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Meeting of the Ecosystem Approach Correspondence Group on Monitoring (CORMON) Biodiversity and Fisheries

Videoconference, 10-11 June 2026

Agenda Item 3: Draft Updated Guidance Factsheets for biodiversity (EO1

3.4. Marine mammals - Cetaceans (OE 1: Common Indicator 3 – Species distributional range, Common Indicator 4 – species population abundance and Common Indicator 5: population demographic characteristics)

Draft updated IMAP Common Indicator 3, 4 and 5 factsheets related to cetaceans

UNEP/MAP
Tunis, 2026

Note by the Secretariat

1. In 2008, the Contracting Parties to the Barcelona Convention, through COP 15 Decision IG.17/6, committed to progressively applying the Ecosystem Approach (EcAp) to the management of human activities affecting the Mediterranean marine and coastal environment. This approach aims to promote sustainable development and achieve Good Environmental Status (GES) of the Mediterranean Sea and its coasts.

2. A key component of the Ecosystem Approach is the monitoring and assessment of the marine and coastal environment. To support a coherent regional implementation framework, the Contracting Parties adopted the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP) through COP 19 Decision IG.22/7 in 2016. IMAP includes 23 Common Indicators, primarily focusing on state and impact indicators.

3. To support harmonized and consistent monitoring across the Mediterranean region, Guidance Factsheets were developed for each IMAP Common Indicator. These factsheets define common monitoring and assessment approaches and serve as key technical references for Contracting Parties in the development, revision, and implementation of their national monitoring programmes. Their overall objective is to strengthen the implementation of the Ecosystem Approach and support the achievement of Good Environmental Status (GES).

4. The first version of the Guidance Factsheets was reviewed by the Meeting of the Correspondence Group on Monitoring (CORMON) on Biodiversity and Non-Indigenous Species (Madrid, Spain, 28 February–1 March 2017) and by the Meeting of the SPA/DB National Focal Points (Alexandria, Egypt, 9–12 May 2017). The outcomes of these reviews were reflected in document UNEP(DEPI)/MED WG.444/6/Rev.1 presented at the 6th Meeting of the Ecosystem Approach Coordination Group (Athens, Greece, 11 September 2017).

5. Building on the experience gained through national IMAP implementation and the findings of the 2023 Mediterranean Quality Status Report (MED QSR), the Contracting Parties initiated the revision of the Ecosystem Approach (EcAp) policy and the update of IMAP, in line with the mandate provided at COP 23. This process aims to strengthen monitoring and assessment capacities, improve data quality, and ensure more robust and reliable regional assessments.

6. As outlined in the SPA/RAC work programme, the update of the IMAP Common Indicator Guidance Factsheets is scheduled to be carried out during the 2024–2025 and 2026–2027 biennia. SPA/RAC is updating the Guidance Factsheets of the IMAP Common Indicators for Ecological Objective 1 (EO1: Biodiversity), in close consultation with the Biodiversity Online Working Group (OWG), with the objectives to:

   (i) incorporate climate change considerations into the updated Guidance Factsheets. As one of the most significant threats to biodiversity in the Mediterranean Sea, climate change requires further clarification within the Guidance Factsheets and GES definitions. Climate change impacts should be integrated into existing indicators and methodologies, particularly in the establishment of baseline and threshold values;
   (ii) take into consideration the development of Monitoring and Assessment Scales, Assessment Criteria, Thresholds, and Baseline Values for IMAP Common Indicators 3 (Species distributional range), 4 (Population abundance), and 5 (Population demographic characteristics) related to cetaceans ; and iii) integrate the latest scientific knowledge and methodological developments in marine biodiversity research, ecological monitoring, and climate change impacts to support more accurate assessments and effective conservation measures.

7. In this context, SPA/RAC has prepared the draft updated IMAP Common Indicator 3, 4 and 5 Factsheets related to cetaceans, with a view to supporting the Contracting Parties in updating their national IMAP monitoring programmes and facilitating data collection and assessment for the third IMAP assessment cycle (2024 – 2031).

8. This proposal was developed with the support of the ACCOBAMS Scientific Committee (EcAp-MSFD Task Force) and the Secretariat. The Meeting is expected to review the document and provide guidance with a view to its submission to the SPA/DB Focal Points Meeting (scheduled for May 2027) and the EcAp Coordination Group Meeting (scheduled for September 2027).

1. Common indicator 3: Species distributional range (Cetaceans) (EO 1)

Indicator Title	*Common indicator 3: species distributional range (Cetaceans)*	
Relevant GES definition	Related Operational Objective	Proposed Target(s)
The species are present in all their natural distributional range.	Species distribution is maintained	The distribution of cetaceans 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

Rationale

Justification for indicator selection

The objective of this indicator is to focus on the species distributional range of, particularly cetaceans within the Mediterranean waters, with a special focus on those species selected by the Parties. Differences and shifts in distribution may reflect changes in the occurrence of suitable habitats, availability of food resources, selective pressures from human-related activities, as well as climate change. With increasing concern about species conservation, quantitative and qualitative descriptions of species' range structure and extent of geographical distribution - both for single species or groups of species - together with detailed information on the location of breeding/feeding areas, can provide crucial information for management purposes.

Eight species of cetaceans are considered to regularly occur in the Mediterranean area: short-beaked common dolphins (*Delphinus delphis*), striped dolphins (*Stenella coeruleoalba*), common bottlenose dolphins (*Tursiops truncatus*), long-finned pilot whales (*Globicephala melas*), Risso's dolphins (*Grampus griseus*), fin whales (*Balaenoptera physalus*), sperm whales (*Physeter macrocephalus*), and Cuvier's beaked whales (*Ziphius cavirostris*).

Harbour porpoises (*Phocoena phocoena*), killer whales (*Orcinus orca*), and rough-toothed dolphins (*Steno bredanensis*) are considered visitors with very limited ranges: *P. phocoena* is regular in the Gulf of Cadiz and has also been detected in the coastal area of Malaga, possibly representing a small remnant population in the Aegean Sea; meanwhile, *O. orca* is regular in the contiguous Atlantic area (Strait of Gibraltar) and *S. bredanensis* in the Levantine area.

Knowledge about the distribution, abundance and habitat use and preferences of some of these species, including the most abundant ones, is in part scant and limited to specific sectors of the Mediterranean Sea, due to the uneven distribution of research effort during the last decades. In particular, the south-eastern portion of the basin, the coasts of North Africa and the central Mediterranean offshore waters are amongst the areas with limited knowledge on cetacean presence, occurrence and distribution.

The conservation status of marine mammals in the Mediterranean Sea has been a source of concern for many years. Marine mammals living in the Mediterranean Sea find themselves in precarious conditions due to the intense human presence and activities in the region; these are the source of a variety of pressures that are threatening these species' survival. These animals are highly mobile and are usually not confined within single nations' jurisdictions, stressing the need for basin-wide Conservation and protection effort. Several threats affect marine mammals in the Mediterranean Sea and their effect on the population, distributional range and survival may act in a synergistic manner. Threats include interaction with fisheries, disturbance, injuries and fatal collisions from shipping, direct interactions with vessels (such as the recent phenomena involving orcas in the Strait of Gibraltar), habitat loss and degradation, chemical pollution, anthropogenic noise, direct killings and climate change.

Indicator Title	*Common indicator 3: species distributional range (Cetaceans)*

The distribution of marine mammals is affected by several factors, which should all be taken into consideration in monitoring activities, Abundance of food, sea temperature, morphology of the coastline, seabed topography, seem to interact and influence which areas are preferred habitats for cetaceans. Certain habitats have a particular key value in the life cycles of different species, in that they are used as foraging grounds due to prey abundance, for breeding or as migration corridors between areas.

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Indicator Title	*Common indicator 3: species distributional range (Cetaceans)*

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Policy Context and targets (other than IMAP)

Policy context description

The Mediterranean cetaceans' populations are protected under the auspices of ACCOBAMS (Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area), under the auspices of the UNEP Convention on the Conservation of Migratory Species of Wild Animals (UNEP/CMS).

All cetacean species in the Mediterranean Sea are protected under **Annex II** of the SPA-BD Protocol (Barcelona Convention), **Appendix II** of the Bern Convention (Strictly Protected Fauna), and **Appendix II** of the Bonn Convention (CMS). Regarding CITES (Washington Convention), they are listed under **Appendix I or II** depending on the species.

The **fin whale**, the **sperm whale** and the **short-beaked common dolphin** (Mediterranean population) are also specifically listed under **Appendix I** of the Bonn Convention (CMS) as endangered migratory species.

Under the **EU Habitats Directive**, the common bottlenose dolphin and the harbor porpoise are listed under **Annex II** (requiring the designation of Special Areas of Conservation), while **all cetaceans** are included in **Annex IV**, ensuring their strict protection across all European waters.

Moreover, The Pelagos Sanctuary agreement, established in the **Corso-Ligurian-Provençal Basin** signed on November 25, 1999 by Italy, France and Monaco Principality, serves as a pioneering transboundary model for international cooperation, fostering standardized scientific research and coordinated management to mitigate anthropogenic threats to Mediterranean cetaceans.

Indicator/Targets

Kunming–Montreal Global Biodiversity

Framework CBD Target 3 (30x30)

EU Regulation 812/2004 concerning incidental catches of cetaceans in fisheries
EU MSFD Descriptor 1 and 4
EU Habitats Directive
The obligations under ACCOBAMS

Policy documents

- Aichi Biodiversity Targets - https://www.cbd.int/sp/targets/
- EU Biodiversity Strategy - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0244&from=EN
- EU Regulation 1143/2014 - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN
- Marine Strategy Framework Directive - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN
- Commission Decision on criteria and methodological standards on good environmental status of marine waters - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010D0477(01)&from=EN

Indicator Title	*Common indicator 3: species distributional range (Cetaceans)*

- Pan-European 2020 Strategy for Biodiversity https://www.google.no/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwiP1Jv_P7NAhWHjSwKHZfoBRIQFggtMAE&url=https%3A%2F%2Fcapacity4dev.ec.europa.eu%2Fsystem%2Ffiles%2Ffile%2F08%2F10%2F2012_-_1535%2Fpan european_2020_strategy_for_biodiversity.pdf&usg=AFQjCNGa4NkkljA4x3l9WDO49uwrdYafMg
- UNEP/MAP-SPA/RAC, 2021. Post-2020 Strategic Action Programme for the Conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region. Ed. SPA/RAC, Tunis: 70 pp + Annexes https://legacy.sparac.org/uploads/CKFiles/files/post_2020_sapbio_en.pdf

- National Biodiversity Strategies and Action Plans (NBSAPs) - https://www.cbd.int/nbsap/ ACCOBAMS Agreement Text - http://www.accobams.org/images/stories/Accord/anglais_text%20of%20the%20agreement%20english.pdf

- ACCOBAMS STRATEGY (PERIOD 2014 – 2025) - https://accobams.org/images/stories/MOP/MOP5/Documents/Resolutions/mop5.res5.1_accobams%20strategy.pdf

Indicator analysis methods

Indicator Definition

This indicator is aimed at defining the distributional range of cetacean species. It is designed to map the spatial extent of cetaceans present in Mediterranean waters, with a special focus on the priority species selected by the Parties.

Methodology for indicator calculation

The range of a species is commonly represented by a distribution map. The main outputs of the monitoring under this common indicator will therefore be maps of species presence, distribution and occurrence. Data to elaborate the distribution of cetaceans may be obtained through dedicated ship and aerial surveys, combined visual and acoustic surveys, implementing distance sampling methods. Nevertheless, additional data can be collected opportunistically by platform of opportunities (e.g., whale watching operators, ferries, cruise ships, military ships,) and citizen-science programmes.

The use of Geographical Information Systems (GIS) is essential for spatial management and the compilation of the monitoring data collected and the elaboration of the species distributional range maps. Following the successful implementation of the first ACCOBAMS Survey Initiative (ASI) in summer 2018, which provided the first synoptic assessment of cetacean abundance and distribution across the Mediterranean, thereby establishing a foundational baseline for future conservation and monitoring efforts, a second edition (ASI 2) is planned in summer 2026. This ongoing effort provides essential, high-quality baseline data to meet national and international monitoring requirements, such as those defined by the Ecosystem Approach (EcAp)/IMAP and the Marine Strategy Framework Directive (MSFD).

When a global, basin-wide approach is unfeasible, small-scale monitoring programmes should be established at sub-regional or national level. These initiatives are essential to fulfill monitoring obligations under the EU Habitats Directive and the MSFD within specific macro-regions or UNEP-MAP-RAC/SPA (2010) marine eco-regions (Fig. 1). Furthermore, such efforts should be aligned with the ACCOBAMS Long-Term Monitoring Programme (LTMP), ensuring that localized data collection contributes to a standardized, long-term chronological series for the entire Mediterranean area. In any case, once dealing with a subregional implementation approach for cetacean surveying campaigns, this should be carried out in line with agreed common, regional methodologies, using existing and shared Protocols, with the facilitation, as appropriate, of ACCOBAMS.

Indicator Title	*Common indicator 3: species distributional range (Cetaceans)*

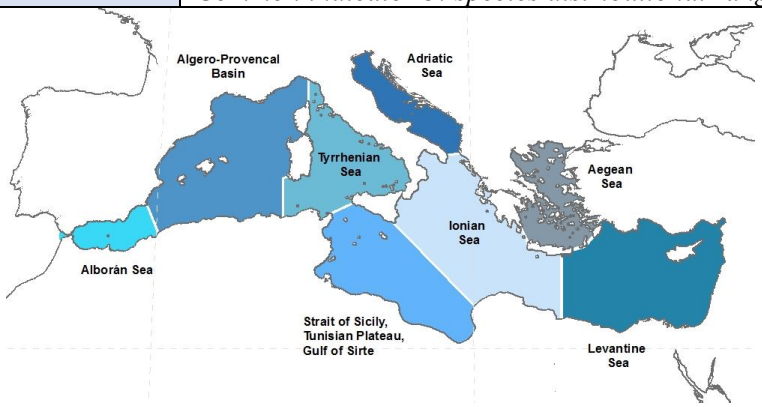

Figure 1. Mediterranean Sea with 7 sub-divided marine ecoregions. These include Alborán Sea; Algero-Provencal Basin; Tyrrhenian Sea; Adriatic Sea; Strait of Sicily, Tunisian Plateau, Gulf of Sirte; Ionian Sea/Central Mediterranean; Aegean Sea; Levantine Sea. Based on those divisions presented in UNEP-MAP-RAC/SPA, 2010.

Indicator units

The Integrated Monitoring and Assessment Guidance provided in document UNEP(DEPI)/MED WG.420/4 recommended to use for recording the presence/absence of each species, the standardized 30 x 30 nautical mile grid map produced by FAO/GFCM or the 50 x 50 km grids used by the European Bird Census Council.

According to the Marine Strategy Framework Directive and the Habitat Directive, a finer 10 x 10 Km scale map based on the ETRS89-LAEA (Lambert Azimuthal Equal Area) coordinate reference system is used.

List of available Guidance documents and protocols

A document on 'Monitoring Guidelines to assess Cetaceans' Distributional Range, Population Abundance and Population Demographic Characteristics' has been produced by ACCOBAMS and should be considered as guidance when establishing monitoring programmes.

Technical guidance on defining species' distributional ranges and standardized analytical procedures is provided within the official Monitoring and Reporting documents of the Habitats Directive (notably under Article 17), ensuring methodological consistency across Member States.

Data Confidence and uncertainties

Distribution maps are generally qualitative. It is important to consider the high mobility of cetaceans and the driving forces (mainly prey availability and their proxis as well as the effects of climate change which can alter the availability of suitable habitats) which affect their distribution. In case of trends in distribution over time, appropriate statistical tools and analytical framework, such as habitat prediction modelling, should be applied. As an example, standard regression methods (simple linear regression, generalized linear or additive models, etc.) provide estimates of uncertainty (standard errors and confidence intervals of estimated trends). Such uncertainty estimates should accompany all reported trends.

Methodology for monitoring, temporal and spatial scope

Available Methodologies for Monitoring and Monitoring Protocols:

Several methods are available implementing different monitoring platforms and approaches. Countries should select the most appropriate one based on species of interest, available resources and conservation needs. Some methods could be combined to provide more robust information, such as visual and acoustic.

The available methods include, *inter alia*, the following:

- Dedicated ships or aerial surveys
- Photo-ID
- Bio-logging: satellite tracking, GPS/GSM tracking, radio tracking and the use of multi-sensors data loggers
- Acoustic data collection
- By-catch data

Indicator Title	*Common indicator 3: species distributional range (Cetaceans)*

- Beached and stranded specimens monitoring
- Opportunistic data collected from platform of opportunities

Citizen science data (only if verified by experts); Automatic infrared camera

Available data sources

Global Biodiversity Information Facility (GBIF https://www.gbif.org/) and the Ocean Biodiversity Information System (OBIS-SEAMAP http://seamap.env.duke.edu/). While GBIF acts as a universal repository for multi-taxa occurrence records from both terrestrial and marine environments, OBIS-SEAMAP is specifically designed for marine megafauna. The latter is a spatially referenced online database, aggregating marine mammal, seabird, sea turtle and ray & shark observation data from across the globe and provides specialized datasets that integrate high-resolution survey effort, telemetry, and photo-identification.
ACCOBAMS ASI 2018 data are available upon request.

Spatial scope guidance and selection of monitoring stations

To date knowledge of the distributional range of marine mammals in the Mediterranean Sea is largely affected by patchy distribution of research effort during the last decades. In particular, the south-eastern portion of the basin, the coasts of North Africa and the central Mediterranean offshore waters are amongst the areas with limited knowledge. Priority should be given to the less investigated areas.

According to the document UNEP/MED WG.514/Inf.11, it is recommended to refine the definition of High Priority (HP) and Low Priority (LP) sub-regional units for monitoring. This prioritization should be driven by the identification of critical habitats—such as fin whale feeding grounds, sperm whale breeding areas, and preferred habitats for Cuvier's beaked whales—integrating ASI survey data and the latest IUCN Red List assessments to optimize distributional range monitoring (Common Indicator 3)

Temporal Scope guidance

The distribution of cetaceans may vary on an annual, seasonal, or monthly basis. Ideally, Monitoring programmes should therefore prioritize the identification of aggregation areas, which are typically driven by concentrated prey availability (feeding), specific reproductive needs (breeding), or social behaviors. The temporal scale is largely determined by specific conservation questions and expected management outputs. Long-term monitoring projects are essential to provide reliable indications of trends in distribution over both time and space in priority areas. Under the Habitats Directive (Council Directive 92/43/EEC), Member States must maintain or restore species to a Favourable Conservation Status (FCS). This requires consistent surveillance and reporting every six years but more frequent sampling is recommended for robust data collection. To ensure efficiency, strong links should be established with other relevant frameworks, such as the MSFD and the Ecosystem Approach/IMAP under the Barcelona Convention, to align temporal monitoring efforts across the Mediterranean. The combination of a 10 x 10 km spatial resolution with a consistent temporal frequency is key to detecting significant shifts in the distributional range.

Data analysis and assessment outputs

Statistical analysis and basis for aggregation

Standard regression methods (simple linear regression, generalized linear or additive models), power analysis for detecting trends should be applied.
Under the Habitat Directive art 17 the range of a species is the external envelope around species distributions. The range is calculated considering the map of the actual distribution using a standardized algorithm and a "gap Distance" [(range tool (http:// disco map. eea. europa. eu/App/ Range Tool/)]. The gap distance aims to exclude major discontinuities of the distribution of a species. Different values are considered and Countries should coordinate the choice of a common value.

Expected assessments outputs

Indicator Title	*Common indicator 3: species distributional range (Cetaceans)*

The analysis delivers annual (and possibly seasonal) distribution maps, as well as predictive distribution maps.

Climate change integration

- Use of habitat prediction modelling to differentiate natural range variation from climate-driven shifts.
- Overlaying at-sea distribution with climate data (to measure indicator species response to e.g. marine heatwaves)
- Cross-reference with Candidate Common Indicators 39-43 (e.g. sea level rise, changes in sea surface temperature and circulation patterns) to explain habitat loss and range shifts
- Cross-reference with indirect impacts of climate change on other Ecological Objectives and Common Indicators influencing cetaceans' distributional range (e.g. EO4: Marine Food Webs; CI9 under EO3: Fish stocks)
- Potentially allow for use of "Shifting Baselines" to acknowledge climate-driven shifts in distribution

Methodologies for reporting

Submission of all distribution range data and metadata in a standardized form to the IMAP INFO/RAC System (https://www.info-rac.org/).

Known gaps and uncertainties in the Mediterranean

Data distribution in the Mediterranean Sea is characterized by significant spatial and seasonal imbalances. A gap analysis by Duke University highlights a lack of winter data, due to adverse meteorological conditions and/or logistic constraints, which prevent research outside of the summer months. However, certain countries have begun expanding research into non-summer periods through national programs driven by the Habitats Directive (HD) and the Marine Strategy Framework Directive (MSFD).

Contacts and version Date		
Key contacts within UNEP for further information		
Version No	Date	Author
V.1	20/07/2016	SPA/RAC
V.2	14/04/2017	SPA/RAC
V.3	11/05/2026	SPA/RAC & ACCOBAMS

2. Common indicator 4: Species population abundance (Cetaceans) (EO 1)

Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*	
Relevant GES definition	Related Operational Objective	Proposed Target(s)
The species population has abundance levels allowing qualifying to Least Concern Category of IUCN Red List or has abundance levels that are improving and moving away from the more critical IUCN category.	Population size of selected species is maintained, or, if depleted, it recovers to natural levels	No human-induced mortality is causing a decrease in breeding population size or density. Populations recover towards natural levels.

Rationale

Justification for indicator selection

This indicator focuses on population abundance estimates for marine cetaceans within the Mediterranean Basin, particularly for the species selected by the Parties.

Population abundance refers to the total number of individuals of a species in a specific area in a given timeframe, to inform about the growth or decline of a population. The systematic monitoring of the abundance and distribution of wild species constitutes a crucial element of any conservation strategy, but it is often neglected in many regions, including much of the Mediterranean. The number of individuals in a population may vary by both man-made pressures, environmental dynamics and climate changes besides naturally. Hence, species abundance should be systematically monitored at regular intervals to inform effective conservation or review the efficacy of measures already in place.

Eight species of cetaceans are considered to regularly occur in the Mediterranean area: short-beaked common dolphins (*Delphinus delphis*), striped dolphins (*Stenella coeruleoalba*), common bottlenose dolphins (*Tursiops truncatus*), long-finned pilot whales (*Globicephala melas*), Risso's dolphins (*Grampus griseus*), fin whales (*Balaenoptera physalus*), sperm whales (*Physeter macrocephalus*), and Cuvier's beaked whales (*Ziphius cavirostris*).

Harbour porpoises (*Phocoena phocoena*), killer whales (*Orcinus orca*), and rough-toothed dolphins (*Steno bredanensis*) are considered visitors with very limited ranges: *P. phocoena* is regular in the Gulf of Cadiz and has also been detected in the coastal area of Malaga, possibly representing a small remnant population in the Aegean Sea; meanwhile, *O. orca* is regular in the contiguous Atlantic area (Strait of Gibraltar) and *S. bredanensis* in the Levantine area.

The conservation status of cetaceans in the Mediterranean Sea has been a source of concern for many years. Cetaceans living in the Mediterranean Sea find themselves in precarious conditions due to the intense human presence and activities in the region; these are the source of a variety of pressures that are threatening these species' survival. These animals are highly mobile and are usually not confined within single nations' jurisdictions, stressing the need for basin-wide conservation and protection effort. Several threats affect marine mammals in the Mediterranean Sea and their effect on the population, distributional range and survival may act in a synergistic manner. Threats include interaction with fisheries, disturbance, injuries and fatal collisions from shipping, direct interactions with vessels (such as the recent phenomena involving orcas in the Strait of Gibraltar) habitat loss and degradation, chemical pollution, anthropogenic noise, direct killings and climate change.

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Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*

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Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*

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Policy Context and targets (other than IMAP)

Policy context description

The Mediterranean cetaceans' populations are protected under the auspices of ACCOBAMS (Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area), under the auspices of the UNEP Convention on the Conservation of Migratory Species of Wild Animals (UNEP/CMS).

All cetacean species in the Mediterranean Sea are protected under **Annex II** of the SPA-BD Protocol (Barcelona Convention), **Appendix II** of the Bern Convention (Strictly Protected Fauna), and **Appendix II** of the Bonn Convention (CMS). Regarding CITES (Washington Convention), they are listed under **Appendix I or II** depending on the species.

The **fin whale**, the **sperm whale** and the **short-beaked common dolphin** (Mediterranean population), are also specifically listed under **Appendix I** of the Bonn Convention (CMS) as endangered migratory species.

Under the **EU Habitats Directive**, the common bottlenose dolphin and the harbor porpoise, are listed under **Annex II** (requiring the designation of Special Areas of Conservation), while **all cetaceans** are included in **Annex IV**, ensuring their strict protection across all European waters.

Moreover, The Pelagos Sanctuary agreement, established in the **Corso-Ligurian-Provençal Basin** signed on November 25, 1999 by Italy, France and Monac Principality, serves as a pioneering transboundary model for international cooperation, fostering standardized scientific research and coordinated management to mitigate anthropogenic threats to Mediterranean cetaceans.

Indicator/Targets

Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*

Kunming–Montreal Global Biodiversity Framework

CBD Target 3 (30x30)

EU Regulation 812/2004 concerning incidental catches of cetaceans in fisheries
EU MSFD Descriptor 1 and 4 - Marine Strategy Framework Directive requests regular reports on the population dynamics, range and status of cetacean species in Europe's waters.
EU Habitats Directive - The European Habitat Directive not only requires the monitoring of the Good Environmental Status (GES) of species and habitats of community interest, but also requires reporting on this status every 6 years.
The obligations under ACCOBAMS.

Policy documents

- CBD Target 3 (30x30)
- EU Biodiversity Strategy - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0244&from=EN
- EU Regulation 1143/2014 - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN
- Marine Strategy Framework Directive - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN
- Commission Decision on criteria and methodological standards on good environmental status of marine waters - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010D0477(01)&from=EN
- Pan-European 2020 Strategy for Biodiversity - https://www.google.no/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwiP1J-v_P7NAhWHjSwKHZfoBRIQFggtMAE&url=https%3A%2F%2Fcapacity4dev.ec.europa.eu%2Fsystem%2Ffiles%2Ffile%2F08%2F10%2F2012_-_1535%2Fpan-european_2020_strategy_for_biodiversity.pdf&usg=AFQjCNGa4NkkljA4x3l9WDO49uwrdYafMg
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- ACCOBAMS STRATEGY (PERIOD 2014 – 2025) - https://accobams.org/images/stories/MOP/MOP5/Documents/Resolutions/mop5.res5.1_accobams%20strategy.pdf

Common Fisheries Policy (CFP) and its reform - http://ec.europa.eu/fisheries/cfp/index_en.htm and http://ec.europa.eu/fisheries/reform/ and http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:354:0022:0061:EN:PDF
Council Regulation (EC) No 812/2004 of 26.4.2004 laying down measures concerning incidental catches of cetaceans in fisheries and amending Regulation (EC) No 88/98 - http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32004R0812
Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning - http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.257.01.0135.01.ENG
Regulatory and Governance Gaps in the International Regime for the Conservation and Sustainable Use of Marine Biodiversity in Areas beyond National Jurisdiction - https://cmsdata.iucn.org/downloads/iucn_marine_paper_1_2.pdf

Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*

International Convention for the Prevention of Pollution from Ships (MARPOL) - http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx
United Nations Convention on the Law of the Sea - http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm
UNEP Regional Seas Programme - http://www.unep.org/ecosystemmanagement/water/regionalseas40/
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Indicator analysis methods

Indicator Definition

This indicator is aimed at providing information about the abundance of cetaceans. It is intended to determine the abundance and density of cetaceans that are present in Mediterranean waters, with a special focus on the species selected by the Parties.
The rationale behind the organisation of systematic surveys is that the knowledge of baseline information, such as abundance and density, is fundamental to address many questions of ecological importance and for the implementation of conservation measures. This is particularly true for the Mediterranean Sea, since most of the marine cetacean populations occurring in the area are threatened by human activities and their conservation status requires effective protection actions.

Methodology for indicator calculation

Line transect surveys (both aerial and ship-based) are particularly effective for estimating the abundance of cetaceans, providing robust data with low Coefficients of Variation (CV) and narrow Confidence Intervals (CI). These surveys rely on Distance Sampling, a widespread method used to estimate population parameters by recording individuals or groups along pre-defined transects. By collecting data on group size and their distance from the transect line, a precise density value for the surveyed area can be calculated using dedicated software (e.g., Distance 8.x, R).

Geographical Information Systems (GIS) are essential for the spatial management of collected monitoring data and the modelling of species density and abundance. By integrating visual sightings with environmental covariates, GIS enables the production of predictive distribution maps, which are crucial for identifying core habitats and informing conservation management.

While dedicated surveys remain the primary source of information, data can also be supplemented through:

- Acoustic surveys (especially for deep-diving species);
- Platforms of Opportunity (e.g., ferries, whale-watching vessels, or military ships);
- Capture-Mark-Recapture (CMR) methodologies.

In cases of resident populations occupying relatively small areas, CMR via photo-identification is particularly valuable. Beyond abundance estimates, this approach allows for the calculation of vital population parameters, including birth, mortality, and survival rates.

To ensure a comprehensive coverage of the ecosystem, the indicator species should be selected taking into account their functional role. In this context the Contracting Parties agreed to monitor the following indicator species (Decision IG.22/7):
cetaceans:
Baleen whales: *Balaenoptera physalus*
Toothed whales:
- deep diving species: *Physeter macrocephalus*
Ziphius cavirostris
- epipelagic species: *Delphinus delphis*

Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*

Tursiops truncatus
Stenella coeruleoalba
Globicephala melas
Grampus griseus

Methods for estimating density and abundance are generally species-specific and ecological characteristics of a target species should be considered carefully when planning a research campaign. For example, visual surveys may be particularly appropriate for large whales, but may be less effective for deep diving species such as sperm whales. In this latter case, passive acoustic monitoring is by far the most suitable methodology.

When a global approach such as that currently proposed by ACCOBAMS (i.e., ASI I and ASI II) is unfeasible or too ambitious, small scale monitoring programmes should be established, adapting to MSFD macro-regions or UNEP-MAP-RAC/SPA (2010) marine eco-regions (Fig. 1), according to specific needs.

In any case, once dealing with a subregional implementation approach for cetacean surveying campaigns, this should be carried out in line with agreed common, regional methodologies, using existing and shared Protocols, with the facilitation, as appropriate, of ACCOBAMS.

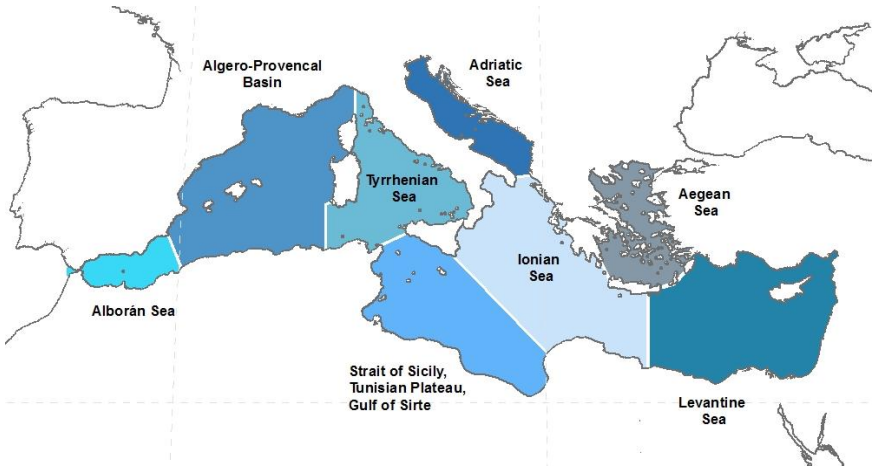

Figure 1. Mediterranean Sea with 7 sub-divided marine ecoregions. These include Alborán Sea; Algero-Provencal Basin; Tyrrhenian Sea; Adriatic Sea; Strait of Sicily, Tunisian Plateau, Gulf of Sirte; Ionian Sea/Central Mediterranean; Aegean Sea; Levantine Sea. Based on those divisions presented in UNEP-MAP-RAC/SPA, 2010.

Indicator units

The Integrated Monitoring and Assessment Guidance provided in document UNEP(DEPI)/MED WG.420/4 recommended to use for recording the presence/absence of each species, the standardized 30 x 30 nautical mile grid map produced by FAO/GFCM or the 50 x 50 km grids used by the European Bird Census Council.

Existing standard protocols, such as those suggested by the Marine Strategy Framework Directive and the Habitat Directive should be applied and followed.

According to specific needs, a finer scale map can be used, to provide finer information. Regardless of resolution used, number of individuals along with 95% confidence intervals should be used as indicator unit.

List of Guidance documents and protocols available

A document on 'Monitoring Guidelines to Assess Cetaceans' Distributional Range, Population Abundance and Population Demographic Characteristics' has been produced by ACCOBAMS and should be considered as guidance when establishing monitoring programmes.

Protocols for large scale surveys (Scans I, II, III, CODA) are also available.

The Workshop on Cetacean Abundance Estimation (WKCETAB) provides guidance and support for the population assessment of marine mammals. It addresses the essential need for methodological harmonization and cross-country coordination at the regional level to ensure coherent and comparable

Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*

reporting. The WKCETAB protocols focus on the consolidation of available Distance Sampling data for regional assessments and provide a standardized analytical framework to evaluate how survey design and different statistical approaches influence the precision and reliability of final abundance estimates.

Data Confidence and uncertainties

Estimates of density and abundance are particularly 'data-hungry' and a minimum of 40-60 sightings for each species should be available to maintain low Coefficients of Variation (CVs) and narrow Confidence Intervals (CIs). This may be easy to achieve with some cetacean species, such as fin whales, striped or bottlenose dolphins, while it may be very hard to achieve for beaked or pilot whales. It is important to consider the high mobility of cetaceans and the driving forces (mainly prey availability) which affect their distribution. In case of trends over time, appropriate statistical tools and analytical framework, such as density prediction modelling and power analysis should be applied. Aerial surveys proved to be a very cost-effective methodology to collect reliable data, to obtain robust abundance and density estimates for cetaceans and other large marine vertebrates (including marine litter), and to provide preliminary evidence of population trends over time.

Methodology for monitoring, temporal and spatial scope

Available Methodologies for Monitoring and Monitoring Protocols

Several protocols are available using different monitoring platforms and approaches such as:

- dedicated ships or aerial surveys,
- tagging, artificial tags & photo-identification to apply capture-mark-recapture analysis.
- passive acoustic data collection,
- mark-recapture analysis.

Available data sources

Global Biodiversity Information Facility (GBIF https://www.gbif.org/) and the Ocean Biodiversity Information System (OBIS-SEAMAP http://seamap.env.duke.edu/). While GBIF acts as a universal repository for multi-taxa occurrence records from both terrestrial and marine environments, OBIS-SEAMAP is specifically designed for marine megafauna. The latter is a spatially referenced online database, aggregating marine mammal, seabird, sea turtle and ray & shark observation data from across the globe and provides specialized datasets that integrate high-resolution survey effort, telemetry, and photo-identification.

ACCOBAMS ASI 2018 data are available upon request

Spatial scope guidance and selection of monitoring stations

The current spatial distributional range of marine mammals in the Mediterranean Sea is largely affected by available data, due to the uneven distribution of research effort during the last decades. In particular, the south-eastern portion of the basin, the coasts of North Africa and the central offshore waters are amongst the areas with the most limited knowledge on cetacean presence, occurrence and distribution. Priority should be given to the less known areas, using online data sources, such as OBIS SEAMAP and published data and reports as sources of information.

Most of the species selected as indicator species in relation to this common indicator are migratory species, whose range extends over wide areas in the Mediterranean. It is therefore recommended to consider monitoring these species at regional or sub-regional scales for the assessment of their population abundance.

Following the successful implementation of the first ACCOBAMS Survey Initiative (ASI) in 2018, which provided the first synoptic assessment of cetacean abundance and distribution across the Mediterranean, ACCOBAMS is now undertaking the second edition (ASI 2), planned for summer 2026. The data collected during these regional surveys will allow for robust abundance estimates for several species.

Temporal Scope guidance

Estimates of density and abundance relate to a specific time and area, and may vary on annual, or seasonal basis. Ideally, seasonal monitoring programmes should be conducted, although winter and summer campaigns should provide enough information. Temporal scale is largely affected by the conservation questions and expected outputs as well as from the monitoring method employed.

Indicator Title	*Common indicator 4: Species population abundance (Cetaceans)*

European Directives suggest a six-year interval between large-scale monitoring programmes, but smaller intervals are recommended. Long-term projects provide robust indications on trends over time and space in selected areas.

Data analysis and assessment outputs

Statistical analysis and basis for aggregation

Values of density and abundance of cetaceans and other large marine vertebrates can be estimated using design-based and model-based methodologies. Both methods present very similar and comparable results. Power analysis for detecting trends in density or abundance should be also applied.

Expected assessments outputs

I.e. Seasonally, yearly trend analysis maps according to the monitoring method and timing ; statistical frameworks applied.

Climate change integration

- Use of habitat prediction modelling to differentiate natural range variation from climate-driven shifts.
- Overlaying at-sea distribution with climate data (to measure indicator species response to e.g. marine heatwaves)
- Cross-reference with Candidate Common Indicators 39-43 (e.g. sea level rise, changes in sea surface temperature and circulation patterns) to explain habitat loss and range shifts
- Cross-reference with indirect impacts of climate change on other Ecological Objectives and Common Indicators influencing cetaceans' distributional range (e.g. EO4: Marine Food Webs; CI9 under EO3: Fish stocks)
- Potentially allow for use of "Shifting Baselines" to acknowledge climate-driven shifts in distribution

Known gaps and uncertainties in the Mediterranean

Data in the Mediterranean Sea are characterized by their uneven distribution, both geographical and spatial. The summer months are the most representative ones and very little information has been provided for the winter months, when conditions to conduct off-shore research campaigns are particularly hard due to meteorological adversity.

Efforts by ACCOBAMS aim to address these gaps through synchronized regional surveys. Following the Basin-wide surveys conducted in summer 2018 (ASI 1), a second edition (ASI 2) is planned for summer 2026, supported by in-kind and financial contributions from Member Countries and Agencies. This upcoming phase will be pivotal for detecting shifts in species abundance since the first edition, enabling a comparative analysis of population trends over time. Such data are instrumental for meeting the requirements of the Ecosystem Approach and the MSFD

Methodologies for reporting

Submission of all abundance data in a standardized format to the IMAP INFO/RAC system. (https://www.info-rac.org/).

Contacts and version Date

Key contacts within UNEP for further information

Version No	Date	Author
V.1	14/04/2017	SPA/RAC
V.2	14/04/2017	SPA/RAC
V.3	11/05/2026	SPA/RAC & ACCOBAMS

3. Common Indicator 5: Population demographic characteristics (cetaceans) (EO 1)

Indicator Title	*Common Indicator 5: Population demographic characteristics (cetaceans)*	
Relevant GES definition	Related Operational Objective	Proposed Target(s)
Cetaceans: species populations are in good condition: low human induced mortality, balanced sex ratio and no decline in calf production.	Population condition of selected species is maintained	Cetaceans: preliminary assessment of incidental catch, prey depletion and other human induced mortality followed by implementation of appropriate measures to mitigate these threats

Rationale

Justification for indicator selection

The objective of this indicator is to focus on the population demographic characteristics of cetacean within the Mediterranean waters, with a special emphasis on those species selected by the Parties.

Demographic characteristics of a given population may be used to assess its conservation status by analysing demographic parameters as the age structure, age at sexual maturity, sex ratio and rates of birth (fecundity) and of death (mortality). These data are particularly difficult to obtain for marine mammals, thus relying on demographic models, which imply several assumptions which may be violated.

The populations of long-lived and slow reproducing cetaceans are among the most critical conservation units; a demographic approach can be therefore very useful for their management and conservation.

Eight species of cetaceans are considered to regularly occur in the Mediterranean area: short-beaked common dolphins (*Delphinus delphis*), striped dolphins (*Stenella coeruleoalba*), common bottlenose dolphins (*Tursiops truncatus*), long-finned pilot whales (*Globicephala melas*), Risso's dolphins (*Grampus griseus*), fin whales (*Balaenoptera physalus*), sperm whales (*Physeter macrocephalus*), and Cuvier's beaked whales (*Ziphius cavirostris*).

Harbour porpoises (*Phocoena phocoena*), killer whales (*Orcinus orca*), and rough-toothed dolphins (*Steno bredanensis*) are considered visitors with very limited ranges: *P. phocoena* is regular in the Gulf of Cadiz and has also been detected in the coastal area of Malaga, possibly representing a small remnant population in the Aegean Sea; meanwhile, *O. orca* is regular in the contiguous Atlantic area (Strait of Gibraltar) and *S. bredanensis* in the Levantine area.

The conservation status of cetaceans in the Mediterranean Sea has been a source of concern for many years. Marine mammals living in the Mediterranean Sea find themselves in precarious conditions due to the intense human presence and activities in the region; these are the source of a variety of pressures that are threatening these species' survival. These animals are highly mobile and are usually not confined within single nations' jurisdictions, stressing the need for basin-wide conservation and protection effort. Several threats affect cetaceans in the Mediterranean Sea and their effect on the population, distributional range and survival may act in a synergistic manner. Threats include interaction with fisheries, disturbance, injuries and fatal collisions from shipping, (such as the recent phenomena involving orcas in the Strait of Gibraltar), habitat loss and degradation, chemical pollution, anthropogenic noise, direct killings and climate change.

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Policy Context and targets (other than IMAP)

Policy context description

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Indicator Title	*Common Indicator 5: Population demographic characteristics (cetaceans)*

transboundary model for international cooperation, fostering standardized scientific research and coordinated management to mitigate anthropogenic threats to Mediterranean cetaceans

Indicator/Targets

Kunming–Montreal Global Biodiversity Framework
CBD Target 3 (30x30)

EU Regulation 812/2004 concerning incidental catches of cetaceans in fisheries
EU MSFD Descriptor 1 and 4
EU Habitats Directive
The obligations under ACCOBAMS

Policy documents

- Aichi Biodiversity Targets - https://www.cbd.int/sp/targets/

Kunming–Montreal Global Biodiversity Framework - https://www.cbd.int/gbf,

https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf

- CBD Target 3 (30x30) - https://www.cbd.int/gbf/targets/3
- EU Biodiversity Strategy - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0244&from=EN
- EU Regulation 1143/2014 - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN
- Marine Strategy Framework Directive - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN
- Commission Decision on criteria and methodological standards on good environmental status of marine waters - http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010D0477(01)&from=EN
- Pan-European 2020 Strategy for Biodiversity - https://www.google.no/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwiP1J-v_P7NAhWHjSwKHZfoBRIQFggtMAE&url=https%3A%2F%2Fcapacity4dev.ec.europa.eu%2Fsystem%2Ffiles%2Ffile%2F08%2F10%2F2012_-_1535%2Fpan-european_2020_strategy_for_biodiversity.pdf&usg=AFQjCNGa4NkkljA4x3l9WDO49uwrdYafMg
- UNEP/MAP-SPA/RAC, 2021. Post-2020 Strategic Action Programme for the Conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region. Ed. SPA/RAC, Tunis: 70 pp + Annexes http://sapbio.rac-spa.org/http://rac-spa.org/nfp12/documents/working/wg.408_08_eng.pdfUNEP/MAP-SPA/RAC, 2021. Action Plan for the conservation of cetaceans in the Mediterranean Sea. Ed. SPA/RAC, Tunis: 39 pp
- National Biodiversity Strategies and Action Plans (NBSAPs) - https://www.cbd.int/nbsap/
- ACCOBAMS –Agreement Text - http://www.accobams.org/images/stories/Accord/anglais_text%20of%20the%20agreement%20english.pdf
- ACCOBAMS STRATEGY (PERIOD 2014 – 2025) - https://accobams.org/images/stories/MOP/MOP5/Documents/Resolutions/mop5.res5.1_accobams%20strategy.pdf

Indicator analysis methods

Indicator Definition

This indicator is aimed at providing information about the population demographic characteristics of cetaceans in the Mediterranean Sea. Monitoring effort should be directed to collect long-term data series covering the various life stages of the selected species. This would involve the participation of

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several teams using standard methodologies and covering sites of particular importance for the key life stages of the target species.
While some demographic studies have been conducted using industrial whaling data on Northeast Atlantic populations, little is known about the demography of their counterparts in the Mediterranean, where industrial whaling has never occurred.
The preliminary classical tools for demographic analyses are life tables, accounting for the birth rates and probabilities of death for each vital stage or age class in the population. A life table can be set out in different ways:
1) following an initial age class (i.e. cohort) from birth to the death of the last individual; this approach allows to set out a cohort life table and is generally applied on sessile and short-lived populations;
2) counting population individuals grouped by age or by stages in a given time period; this approach allows to obtain a static life table, that is appropriate with long-lived or mobile species;
3) Analyzing the age or stage distribution of individuals at death; this approach allows to develop a mortality table, using carcasses from stranding data.

Methodology for indicator calculation

The monitoring effort to address this Common Indicator is expected to provide data allowing the assessment at regional or sub-regional scales of the selected species. The main outputs of the monitoring will be data about:

- Age structure
- Sex ratio
- Fecundity
- Mortality

Photo-identification is one of the most powerful techniques to investigate marine mammals' populations. Information on group composition, area distribution, inter-individual behaviour and short and long-term movement patterns can be obtained by the recognition of individual animals. Long-term datasets on photo-identified individuals can provide information on basic life-history traits, such as age at sexual maturity, calving interval, reproductive and total life span. The mark-recapture technique can also be applied to obtain estimates of population size.
In any case, once dealing with a subregional implementation approach for cetacean surveying campaigns, this should be carried out in line with agreed common, regional methodologies, using existing and shared Protocols, with the facilitation, as appropriate, of ACCOBAMS.

Indicator units

The main demographic parameters are defined in the following units:

- adult survival probability: range between 0 and 1
- juvenile survival probability: range between 0 and 1
- fecundity, or breeding productivity: average no. of young produced per breeding pair per year
- age class distribution: percentage of each age class
- sex ratio: percentage

List of Guidance documents and protocols available

- A document on 'MONITORING GUIDELINES TO ASSESS CETACEANS' DISTRIBUTIONAL RANGE, POPULATION ABUNDANCE AND POPULATION DEMOGRAPHIC CHARACTERISTICS' has been produced by ACCOBAMS and should be considered as guidance when establishing monitoring programmes.
- RAC/SPA-ACCOBAMS Guidelines for the Development of National Networks of Cetacean Strandings Monitoring[1].

Data Confidence and uncertainties

Sex and length at death may come from stranded animals. This information may be uneven, since in many cases sex and exact size measurements may be unprecise due animal decomposition.

[1] http://www.rac-spa.org/sites/default/files/doc_cetacean/stranding.pdf

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Dealing with stranded data implies several assumptions; the main one being that stranding data represent a faithful description of the real mortality by different life stages. This assumption, however, is true only if the probability of stranding is equal in all life stages.
Estimating age and length from free-ranging individuals may be rather difficult and increase the uncertainties in the models. Long-term data sets on known individuals through photo-identification may overcome some of the biases.

Methodology for monitoring, temporal and spatial scope

Available Methodologies for Monitoring and Monitoring Protocols
Several protocols are available using different monitoring platforms and approaches such as:

- Direct observation
- Stranded animal monitoring
- Dedicated ships surveys
- By-catch data
- Photo-identification (mark-recapture models)
- Automatic infrared camera
- Direct killings

Available data sources

- OBIS-SEAMAP, Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations, is a spatially referenced online database, aggregating marine mammal, seabird, sea turtle and ray & shark observation data from across the globe. http://seamap.env.duke.edu/
- When existing, the databases from the National Stranding Networks, such as in Italy the CSC (Cetacean Study Centre) database, available online at http://www-3.unipv.it/cibra/spiaggiamenti.html or in France, the Pelagis Observatory database (http://www.observatoire-pelagis.cnrs.fr/les-donnees/).
- The Mediterranean Database of Cetacean Strandings (MEDACES), has been set-up to co-ordinate all national and regional efforts for riparian countries. Cetacean stranding data are organized into a spatially referenced database of public access.
- International Whaling Commission List of Stranding Networks (as at 13 April 2011) https://iwc.int/private/downloads/fECe-nYMEKa7G5C8RRCqKg/WHALE%20STRANDING%20NETWORKS%20LIST_2011.pdf

Spatial scope guidance and selection of monitoring stations
Current knowledge of spatial distributional range of marine mammals in the Mediterranean Sea is largely affected by available data, due to the uneven distribution of research effort during the last decades. In particular, the south-eastern portion of the basin, the coasts of North Africa and the central offshore waters are amongst the areas with the most limited knowledge on cetacean presence, occurrence and distribution. Priority should be given to the less known areas, using online data sources, such as OBIS SEAMAP and published data and reports as sources of information.

Temporal Scope guidance
Demographic studies on marine mammals, which are long-living species, require long-term projects, to allow robust indications on trends in population size and demographic parameters over time.

Data analysis and assessment outputs

Statistical analysis and basis for aggregation
Simple demographic models based on the pre-defined life-tables can be used to create a complete mortality table for the population under examination. Continuous age distribution and constant mortality rates within each stage, under the assumption of population stationarity (i.e. the population is assumed to be constant in number and age structure over time) can be used.

Expected assessments outputs
Demographic studies can supply useful tools to the management and the conservation of threatened and overexploited species. Population models, based on life-history tables and transition matrices, allow to assess population performance, to project population trends overtime and thus to foster the conservation of the studied populations, suggesting specific measures for their protection.

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Climate change integration

- Use of habitat prediction modelling to differentiate natural range variation from climate-driven shifts.
- Overlaying at-sea distribution with climate data (to measure indicator species response to e.g. marine heatwaves)
- Cross-reference with Candidate Common Indicators 39-43 (e.g. sea level rise, changes in sea surface temperature and circulation patterns) to explain habitat loss and range shifts
- Cross-reference with indirect impacts of climate change on other Ecological Objectives and Common Indicators influencing cetaceans' distributional range (e.g. EO4: Marine Food Webs; CI9 under EO3: Fish stocks)
- Potentially allow for use of "Shifting Baselines" to acknowledge climate-driven shifts in distribution

Methodologies for reporting

Submission of all demographic data in a standardized format to the IMAP INFO/RAC system. (https://www.info-rac.org/).

Known gaps and uncertainties in the Mediterranean

Data in the Mediterranean Sea are characterized by their uneven distribution, both geographical and spatial. The summer months are the most representative ones and very little information has been provided for the winter months, when conditions to conduct off-shore research campaigns are particularly hard due to meteorological adversity.

Ongoing effort is targeting the identification of Cetacean Critical Habitats (CCHs) and Important Marine Mammal Areas (IMMAs) in the entire Mediterranean Sea. A gap analysis is also ongoing at regional scale in order to provide an inventory of available data and to select areas where more information should be collected.

Contacts and version Date

Key contacts within UNEP for further information

Version No	Date	Author
V.1	20/07/2016	SPA/RAC
V.2	14/04/2017	SPA/RAC
V.3	11/05/2026	SPA/RAC- ACCOBAMS