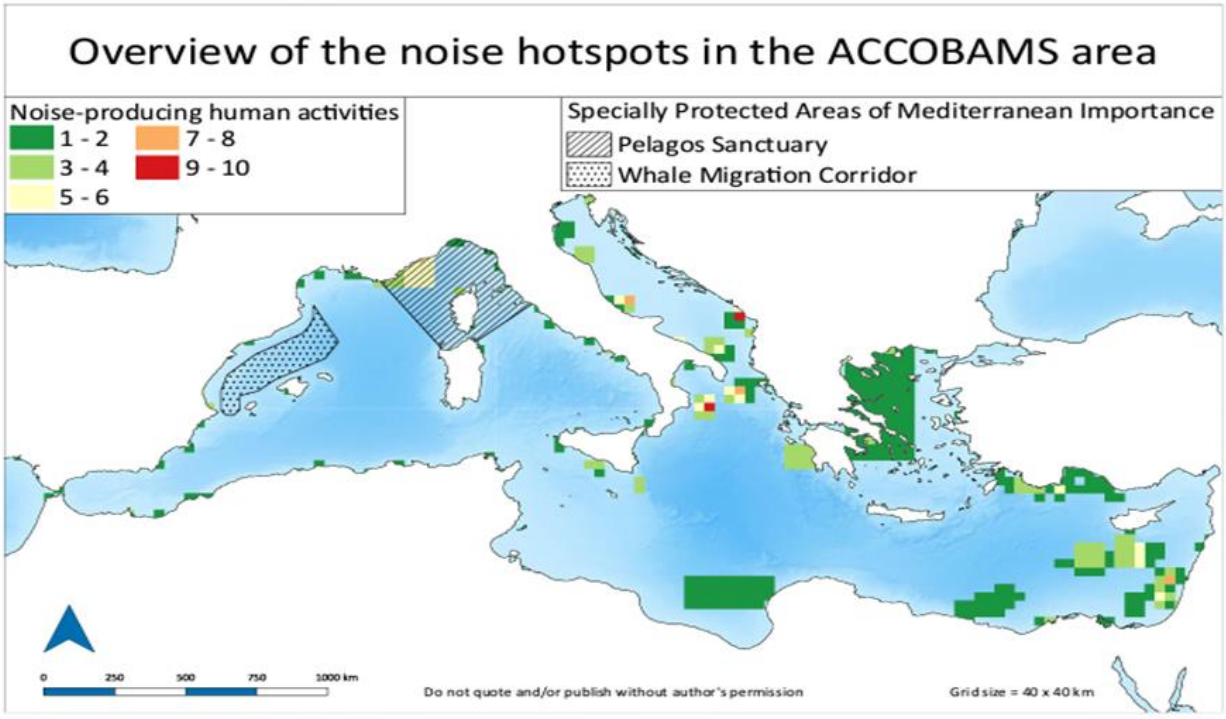

Figure 3. 3 : The Mediterranean Cetacean Migration Corridor SPAMI and the Pelagos Sanctuary for Marine Mammals SPAMI and seismic surveys. Source ACCOBAMS, 2022

28. The Mediterranean Sea is already heavily polluted with **marine litter**. As a closed basin with coastal population of about 210 million inhabitants, which multiplies for about 1.7 times due to intensive inflow of tourists, Mediterranean Sea receives large amount of waste from coastal areas, as well as from large rivers which flow through large urban areas end enter the Mediterranean Sea, such as river Nile (Fossi et Panti

for ACCOBAMS, 2022a). The intensive maritime traffic should also be taken into account as a source of the marine litter. Plastic accounts for up to 95-100% of total floating marine litter and more than 50% of seabed marine litter. The Mediterranean Sea receives on average 260,000 plastic items per km^2, resulting in an estimate of around 650 billion plastic particles floating on the surface of the Mediterranean (Pedrotti et al, 2022). Particular importance is currently being paid to the emerging issues of micro- and nano plastics and the possible release of associated Persistent Organic Pollutants (POPs) and Endocrine Disrupting Chemicals (EDCs). Concentrations of microplastics at the surface of the Mediterranean Sea are largely above 100,000 items per km^2 (UNEP/MAP, 2015) and reach maximums of more than 64 million floating particles per km^2 (Van Der Hal, Ariel & Angel, 2017).

29. The several papers, and particularly the Javier Soto-Navarro et al 2020 modelling study, show that the highest concentrations of neutral particles are found in the Catalan continental shelf, the proximities of the Strait of Sicily and the Gulf of Gabes, the Adriatic Sea and the easternmost slope of the Levantine basin (Figure 3.4.)**.** For the floating particles large concentrations are also found in the Balearic Sea. On the other hand, the particles with negative buoyancy rapidly sink and reach the seafloor close to their sources, with no time to disperse.

30. For cetaceans, entanglement or ingestion of marine litter/plastic can cause injuries, starvation and ultimately suffocation and drowning. Almost two-thirds of cetacean species have been found to have ingested plastic macro-litter (2.5 cm+) and this affects species across many different habitats and with different feeding techniques (Fossi at Panti, ACCOBAMS, 2022). In the scope of ACCOBAMS there is ongoing work to identify hotpots of interactions between cetaceans and marine litter.

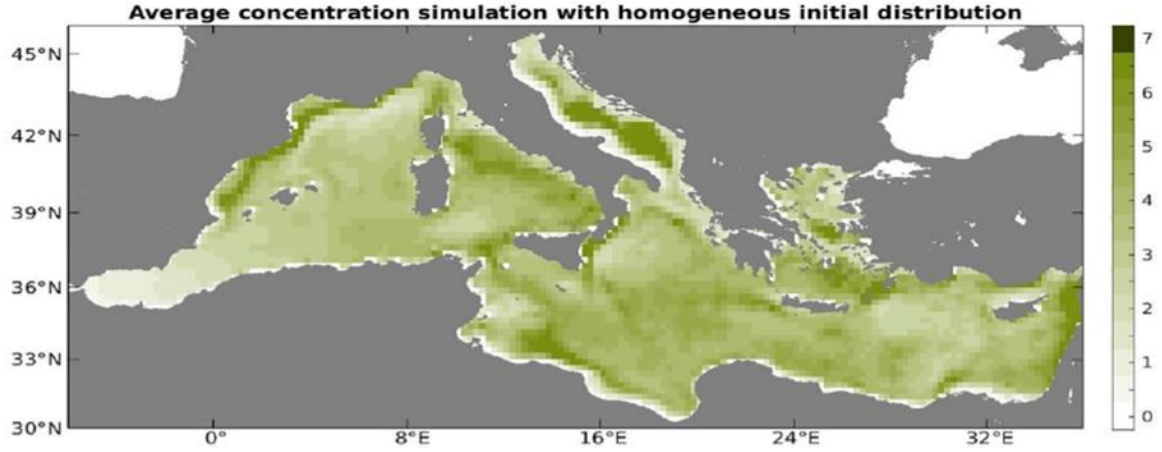

Figure 3. 4 : Average concentration for the simulation starting from a homogeneous particle distribution over the whole basin. Units are kg/km2. Source: Soto-Navarro, et al. 2020.

31. In addition to marine litter, the Mediterranean Sea is significantly exposed to **chemical pollution.** Already mentioned significant human population inhabiting the Mediterranean basin, combined with tourism, maritime traffic, agriculture and growing industry, result with significant sewage, industrial and incidental discharges, as well as effluents from agricultural areas which carry residuals of pesticides and mineral fertilisers into the Mediterranean Sea.

32. Cetaceans are particularly sensitive to environmental contaminants; heavy metals, legacy persistent organic pollutants (POP), such as polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), dichlorodiphenyltrichloroethane (DDTs), as well as the emerging pollutants, notably plastic additives (Fossi et Panti for ACCOBAMS, 2022b). The POP's have been mostly banned for almost half a century, but due to their characteristics, they are still present in the marine environment. For example, the environmental concentrations of PCBs in the Mediterranean Sea have not declined 2014 (Sauvé, S. & Desrosiers, 2014) and PBDEs are also most probably present in large concentrations. Concentrations of PCBs in different Mediterranean odontocete species have already surpassed toxicity thresholds for marine mammals. Such concentrations can have population level consequences through reduced reproduction and/or survival of marine mammals (Hall et al., 2018). In particular, high concentrations of contaminants result with higher susceptibility to diseases in cetaceans. Again, in the scope of ACCOBAMS, there is ongoing work to understand better the impacts of chemical pollutants on cetaceans in the Mediterranean Sea, Black Sea and contiguous Atlantic area.

33. **Climate change** is an ever-growing pressure on marine biodiversity, including cetaceans. The Mediterranean Sea is one of the first oceanic regions where the temperature increase was linked to greenhouse effects and global warming, mainly caused by anthropogenic activities (Belhajder et David for ACCOBAMS, 2021). The Mediterranean Sea surface temperature (SST) cumulative trend in the period between 1993 and 2019, shows significant increase in sea warming, particularly in the Adriatic Sea, part s of the Ionian Sea (southern Italy), north of the Aegean Sea and significant part of the eastern Mediterranean (Figure 3.5.).

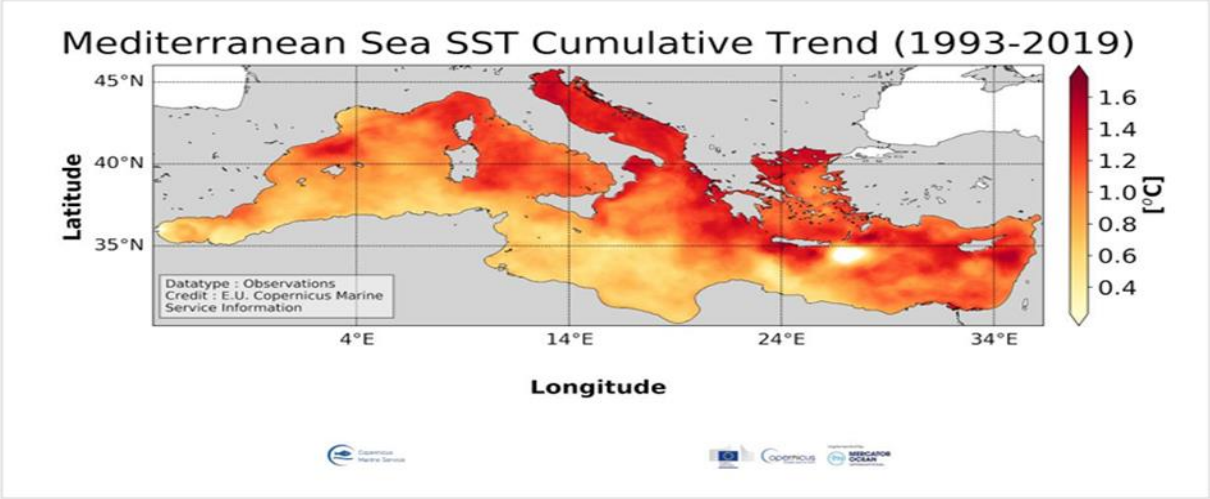

Figure 3. 5 : Cumulative SST trend for the Mediterranean Sea over the period 1993-2019. Source: Belhajder et David for ACCOBAMS, 2021

34. The main source of CO_2 emissions, which causes global warming and subsequently promotes climate change, is the use of fossil fuels as a main source of energy for all human activities, particularly traffic, everyday living and industry.

35. Climate change affects all trophic levels, including cetaceans. There is already indication that the distribution of some cetacean species may alter as a response to the change in sea surface temperature (SST). This may be the case with fin whales (*Balaenoptera physalus*), striped dolphins (*Stenella coeruleoalba*) and sperm whales (*Physeter macrocephalus*) in the Ligurian Sea (Azzellino et al., 2008). Likewise, in the Alborán Sea, an inverse relationship was found between short-beaked common dolphins (*Delphinus delphis*) density and SST (Cañadas et Vázquez, 2017). However, the vulnerability of marine mammals in general to global warming is still poorly understood (Albouy et al., 2020). Besides changes in SST, the significant problem for cetaceans is the change of prey availability caused by climate change. For example, the shifts in the primary producers are likely to influence the Mediterranean food web and consequently fin whales (Bentaleb et al., 2011). In that case fin whales will either shift their distribution to follow their main prey (*Meganyctiphanes norvegica*), or they will have to change their diet. The research of sperm-whales in the North-western Mediterranean Sea showed that their distribution is influenced by the presence of cold surface temperatures, significant chlorophyll concentrations (Praca & Gannier, 2008) and thermal fronts separating water masses such as the Balearic front (Gannier & Praca, 2007), which make this species sensitive to any changes of those parameters. Furthermore, the changes of distribution of Risso's dolphin (*Grampus griseus*) in the same area may also be partly related with climate change (Belhajder et David for ACCOBAMS, 2021).

36. Climate change also has the potential to increase pathogen development and survival rate, disease transmission and host susceptibility (Simmonds & Eliott, 2009).

37. **Cetacean watching activities** are increasing in the Mediterranean Sea, particularly in the north-western part (e.g. Pelagos Sanctuary). On the one hand, these activities can be beneficial to local economies and could contribute to raising awareness about cetaceans, but without proper measures in place they could also have negative impacts on the individuals and populations that are the focus of tourism activities (ACCOBAMS, 2022d).

~~36.~~38. Although all above mentioned individual pressures have impacts on cetaceans, in reality, these pressures do not come alone, but rather combined. Hence, in order to understand pressures and impacts on cetaceans, one should analyse **cumulative and synergistic effects**. But this task is often very complex and not easy to elaborate. One of the more obvious examples is the correlation between contaminants and weaker immunological system in cetaceans, which combined with promotions of pathogens development due to climate change may promote diseases outbreaks that affect certain cetaceans' species, such as the case with *Morbilivirus* and striped dolphins in the Mediterranean Sea.

39. The **international conservation community** is already aware of pressures on cetaceans and strives to **ensure long-term conservation** of these species. At the Mediterranean Sea level the most relevant cetacean specific agreements are already mentioned ACCOBAMS, as well as the SPA/BD Protocol under Barcelona Convention. Cetaceans are treated as protected species and a significant amount of work has been done to address all the problems these species are challenged with in the Mediterranean. These efforts require cooperation with other sector specific organisations, such as GFCM and IMO. In addition, the Mediterranean EU Member States operate within the EU legislative framework addressing cetaceans, notably the EU Habitats Directive and MSFD. The cetacean conservation related regional level legislation

and policies promote several conservation mechanisms and tools, including recognition and protection of cetaceans habitats (e.g. Natura 2000 network, SPAMI areas, Critical Cetaceans Habitats under ACCOBAMS and Important Marine Mammal areas under IUCN), species action/conservation and management plans, guidelines to address existing pressures to cetaceans, such as guidelines related to mitigation of bycatch, anthropogenic noise, best practices on sustainable cetaceans watching, population genetics etc. One of the important components of the regional level efforts is promotion of systematic cetaceans monitoring, as displayed through the ASI project, analysis of pressures-cetaceans' hotspots, as well as periodical conservation status assessment, such as the Mediterranean level IUCN Red List assessments. Naturally, Mediterranean countries play a key role in implementation of regional policies, and contribute to the process through their national legislations and conservation policies.

4. Good Environmental Status (GES)/alternative assessment

4.1. Theme selected for GES assessment

~~37.~~40. Cetaceans play a key role in functioning and balancing marine ecosystems. They are top predators which share a similar trophic position to humans, and they are very sensitive to changes in environment. However, their high mobility allows them to migrate to more favourable conditions (Williamson et al, 2021). In addition, cetaceans are charismatic species and attract more human attention than other marine species. Consequently, changes in status of cetacean populations are more likely to be noticed and to result with implementation of appropriate conservation actions. All these features make cetaceans, notably their presence and status, good indicators of the health of the marine environment.

~~38.~~41. In the following sections, an attempt is made to assess whether GES is achieved for the Common Indicators under EO1 - Biodiversity specific for cetaceans; CI3 - Species distribution, CI4 - Population abundance and CI5 - Population demographic characteristics. In addition, the interrelations with other EOs are explained, notably with the ones expressing the factors that (may) affect the status of cetaceans.

4.2. GES Assessment for CI/ alternative assessment for CI

4.2.1. EO1: COMMON INDICATOR 3. SPECIES DISTRIBUTIONAL RANGE (MARINE MAMMALS - CETACEANS)

~~39.~~42. In order to assess whether the GES is achieved for the Common Indicator 3: Species distributional range, the distributional range of eight marine mammals' species which are representative for the Mediterranean Sea region is analysed (see Table 2.2.). In this regard, data on the distribution (and abundance) of species is collected and analysed (georeferenced and mapped) and it is assessed whether the species is present within its expected range and whether further conservation measures may be needed.

43. Spatial distribution for each species is mainly described by indicating areas where the species is present - both Mediterranean sub-regions (as shown in Figure 2.1.), as well as sea names (Figure 4.1.).

Figure 4. 1 : Mediterranean Sea. Prepared by: Stenella consulting, Croatia

~~40.~~44. The following GES assessment elements are being defined for the CI3 and analysed for each of the eight representative species (Table 4.1.).

Table 4. 1 : CI3 Species distributional range GES definition, target, baseline and threshold

GES definition:	The species are present in all their *natural* distributional range.
GES target:	The distribution of marine mammals remains stable or expanding and the species that experienced reduced distribution in the past are in favourable status of conservation and can recolonise areas with suitable habitats.
Baseline/Reference value:	For the purposes of GES assessment, ACCOBAMS status report (2021) species distribution reference maps were used as the baseline for the assessment of the CI3 Species distributional range. This report takes into account results of ASI, as well as results of longer-term research and monitoring.
UNEP/MAP proposal for thresholds:	The extent of the distribution of each species remains stable or expanding compared to a species distribution reference map. In particular, the extent of occurrence shows: 1) no decline (in all sub-regions where the species was regularly found since last assessment, 2) no decline of number of locations or local putative populations for the species within its distributional range.
Scale of assessment	Regional(primary) and sub-regional level

GES ASSESSMENT

SHALLOW-DIVING TOOTHED WHALES ~~SMALL CETACEAN SPECIES DISTRIBUTION~~

A. Long finned pilot whale (*Globicephala melas*)

Figure 4. 2 : Long-finned pilot whale (*Globicephala melas*). Author: Dirk Klaus

~~41.~~45. Long-finned pilot whale is a ~~small~~ cetacean species found in a variety of deep-water environments, including offshore areas, canyons, and seamounts (Cañadas et al. 2005, Azzellino et al. 2008). It is one of the deepest-diving delphinids distributed almost exclusively in the deep pelagic waters of the western basin of the Mediterranean Sea (Verborgh et al., 2016, ACCOBAMS, 2021a) (Figure 4.3.). Largest groups of long finned pilot whales were sighted in the Alborán Sea, along the coast of Morocco and in the Gulf Lion. Relatively smaller pods were observed in the Ligurian Sea within the waters of the Pelagos Sanctuary (ACCOBAMS, 2021a). Based on the 2018 - 2021 IUCN Red List assessment in ACCOBAMS area, long-finned pilot whale is listed as Endangered for the Inner Mediterranean subpopulation and Critically Endangered for the Strait of Gibraltar subpopulation.

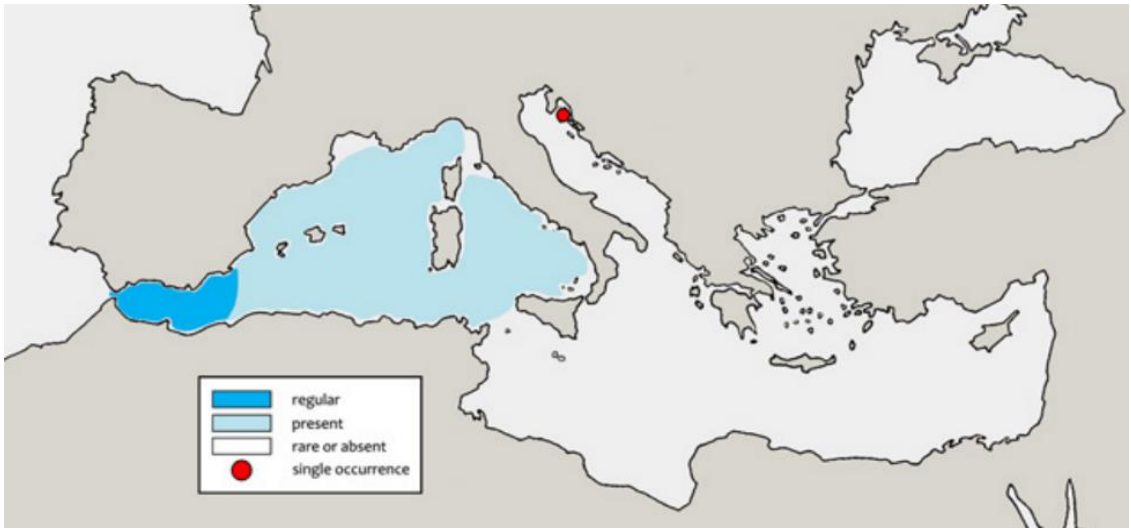

Figure 4. 3 : Distribution of long-finned pilot whale (*Globicephala melas*) in the Mediterranean Sea. Source: ACCOBAMS, 2021a

~~42.~~46. The distribution map shown in Figure 4.3. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.2.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.3.

~~43.~~47. A snapshot of occurrence data collected through OBIS, ASI data, GBIF, INTERCET ~~andcnsolidatess~~and consolidations ~~Collected data consolidates over~~ over 1100 records of the long-finned pilot whale occurrences over the time range from 1973 to 2021. In addition, ~~,~~ – species distribution data (polygons) is available, as reported by Member States related to the Habitats Directive, Article 17 (Figure 4.4. and 4.5.). Observations' data confirm the presence of the long-finned pilot whale almost exclusively in the western Mediterranean Sea, as presented in the distribution map in Figure 4.3.

Table 4. 2 : A snapshot of the long-finned pilot whale (Globicephala melas) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023)

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1973 - 2019	758 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	16 occurrences (pod size from 1 – 30)
GBIF - Global Biodiversity Information Facility	1986 - 2021	32 occurrences
INTERCET	NA	342 occurrences
Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 4 : *Globicephala melas* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

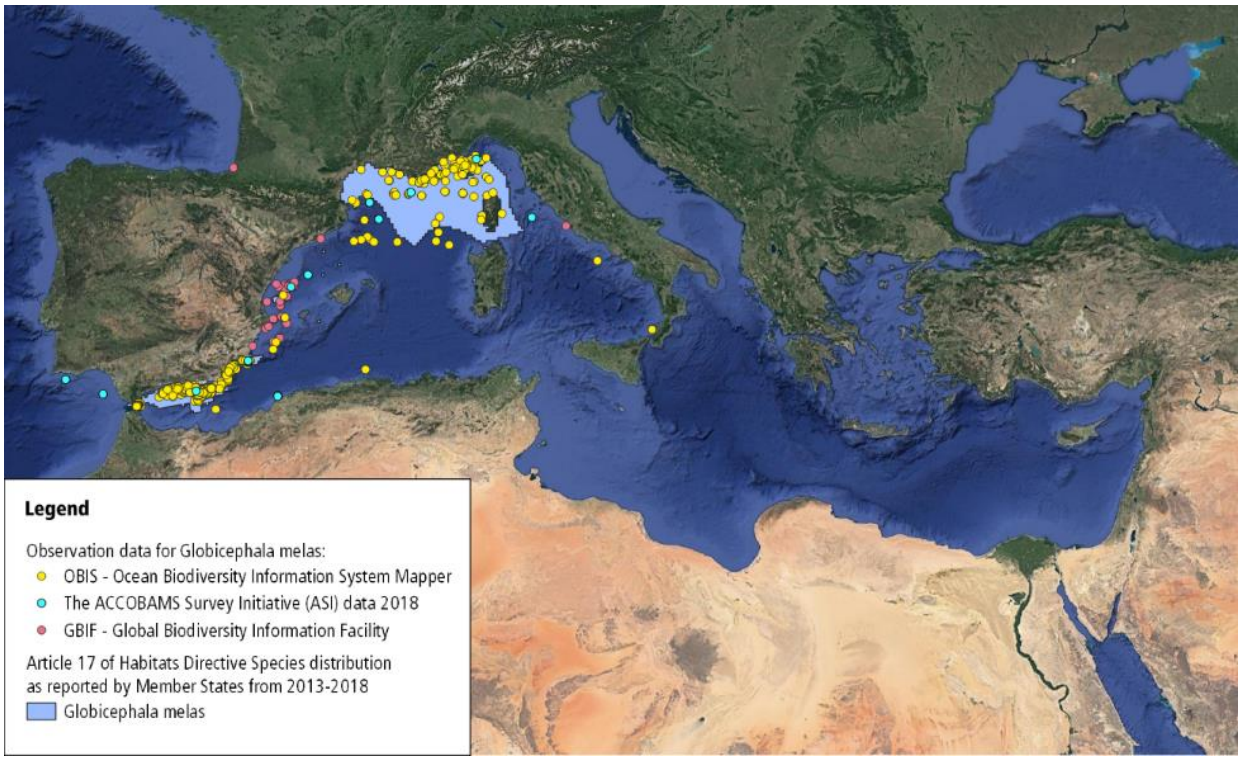

Figure 4. 5 : *Globicephala melas* occurrence data from OBIS, ASI, GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting, Croatia

GES assessment conclusion

~~44.~~48. The baseline/reference distribution map for long-finned pilot whale in the Mediterranean is defined and it shows that this species is present in the western portion of the Mediterranean basin and absent

elsewhere (ACCOBAMS, 2021a). However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information of trends in spatial distribution. Since the baseline/reference value dates from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

B. Risso's dolphin (*Grampus griseus*)

Figure 4. 6 : Risso's dolphin (*Grampus griseus*). Author: William Terry Hunefeld

~~45.~~49. Risso's dolphin is the small cetacean species that is present throughout the Mediterranean Sea, with the most frequent observations in the western part of the basin - the Alborán Sea, the Moroccan and Algerian waters and the Balearic Islands (Figure 4.7.). Risso's dolphins have also been frequently spotted in the southern part of the Adriatic Sea as well as the Ionian Sea and the deep Hellenic Trench. In the eastern Mediterranean sightings are usually low and the species is also encountered in mixed-species groups with striped dolphins and short-beaked common dolphins in the deep waters of the Gulf of Corinth (Frantzis and Herzing, 2002; Frantzis et al., 2003). In the Mediterranean region, Risso's dolphins are typically found in deep offshore waters and often in large groups or pods. Based on the 2018 - 2021 IUCN Red List assessment in the ACCOBAMS area, Risso's dolphin is listed as Endangered (ACCOBAMS Resolution 8.12, 2022).

Figure 4. 7 : Distribution of Risso's dolphin (*Grampus griseus*) in the Mediterranean Sea. Source: ACCOBAMS, 2021a[4]

~~46.~~50. The distribution map shown in Figure 4.7. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.3.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.7.

~~47.~~51. Available data sources provide Risso's dolphins' occurrence data as well as depiction of the distribution area based on the datasets from the Article 17 of the Habitats Directive (Table 4.3.). Collected data consolidates over 1140 records of the Risso's dolphins' occurrences over the time range from 1973 to 2020 (Figure 4.8. and 4.9.). Observations' data confirm the presence of the Risso's dolphin as presented in the distribution map, as shown in Figure 4.7.

Table 4. 3 : Risso's dolphin (*Grampus griseus*) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023)

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1973 - 2020	564 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	64 occurrences (pod size from 1 – 40)
GBIF - Global Biodiversity Information Facility	1993 - 2019	55 occurrences
INTERCET	NA	464 occurrences

[4] Note: The source of distribution maps (ACCOBAMS, 2021a) shows species distribution in the Mediterranean Sea and, when applicable, in the contiguous Atlantic area (as parts of ACCOBAMS area). However, the focus of this report is the Mediterranean Sea, which is supported with written description of distribution. This is also valid for presentations of cetacean distribution maps elaborated in following sections.

Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 8 : *Grampus griseus* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

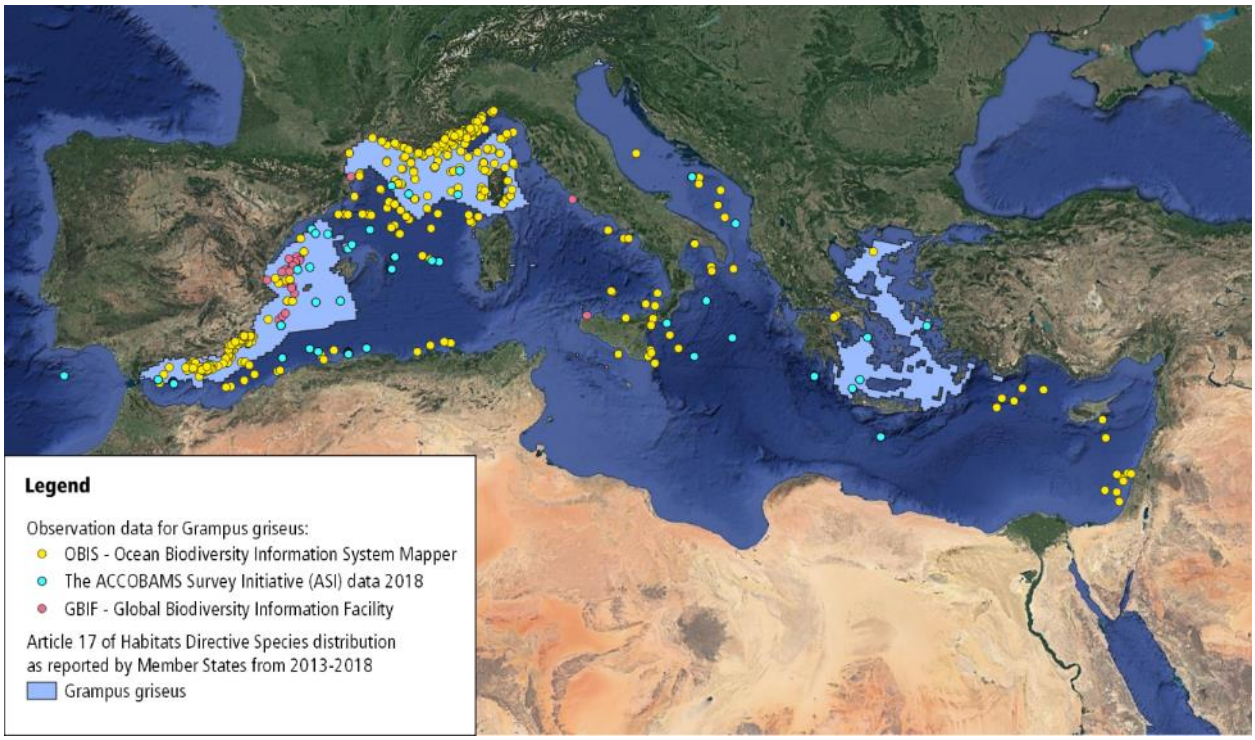

Figure 4. 9 : *Grampus griseus* occurrence data from OBIS, ASI and GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting

GES assessment conclusion

~~48.~~52. The baseline/reference distribution map for presence of Risso's dolphin in the Mediterranean is defined and it shows presence of the species throughout the Mediterranean basin, with the highest density and regular observations in the Alborian and Balearic Sea, southern part of the Adriatic as well as the Ionian and Aegean Sea (ACCOBAMS, 2021a). However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information on trends in spatial distribution. Since the baseline/reference value dates from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

C. Common bottlenose dolphin (*Tursiops truncatus*)

~~49.~~53. Common bottlenose dolphins are regularly present and widely distributed across the Mediterranean Sea, mostly spotted in the continental shelf but also occurring in the deeper offshore waters throughout the region. Most recent aerial data showed a discontinued distribution of the common bottlenose dolphin from the Strait of Gibraltar to the area north of the Balearic Islands towards the Gulf of Lion, Corsica and northern Tyrrhenian Sea. They seem particularly abundant in the northern Adriatic Sea, in the Strait of Sicily and in the Aegean Sea (Figure 4.10.). Based on the 2018 – 2021 IUCN Red List assessment in ACCOBAMS area, common bottlenose dolphin is listed as Least Concern for the Inner Mediterranean subpopulation and Critically Endangered for the Gulf of Ambracia subpopulation (ACCOBAMS Resolution 8.12, 2022).

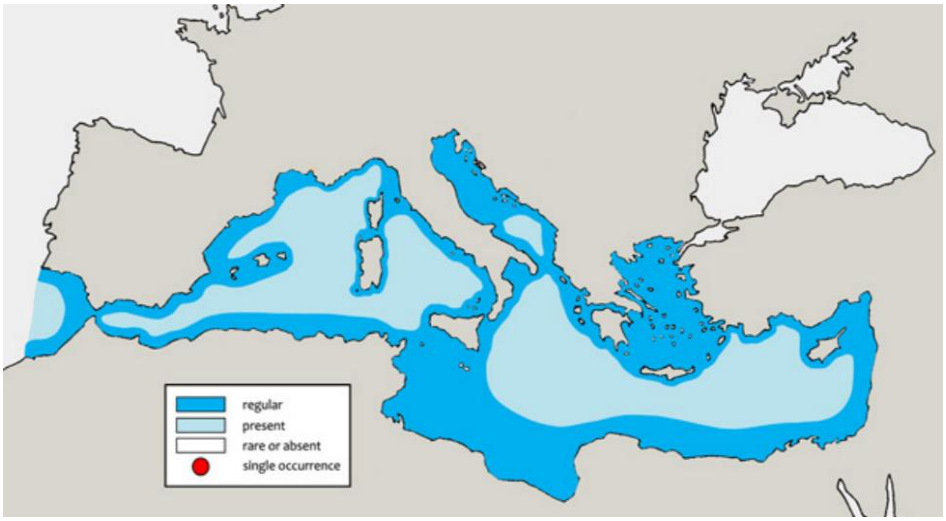

Figure 4. 10 : Distribution of common bottlenose dolphin (*Tursiops truncatus*) in the Mediterranean Sea. Source: ACCOBAMS, 2021a

Figure 4. 11 : Common bottlenose dolphin (*Tursiops truncatus*). Author: Gregory "Slobirdr" Smith

54. The distribution map shown in Figure 4.10. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.4.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.10.

~~50.~~55. Available data sources provide common bottlenose dolphins' occurrence data as well as depiction of the distribution area based on the datasets from the Article 17 of the Habitats Directive (Table 4.4.) Collected data consolidates almost 14000 records of the common bottlenose dolphins' occurrences over the time range from 1972 to 2022 (Figure 4.12. and 4.13.). Observations' data confirm the presence of the common bottlenose dolphin as presented in the distribution map, as shown in Figure 4.10.

Table 4. 4 : Common bottlenose dolphin (*Tursiops truncatus*) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1972 - 2022	4592 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	178 occurrences (pod size from 1 – 181)
GBIF - Global Biodiversity Information Facility	1990 - 2021	1322 occurrences
INTERCET	NA	7621 occurrences
Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 12 : *Tursiops truncatus* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

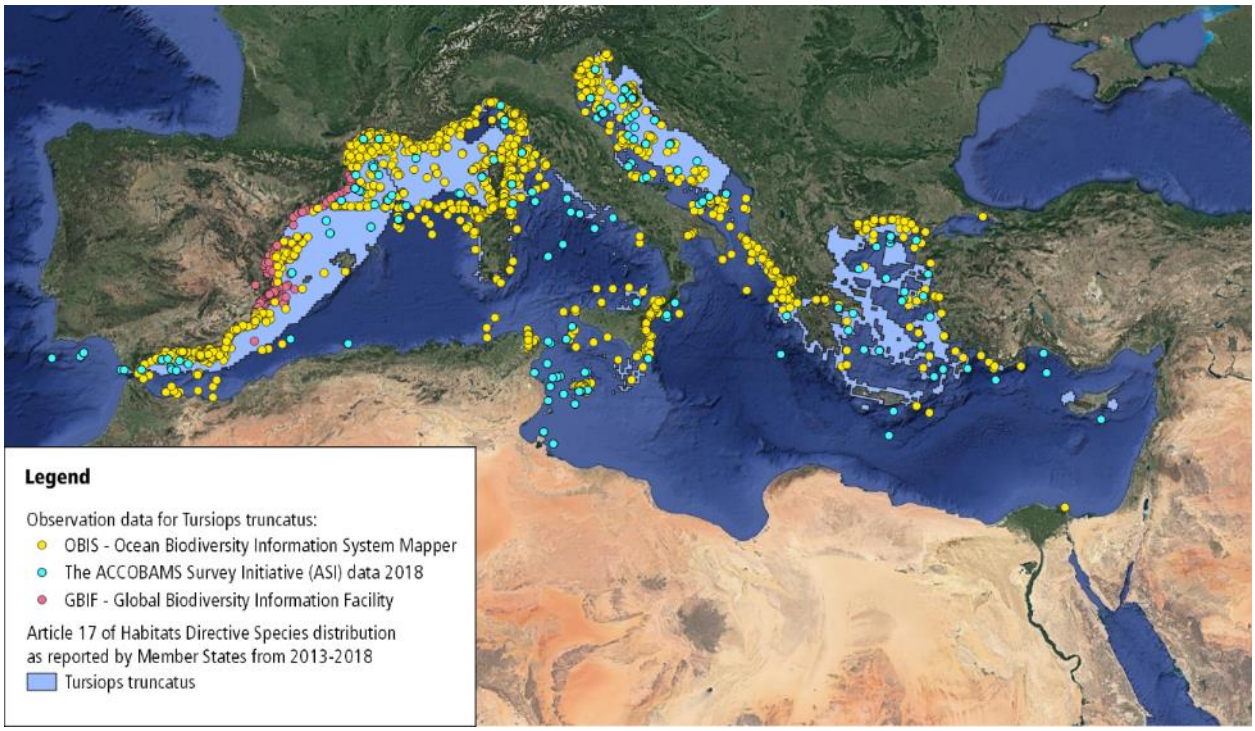

Figure 4. 13 : *Tursiops truncatus* occurrence data from OBIS, ASI and GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting, Croatia

GES assessment conclusion

~~51.~~56. The baseline/reference distribution map for presence of common bottlenose dolphin in the Mediterranean is defined and it shows that the species is confirmed throughout the entire Mediterranean basin, especially in the continental shelf (ACCOBAMS, 2021a). However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information on trends in spatial distribution. Since the baseline/reference value dates from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

D. Common dolphin (*Delphinus delphis*)

~~52.~~57. Common dolphins have been mostly sighted in both deep offshore waters and shallow coastal waters of the Mediterranean (Bearzi et al. 2003, ACCOBAMS 2021a), most abundantly the Alborán Sea, the Strait of Sicily and of the Sardinian, Tyrrhenian and western Ionian seas, including the Gulf of Corinth, the northern and eastern Aegean Sea and along the coastal waters of southern Israel, as shown in Figure 4.14. The presence of common dolphins from Algeria to Libya has been often reported, but without quantitative indications of abundance (ACCOBAMS 2021a). Based on vast literature and museum collections, common dolphins used to be present throughout the Mediterranean Sea until the first half of the 20th century and as such they are still considered to be potentially present in their former distribution range. Based on the 2018 – 2021 IUCN Red List assessment in ACCOBAMS area, common dolphin is

listed as Endangered for the Inner Mediterranean subpopulation and Critically Endangered for the Gulf of Corinth subpopulation (ACCOBAMS Resolution 8.12, 2022).

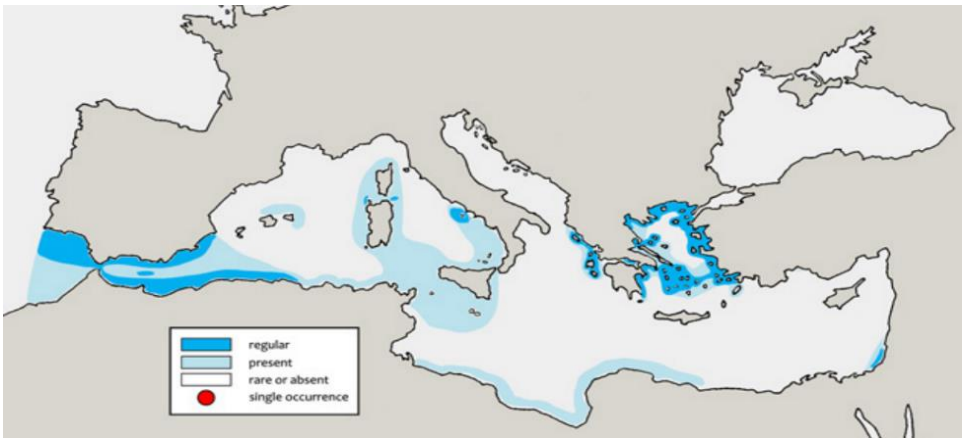

Figure 4. 14 : Distribution of common dolphin (*Delphinus delphis*) in the Mediterranean Sea. Source: ACCOBAMS, 2021b

Figure 4. 15 : Common dolphin (*Delphinus delphis*). Author: Gregory "Slobirdr" Smith

58. The distribution map shown in Figure 4.14. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.5.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.14.

~~53.~~59. Available data sources provide common bottlenose dolphins' occurrence data as well as depiction of the distribution area based on the datasets from the Article 17 of the Habitats Directive (Table 4.5).

Collected data consolidates almost 3100 records of the common dolphins' occurrences over the time range from 1934 to 2021 (Figure 4.16. and 4.17). Observations' data confirm the presence of the common dolphin as presented in the distribution map (Figure 4.14).

Table 4. 5 : Common dolphin (*Delphinus delphis*) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023)

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1969 - 2019	2323 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	33 occurrences (pod size from 1 – 150)
GBIF - Global Biodiversity Information Facility	1934 - 2021	12 occurrences
INTERCET	NA	731 occurrences
Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 16 : *Delphinus delphis* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

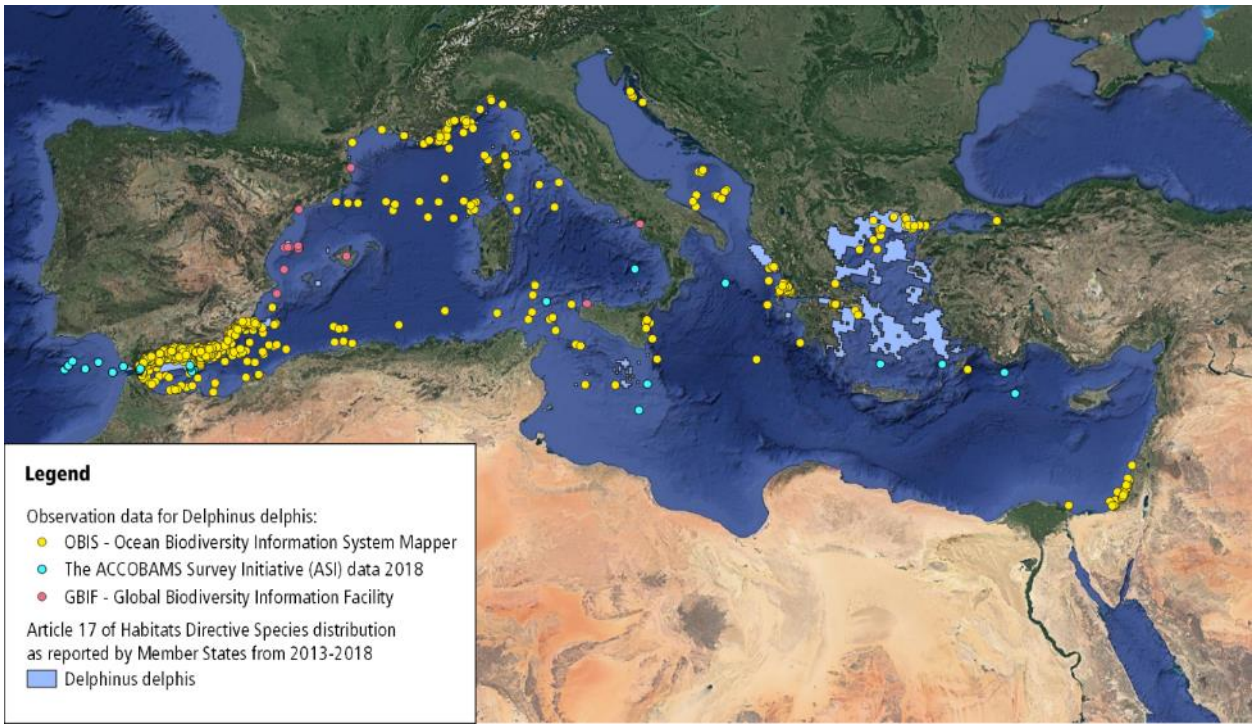

Figure 4. 17 : *Delphinus delphis* occurrence data from OBIS, ASI and GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting, Croatia

GES assessment conclusion

~~54.~~60. The presence of common dolphin in the Mediterranean is confirmed mostly in the western part of Mediterranean basin, including Alboran Sea, around Sardinia and Sicily but also around the coast of North Africa as well as throughout Aegean Sea (ACCOBAMS, 2021a). However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information on trends in spatial distribution. Since the baseline/reference value dates from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

E. Striped dolphin (Stenella coeruleoalba)

~~55.~~61. Striped dolphin is the most sighted and abundant small cetacean species regularly present almost throughout the Mediterranean Sea where the can be found predominantly offshore and very rarely in waters shallower than 100 m (Notarbartolo di Sciara et al. 1993). It has also been regularly spotted from Gibraltar to the Levantine Sea, most often in the Alborán Sea region, in the waters between the Balearic Islands and the Iberian mainland, in the Gulf of Lions and in the Ligurian Sea as well as the Tyrrhenian and Ionian Seas, including in the Gulf of Taranto, and in the open waters of the southern Adriatic Sea, as well as in the Strait of Sicily, and throughout the Aegean and Levantine seas, all the way to Cyprus, Gulf of Corinth and Israel (Figure 4.18). Based on the 2018 - 2021 IUCN Red List assessment in ACCOBAMS area, striped

dolphin is listed as Least Concern for the Mediterranean subpopulation and Endangered for the Gulf of Corinth subpopulation (ACCOBAMS Resolution 8.12, 2022).

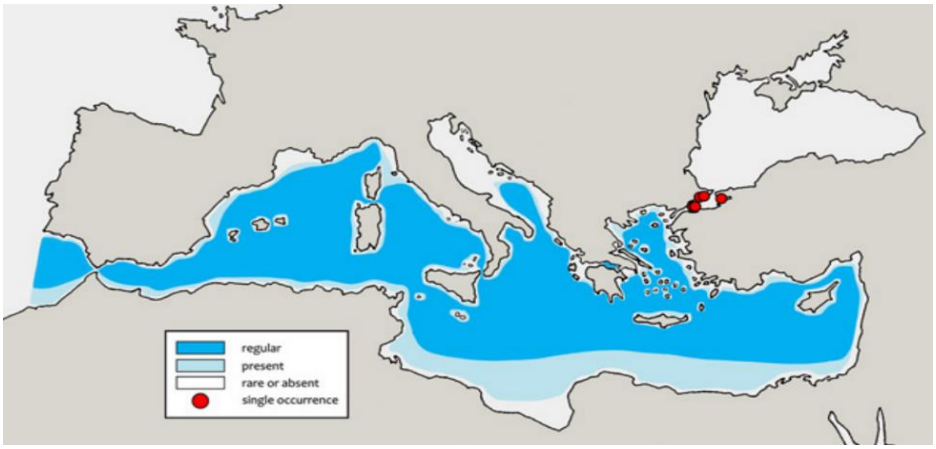

Figure 4. 18 : Distribution of Striped dolphin (*Stenella coeruleoalba*) in the Mediterranean Sea. Source: ACCOBAMS, 2021a

Figure 4. 19 : Striped dolphin (*Stenella coeruleoalba*). Author: Wanax01

62. The distribution map shown in Figure 4.18. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.6.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.18.

~~56.~~63. Available data sources provide striped dolphins' occurrence data as well as depiction of the distribution area based on the datasets from the Article 17 of the Habitats Directive (Table 4.6.). Collected data consolidates almost 25000 records of the striped dolphins' occurrences over the time range from 1972 to 2021 (Figure 4.20. and 4.21). Observations' data confirm the presence of the striped dolphin as presented in the distribution map (Figure 4.18).

Table 4. 6 : Striped dolphin (*Stenella coeruleoalba*) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023)

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1972 - 2021	11126 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	451 occurrences (pod size from 1 – 250)
GBIF - Global Biodiversity Information Facility	1996 - 2021	599 occurrences
INTERCET	NA	12085 occurrences
Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 20 : *Stenella coeruleoalba* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

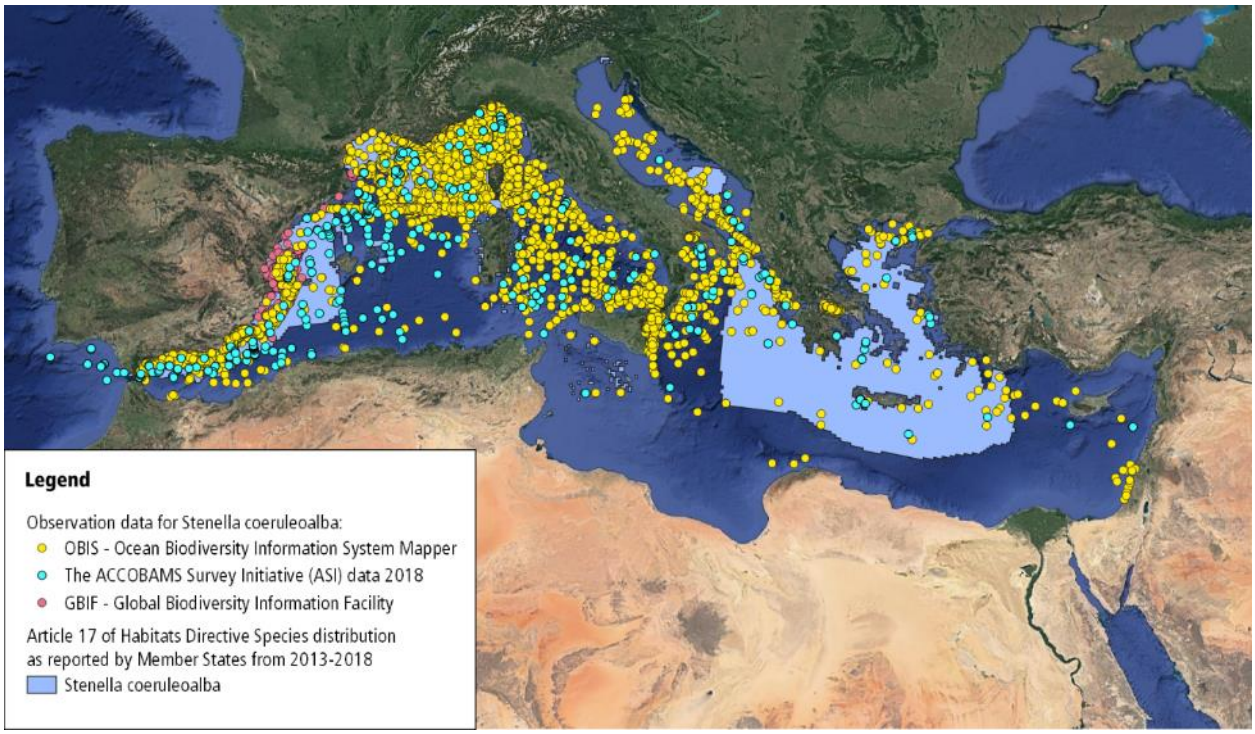

Figure 4. 21 : Stenella coeruleoalba occurrence data from OBIS, ASI and GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting

GES assessment conclusion

~~57.~~64. The presence of the striped dolphin is confirmed throughout deeper waters of the entire Mediterranean basin, from Gibraltar to Levantine Sea. However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information on trends in spatial distribution. Since the baseline/reference value dates from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

DEEP-DIVING TOOTHED WHALES

A. Sperm whale (Physeter macrocephalus)

~~58.~~65. Sperm whale is a large cetacean species occurring throughout the deep and slope waters of the Mediterranean Sea, from Gibraltar to the Levantine Sea. Sperm whales have been most frequently spotted in specific areas such as the Strait of Gibraltar as well as in Tunisian waters, Balearic Islands, the Liguro-Provençal Basin, parts of the Tyrrhenian Sea, the Hellenic Trench, and south of Türkiye from Rhodes to Cyprus. Additionally, strandings have been reported in Libya and Egypt, suggesting intermittent use of this area by the species. Sperm whales are rare and occur only sporadically in the shallow waters of the Mediterranean such as the northern and central Adriatic, the Strait of Sicily and portions of the Aegean Sea, as shown in Figure 4.26. Based on the 2018 - 2021 IUCN Red List assessment in ACCOBAMS area, Mediterranean subpopulation of sperm whale is listed as Endangered (ACCOBAMS Resolution 8.12, 2022).

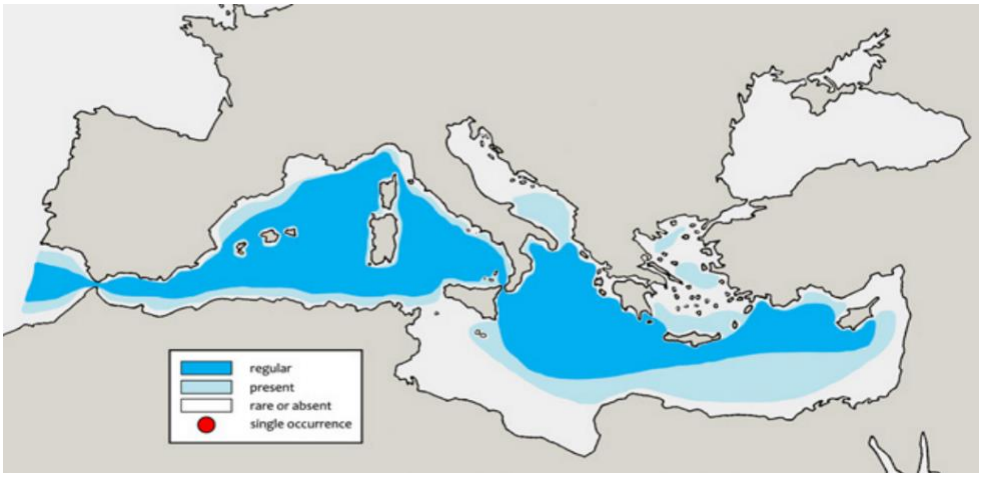

Figure 4. 22 : Distribution of Sperm whale (*Physeter macrocephalus*) in the Mediterranean Sea. Source: ACCOBAMS, 2021a

Figure 4. 23 : Sperm whale (*Physeter macrocephalus*) - mother and the baby. Author: Gabriel Barathieu

~~59.~~66. The distribution map shown in Figure 4.22. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.7.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.22.

~~60.~~67. Available data sources provide sperm whales' occurrence data as well as depiction of the distribution area based on the datasets from the Article 17 of the Habitats Directive (Table 4.~~8~~7.). Collected data consolidates around 3200 records of the Sperm whales' occurrences over the time range from 1913 to 2020 (Figure 4.2~~8~~4. and 4.2~~9~~5). Observations' data confirm the presence of the Sperm whales as presented in the distribution map (Figure 4.2~~6~~2).

Table 4. 7 : Sperm whale (*Physeter macrocephalus*) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023)

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1913 - 2020	1841 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	14 occurrences (pod size from 1 – 11)
GBIF - Global Biodiversity Information Facility	1993 - 2013	16 occurrences
INTERCET	NA	1351 occurrences
Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 24 : *Physeter macrocephalus* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

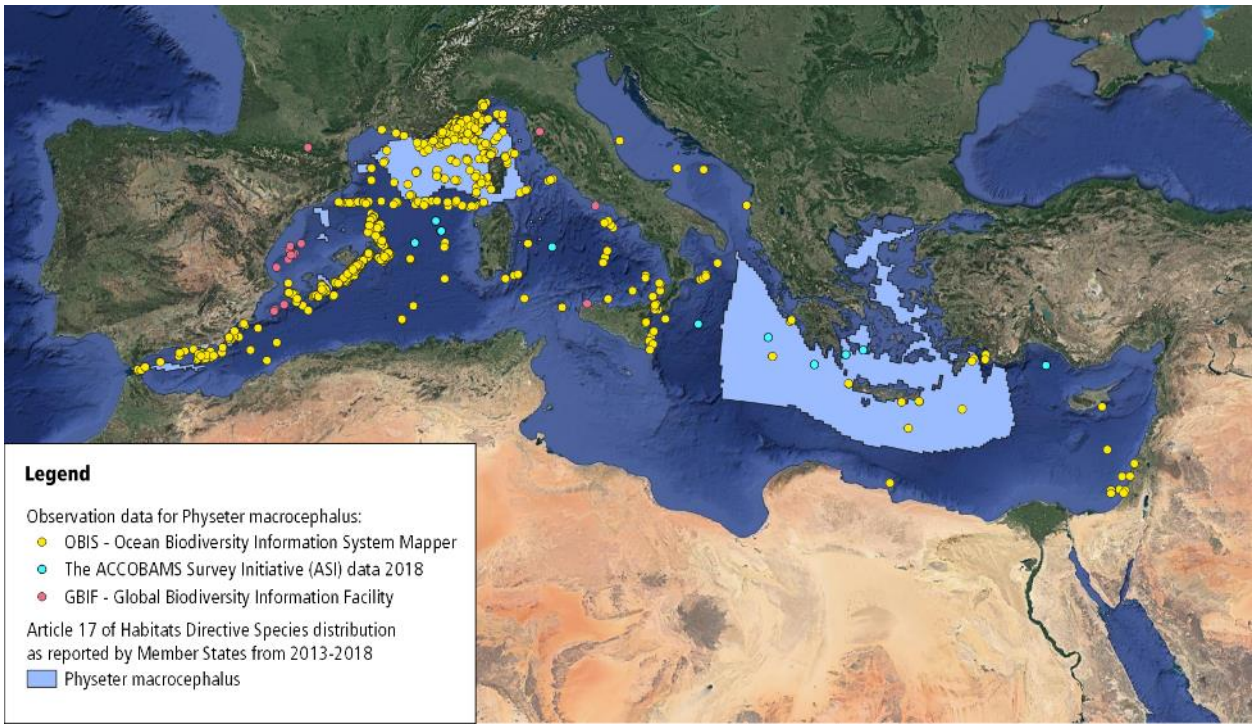

Figure 4. 25 : *Physeter macrocephalus* occurrence data from OBIS, ASI and GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting

GES assessment conclusion

~~61.~~68. The presence of the sperm whale is confirmed throughout deep offshore waters of the Mediterranean, with only sporadic seasonal occurrences in the shallow waters such as the northern and central Adriatic, the Strait of Sicily and portions of the Aegean Sea. However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information on trends in spatial distribution. Since the baseline/reference value dates from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

B. Cuvier's beaked whale (*Ziphius cavirostris*)

~~62.~~69. Cuvier's beaked whales are present throughout the Mediterranean basin, most abundantly in the following hotspots: the Alborán Sea, the northern part of Ligurian Sea, the northern Tyrrhenian Sea, the Ionian Sea (east of Sicily), narrow pathway from the southern Adriatic Sea, along the Hellenic Trench to the west of Cyprus and Levantine Sea waters off Lebanon and Israel. The species is rare or absent in the north and central Adriatic Sea as well as the Turkish Strait System, as shown in Figure 4.30. Cuvier's beaked whale is also considered to be absent from the southern Mediterranean region, along the coast of Tunisia, Libya and Egypt, but this area is yet to be better investigated and monitored in order to make any conclusions. Based on the 2018 - 2021 IUCN Red List assessment in ACCOBAMS area, Mediterranean subpopulation of Cuvier's beaked whale is listed as Vulnerable (ACCOBAMS Resolution 8.12, 2022).

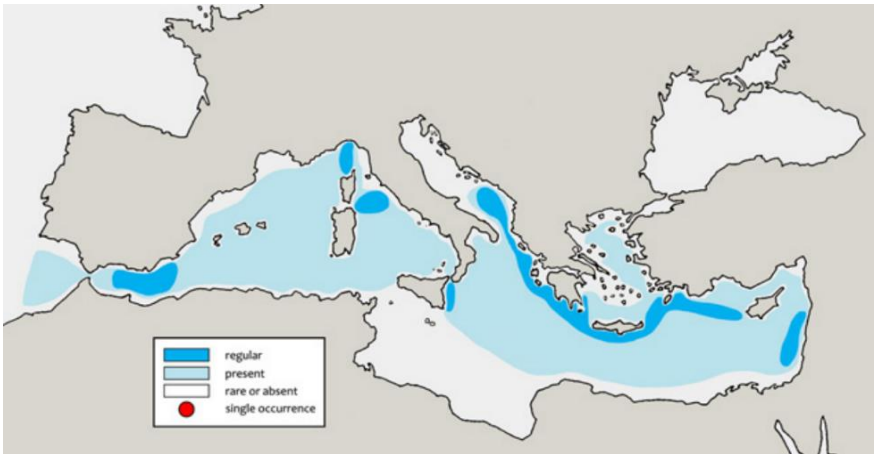

Figure 4. 26 : Distribution of Cuvier's beaked whale (*Ziphius cavirostris)* in the Mediterranean Sea. Source: ACCOBAMS, 2021a

Figure 4. 27 : Cuvier's beaked whale (*Ziphius cavirostris*). Author: Laurent Bouveret

70. The distribution map shown in Figure 4.26. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.8.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.26.

~~63.~~71. Available data sources provide Cuvier's beaked whales' occurrence data as well as depiction of the distribution area based on the datasets from the Article 17 of the Habitats Directive (Table 4.~~9~~8.). Collected data consolidates almost 900 records of the Cuvier's beaked whales' occurrences over the time range from 1974 to 2020 (Figure 4.~~32~~28. and 4.~~33~~29.). Observations' data confirm the presence of the Cuvier's beaked whales as presented in the distribution map (Figure 4.~~30~~26.).

Table 4. 8 : Cuvier's beaked whale (*Ziphius cavirostris*) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023)

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1974 - 2020	194 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	17 occurrences (pod size from 1 – 10)
GBIF - Global Biodiversity Information Facility	2002 - 2020	12 occurrences
INTERCET	NA	646 occurrences
Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 28 : *Ziphius cavirostris* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

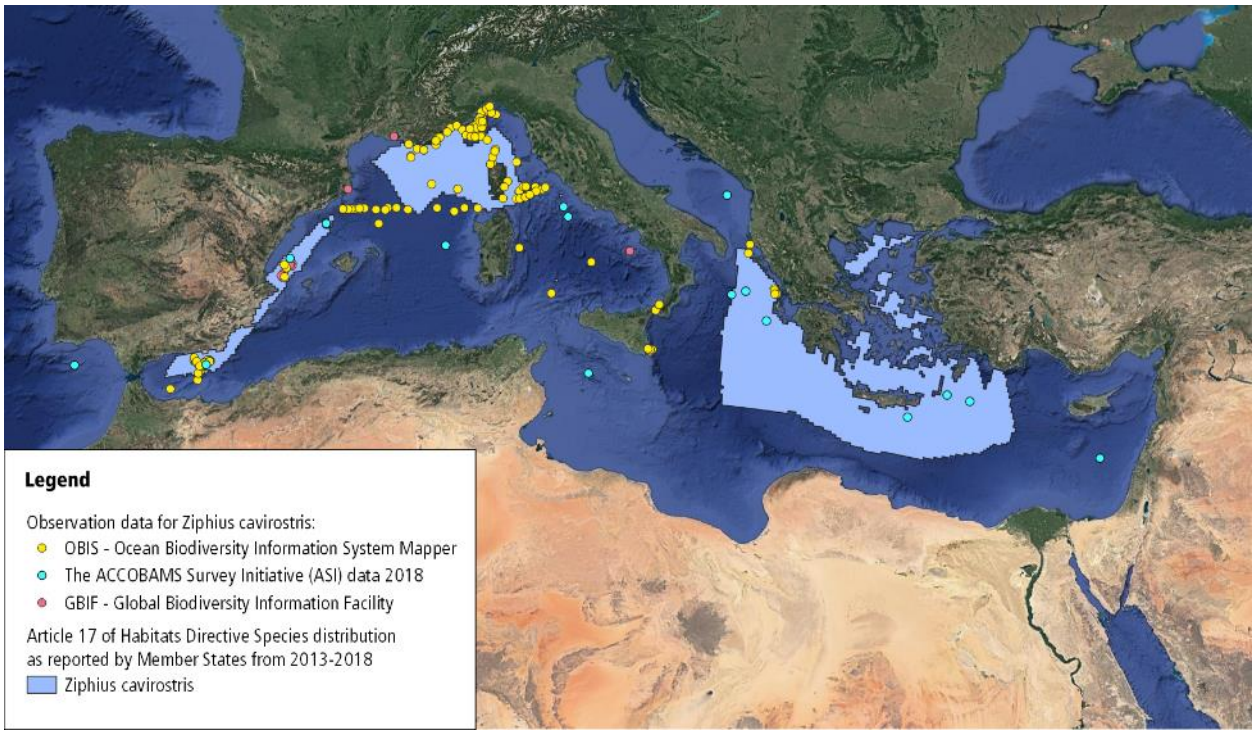

Figure 4. 29 : *Ziphius cavirostris* occurrence data from OBIS, ASI and GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting, Croatia

GES assessment conclusion

~~64.~~72. The presence of the Cuvier's beaked whale is confirmed throughout the Mediterranean region, where they occur in relatively small patches at low densities in specific hotspots (such as Ionian Sea and the Hellenic Trench, southern Adriatic Sea, the Central Tyrrhenian Sea, the Balearic and the Alborán Seas). However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information on trends in spatial distribution. Since the reference value date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

BALEEN WHALES
~~LARGE CETACEAN SPECIES~~

A. Fin whale (Balaenoptera physalus)

~~66.~~73. Fin whale is a large cetacean species regularly present in the deep, pelagic offshore waters of the western Mediterranean basin, with the highest occurrence in the Ligurian Sea, Gulf of Lions ~~and Gulf of Cadiz~~, Provençal Basin and the Western part of the Pelagos Sanctuary and less frequent elsewhere. It should be noted that the species is also present in the Gulf of Cadiz in contiguous Atlantic area, due to the importance of the seasonal migration of the species from Strait of Gibraltar and Gulf of Cadiz in the spring and summer, and back to the Mediterranean basin from November to March (ACCOBAMS; 2021a). During

the summer time Fin whales are concentrating around their feeding grounds in the Provencal, Corsican, Ligurian and northern Tyrrhenian seas (Notarbartolo di Sciara et al. 2003), as well as the Strait of Sicily in winter (Canese et al. 2006), in the Balearic Sea in spring (EDMAKTUB 2018). It occurs only sporadically in the northern part of the Adriatic, Aegean and Levantine seas (Notarbartolo di Sciara et al. 2003), as shown in Figure 4.~~22~~30. Based on the 2018 - 2021 IUCN Red List assessment in ACCOBAMS area, Mediterranean subpopulation of fin whale is listed as Endangered (ACCOBAMS Resolution 8.12, 2022).

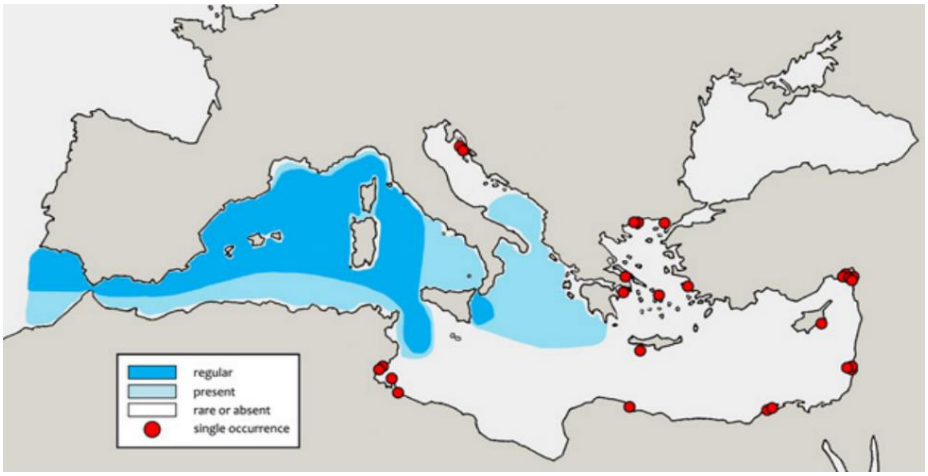

Figure 4. 30 : Distribution of Fin whale (*Balaenoptera physalus*) in the Mediterranean Sea. Source: ACCOBAMS, 2021a

Figure 4. 31 : Fin whale (*Balaenoptera physalus*). Author: Aqqa Rosing-Asvid

74. The distribution map shown in Figure 4.30. is based on experts' interpretation of data from various data sources, with emphasis on ACCOBAMS Survey Initiative data. Since data is the main ingredient for GES assessment, a snapshot is given of various relevant/reliable data sources (databases) with the description of the number of available occurrence data, as data indicative for species distribution (Table 4.9.). It should be emphasized that data given in following paragraphs are indicative only and should be viewed as a contribution to the actual species distribution map given in Figure 4.30.

~~67.~~75. Available data sources provide fin whales' occurrence data as well as depiction of the distribution area based on the datasets from the Article 17 of the Habitats Directive (Table 4.~~9~~7.). Collected data consolidates almost 5800 records of the Fin whales' occurrences over the time range from 1934 to 2021 (Figure 4.32~~24~~. and 4.33~~25~~). Observations' data confirm the presence of the Fin whales as presented in the distribution map (Figure 4.30~~22~~).

Table 4. 9 : Fin whale (*Balaenoptera physalus*) in the Mediterranean Sea occurrence and distribution data from the relevant data sources (data accessed in December 2022/January 2023)

Data source	Time range	Description
OBIS - Ocean Biodiversity Information System Mapper	1934 - 2021	2018 occurrences
The ACCOBAMS Survey Initiative (ASI) data	2018	50 occurrences (pod size from 1 – 4)
GBIF - Global Biodiversity Information Facility	1996 - 2021	302 occurrences
INTERCET	NA	3364 occurrences
Conservation status of habitat types and species: datasets from Article 17, Habitats Directive 92/43/EEC reporting (2013-2018) - PUBLIC VERSION - Aug. 2020	2013 - 2018	species distribution data (10km grid cells) as reported by Member States

Figure 4. 32 : *Balaenoptera physalus* occurrence data from INTERCET Project. Source: INTERCET Presentation map https://www.intercet.it/

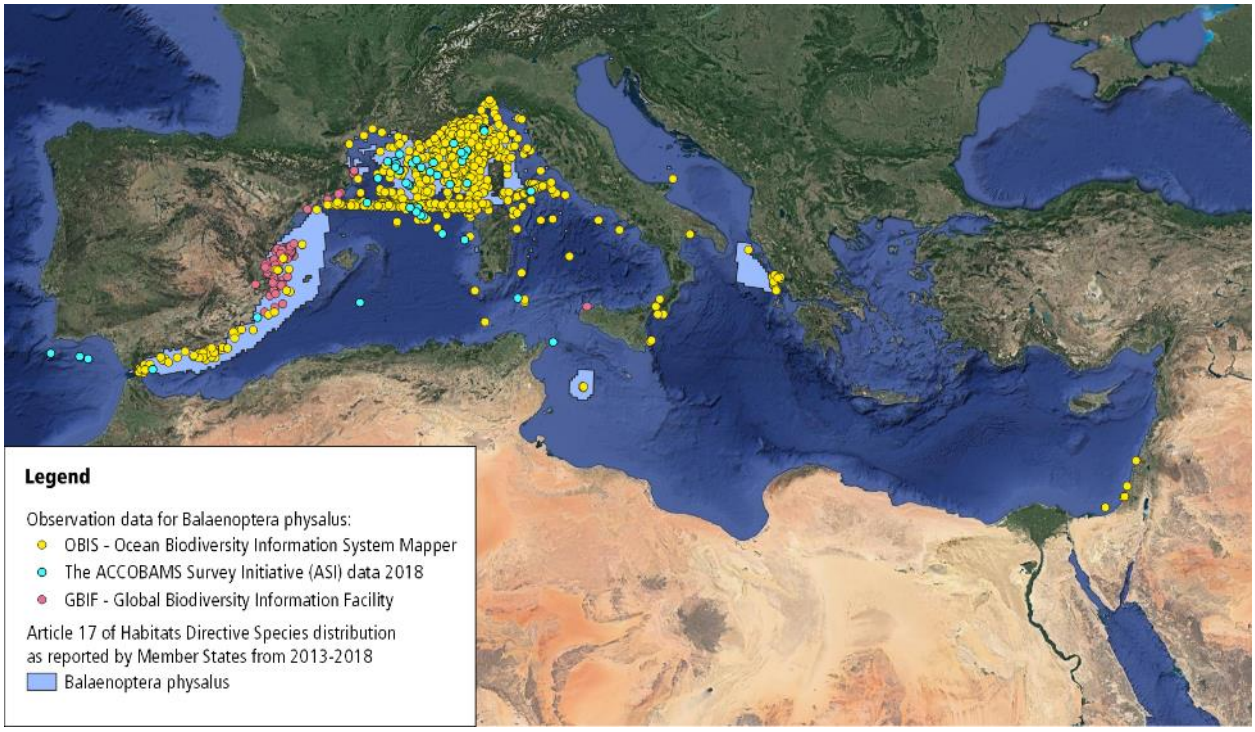

Figure 4. 33 : *Balaenoptera physalus* occurrence data from OBIS, ASI and GBIF and species distribution areas (Habitats Directive, Article 17 reporting). Prepared by: Stenella consulting

GES assessment conclusion

~~68.~~76. The presence of the fin whale is confirmed throughout deep offshore waters of the western and central Mediterranean basin, with only sporadic seasonal occurrences elsewhere. However, in order to assess whether the GES is achieved, as expressed through the defined threshold, it is required to have information on trends in spatial distribution. Since the baseline/reference value dates from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022).

SUMMARY

Table 4. 10 : Assessment of GES for Cetaceans in the Mediterranean Sea for CI3 - Species distribution, based on selected species

Common Indicator	GES definition	GES Assessment ***Globicephala melas – Long finned pilot whale; Grampus griseus – Risso's dolphin; Tursiops truncatus – common bottlenose dolphin; Delphinus delphis – common dolphin; Stenella coeruleoalba – striped dolphin; Balaenoptera physalus – fin whale; Physeter macrocephalus – sperm whale; Ziphius cavirostris – Cuvier's beaked whale***
CI3 Species distributional range	The species are present in all their *natural* distributional range.	Not possible to assess GES. Namely, the baseline/reference values for CI3, expressed through species distributional maps, are set only recently; with ASI survey actually being carried out in 2018 and 2019 and results published in 2021 and the overview of the state of cetaceans in ACCOBAMS area based on all available data (including ASI and other research), compiled in 2021 (ACCOBAMS, 2021a). However, ~~, and~~ there is no long-term data series needed to measure whether defined thresholds are achieved. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (ASI 2) is planned for 2024 -2026.

4.2.2. EO1: COMMON INDICATOR 4. POPULATION ABUNDANCE (MARINE MAMMALS - CETACEANS)

~~69.~~77. The following GES assessment elements are being defined for the CI4 and analysed for each of the eight representative species (Table 4.11).

Table 4. 11 : CI4 Population abundance GES definition, target, baseline and threshold

GES definition:	The species population has abundance levels allowing qualification to Least Concern Category of IUCN Red List or has abundance levels that are improving and moving away from the more critical IUCN category.
GES target:	*State:* Populations recover towards natural levels. ***2017 Proposal****:* No human-induced mortality is causing a decrease in breeding population size or density. Populations recover towards natural levels.

Baseline/Reference value:	For the purposes of GES assessment, ACCOBAMS status report (2021) species population abundance design-based estimates were used as the baseline for the assessment of the CI4 Population abundance.
UNEP/MAP proposal for thresholds:	Check IUCN Mediterranean Red Listing and if EN, CR, VU then maintain total abundance at or above reference levels. No decrease of ≥20% over 3 generations.
Scale of assessment:	Regional (primary) and sub-regional Ievel~~Sub-regional~~

GES ASSESSMENT

SHALLOW-DIVING TOOTHED WHALES
~~**SMALL CETACEAN SPECIES**~~

~~B.~~A. Long finned pilot whale (*Globicephala melas*)

~~70.~~78. Long-finned pilot whales prefer deep pelagic waters of the western Mediterranean Sea with largest groups observed in the Alborán Sea, along the coast of Morocco and in the Gulf Lion and smaller pods observed in the Pelagos Sanctuary (Figure 4.34.). The species' overall abundance is estimated at 5130 individuals on the Mediterranean level. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 4833, Ionian Sea and the Central Mediterranean Sea 297, Adriatic Sea 0 and Aegean - Levantine Sea 0 (ACCOBAMS, 2021b).

~~71.~~79. During ASI 2018/2019, 14 long-finned pilot whales' observations were registered with pod sizes ranging from 1 - 30. It should be noted that pilot whales are to some extent difficult to spot during aerial surveys due to the relatively short surfacing periods (Thomson et al., 2012). Hence the abundance and density estimates derived from aerial surveys should be considered with caution.

~~72.~~80. Based on the 2018 – 2021 IUCN Red List assessment in the ACCOBAMS area, long-finned pilot whale is listed as Endangered for the Inner Mediterranean subpopulation and Critically Endangered for the Strait of Gibraltar subpopulation (ACCOBAMS Resolution 8.12, 2022).

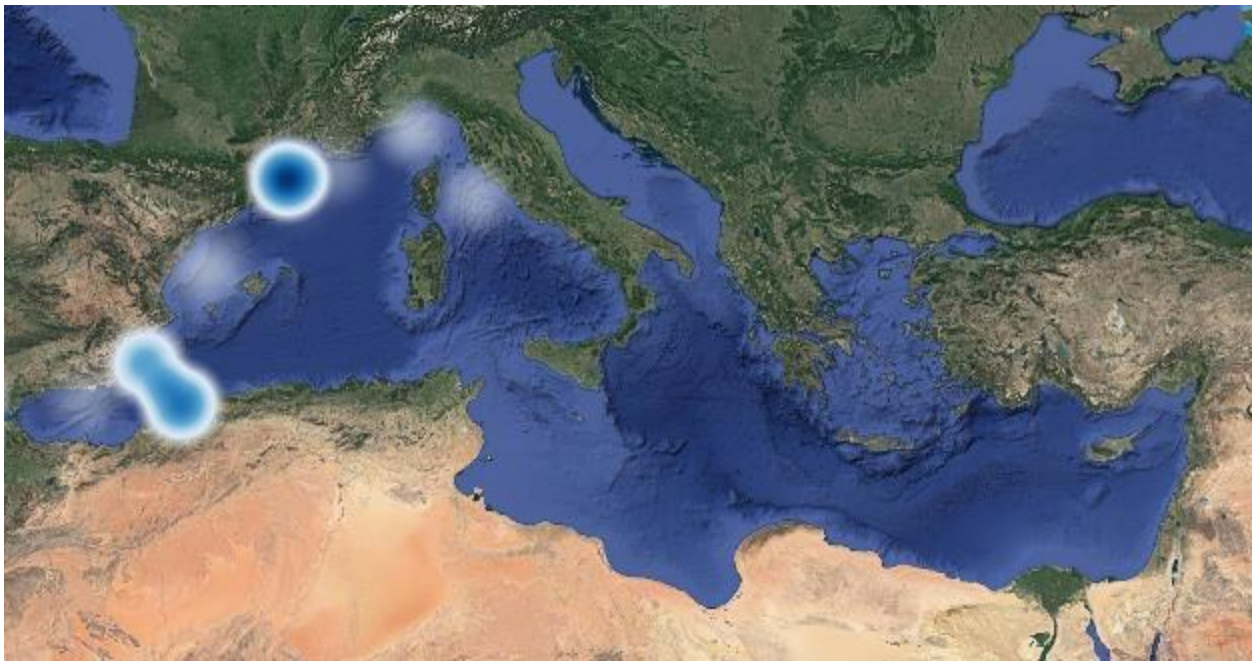

Figure 4. 34 : Long finned pilot whale (Globicephala melas) observations by pod size. Prepared by: Stenella consulting based on ASI 2018/2019 data.

GES assessment conclusion

~~73.~~81. Long- finned pilot whale population abundance has been estimated based on the data collected through ASI 2018/2019, thus providing baseline/reference values for CI4 common indicator. However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022). In addition, in the scope of ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

~~C.~~B. Risso's dolphin (*Grampus griseus*)

~~74.~~82. Available observation data confirms Risso's dolphins' strong preference for the western basin of the Mediterranean Sea in summer, with highest abundance and density registered in the Alborán Sea, the Moroccan and Algerian waters and the Balearic Islands. Relatively large groups of Risso's dolphins have also been spotted in the deeper southern part of the Adriatic Sea, the Ionian Sea and the deep Hellenic Trench (Figure 4.35., Figure 4.36.). During ASI 2018/2019 64 Risso's dolphins' observations were registered with pod sizes ranging from 1 - 40. Estimated species' overall abundance is 23164. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 16651, Ionian Sea and the Central Mediterranean Sea 1540, Adriatic Sea 1467 and Aegean - Levantine Sea 3506.

~~75.~~83. Based on the 2018 - 2021 IUCN Red List assessment in the ACCOBAMS area, Risso's dolphin is listed as Endangered (ACCOBAMS Resolution 8.12, 2022).

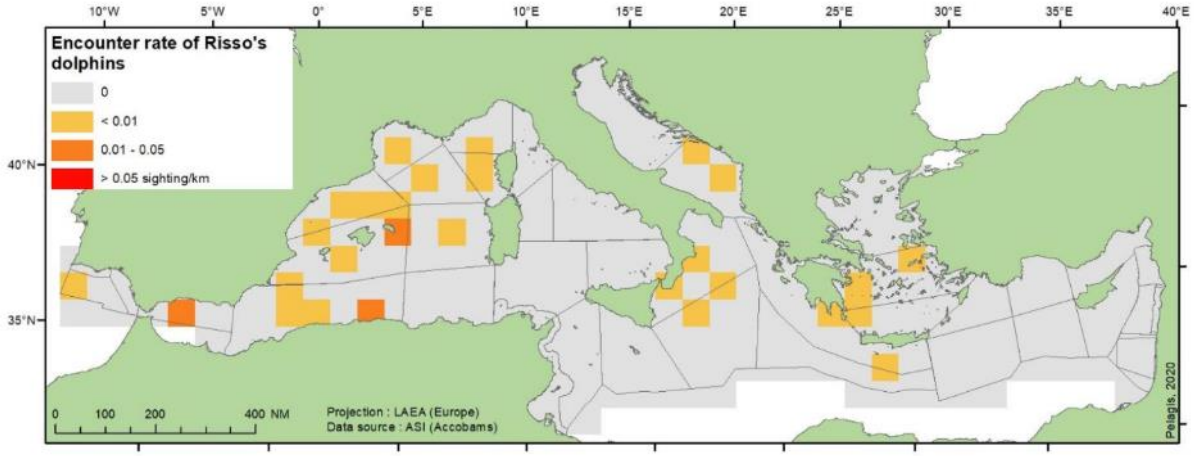

Figure 4. 35 : Encounter rate of Risso's dolphins (sightings per km) on a grid of 100x100 km. Source: ACCOBAMS, 2021b.

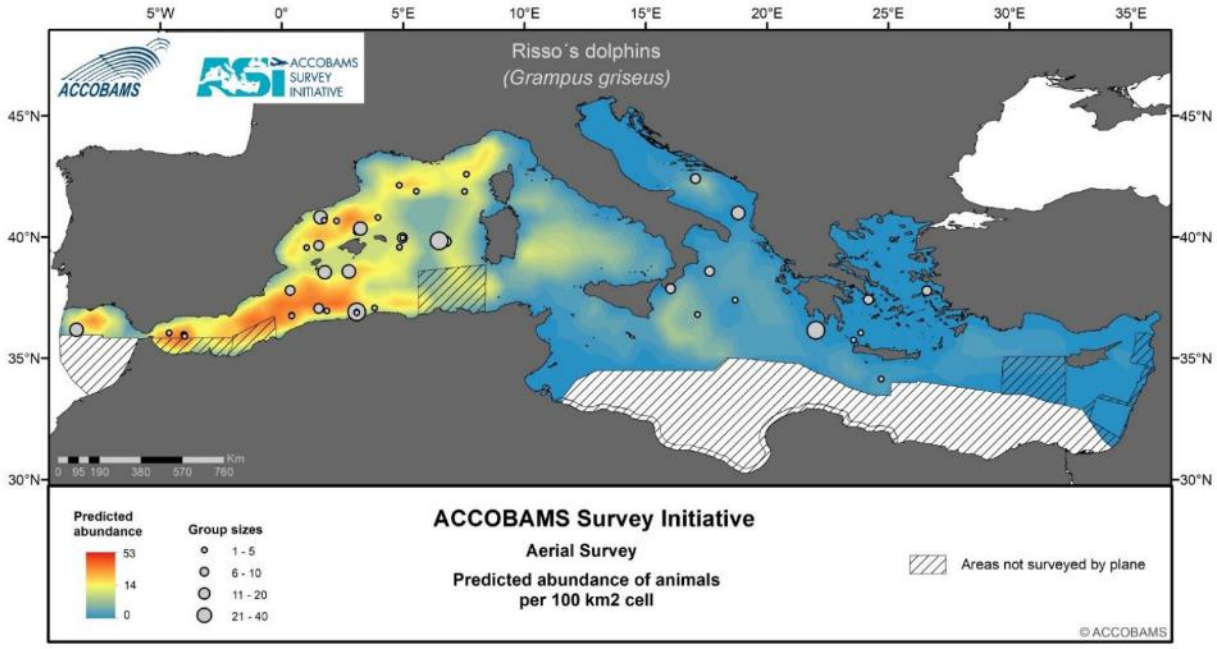

Figure 4. 36 : Predicted abundance of Risso's dolphins. Source: ACCOBAMS, 2021b.

GES assessment conclusion

~~76.~~84. Risso's dolphin population abundance has been estimated based on the data collected through ASI 2018/2019, thus providing baseline/reference values for CI4 common indicator. However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022). In addition, in the scope of

ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

~~D.~~C. Common bottlenose dolphin (*Tursiops truncatus*)

~~77.~~85. Common bottlenose dolphin is the second most abundant species mostly observed in coastal areas during the latest aerial survey ASI 2018/2019. Species distribution was strongly fragmented with patches of higher abundance in the Strait of Gibraltar and Alborán Sea, the Balearic Sea and the Gulf of Lion, the waters surrounding the Island of Corsica and north of Tyrrhenian Sea. Common bottlenose dolphins appeared regularly in the northern Adriatic Sea, in the Strait of Sicily and in the Aegean Sea (Figure 4.37.).

~~78.~~86. During ASI 2018/2019 178 common bottlenose dolphins' observations were registered with pod sizes ranging from 1 - 181 (Figure 4.38.). Estimated species' overall abundance is 61391. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 23363, Ionian Sea and the Central Mediterranean Sea 16010, Adriatic Sea 10350 and Aegean - Levantine Sea 11669.

~~79.~~87. On the IUCN Red List assessment in the ACCOBAMS area, *Tursiops truncatus* is listed as Least Concern for the Inner Mediterranean subpopulation and Critically Endangered for the Gulf of Ambracia subpopulation (ACCOBAMS Resolution 8.12, 2022).

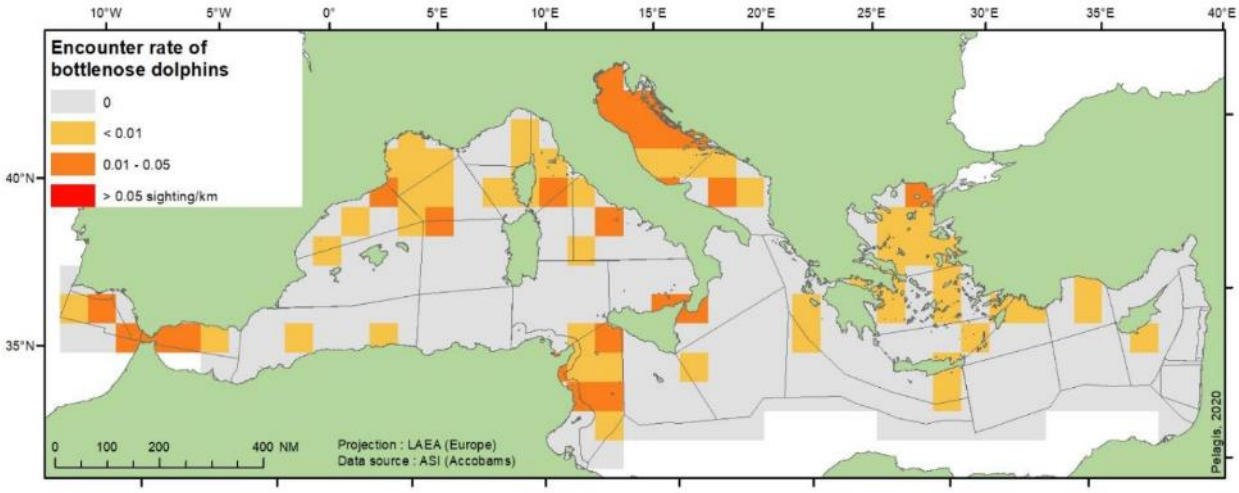

Figure 4. 37 : Encounter rate of common bottlenose dolphins (sightings per km) on a grid of 100x100 km. Source: ACCOBAMS, 2021b.

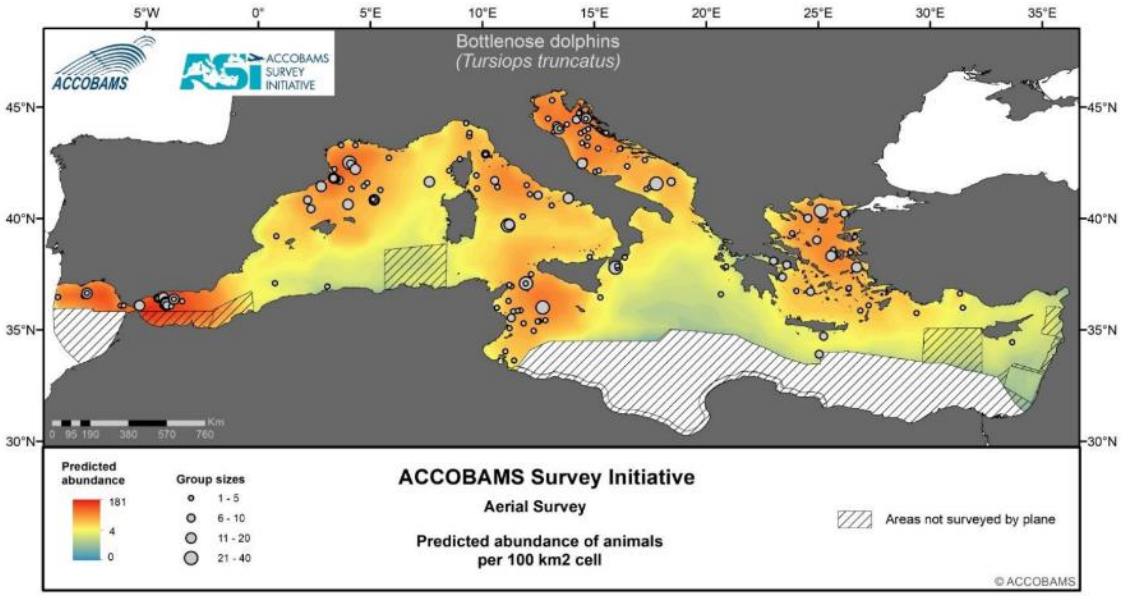

Figure 4. 38 : Predicted abundance of common bottlenose dolphins. Source: ACCOBAMS, 2021b

GES assessment conclusion

~~80.~~88. Common bottlenose dolphin population abundance has been estimated based on the data collected through ACCOBAMS Aerial Survey (ASI) 2018, thus providing baseline/reference values for CI4 common indicator. However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022). In addition, in the scope of ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

~~E.~~D. Common dolphin (*Delphinus delphis*)

~~81.~~89. Common dolphins have been mostly sighted in the Western portion of the Mediterranean basin, with the highest encounter rates in the Tyrrhenian Sea and the Strait of Sicily (Figure 4.39.). During the ASI 2018/2019 aerial survey the common dolphins were sighted usually in mixed-species groups with striped dolphins, often resulting in imperfect species detection. Sightings identified as common dolphins were only 32 with pod sizes ranging from 1 - 150 (without striped/common dolphin undistinguished observations) (Figure 4.40., Figure 4.41.). The overall abundance for the Mediterranean was estimated at 29647. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 24430, Ionian Sea and the Central Mediterranean Sea 1214, Adriatic Sea 0 and Aegean - Levantine Sea 4003. Based on the 2018 – 2021 IUCN Red List assessment in the ACCOBAMS area, *Delphinus delphis* is listed as Endangered for the Inner Mediterranean subpopulation and Critically Endangered for the Gulf of Corinth subpopulation (ACCOBAMS Resolution 8.12, 2022).

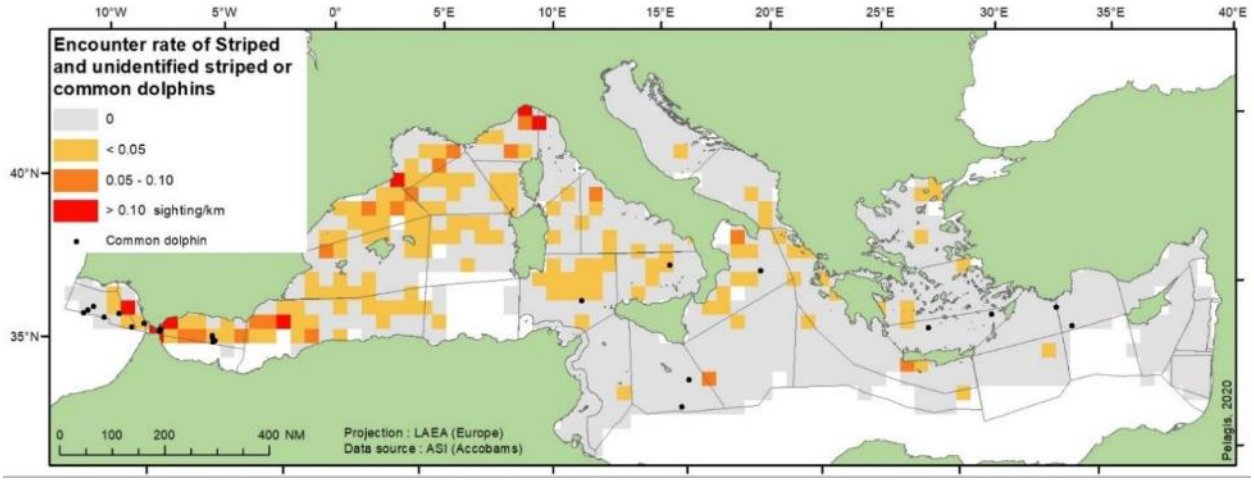

Figure 4. 39 : Encounter rate of Striped and unidentified striped or common dolphins (sightings per km) on a grid of 50x50 km. Source: ACCOBAMS, 2021b.

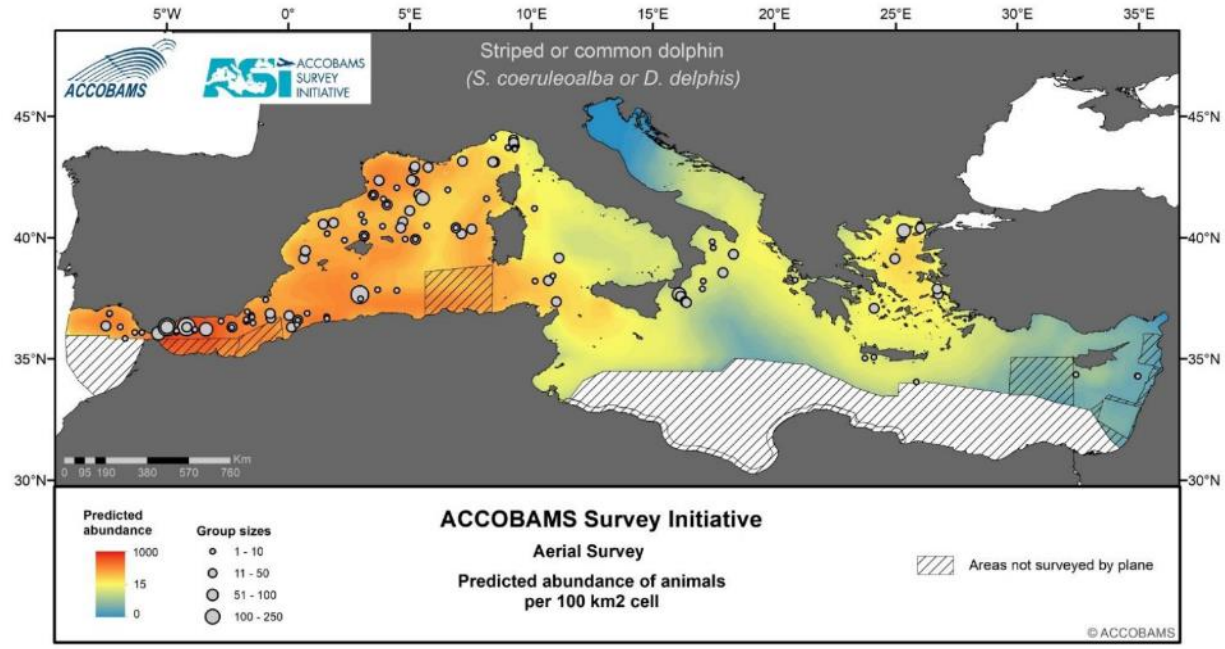

Figure 4. 40 : Predicted abundance of undetermined striped or common dolphins. Source: ACCOBAMS, 2021b.

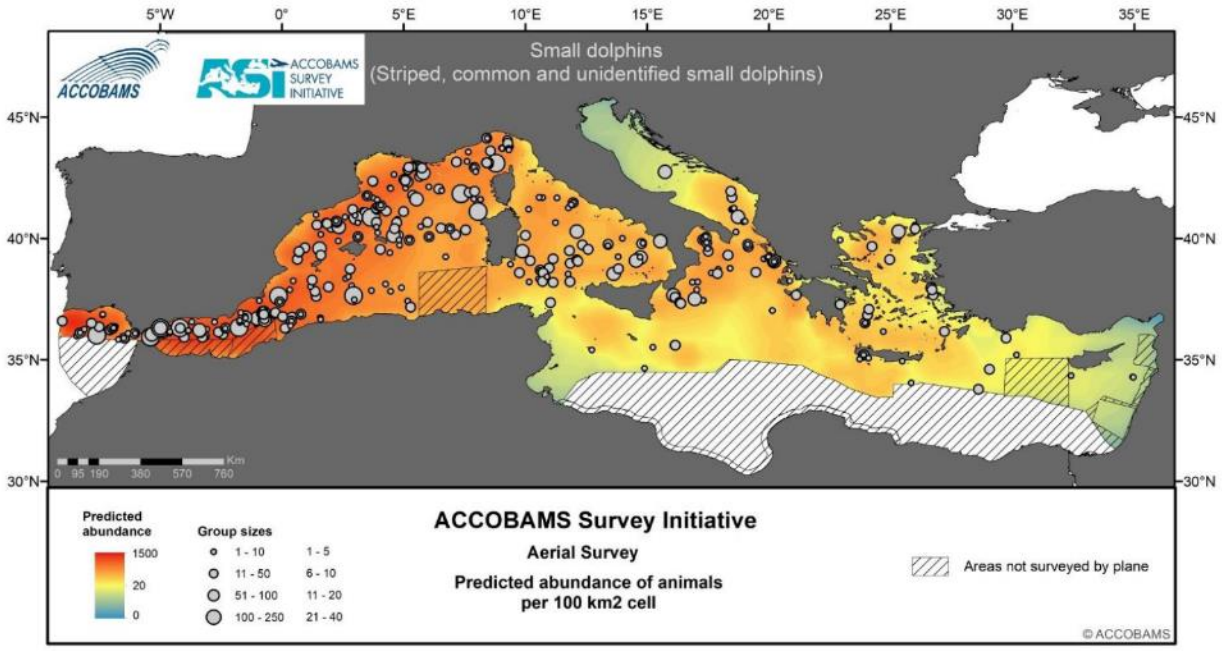

Figure 4. 41 : Predicted abundance of small dolphins (striped, common dolphins). Source: ACCOBAMS, 2021b.

GES assessment conclusion

~~82.~~90. Common dolphin population abundance has been estimated based on the data collected through ASI 2018/2019, thus providing baseline/reference values for CI4 common indicator. However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022). In addition, in the scope of ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

~~F.~~E. Striped dolphin (Stenella coeruleoalba)

~~83.~~91. Both aerial and vessel surveys resulted in the striped dolphin being the most sighted and abundant species in the Mediterranean, with a clear preference for the Western Basin (Figure 4.39). Striped dolphins were registered in 451 occurrences with pod sizes ranging from 1 – 250 (Figure 4.42). The overall abundance was estimated at about 419456 individuals. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 315789, Ionian Sea and the Central Mediterranean Sea 66311, Adriatic Sea 10264 and Aegean - Levantine Sea 27092.

~~84.~~92. It is important to note that during the ASI survey the striped dolphins were commonly sighted within mixed-species groups with common dolphins, often resulting in imperfect species detection.

~~85.~~93. Based on the 2018 - 2021 IUCN Red List assessment in the ACCOBAMS area, striped dolphin is listed as Least Concern for the Mediterranean subpopulation and Endangered for the Gulf of Corinth subpopulation (ACCOBAMS Resolution 8.12, 2022).

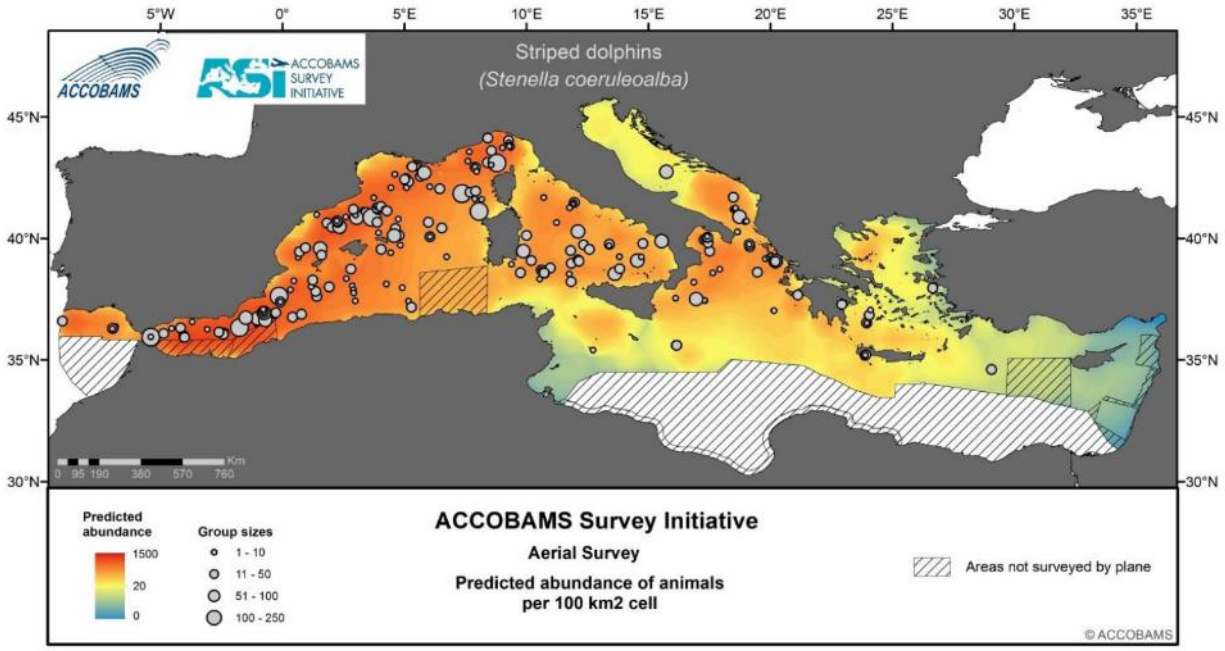

Figure 4. 42 : Predicted abundance of Striped dolphins. Source: ACCOBAMS, 2021b.

GES assessment conclusion

~~86.~~94. Striped dolphin population abundance has been estimated based on the data collected through ACCOBAMS Aerial Survey (ASI) 2018, thus providing baseline/reference values for CI4 common indicator. ~~-~~However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2022 – 2026 (ACCOBAMS Resolution 8.10, 2022). In addition, in the scope of ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

DEEP-DIVING TOOTHED WHALES

A. Sperm whale (Physeter macrocephalus)

~~87.~~95. During ASI 2018/2019, sperm whales were detected acoustically throughout the western basin of the Mediterranean Sea, from Alboran to Tyrrhenian Sea, with additional detections in the Strait of Gibraltar (Figure 4.4~~4~~3.). A total of 249 individual sperm whales were detected from Song of the Whale and additional 71 individuals were detected off the track-line (Figure 4.4~~5~~4.). The overall abundance of sperm whales was estimated at about 1416. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 356, Ionian Sea and the Central Mediterranean Sea 324, Adriatic Sea 0 and Aegean - Levantine Sea 737.

~~88.~~96. Based on the 2018 - 2021 IUCN Red List assessment in the ACCOBAMS area, Mediterranean subpopulation of sperm-whale is listed as Endangered (ACCOBAMS Resolution 8.12, 2022).

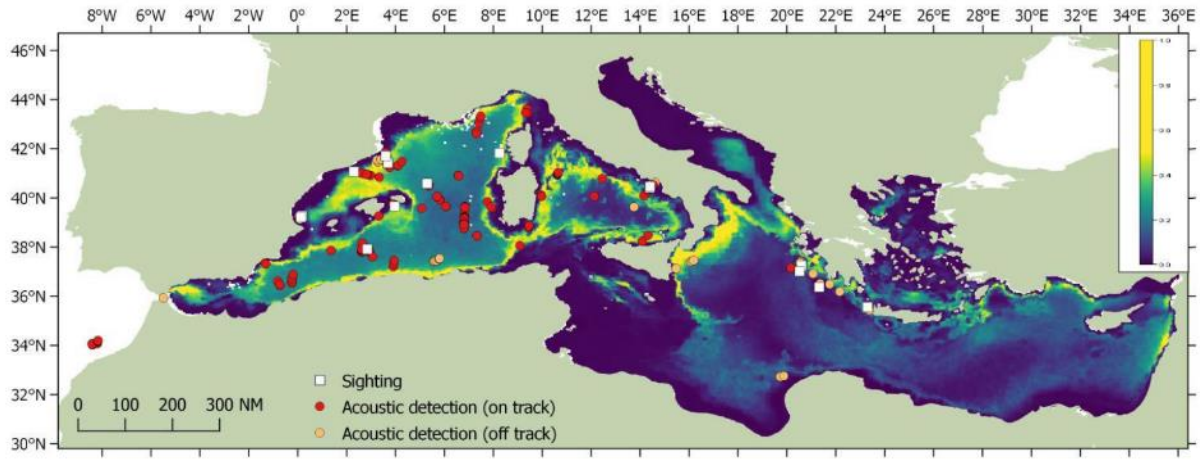

Figure 4. 43 : Sightings and detections of sperm whales made by the Song of the Whale team during the ASI survey (white squares and red/orange circles respectively). A predicted density map from Mannocci et al., 2018b is overlaid showing regions of ideal sperm whale habitat (yellow = highest likelihood, blue = lowest likelihood). Source: ACCOBAMS, 2021b.

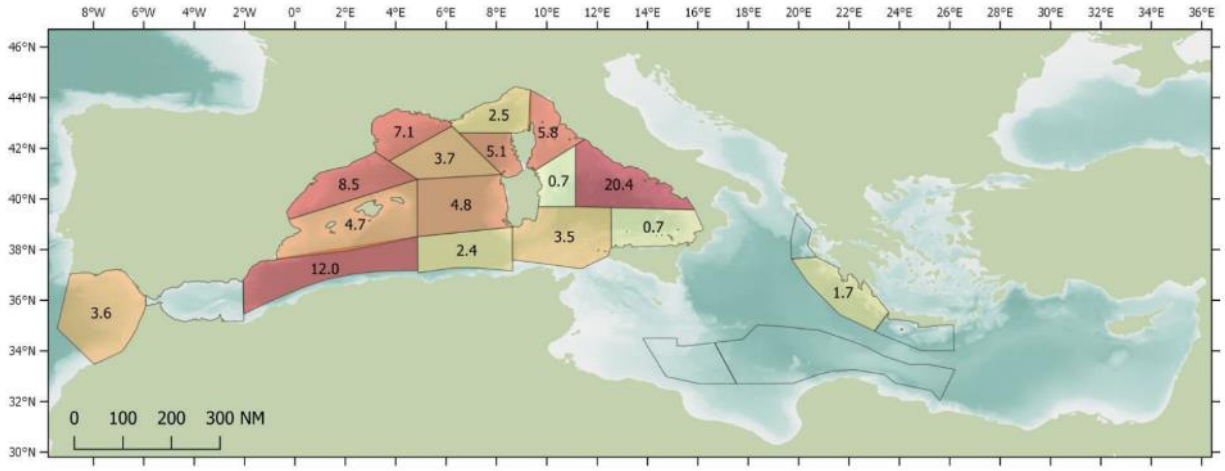

Figure 4. 44 : Sperm whale acoustic densities (individuals per 1000 km2) derived for each block surveyed by the Song of the Whale team. Empty blocks represent those areas where no on-track detections were made. Source: ACCOBAMS, 2021b.

GES assessment conclusion

~~89.~~97. Sperm whale population abundance has been estimated based on the data collected through ACCOBAMS Aerial Survey (ASI) 2018/2019, thus providing baseline/reference values for CI4 common indicator. However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution

8.10, 2022). In addition, in the scope of ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

B. Cuvier's beaked whale (*Ziphius cavirostris*)

~~90.~~98. Cuvier's beaked whale is a deep diver species sighted in the scope of ASI throughout Mediterranean regions, with highest abundance and encounter rates in specific hotspots such as the Alborán Sea, the northern part of Ligurian Sea, the northern Tyrrhenian Sea, the Ionian Sea (east of Sicily), narrow pathway from the southern Adriatic Sea, along the Hellenic Trench to the west of Cyprus and Levantine Sea waters off Lebanon and Israel (Figure 4.4~~65~~., Figure 4.4~~76~~.). Cuvier's beaked whales were spotted within 17 occurrences with pod sizes ranging from 1 - 10 individuals. The overall abundance for the Mediterranean was estimated at about 2724. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 1406, Ionian Sea and the Central Mediterranean Sea 616, Adriatic Sea 66 and Aegean - Levantine Sea 637.

~~91.~~99. Based on the 2018 - 2021 IUCN Red List assessment in the ACCOBAMS area, Mediterranean subpopulation of Cuvier's beaked whale is listed as Vulnerable (ACCOBAMS Resolution 8.12, 2022).

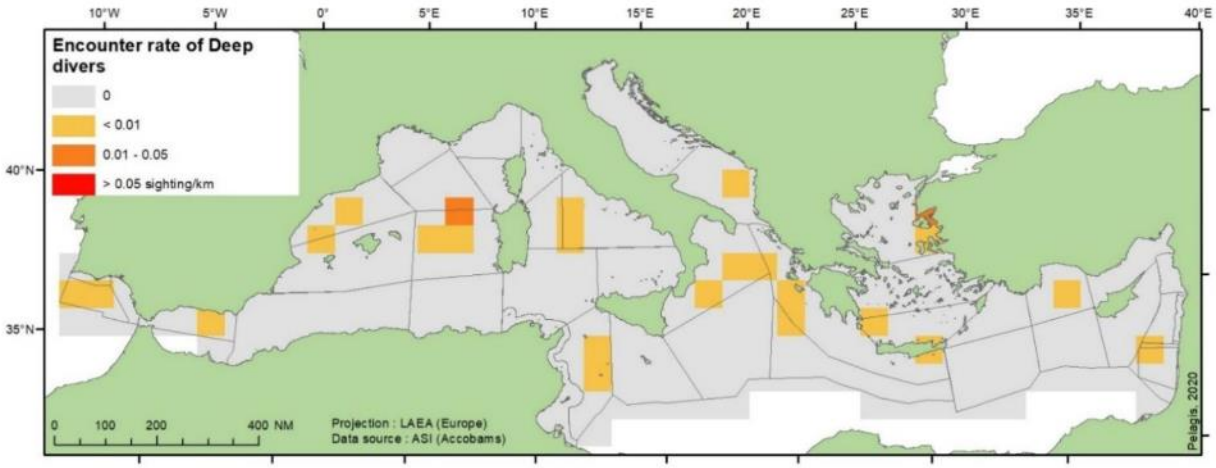

Figure 4. 45 : Encounter rate of deep divers (sightings per km): Kogia spp., sperm whales and Ziphiidea on a grid of 100x100 km and effort surveyed with sightings by species with class of pod size (a number of sightings by class) during aerial survey. Source: ACCOBAMS, 2021b.

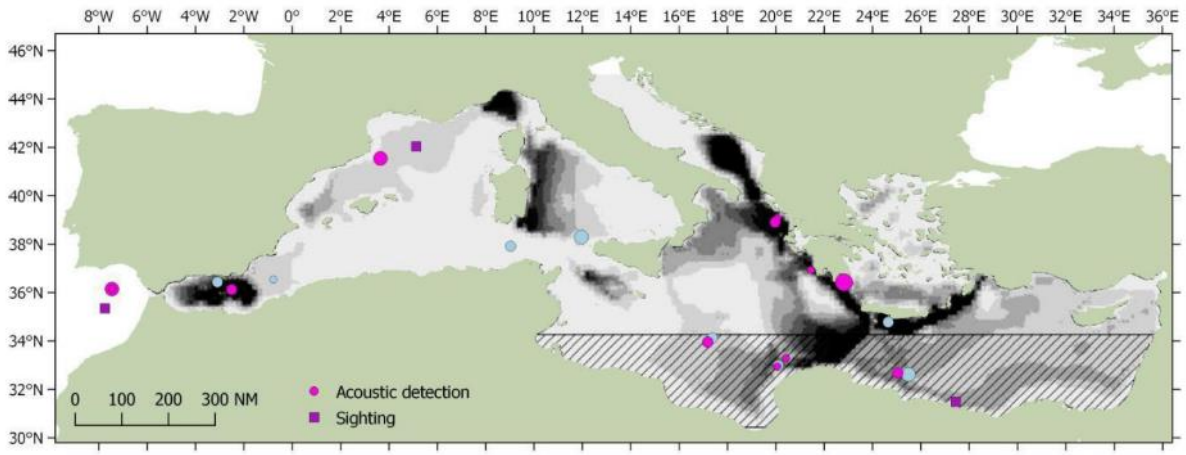

Figure 4. 46 : Sightings/detections of beaked whales made by all survey vessels during the ASI survey (pink squares/circles respectively). A predicted density map from Cañadas et al., 2018 is overlaid in monochrome showing those regions likely to contain ideal habit for Cuvier's beaked whale (the predictions in the striped region were considered unreliable due to low sample size). Source: ACCOBAMS, 2021b.

GES assessment conclusion

~~92.~~100. Cuvier's beaked whale population abundance has been estimated based on the data collected through ACCOBAMS Aerial Survey (ASI) 2018/2019, thus providing baseline/reference values for CI4 common indicator. However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10). In addition, in the scope of ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

~~LARGE CETACEAN SPECIES~~BALEEN WHALES

A. Fin whales (Balaenoptera physalus)

~~93.~~101. During ASI 2018/2019 aerial survey, fin whales were mostly sighted in the deep, offshore waters of the western Mediterranean basin, with the highest abundance in the Ligurian Sea, Gulf of Lions and Gulf of Cadiz, Provençal Basin and the Western part of the Pelagos Sanctuary. Species was spotted within 50 occurrences with pod sizes ranging from 1 - 4 individuals (Figure 4.4~~3~~7.). The overall abundance in the Mediterranean was estimated at about 1960. On the sub-regional level, abundance is estimated as follows: Western Mediterranean Sea 1765, Ionian Sea and the Central Mediterranean Sea 195, Adriatic Sea 0 and Aegean - Levantine Sea 0.

~~94.~~102. Based on the 2018 - 2021 IUCN Red List assessment in the ACCOBAMS area, Mediterranean subpopulation of Balaenoptera physalus is listed as Endangered (ACCOBAMS Resolution 8.12, 2022).

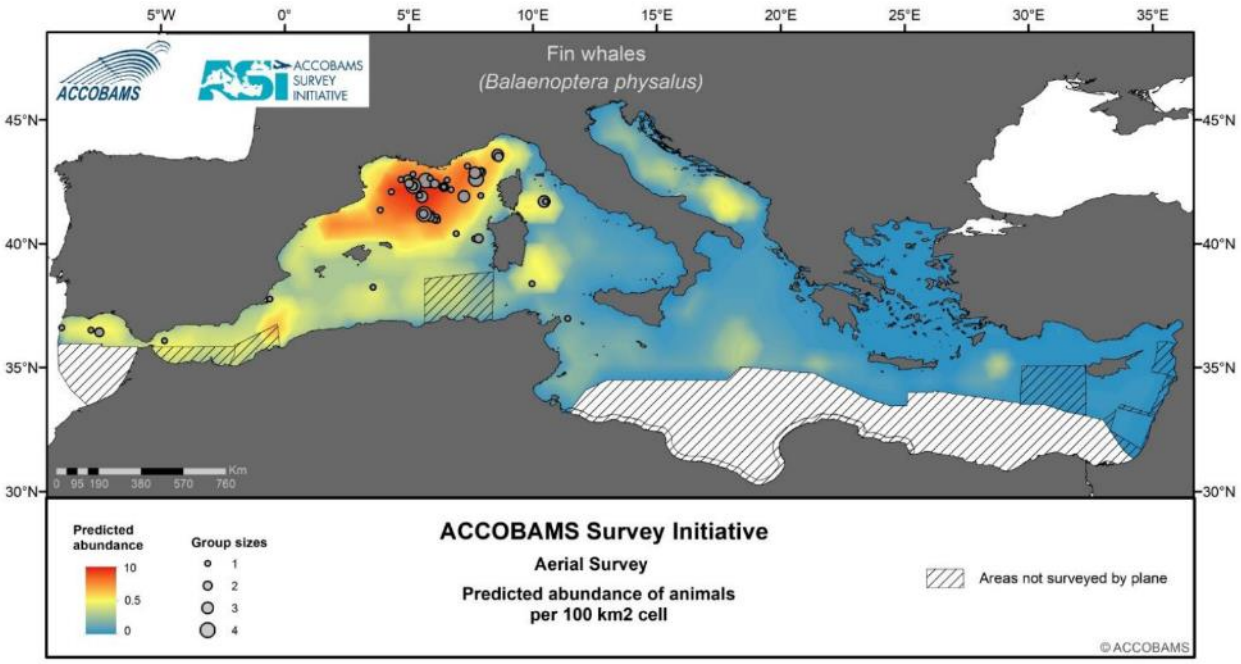

Figure 4. 47 : Predicted abundance of Fin whales. Source: ACCOBAMS, 2021b.

GES assessment conclusion

~~95.~~103. Fin whale population abundance has been estimated based on the data collected through ASI 2018/2019, thus providing baseline/reference values for CI4 common indicator. However, in order to assess GES, it is required to examine potential changes in population abundance levels; that is population abundance trends. Since the baseline/reference values date from 2018 and 2019 (ASI results published in 2021), there is no long-term data series and GES could not be assessed. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (next ASI) is planned for 2024 – 2026 (ACCOBAMS Resolution 8.10, 2022). In addition, in the scope of ACCOBAMS and in cooperation with IUCN, a revised IUCN conservation status assessment will be carried out in the future.

SUMMARY

Table 4. 12 : Assessment of GES for Cetaceans in the Mediterranean Sea for CI4, based on selected species

Criteria Indicator	GES definition	GES Assessment ***Globicephala melas – Long finned pilot whale; Grampus griseus – Risso's dolphin; Tursiops truncatus – common bottlenose dolphin; Delphinus delphis – common dolphin; Stenella coeruleoalba – striped dolphin; Balaenoptera physalus – fin whale; Physeter macrocephalus – sperm whale; Ziphius cavirostris – Cuvier's beaked whale***
CI4 Population abundance	The species population has abundance levels allowing qualification to Least Concern Category of IUCN Red List or has abundance levels that are improving and moving away from the more critical IUCN category.	Not possible to assess GES. Namely, the regional baseline/reference values for CI4 are set only recently; with ASI survey actually being carried out in 2018 and 2019 and results published in 2021, and there is no long-term data series needed to measure whether defined thresholds are achieved. However, data for some species, notably long-finned pilot whale, should be taken with particular caution. GES assessment should be possible in the future (for the next Med QSR), particularly since the next Mediterranean Sea basin wide survey (ASI 2) is planned for 2024 -2026, and the IUCN Red List assessment for the ACCOBAMS area will also be revised.

4.2.3. EO1: COMMON INDICATOR 5. POPULATION DEMOGRAPHIC CHARACTERISTICS (MARINE MAMMALS - CETACEANS)

~~96.~~104. The following GES assessment elements are being defined for the CI5 and analysed for the representative species (Table 4.13). Representative cetacean species for the Mediterranean, for the assessment of CI5 Population demographic characteristics are: *Tursiops truncatus* – common bottlenose dolphin, *Stenella coeruleoalba* – striped dolphin and *Balaenoptera physalus* – fin whale. It should be stressed again that the 21wg.514/Inf.11 proposes to move GES definitions for *State* and *Pressures* to CI12 and reformulate definition for CI5. So that it reflects better the population demographic characteristics such as sex ratio, calf production etc. However, for the Med QSR 2023 report, the currently valid elements were used, as elaborated under Table 4.13, which put more emphasis on human induced mortality.

Table 4. 13 : CI5 Population demographic characteristics GES definition, target, baseline and threshold

GES definition:	*State:* Decreasing trends in human induced mortality. *Pressure:* Appropriate measure implemented to mitigate incidental catch, prey depletion and other human induced mortality.
GES target:	Species populations are in good condition: Low human induced mortality, balanced sex ratio and no decline in calf production. **2017 Proposal**[5]: preliminary assessment of incidental catch, prey depletion and other human induced mortality followed by implementation of appropriate measures to mitigate these threats.
Baseline/Reference value/Thresholds:	It is not possible to develop reference and threshold values at this point.
Scale of assessment:	Regional

~~97.~~105. According to the 21wg.514/Inf.11~~2~~, it is not possible to develop a baseline/reference values and threshold for the GES assessment for CI5, which is mainly the result of ~~due to~~ the lack of data. However, for the purposes of this document, **available bycatch and stranding data from relevant sources was collected and analysed in an attempt to bring insights useful for the future assessments**. The following main data sources were used:

- latest FAO report *The State of Mediterranean and Black Sea Fisheries* (FAO, 2022) as well as the review *Incidental catch of vulnerable species in Mediterranean and Black Sea fisheries* (FAO, 2021), providing historical overview of bycatch data covering time range from 1980 until 2018 and the entire Mediterranean region,
- ICES bycatch and stranding data (from the EU Member States only). The ICES Working Group on Bycatch of Protected Species published the latest 2021 Report, which contains bycatch and stranding data for 2019 and 2020 (data are obtained from the EU MS through 2021 data calls),
- Data from Mediterranean Database of Cetacean Strandings (MEDACES).

~~98.~~106. MEDACES is a specific database on cetaceans strandings launched at the 12th Meeting of the Contracting Parties to the Barcelona Convention, in 2001, when the offer by Spain was approved on establishment in Valencia of MEDACES, within the SPA/BD Protocol. The Regional Activity Centre for Specially Protected Areas has been set as the depositary for the database, whose management is entrusted to the University of Valencia's Cavanilles Biodiversity Institute, with the financial support of the Spanish Ministry of Environment. The scope of the databases was extended to the entire ACCOBAMS area and the database itself was also supported by ACCOBAMS since 2010. The data contributions to MEDACES are sent annually, either by the national co-ordination centres or by individual institutions of the countries involved. The database also incorporates already-published information in scientific journals or technical reports. MEDACES provides a lot of information and data on strandings, from 1970 onwards. However, as

[5] UNEP(DEPI)/MED WG.444/6/Rev.1. IMAP Common Indicator Guidance Facts Sheets (Biodiversity and Fisheries). 6th Meeting of the Ecosystem Approach Coordination Group, Athens, Greece, 11 September 2017

in ICES, MEDACES too does not contain data on the cause of the stranding, which would be very useful for the assessment of whether the stranding was impacted by human activity or not.

GES ASSESSMENT

SHALLOW-DIVING TOOTHED WHALES
~~**SMALL CETACEAN SPECIES**~~

~~B.~~A. Common bottlenose dolphin (*Tursiops truncatus*)

~~99.~~107. Along with the common dolphin (*Delphinus delphis*), the common bottlenose dolphin (*Tursiops truncatus*) is one of the small cetacean species most frequently interacting with small-scale fishing activities in the Mediterranean, and thus mostly susceptible to the incidental catch (bycatch).

~~100.~~108. According to the available data (*FAO, 2021, ICES 2021)*, over 110 common bottlenose dolphin bycatch incidents were reported in the period from 1988 until 2020 (only two incidents reported to ICES in 2020), with most incidental catch resulting from the interacting with midwater pair and bottom trawlers, gillnets and pelagic driftnets and most incidents reported in the Adriatic sub-region (Table 4.14., Table 4.15).

Table 4. 14 : Incidental catch of common bottlenose dolphin (Tursiops truncatus) by fishing gear and Mediterranean sub-regions between 1988 and 2018. Source: FAO, 2021

Subregion	Species	Time range	Fishing gear	Reported individuals in bycatch events
Adriatic Sea	*Tursiops truncatus*	1988 - 2018	gillnet	25
Adriatic Sea	*Tursiops truncatus*	1988 - 2018	midwater pair trawlers	19
Central Mediterranean	*Tursiops truncatus*	1988 - 2018	gillnet	6
Central Mediterranean	*Tursiops truncatus*	1988 - 2018	gillnet/trammel net	4
Central Mediterranean	*Tursiops truncatus*	1988 - 2018	bottom trawlers	1
Central Mediterranean	*Tursiops truncatus*	1988 - 2018	purse seiners	1
Central Mediterranean	*Tursiops truncatus*	1988 - 2018	(blank)	2
Eastern	*Tursiops truncatus*	1988 - 2018	bottom trawlers	26

Mediterranean				
Western Mediterranean	*Tursiops truncatus*	1988 - 2018	gillnet	5
Western Mediterranean	*Tursiops truncatus*	1988 - 2018	drifting longline	2
Western Mediterranean	*Tursiops truncatus*	1988 - 2018	bottom trawlers	4
Western Mediterranean	*Tursiops truncatus*	1988 - 2018	pelagic driftnets	15
Western Mediterranean	*Tursiops truncatus*	1988 - 2018	midwater pair trawlers	1
			TOTAL	**111**

Table 4. 15 : Number of bycatch specimens and incidents of common bottlenose dolphin in 2019/2020 provided through the ICES WGBYC 2021 data call by ecoregion. Source: ICES 2021

Subregion	Species	Year	Fishing gear	Incidents	No. of specimens
Western Mediterranean	*Tursiops truncatus*	2020	Bottom trawls	1	1
Adriatic Sea	*Tursiops truncatus*	2020	Pelagic trawls	1	1

~~101.~~109. According to MEDACES, over 3200 strandings of *Tursiops truncatus* have been reported in the time range from 1972 until 2022, with most incidents occurring on the coast of Spain, Italy, France, Croatia and Greece (Figure 4.48.). In the recent period from 2019 until 2022, there were 184 strandings incidents reported to MEDACES, again mostly in the Spanish coastal area (Table 4.16.). According to the latest ICES report (ICES, 2021), in the 2019 and 2020 total of 181 strandings were reported in the Mediterranean EU Member States, mostly occurring in Italian waters (Table 4.17).

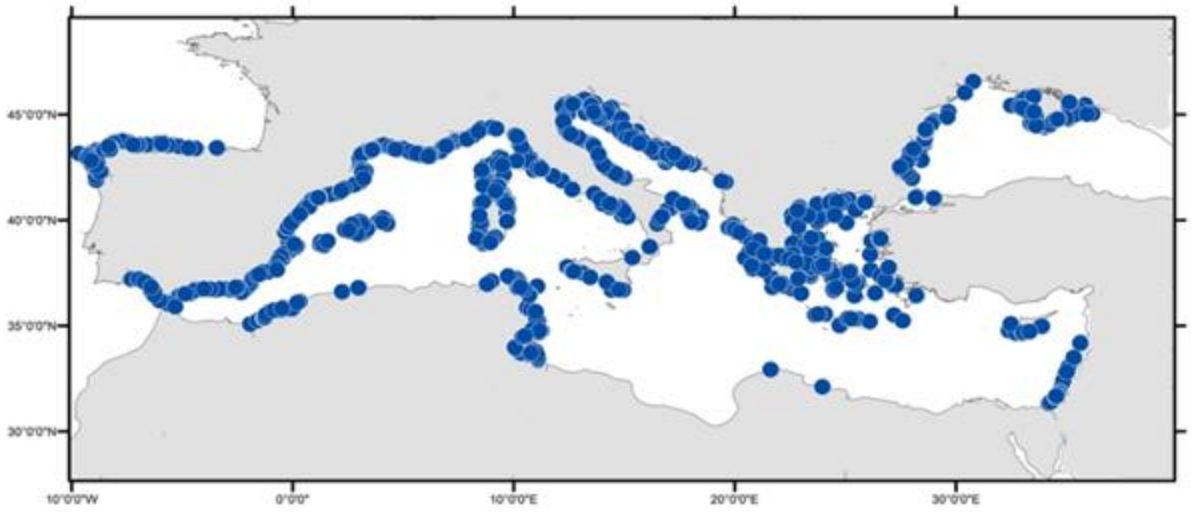

Figure 4. 48 : Common bottlenose dolphin strandings between 1972 - 2022. Source: MEDACES http://medacesdb.uv.es/home_eng.htm, Data accessed and obtained in January 2023

Table 4. 16 : Common bottlenose dolphin strandings in the Mediterranean between 2019 - 2022. Source: MEDACES, Data accessed and obtained in January 2023

Year	France	Israel	Spain	Grand Total
2019	8	9	47	**64**
2020	12		47	**59**
2021			54	**54**
2022			7	**7**
Grand Total	**20**	**9**	**155**	**184**

Table 4. 17 : Common bottlenose dolphin strandings in the Mediterranean in 2019 - 2020. Source: ICES 2021

Country	Year	Species	No. of strandings
France (Med)	2019	*Tursiops truncatus*	8
Italy	2019	*Tursiops truncatus*	93
France (Med)	2020	*Tursiops truncatus*	8
Italy	2020	*Tursiops truncatus*	72
		Grand Total	**181**

~~102.~~110. Based on the historic strandings data collected through MEDACES, strandings' probability map for common bottlenose dolphin has been generated, showing hotspots throughout Mediterranean with most probability of strandings occurring. These hotspots include the coast of Israel, northern Adriatic region, Sardinia, Alborian and Balearic Sea as well as the Hellenic Trench (Figure 4.49.).

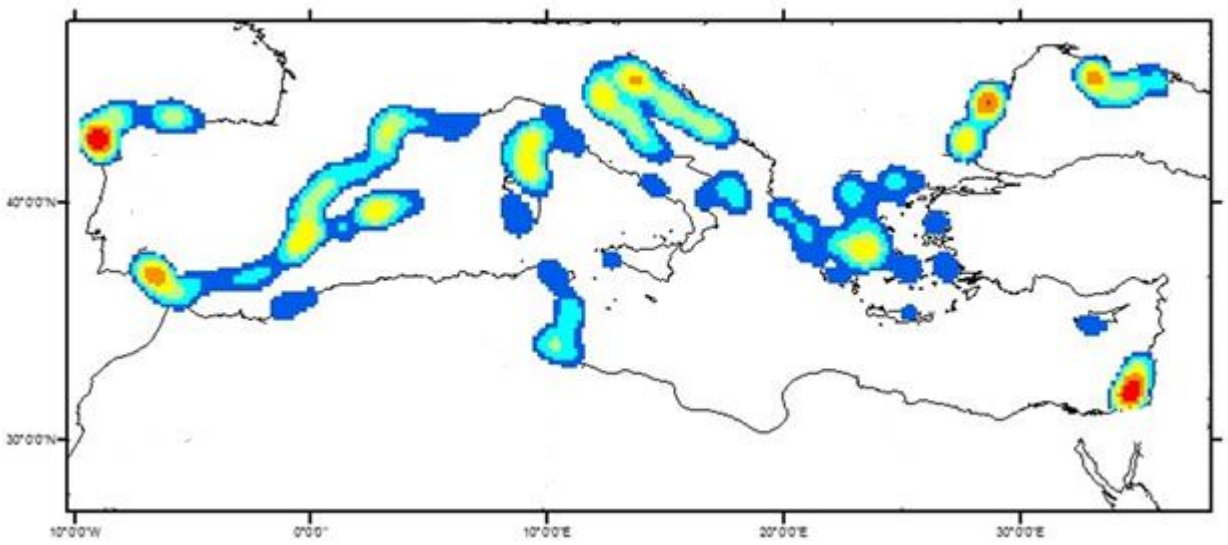

Figure 4. 49 : Common bottlenose dolphin strandings' probability map. Source: MEDACES http://medacesdb.uv.es/home_eng.htm, Data accessed and obtained in January 2023

GES assessment conclusion

~~103.~~111. Although there are various available data sources with cetacean bycatch and strandings data, this data is still partial, inconsistent and it is not possible to draw concrete conclusions about level of bycatch, and subsequently to which level this issue represents the problem for conservation of cetaceans. Namely, there is a lack of systematic bycatch data collection, and there are issues with biased estimates, lack of reliable information and the fact that measured bycatch is fairly underestimated. Stranding data lack information on the cause of the stranding, which would allow assessment whether stranding occurred due to human activity and influence. Moreover, according to the UNEP-MAP, 2021, it is not possible to develop baseline/reference and threshold values for the assessment of CI5 Population demographics characteristics. Therefore, the GES could not be assessed.

~~C.~~B. Striped dolphin (Stenella coeruleoalba)

~~104.~~112. Based on the available data on fisheries incidental catch, the striped dolphin (*Stenella coeruleoalba*) was the most impacted species by number, especially by pelagic driftnets.

~~105.~~113. More specifically, available data (*FAO, 2021)* shows that almost 500 striped dolphins' bycatch incidents were reported in the period from 1980 until 2011, with most incidental catch resulting from the interacting with midwater pair and bottom trawlers, gillnets and pelagic driftnets and most incidents reported in the Adriatic sub-region (Table 4.18). In the latest ICES 2021 report, there were no striped dolphin bycatch incidents reported for the Mediterranean region.

Table 4. 18 : Incidental catch of striped dolphin (Stenella coeruleoalba) by fishing gear and Mediterranean sub-regions between 1980 and 2011. Source: FAO, 2021

Subregion	Species	Time range	Fishing gear	Reported individuals in bycatch events
Central Mediterranean	*Stenella coeruleoalba*	1980 - 2011	gillnet	1
Central Mediterranean	*Stenella coeruleoalba*	1980 - 2011	bottom trawlers	1
Eastern Mediterranean	*Stenella coeruleoalba*	1980 - 2011	pelagic driftnets	20
Western Mediterranean	*Stenella coeruleoalba*	1980 - 2011	gillnet	4
Western Mediterranean	*Stenella coeruleoalba*	1980 - 2011	drifting longline	13
Western Mediterranean	*Stenella coeruleoalba*	1980 - 2011	bottom trawlers	1
Western Mediterranean	*Stenella coeruleoalba*	1980 - 2011	pelagic driftnets	416
Western Mediterranean	*Stenella coeruleoalba*	1980 - 2011	purse seiners	35
Western Mediterranean	*Stenella coeruleoalba*	1980 - 2011	midwater pair trawlers	5
				496

~~106.~~114. According to MEDACES, over 6200 strandings of *Stenella coeruleoalba* have been reported in the time range from 1968 until 2022, with most incidents occurring on the coast of Spain and France (Figure 4.50). In the recent period from 2019 until 2022, there were 361 strandings incidents reported to MEDACES, again mostly in the Spanish coastal area (Table 4.19.). According to the latest ICES report (ICES, 2021), in the 2019 and 2020 total of 128 strandings were reported in Italian and French waters (Table 4.20.).

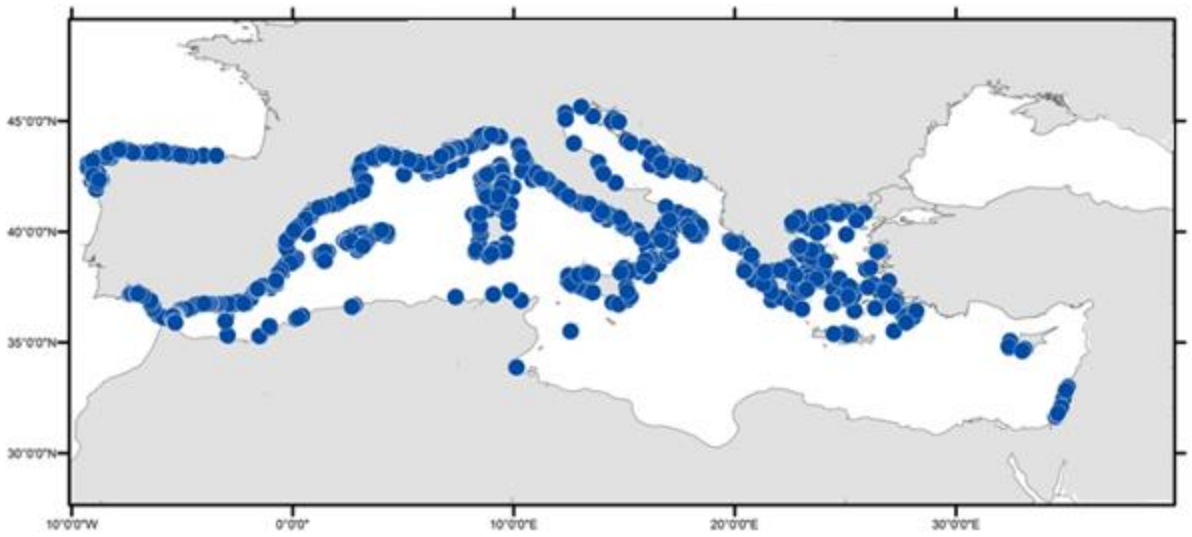

Figure 4. 50 : Striped dolphin strandings. Source: MEDACES http://medacesdb.uv.es/home_eng.htm, Data accessed and obtained in January 2023

Table 4. 19 : Striped dolphin strandings in the Mediterranean between 2019 - 2022. Source: MEDACES, Data accessed and obtained in January 2023

Year	France	Spain	Grand Total
2019	51	76	**127**
2020	46	58	**104**
2021		129	**129**
2022		1	**1**
Grand Total	97	264	**361**

Table 4. 20 : Striped dolphin strandings in the Mediterranean in 2019/2020. Source: ICES 2021

Country	Year	Species	No. of strandings
Italy	2019	*Stenella coeruleoalba*	83
France (Med)	2020	*Stenella coeruleoalba*	45
		Grand total	**128**

~~107.~~115. Based on the historic strandings data collected through MEDACES, strandings' probability map for striped dolphin has been generated, showing hotspots throughout Mediterranean with most

probability of strandings occurring. These hotspots include the Spanish and French coastal belt, Italian waters, eastern Adriatic coast and the Hellenic Trench (Figure 4.51.).

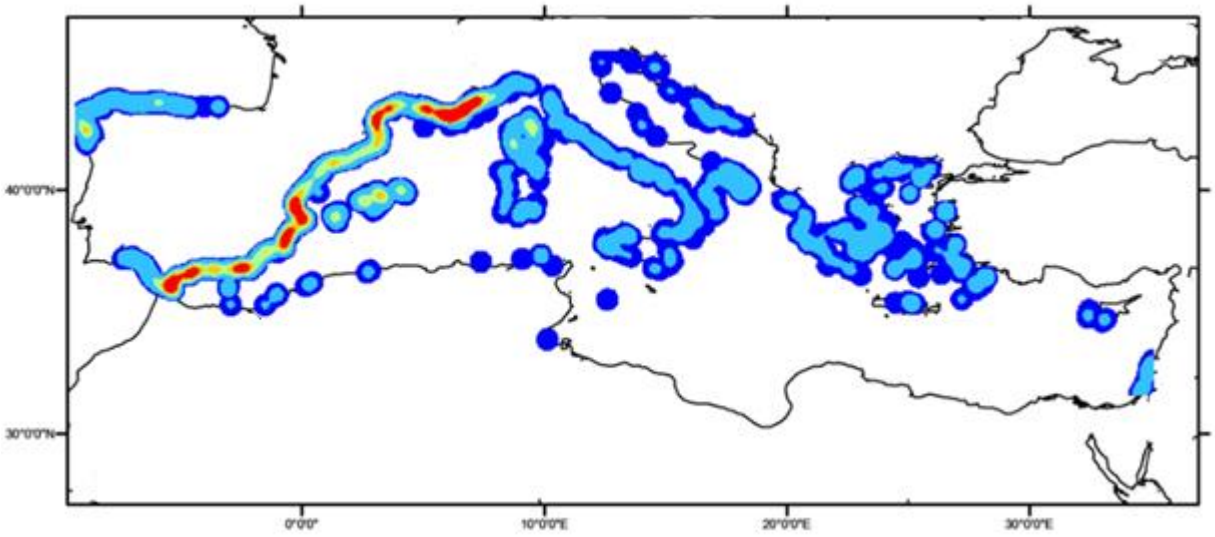

Figure 4. 51 : Striped dolphin strandings' probability map. Source: MEDACES http://medacesdb.uv.es/home_eng.htm, Data accessed and obtained in January 2023

GES assessment conclusion

~~108.~~116. Although there are various available data sources with cetacean bycatch and strandings data, this data is still partial, inconsistent and it is not possible to draw concrete conclusions about level of bycatch, and subsequently to which level this issue represents the problem for conservation of cetaceans. Namely, there is a lack of systematic bycatch data collection, and there are issues with biased estimates, lack of reliable information and the fact that measured bycatch is fairly underestimated. Stranding data lack information on the cause of the stranding, which would allow assessment whether stranding occurred due to human activity and influence. Moreover, according to the UNEP-MAP, 2021, it is not possible to develop baseline/reference and threshold values for the assessment of CI5 Population demographics characteristics. Therefore, the GES could not be assessed.

~~LARGE CETACEAN SPECIES~~BALEEN WHALES

A. Fin whale (Balaenoptera physalus)

~~109.~~117. Based on the available data on fisheries incidental catch, fin whales are occasionally bycaught due to interaction with pelagic driftnets and gillnets.

~~110.~~118. According to the available data (*FAO, 2021)*, 2 fin whale bycatch incidents were reported in the period from 1988 until 1996, with incidents reported in the Western and Central Mediterranean subregion (Table 4.21.). In the latest ICES 2021 report, there were no fin whales' bycatch incidents reported for the Mediterranean region.

Table 4. 21 : Incidental catch of fin whale (*Balaenoptera physalus*) by fishing gear and Mediterranean sub-regions between 1988 and 1996. Source: FAO, 2021

Subregion	Species	Time range	Fishing gear	Reported individuals in bycatch events
Central Mediterranean	*Balaenoptera physalus*	1988 - 1996	gillnet	1
Western Mediterranean	*Balaenoptera physalus*	1988 - 1996	pelagic driftnets	1
			TOTAL	2

~~111.~~119. According to MEDACES, 361 strandings of *Balaenoptera physalus* have been reported in the time range from 1941 until 2021, with most incidents occurring on the coast of Spain and France (Figure 4.52.). In the recent period from 2019 until 2022, there were 18 strandings incidents reported to MEDACES, again mostly in the Spanish coastal area (Table 4.22.). According to the latest ICES report (ICES, 2021), there were no strandings reported in the Mediterranean region.

Table 4. 22 : Fin whale strandings in the Mediterranean in 2019 - 2022. Source: MEDACES, Data accessed and obtained in January 2023

Year	France	Spain	Grand Total
2019	2	6	**8**
2020	1	4	**5**
2021		5	**5**
Grand Total	3	15	**18**

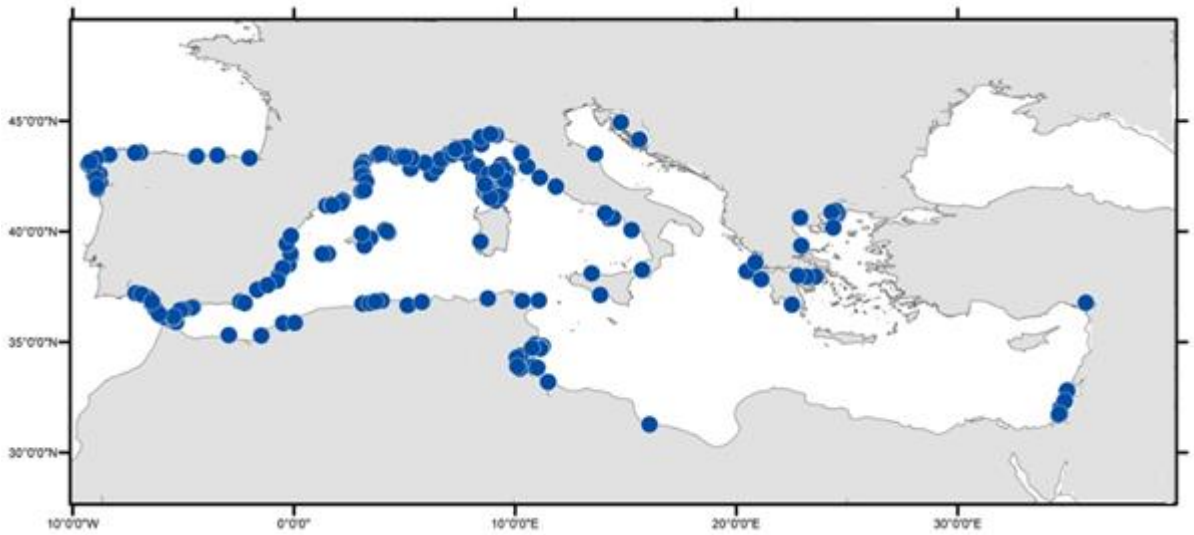

Figure 4. 52 : Fin whale strandings. Source: MEDACES http://medacesdb.uv.es/home_eng.htm, Data accessed and obtained in January 2023

GES assessment conclusion

~~112.~~120. Although there are various available data sources with cetacean bycatch and strandings data, this data is still partial, inconsistent and it is not possible to draw concrete conclusions about level of bycatch, and subsequently to which level this issue represents the problem for conservation of cetaceans. Namely, there is a lack of systematic bycatch data collection, and there are issues with biased estimates, lack of reliable information and the fact that measured bycatch is fairly underestimated. Stranding data lack information on the cause of the stranding, which would allow assessment whether stranding occurred due to human activity and influence. Moreover, according to the UNEP-MAP, 2021, it is not possible to develop baseline/reference and threshold values for the assessment of CI5 Population demographics characteristics. Therefore, the GES could not be assessed.

SUMMARY

Table 4. 23 : Assessment of GES for Cetaceans in the Mediterranean Sea for CI5, based on selected species

Criteria Indicator	GES definition	GES Assessment ***Tursiops truncatus – common bottlenose dolphin; Stenella coeruleoalba – striped dolphin; Balaenoptera physalus – fin whale***
CI5 Population demographic characteristics	*State:* Decreasing trends in human induced mortality. *Pressure:* Appropriate measure	Not possible to assess GES. Methodologically, according to the UNEP-MAP, 2021, it is not possible to develop baseline/ reference and threshold values for the assessment of CI5, due to lack

	implemented to mitigate incidental catch, prey depletion and other human induced mortality.	of data. Although there are various available data sources with cetacean bycatch and strandings data, this data is still partial, inconsistent and it is not possible to draw concrete conclusions about level of bycatch and other human impacts, and subsequently to which level these issues represents the problem for conservation of cetaceans.

4.2.4. Alternative assessment for EO1 (CI3 and CI4 topics) - IUCN Red List assessment

~~113.~~121. The Red listing system of the IUCN is one of the most recognized methods for assessing and understanding the state of biodiversity. The IUCN criteria focus both on changes of population size and abundance over time (Criteria A), as well as changes of size and quality of species habitat (Criteria B), and related pressures, and as such these criteria co-relate with GES Common Indicators. Indeed, thresholds for the CI4 – Population abundance are based on the IUCN criteria on population size changes. Therefore, the results of the assessments of the status of cetaceans in the Mediterranean using IUCN criteria, represent good indicators of the state of cetaceans in this region.

~~114.~~122. The IUCN Red List assessments were particularly promoted through ACCOBAMS, in cooperation with IUCN and relevant cetacean experts. Around mid-2000s, the first IUCN Red List assessment was carried out, covering species populations/subpopulations of the Mediterranean Sea, Black Sea and contiguous Atlantic area (ACCOBAMS area). The results of these assessments were adopted by the 3rd Meeting of the ACCOBAMS Parties in 2007, in the form of the Resolution 3.19. During the development of the ACCOBAMS Strategy for the period between 2014 and 2025, the changes in the IUCN Red List status of cetaceans were chosen as one of the main indicators of the achievement of the Strategy's main objectives and several specific objectives. Consequently, another IUCN assessment was conducted under the ACCOBAMS frame in the period from 2018 to 2021, and the new list was adopted by the 8th Meeting of ACCOBAMS Parties in 2022 as already mentioned Resolution 8.12. These two IUCN assessments provided a good insight into changes of status of cetacean populations/subpopulations over the sufficient period of time (cca 15 years) (Table 4.25.). However, in order to keep as much as possible relation with IMAP/GES assessment, the IUCN conservation status of eight species, representative for the GES assessment, is elaborated in more detail.

~~115.~~123. Overall, the status of the majority of representative species is not good, with 6 species being assessed in categories to the species with the high risk of extinction (CR, EN, VU); fin whales, sperm whale, long finned pilot whale, common dolphin and Risso's dolphin are assessed as Endangered (EN) and Cuvier's beaked whale as Vulnerable (VU). Only common bottlenose dolphin and striped dolphin populations were assessed as Least Concern (LC). It should also be noted that Mediterranean subpopulations of some species in the latest assessment have been treated as two subpopulations; with the bigger Inner Mediterranean subpopulation and smaller subpopulations in the important, but limited geographical locations, such as Alboran Sea etc.; for example, even if the Inner Mediterranean subpopulation is in good state, these isolated subpopulations may be endangered.

~~116.~~124. Comparison of the results of two IUCN assessments for the eight representative species shows mixed results.

~~117.~~125. The positive news is that the status of two species in the Mediterranean Sea (the striped and common bottlenose dolphins) has improved from Vulnerable to Least Concern, However, in the 2018 – 2021 assessment the status of the Gulf of Ambracia subpopulation of common bottlenose dolphin is assessed separately and the conclusion is that it is Critically Endangered. The same approach is applied for the status of the Gulf of Corinth subpopulation of striped dolphin, which is assessed as Endangered.

~~118.~~126. The status of the Mediterranean sperm whale and common dolphin remained the same – Endangered, although for the latter the Alborán Sea is now excluded and the subpopulation is called the Inner Mediterranean subpopulation. In addition, the status of the Gulf of Corinth subpopulation is assessed as Critically Endangered.

~~119.~~127. On the other hand, the status of fin whales has worsened from Vulnerable to Endangered. It should be noted that this species is particularly vulnerable to ship strikes.

~~120.~~128. Several species were assessed as Data Deficient in the first assessment, but for the recent assessments there was sufficient data to be able to assess their status concretely. In addition, the Mediterranean long-finned pilot whale is now considered as two subpopulations with the Inner Mediterranean one assessed as Endangered and the Strait of Gibraltar as Critically Endangered. Mediterranean subpopulations of Risso's dolphin are now assessed as Endangered and of the Cuvier's beaked whale as vulnerable.

4.3. GES Assessment for the EO1 / alternative assessment for EO1

4.3.1. Summary of GES assessment for CI3, CI4 and CI5

Table 4. 24 : GES assessment summary for CI3, CI4 and CI5 for representative cetacean species in the Mediterranean

EO1 Common Indicators	***SHALLOW-DIVING TOOTHED WHALES*** ~~***SMALL CETACEAN SPECIES***~~					***DEEP-DIVING TOOTHED WHALES***		***BALEEN WHALES***
	Globicephala melas	*Grampus griseus*	*Tursiops truncatus*	*Delphinus delphis*	*Stenella coeruleoalba*	*Physeter macrocephalus*	*Ziphius cavirostris*	*Balaenoptera physalus*
CI3 Species distributional range								
CI4 Population abundance								

CI5 Population demographic characteristics	**X**	**X**		**X**		**X**	**X**	

Colour scheme: Grey - GES not possible to assess; X – species not representative for specific CI

4.3.2. Summary of alternative assessment - IUCN Red List assessment

~~121.~~129. Based on the results of the IUCN Red List assessments carried out in the scope of ACCOBAMS in the 2018 - 2021 period, and focussing on eight species that are representative for the GES assessment, it could be concluded that the state of cetaceans is not good (Table 4.25.). Still, when comparing the recent results with the mid-2000s assessment, there are some positive trends. Most notably, the status improved for common bottlenose dolphin and striped dolphin populations. In addition, thanks to the improved data, it was possible to assess the status of previously data deficient species, notably Cuvier's beaked whale and long-finned pilot whale. However, for fin whale, the status has worsened.

Table 4. 25 : IUCN Red List assessments status comparison for cetacean species representative for the GES assessment

Species	Previous IUCN Red List status		IUCN Red List status following the 2018-2021 assessments		Change in the status since mid-2000s
Globicephala melas	Mediterranean subpopulation	**Data Deficient**	Inner Mediterranean subpopulation	**Endangered**	NA
			Strait of Gibraltar subpopulation	**Critically Endangered**	NA
Grampus griseus	Mediterranean subpopulation	**Data Deficient**	Mediterranean subpopulation	**Endangered**	NA
Tursiops truncatus	Mediterranean subpopulation	**Vulnerable**	Inner Mediterranean subpopulation	**Least Concern**	↑
			Gulf of Ambracia subpopulation Critically	**Endangered**	↓
Delphinus delphis	Mediterranean subpopulation	**Endangered**	Inner Mediterranean subpopulation	**Endangered**	↔

			Gulf of Corinth subpopulation Critically	**Endangered**	↔
Stenella coeruleoalba	Mediterranean subpopulation	**Vulnerable**	Mediterranean subpopulation	**Least Concern**	↑
			Gulf of Corinth subpopulation	**Endangered**	↓
Balaenoptera physalus	Mediterranean subpopulation	**Vulnerable**	Mediterranean subpopulation	**Endangered**	↓
Physeter macrocephalus	Mediterranean subpopulation	**Endangered**	Mediterranean subpopulation	**Endangered**	↔
Ziphius cavirostris	Mediterranean subpopulation	**Data Deficient**	Mediterranean subpopulation	**Vulnerable**	NA

Status: ↑ - status improved; ↓ - status worsened; ↔ - status unchanged; NA - not applicable

4.3.3. Towards integrated GES Assessment

~~122.~~130. The state of cetaceans, as measured through GES assessment under EO1, could be linked to majority of measured EOs under IMAP: EO3 (Fisheries), EO5 (Eutrophication), EO7 (Hydrographic characteristics), EO8 (physical loss of coastal ecosystems and landscapes), EO9 (Pollution) and E10 (marine litter). The relevance of EO11 (Underwater noise) for cetaceans should also be mentioned, even though the CIs under EO11 are not yet elaborated. In any case, due to limited knowledge, it is not yet fully possible to evaluate the significance of these interrelations. Further in the text, most relevant qualitative characteristics of interlinkages between EO1 for cetaceans and other EOs are summarised. It should also be noted that all EOs are very much interlinked between themselves

~~123.~~131. As already elaborated under Chapter 3, interactions with fisheries represent significant challenges for cetaceans, particularly through bycatch and loss of fish as cetaceans prey. The most concrete link between EO3 - Fisheries and measurements of GES for cetaceans under EO1 is EO3's CI12, which measures bycatch of vulnerable and non-target species.

~~124.~~132. Eutrophication (EO5) can have severe impacts on the entire marine ecosystem through nutrient and organic matter enrichment. As such, eutrophication can also be linked to fisheries and alternation of food webs, which can have consequences to cetaceans too. According to the available knowledge, eutrophication is not yet perceived as relevant for the cetaceans in the Mediterranean Sea.

~~125.~~133. Hydrographic characteristics (EO7) (such as temperature, salinity, currents, waves, turbulence etc.) play a crucial role in the dynamics of marine ecosystems and are therefore interlinked with all other EOs. Changes of hydrographic characteristics are particularly linked to climate change, with the

obvious example of more extreme sea temperatures occurring. These changes affect not only the habitats and entire food-chain, but they could facilitate spread of marine litter and redistribution of contaminants.

~~126.~~134. The alternations of coastal ecosystems and landscapes (EO8), particularly urbanizations and all pressures on environment it entails, may also cause nutrient enrichment in near-shore marine areas, as well as bring pollutants (EO9), and as such, indirectly affect food-webs and higher trophic levels, such as cetaceans.

~~127.~~135. Pollution (EO9) may also affect cetaceans. This could be demonstrated through toxicological effects of harmful chemicals and microbial pathogens.

~~128.~~136. Marine litter (EO10) has certain impacts on cetaceans; such as causing suffocation through ingestion of plastic, and entanglement of animals in fishing gear. As already indicated, microplastic is also quite problematic, entering the food-web, starting with shellfish and fish and subsequently culminating in cetaceans. Recent research studies also show that chemical plasticizers and other known persistent substances can leach from marine litter (both macro and microlitter items). However, present knowledge on marine litter-cetaceans' interactions at the Mediterranean Sea level is still not sufficient to draw more quantifiable conclusions.

5. Key findings per CI

5.1. General remarks regarding drivers, pressures and impacts on state of cetaceans

~~129.~~137. **Six human economic activities represent the main drivers** or sources of pressures to cetaceans in the Mediterranean Sea: agriculture; fisheries; tourism, sporting and recreational activities; energy sector and infrastructure; maritime traffic; urbanisation and industry.

~~130.~~138. The **human activities generate different types of pressures**, with some of the most prominent ones being incidental catch (bycatch), ship strikes, anthropogenic underwater noise, marine litter, chemical pollution and climate change.

~~131.~~139. **The pressures may have different impacts on cetaceans, from mortality to changes in behaviour, re-distribution etc., and as such, they may affect all the Common Indicators measured to assess GES for cetaceans under Ecological Objective 1.**

~~132.~~140. **Pressures and impacts have cumulative/synergistic effects.**

~~133.~~141. The cetacean conservation related issues are already being substantially addressed through various regional agreements, most notably ACCOBAMS and SPA/BD Protocol of the Barcelona Convention. So, there are many tools, but based on the state of cetaceans assessment, they are still not fully implemented.

Knowledge gaps

~~134.~~142. Understanding of extension, intensity and changes of pressures over time and their relations to the state of cetaceans specifically is still partial. However, there are ongoing efforts, particularly in the

scope of ACCOBAMS, to at least identify critical points where cetaceans' critical habitats (CCH) and sources of pressures overlap, such as identification of marine litter/cetaceans hotpots, further identification and monitoring of anthropogenic noise/cetaceans hotspots, as well as further work on CCH and Important Marine Mammal Areas (IMMAPs,) the latter in the scope IUCN.

~~135.~~143. The knowledge on cumulative/synergistic effects of pressures and impacts is still lacking.

5.2. GES Assessment per CI

5.2.1. CI3 – Species distribution

~~136.~~144. **The first methodological step** in GES assessment for cetaceans has been made **for CI3 – Species distribution** under UNEP/MAP with **definition of GES assessment criteria,** particularly baseline/reference values and thresholds, as elaborated in the 21WG.514/Inf.11. However, quantification of measurement of changes in distribution, which will be relevant for the next Med QSR report, is not clear (for example, which measurement unit will be used to compare baseline/reference values with thresholds).

~~137.~~145. The first regional level based synoptic survey of cetaceans, carried out in the scope of the ACCOBAMS Survey Initiative project (aerial and vessel boat surveys were carried out in 2018 and 2019, and data processed in 2021) acquired cetacean distribution data for most of the region (except for the parts of the southern Mediterranean – particularly its central and eastern section). Complemented with data from previous research on national and regional levels, **baseline/reference values were determined**, expressed through species distribution maps. Identification of baseline values is a significant improvement when compared to the Med QSR 2017.

~~138.~~146. **ACCOBAMS Survey Initiative project was a joint coordinated venture** of international organisations, national institutions and cetacean expert, supported by the international and national funding, and this effort displays clearly the necessity of regional – national cooperation in monitoring and subsequently conservation of migratory species, such as cetaceans, in the Mediterranean.

~~139.~~147. **ASI results are available and accessible via web (including spatial GIS data)**. In addition, there are also other web-based data sources, which include, among all, occurrence data in spatial format, most notably OBIS, GBIF and INTERCET.

~~140.~~148. **Regional surveys,** such as ASI, establish and represent an important effort to assess cetaceans' distribution and monitor trends through a coordinated and standardised system.

~~141.~~149. **GES could not be assessed for the CI3**, since the baseline/reference values are recently established (2018 – 2021), and there is no longer-time data series necessary for GES assessment. However, the next ASI project, planned in the scope of ACCOBAMS for 2024 - 2026 should contribute with a new set of data needed for the GES assessment in the scope of the next Med QSR report.

Knowledge gaps for CI3

~~142.~~150. There is still a disparity in research effort, with the most significant gaps in the southern part of the Mediterranean, which was also shown during the implementation of the ASI project.

~~143.~~151. Long-term data series are missing, which would be based on systematic monitoring. For the Med QSR 2023 report it is understandable, since the baseline/referent values for cetaceans are determined only recently (2018 – 2021). ~~But even before the establishment of the GES assessment system, such data were missing and hence the baseline/reference values were identified only recently.~~

5.2.2. CI4 – Population abundance

~~144.~~152. The same as for the CI3, **the first methodological step** in GES assessment for cetaceans has been made for **CI4 – Population abundance** under UNEP/MAP with **definition of GES assessment criteria,** particularly baseline/reference values and thresholds, as elaborated in the 21WG.514/Inf.11.

~~145.~~153. The first regional level based synoptic survey of cetaceans, carried out in the scope of the ACCOBAMS Survey Initiative project (aerial and vessel boat surveys were carried out in 2018 and 2019, and data processed in 2021) acquired cetacean abundance data for the most of the region (except for the parts of the southern Mediterranean – particularly its central and eastern section) and **baseline/reference values were determined** ~~both~~ at the Mediterranean regional level, with estimation being also done at~~as well as level of~~of the level of 4 sub-regions, Western Mediterranean, Ionian and Central Mediterranean, Adriatic Sea, Aegean and Levantine Seas. Identification of baseline values is significant improvement when compared to the Med QSR 2017.

~~146.~~154. **ACCOBAMS Survey Initiative project was a joint coordinated venture** of international organisations, national institutions and cetacean expert, supported international and national funding, and this effort displays clearly the necessity of regional – national cooperation in monitoring and subsequently conservation of migratory species, such as cetaceans, in the Mediterranean,

~~147.~~155. **Regional surveys,** such as ASI, establish and represent an important effort to assess cetacean's abundance and monitor trends through a coordinated and standardised system.

~~148.~~156. **GES could not be assessed for the CI4,** since the baseline/reference values date recently (2018 – 2021), and there is no longer-time data series necessary for GES assessment. However, the next ASI project, planned in the scope of ACCOBAMS for 2024 - 2026 should contribute with a new set of data needed for the GES assessment in the scope of the 2029 Med QSR report.

Knowledge gaps for CI4

~~149.~~157. There is still a disparity in research effort, with the most significant gaps in the southern part of the Mediterranean, which was also shown during the implementation of the ASI project.

~~150.~~158. Long-term data series are missing, which would be based on systematic monitoring. For the Med QSR 2023 report it is understandable, since the baseline/referent values for cetaceans are

determined only recently (2018 – 2021). ~~But even before the establishment of the GES assessment system, such data were missing and hence the baseline/reference values were identified only recently.~~

5.2.3. CI5 - Population demographic characteristics

159. The attempt was made under UNEP/MAP **to define GES assessment criteria** for the CI5 – Population demographic characteristics, particularly baseline/reference values and thresholds, but it was **not yet possible** due to lack of data and knowledge in general (as elaborated in the 21WG.514/Inf.11),

~~151.~~ As currently defined under IMAP 2016, **GES assessment for CI5 is based on measurement of human induced mortality**. However, 21WG.514/Inf.11 proposes future reorganization and reformulation of GES definitions, notably to address human induced mortality under CI12 and to be more focussed on characteristics such as sex ration, calf production etc .

~~152.~~160. Despite methodological limitations, **the attempt was made to collect and process data on bycatch and strandings** in general. Indeed, there are several regional data sources, notably: GFCM, ICES (for the EU Member States only) and MEDACES - cetacean specific regional strandings database under the auspices of SPA/RAC, management and support from the Spanish institutions,

~~153.~~161. **The collected data are very partial and unreliable**, and in many cases, **not regularly updated**, and in general, bycatch is fairly underestimated.

~~154.~~162. **GES could not be assessed for the CI5** due to both lack of defined assessment criteria and lack of adequate data and information.

Knowledge gaps for CI5

~~155.~~163. There is a lack of systematic bycatch data collection and lack of reliable data and information; biased estimates, only some data are reported.

~~156.~~164. Stranding data are also not systematically collected, and even if they are available via MEDACES or other databases, there is a lack of information on the cause of the stranding, which would allow assessment of whether stranding occurred due to particular human activities or naturally.

5.3. IUCN Assessment

~~157.~~165. **IUCN Red List assessment** could be used as a **valuable tool for assessing the state of cetaceans**. As such, it is already linked to thresholds for CI4 under IMAP/GES assessment.

~~158.~~166. **Thanks to the two IUCN Red List assessments of cetaceans in the Mediterranean Sea, Black Sea and contiguous Atlantic area (ACCOBAMS area), performed in the scope of ACCOBAMS**, in cooperation with IUCN and cetacean experts, **several conclusions could be drawn** both on the current status of cetaceans and their status trend since the mid-2000s.

~~159.~~ **In general, the cetaceans (based on 8 GES assessment relevant cetaceans species) in the Mediterranean are significantly threatened, since the majority of species are assessed as Endangered (EN).**

~~160.~~

~~161.~~167. **There is improvement in the status of common bottlenose dolphin and striped dolphins, since previous assessments, which results were officially adopted in 2007 in the framework of ACCOBAMS as the IUCN Red Status List of Cetaceans in the ACCOBAMS area (Resolution 3.19)~~**~~since their largest subpopulations are assessed as Least Concerned (LC) and the status improved since previous assessment in [year].~~**

~~162.~~168. **The knowledge of cetaceans has improved to a certain extent, which enables assessment of previously Data Deficient** (DD) **specie**s such as Cuvier's beaked whale and long-finned pilot whale.

169. **The status of fin whale has worsened compared to previous assessments,** which results were officially adopted in 2007 in the framework of ACCOBAMS as the IUCN Red Status List of Cetaceans in the ACCOBAMS area (Resolution 3.19).
~~in [year].~~

Knowledge gaps

~~163.~~170. Although current knowledge enabled IUCN Red List Assessment, the data and information should be collected and processed through systematic monitoring at all levels (regional and national).

6. Measures and actions required to achieve GES for Cetaceans

6.1. Understanding and addressing pressures/state of cetaceans' linkages

~~164.~~171. **Continue the work on definition of pressures/cetaceans' interaction hotspots**; particularly extension of anthropogenic noise/cetaceans' hotspots analysis to maritime traffic and identification of marine litter/cetaceans' hotspots, as already envisaged in the ACCOBAMS Resolutions 8.17. and 8.20. respectively, both adopted by ACCOBAMS MOP 8 in 2022.

~~165.~~172. **Intensify efforts to improve knowledge on interrelations between climate change and cetaceans**, including identification of sensitive cetaceans' species and monitoring of their state related to climate change.

~~166.~~173. **Continue efforts in data collection and processing regarding the ship strikes**, in cooperation with international organisations on marine traffic, notably IMO, as already included in the ACCOBAMS resolution 8.18.

~~167.~~174. **Develop techniques and models to assess cumulative/synergistic effects** of pressures and impacts on cetaceans, including underwater anthropogenic noise, chemicals, marine litter, climate

change and emerging pathogens, taking into consideration the existing recommendations (such as from the 2021 IWC Intersessional Workshop "Pollution 2025" etc).

~~168.~~175. **Intensify efforts to implement the existing pressures' mitigation tools,** such as guidelines and best practices already developed in the scope of ACCOBAMS, UNEP/MAP and IWC.

6.2. GES assessment

6.2.1. Methodological issues

~~169.~~176. **Reformulate GES definitions and linked GES assessment elements under CI5**, as proposed in the 21WG.514/Inf.11, notably to shift human induced mortality assessment to CI12 and focus on actual population demographic characteristics (sex ration, calf productivity etc).

~~170.~~177. **Define GES assessment criteria**, particularly baseline/reference and threshold values, **for CI5**, **as soon as sufficient data is collected/available**. Possibly select representative pilot areas where adequate data could be collected on regular bases.

~~171.~~178. **Invest efforts in further quantification of thresholds for CI3.**

~~172.~~179. **Encourage sub-regional level of cooperation** between countries in **reviewing and adjusting GES assessment criteria**.

6.2.2. Data collection, availability and GES assessment.

CI3 and CI4

~~173.~~180. **Replicate and conduct regularly regional synoptic surveys (ASI)** (possible dates for ASI 2 – 2024 - 2026), and complement with other monitoring efforts, as already foreseen in the Long-Term Monitoring Programme (LTMP), adopted in the ACCOBAMS framework (Resolution 8.10).

~~174.~~181. Continue to ensure ASI **data availability and easy accessibility** (in standard spatial GIS format) (as it is currently possible via NETCCOBAMS).

~~175.~~182. **Promote and support research of cetaceans in the southern Mediterranean**, particularly in the areas that could not be covered by ASI.

CI5

~~176.~~183. **At the national level (or where possible at sub-regional level), establish or ensure functioning of the stranding networks**, with the particular support of regional agreements/organisations (ACCOBAMS, SPA/RAC) in the segment of capacity building and application of new technologies, as already stipulated in the ACCOBAMS Resolution 8.15,

~~177.~~184. **Regularly submit national strandings data to MEDACES,** including information on causes of mortality,

~~178.~~185. **Upgrade MEDACES** and ensure MEDACES **data availability and easy accessibility** (in standard spatial GIS format) via MEDACES website.

~~179.~~186. **Intensify research efforts on population genetics**, taking into account the ongoing work in the ACCOBAMS framework (reference: ACCOBAMS Resolution 8.11).

6.3. IUCN Red List assessment

~~180.~~187. **Continue to conduct IUCN Red List Assessment for cetaceans in the Mediterranean Sea**, in the **ACCOBAMS framework**, and report on changes in the status, as a basis for further conservation action.

References

ACCOBAMS 2019 - *Review of bycatch rates of cetaceans in the Mediterranean and the Black Sea*. ACCOBAMS-MOP7/2019/Doc 29

ACCOBAMS, 2021a – *Conserving Whales, Dolphins and Porpoises in the Mediterranean Sea, Black Sea and adjacent areas: an ACCOBAMS status report, (2021)*. By: Notarbartolo di Sciara G., Tonay A.M. Ed. ACCOBAMS, Monaco. 160 p.

ACCOBAMS, 2021b. - *Estimates of abundance and distribution of cetaceans, marine megafauna and marine litter in the Mediterranean Sea from 2018-2019 surveys*. By Panigada S., Boisseau O., Canadas A., Lambert C., Laran S., McLanaghan R., Moscrop A. Ed. ACCOBAMS - ACCOBAMS Survey Initiative Project, Monaco, 177 pp.

ACCOBAMS, 2021c - *Impacts of climate change on cetaceans in the North-western Mediterranean Sea and proposal for a recommendation for its monitoring.* Report prepared for ACCOBAMS by Belhadjer, A. & David, L from EcoOcéan Institut (with the collaboration of Marine Roul & Nathalie DiMéglio)

ACCOBAMS, 2022a - *Study on the hotspots of interactions between cetaceans and marine litter in the ACCOBAMS area - Draft report (2022a)* Prepared for ACCOBAMS by Fossi, C. and Panti, C.

ACCOBAMS, 2022b - *Bibliographic review on the impact of chemical pollution on cetaceans, including the identification of ad hoc research projects aimed at assessing chemical pollution on cetaceans in the ACCOBAMS area - Draft report (2022b)*. Prepared for ACCOBAMS by Fossi, C. and Panti, C.

ACCOBAMS, 2022c - *Second hotspots report: updated overview of the noise hotspots in the ACCOBAMS agreement area*, ACCOBAMS-MOP8/2022/Inf43, https://accobams.org/wp-content/uploads/2022/11/MOP8.Inf43_Noise-Hotspots-V2.pdf

ACCOBAMs, 2022d - *Resolution 8.19. commercial Cetacean-watching in the ACCOBAMS area, Annex 1 - Guidelines for management of cetaceans watching activities in the Mediterranean Area*. Guidelines prepared by Gianna Minton

ACCOBAMS Resolution 8.12, 2022 - https://accobams.org/wp-content/uploads/2022/11/MOP8_DraftRes8.12_IUCN-Red-List.pdf

Albouy et al. 2020 - Albouy, C., Delattre, V., Donati, G., Frölicher T.L., Albouy-Boyer S., Rufino M., Pellissier L., Mouillot D. & Leprieur F.(2020). *Global vulnerability of marine mammals to global warming.* Sci Rep 10, 548. https://doi.org/10.1038/s41598-019-57280-3

Azzellino et al. 2007 - Azzellino A., Gaspari S., Airoldi S., Nani B. 2008. *Habitat use and preferences of cetaceans along the continental slope and the adjacent pelagic waters in the western Ligurian Sea.* Deep Sea Research Part I. 55:296-323. doi:10.1016/j.dsr.2007.11.006

Azzelino et al. 2008 - Azzellino A., Gaspari S.A., Airoldi S. & Lanfredi C., (2008). *Biological consequences of global warming: does sea surface temperature affect cetacean distribution in the western Ligurian Sea?* Journal of the Marine Biological Association of the United Kingdom, 88(6), 1145-1152. doi:10.1017/S0025315408000751.

Bentaleb et al. 2011 - Bentaleb I., Martin C., Vrac M., Mate B., Mayzaud P., Siret D., de Stephanis R. & Guinet C. (2011). *Foraging ecology of Mediterranean fin whales in a changing environment elucidated by satellite tracking and baleen plate stable isotopes.* Marine Ecology Progress Series, Inter Research, 438, pp.285-302. ⟨10.3354/meps09269

Cañadas et al. 2005 - Cañadas A., Sagarminaga R., de Stephanis R., Urquiola E., Hammond P.S. 2005. *Habitat preference modelling as a conservation tool: proposals for marine protected areas for cetaceans in southern Spanish waters.* Aquatic Conservation: Marine and Freshwater Ecosystems 15:495-521.

Cañadas et al. 2017 - Cañadas A. & Vázquez J.A. (2017). *Common dolphins in the Alboran Sea: Facing a reduction in their suitable habitat due to an increase in Sea surface temperature.* Deep–Sea Research Part II, 141: 306–318. http://dx.doi.org/10.1016/j.dsr2.2017.03.006

Decision IG.20/4 - *Implementing MAP ecosystem approach roadmap: Mediterranean Ecological and Operational Objectives, Indicators and Timetable for implementing the ecosystem approach roadmap*

Decision IG.21/3 2013 - *Decision IG.21/3 on the Ecosystems Approach including adopting definitions of Good Environmental Status (GES) and targets (2013). 18th COP of the Barcelona Convention, Türkiye.* UNEP(DEPI)/MED IG.21/9 Annex II – Thematic Decisions

Decision IG.22/7 2018 - *UNEP – MAP (2018). Progress Report on the implementation of Decision IG.22/7 on the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP). Rome, Italy*. UNEP/MED WG.450/3

FAO, 2021 - Carpentieri, P., Nastasi, A., Sessa, M. & Srour, A., eds. 2021. Incidental catch of vulnerable species in Mediterranean and Black Sea fisheries – A review. Studies and Reviews No. 101 (General Fisheries Commission for the Mediterranean). Rome, FAO. https://doi.org/10.4060/cb5405en

FAO, 2022 - The State of Mediterranean and Black Sea Fisheries 2022. General Fisheries Commission for the Mediterranean. Rome. https://doi.org/10.4060/cc3370en

Frantzis, 1998 - Frantzis A., 1998. Does acoustic testing strand whales? Nature, 392: 29.

Frantzis, 2004 - Frantzis A., 2004. The first mass stranding that was associated with the use of active sonar (Kyparissiakos Gulf, Greece, 1996). In: Proceedings of the workshop: "Active sonar and cetaceans ". 8 March 2003, Las Palmas, Gran Canaria. ECS newsletter 42 (special issue): pp. 14-20.

Frantzis, 2015 - Frantzis, A., 2015. Short report on the mass stranding of Cuvier's beaked whales that occurred on the 1st of April 2014 in South Crete, Greece, during naval exercises. FINS 6.1, 10-11. (The Newsletter of ACCOBAMS).

Gannier et al., 2007 - Gannier, A., Praca, E. (2007). *SST fronts and the summer sperm whale distribution in the northwest Mediterranean Sea*. J. Mar. Biol. Assoc. UK 87, 187–193.

Hall et al., 2018 - Hall, A.J, McConnell, B. J, Schwacke L. H, Ylitalo, G.M, Williams, R, Rowles, T. K (2018). *Predicting the effects of polychlorinated biphenyls on cetacean populations through impacts on immunity and calf survival*, Environmental Pollution, Volume 233, 2018, Pages 407-418, ISSN 0269-7491, https://doi.org/10.1016/j.envpol.2017.10.074

ICES 2021 - ICES. 2021. Working Group on Bycatch of Protected Species (WGBYC). ICES Scientific Reports. 3:107. 168 pp. https://doi.org/10.17895/ices.pub.9256

IMAP 2016 - UNEP/MAP (2016). *Integrated Monitoring and Assessment Programme (IMAP) of the Mediterranean Sea and Coast and Related Assessment Criteria, Athens, Greece*. UNEP(DEPI)/MED IG.22/Inf.7

IMAP 2017 - UNEP/MAP (2017). *IMAP Common Indicator Guidance Facts Sheets (Biodiversity and Fisheries). Athens, Greece*. UNEP(DEPI)/MED WG.444/6/Rev.1.

Noam van der Hal et al., 2017 - Noam van der Hal, Asaf Ariel, Dror L. Angel, *Exceptionally high abundances of microplastics in the oligotrophic Israeli Mediterranean coastal waters*, Marine Pollution Bulletin, Volume 116, Issues 1–2, 2017, Pages 151-155, ISSN 0025-326X, https://doi.org/10.1016/j.marpolbul.2016.12.052

Pedrotti et al, 2022 - Pedrotti M.L., Lombard F, Baudena A, Galgani F, Elineau A, Petit S, Henry, M, Troublé, R, Reverdin G, Ser-Giacomi E,Kedzierski M, Boss E, Gorsky G (2022). An integrative assessment of the plastic debris load in the Mediterranean Sea. Science of The Total Environment, Volume 838, Part 1, 2022, 155958, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2022.155958

Praca et al., 2008 - Praca, E., Gannier, A., (2008). *Ecological niches of three teuthophageous odontocetes in the northwestern Mediterranean Sea*. Ocean Sci. 4, 49–59.

Sauvé et al., 2014 - Sauvé, S. & Desrosiers, M (2014). *A review of what is an emerging contaminant.* Chemistry Central journal. 8. 15. 10.1186/1752-153X-8-15.

Simmonds et al., 2009 - Simmonds M.P. & Eliott W. (2009). *Climate change and cetaceans: Concerns and recent developments.* Journal of the Marine Biological Association of the United Kingdom, 89(1), 203210. doi:10.1017/S0025315408003196

Soto-Navarro et al., 2020 - Soto-Navarro J, Jordá G, Deudero S, Alomar C, Amores Á, Compa M. (2020). *3D hotspots of marine litter in the Mediterranean: A modelling study.* Mar Pollut Bull 2020;155:111159. https://doi.org/10.1016/j.marpolbul.2020.111159

Tort Castro et al., 2022 - Tort Castro B, Prieto Gonzalez R, O'Callaghan SA, Dominguez Rein-Loring P and Degollada Bastos E (2022) *Ship Strike Risk for Fin Whales (Balaenoptera physalus) Off the Garraf coast, Northwest Mediterranean Sea*. Front. Mar. Sci. 9:867287. doi: 10.3389/fmars.2022.867287

UNEP-MAP, 2015 - *Marine litter assessment in the Mediterranean Sea*. https://wedocs.unep.org/bitstream/handle/20.500.11822/7098/MarineLitterEng.pdf?sequence=1&isAllowed=y

UNEP-MAP, 2020 - *Methodological Approach for mapping the interrelations between Pressures-Impacts and the Status of Marine Ecosystem Components for Biodiversity Cluster.* CORMON meeting. Videoconference. UNEP/MED WG.482/Inf.13

UNEP-MAP, 2021 - *Monitoring and Assessment Scales, Assessment Criteria, Thresholds and Baseline Values for the IMAP Common Indicators 3, 4 and 5 related to marine mammals*. Videoconference. UNEP/MED WG.514/Inf.11

Verborgh et al., 2016 - Verborgh P., Gauffier P., Esteban R., Giménez J., Cañadas A., Salazar-Sierra J.M., de Stephanis R. 2016. *Conservation status of long-finned pilot whales, Globicephala melas, in the Mediterranean Sea.* In: G. Notarbartolo di Sciara, M. Podestà, B.E. Curry (Editors), Mediterranean marine mammal ecology and conservation. Advances in Marine Biology 75:173-204. http://dx.doi.org/10.1016/bs.amb.2016.07.004

Williamson et al, 2021 - Williamson, M. J., ten Doeschate, M. T. I., Deaville, R., Brownlow, A. C., and Taylor, N. L. (2021). *Cetaceans as sentinels for informing climate change policy in UK waters*. Mar. Policy 131, 104634. doi:10.1016/j.marpol.2021.104634