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Agenda item 6: Data Dictionaries and Data Standards for the Common Indicators 3, 4 and 5 related to species

6.1 Data Dictionaries and Data Standards related to Marine Mammals

Data Dictionaries and Data Standards for the Common Indicators 3, 4 and 5 related to Marine Mammals

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Note by the Secretariat

In the framework of the UNEP/MAP Programme of Work and Budget for 2020–2021 (COP 21, Decision IG.24/14), INFO/RAC, leads the work on the development and completion of the "*Info/MAP platform and platform for the implementation of IMAP fully operative and further developed, connected to MAP components' information systems and other relevant regional knowledge platforms, to facilitate access to knowledge for managers and decision-makers, as well as stakeholders and the general public*".

The **EU funded EcAp-MED II Project (2017-2019)** has supported this output with the development of a Pilot IMAP Compatible Data and Information System (IMAP (Pilot) Info System), that has enabled the Contracting Parties to start reporting data as of mid-2020 for selected **11 IMAP Common Indicators.** The IMAP (Pilot) Info System laid down the basis for building a fully operational IMAP Info System as provided for by Decision IG.22/7.

At present, the system supports the reporting data for 11 of the 27 IMAP Common Indicators, namely Common Indicators **1, 2, 6, 13, 14, 15, 16, 17, 21, 22, 23**. The criteria used for selecting the 11 Common Indicators as part of the IMAP (Pilot) Info System have been: a) maturity of Common Indicators as of 2017, in terms of monitoring experiences and best practices; b) existing data collection and availability representing all IMAP clusters; c) availability of Common Indicators Guidance Factsheets and/or metadata templates.

The draft **IMAP (Pilot) Info System** has been developed by INFO/RAC under the coordination of the Secretariat and in close consultation with all relevant MAP Components. The IMAP (Pilot) Info System is now evolving towards the complete **IMAP Info System** and is able to receive data according to the proposed Data Standards and Data Dictionaries (DSs and DDs) that set the basic information on data reporting within IMAP.

The ongoing process of evolution from the pilot to the final IMAP Info System is also supported by the EU funded project **EcAp MED III** project and include the implementation of Data Standards and Data Dictionaries and the related data flows for the whole set of modules for the IMAP Common Indicators (EO3 and candidate C.I.s currently excluded).

Introduction

Data Standards (DSs) are prepared in the form of Excel spreadsheets in which every column indicates a field to be filled by the data providers. **Data Dictionaries (DDs)** are prepared in the form of Excel spreadsheets in which every row contains information to guide the data provider. DSs & DDs are spreadsheets included in the **same Excel file**, downloadable from the IMAP (Pilot) info system. The data uploaded using the Data Standards will be suitable for the inclusion in the database.

The proposal of DSs and DDs provides broader data sets and associated dictionaries than requested as mandatory by the related IMAP Guidance Factsheets and Metadata Templates. In the Data Standards the mandatory data are represented in black and the **non-mandatory** ones in red. The possibility to fill in also **non-mandatory** fields is given to allow the Contracting Parties that already have monitoring systems in place and collect a wider set of data to report them as the additional data. Although it is at the discretion of the Contracting Parties to decide, reporting on non-mandatory data sets is **strongly encouraged** to avoid knowledge gaps between IMAP and other national data flows.

Following the outcome of CORMONs, the finalized DSs and DDs related to the 11 Common Indicators have been uploaded in the IMAP (Pilot) Info System and the consequent changes to the data base structure have been provided. Therefore, once all the parameters and measurement units have been defined, the correspondent data flow have been activated. Following a testing phase of the IMAP (Pilot) Info System realized with the voluntary participation of interested countries, the **phase I** of the system implementation is officially concluded in June 2020.

After the conclusion of the EcAp MED II Project, discussion about further modules has been started with the thematic MAP Components for each already selected Common Indicator and for the remaining ones in view of the completion of the IMAP Common Indicator set, according to the available resources specifically allocated.

The current document is a revised version of the "draft" DSs & DDs related to **Common Indicators 3, 4 & 5,** reflecting comments received during and after the CORMON Meetings on Biodiversity and Fisheries in 2020 and 2021. The document takes into account also discussion held during the following bilateral meetings with SPA/RAC and the Permanent Secretariat of ACCOBAMS. Inputs and comments collected from the Contracting Parties have been integrated to further elaborate the DSs & DDs and the updated version has been discussed and finalized with the support of the Mediterranean experts of the informal Online Working Group (OWG) on marine mammals.

By reviewing this document, the present meeting is expected to provide the final **inputs and further reflections to tune** the standards to timely allow **the implementation of the correspondent data flows** to be ready by June in order to complete the Common Indicator set available for the IMAP call reporting**.**

Nevertheless, given that the development of indicators, monitoring methods and data standards are progressing in parallel, close and continuous dialogue and collaboration are needed among the bodies responsible for these developments to ensure their proper alignment and coherence.

Data Dictionaries and Data Standards for the Common Indicators 3, 4 and 5 related to Marine Mammals

1.   Among five common indicators related to biodiversity (EO1) fixed by IMAP, three are about marine mammals:

- **Common indicator 3**: Species distributional range;

- **Common indicator 4**: Population abundance of selected species;

- **Common indicator 5**: Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates)

2.   The present document aims to present DSs & DDs related to a part of the available methods for monitoring marine mammals species as expressly reported in the IMAP guidance factsheets.

3.   As expressly reported in the IMAP guidance factsheets, several methodologies for monitoring and monitoring protocols are available, using different monitoring platforms and approaches. Contracting Parties to the Barcelona Convention **should select the most appropriate one based on available resources and conservation needs**. Some methods could be combined to provide more robust information, such as visual and acoustic census, for example.

4.   The present document aims to present DSs & DDs related to the available methods for monitoring marine mammals, based on the following reference documents:

- IMAP Common Indicator Guidance Facts Sheets for marine mammals (UNEP/MED WG.444/6/Rev.1)

- IMAP Guidelines for monitoring Cetaceans in the Mediterranean Sea (UNEP/MED WG.461/21)

- IMAP Guidelines for monitoring Mediterranean monk seal (UNEP/MED WG.461/21)

- Monitoring and Assessment Scales, Assessment Criteria, Thresholds and Baseline Values for the IMAP Common Indicators 3, 4 and 5 related to Marine Mammals (UNEP/MED WG.514/Inf.11)

- [Guidelines for the Development of National Networks of Cetacean Strandings Monitoring (SPA/RAC-ACCOBAMS](), 2004)

Cetaceans

5.   There are several methods for the study of cetaceans; the choice of methodologies is made in relation to the parameters to be studied as well as the logistical needs and characteristics of the study areas.

6.   IMAP fixes a **reference list of cetacean species** to be monitored. All cetacean species occurring in the Mediterranean Sea are considered in the IMAP.

7.   **Eleven species of cetaceans** are considered to regularly occur in the Mediterranean area but particular attention is given to the **eight resident** cetacean species, divided into three different functional groups:

- Baleen whales: fin whale (*Balaenoptera physalus*)

- Deep-diving cetaceans: sperm whale (*Physeter macrocephalus*), Cuvier's beaked whale (*Ziphius cavirostris*), long-finned pilot whale (*Globicephala melas*) and Risso's dolphin (*Grampus griseus*).

- Other toothed species: short-beaked common dolphin (*Delphinus delphis*), striped dolphin (*Stenella coeruleoalba*), common bottlenose dolphin (*Tursiops truncatus*).

8.   However, **three other rare species** of cetaceans occur also in the Mediterranean Sea: harbour porpoise (*Phocoena phocoena*), rough-toothed dolphin (*Steno bredanensis*), and killer whale (*Orcinus orca*). Two of these species have very limited ranges: the harbour porpoise, possibly representing a small remnant population in the Aegean Sea, and the killer whale, present only as a small population of a few individuals in the Strait of Gibraltar. The monitoring of these species is proposed as **not mandatory**.

Cetaceans: Species distributional range (Common indicator 3) & Population abundance of selected species (Common indicator 4)

9.   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 even if the ACCOBAMS Survey Initiative project contributed to fill this gap in knowledge thanks to the basin-wide surveys (aerial and boat-based surveys) conducted in 2018 and 2019. Priority should be given to the less known areas, using online data sources and published data and reports as sources of information.

10.   Distribution and abundance can be calculated through different methods. The present document provides DSs and DDs for the two monitoring methods as proposed in the related IMAP documents:

Module BA1 - Line transect distance sampling – (C.I.s 3&4)

11.   Estimation of the abundance and distribution of cetaceans can be provided through the line transect distance sampling method. The method consists in covering routes, by air or even by ship (specially designed by specific software in a defined study area).

12.   **Line transect distance sampling** is one of the methods of the distance sampling family that allows to define the abundance estimation and distribution of specimens in a given space and in a given period of time.

13.   In line transect sampling, a survey area is defined and surveyed along a sampling design of pre-determined transects ensuring equal coverage of the area.

14.   Abundance can be calculated by extrapolating estimated density in the sampled transects to the entire survey area. The calculated number is therefore an estimate of abundance in a defined area at a particular time with its uncertainty.

15.   This method, either boat- or aerial-based, can provide estimates of abundance, distribution and density of large-scale species for all Mediterranean Sea. At the regional and local level, it appears useful to integrate aerial/boat surveys, to obtain local indications of the conservation status and quality of the habitats.

16.   The choice of the **monitoring approach** will be made by the country **on the basis of its national monitoring plan and nature of the monitored area**.

17.   The present method is applicable not only to cetaceans but also to marine reptiles and birds. The Data Standards and Data Dictionaries have been developed to allow the monitoring of a large number of taxa. The monitored species are included in the "List of species" present in the DD of Module BA1.

18.   During a survey applying the distance sampling method is usually carried out a strip transect for **marine litter**. The related sheet proposed in the standard will allow to collect this type of data on a voluntary basis (not mandatory sheet).

19.   The proposed module BA1 is in line with the other standards developed for the IMAP Info System but also compliant with ACCOBAMS Survey Initiative metadata templates developed following the regional surveys carried out in 2018 and 2019 and which will serve future regional survey efforts to be planned.

20.	ACCOBAMS ensure an important role in the Mediterranean Sea for the monitoring of cetaceans according to a regionally harmonized approach, supported by the ACCOBAMS Survey Initiative. It represents an essential baseline scenario for the assessment of distribution and abundance of cetaceans at regional/subregional level.

21.	As agreed during the last CORMON meeting on Biodiversity held in the December 2020, the **module BA1 has been developed by INFO/RAC in close cooperation with ACCOBAMS and SPA/RAC** and is proposed for the monitoring at **regional scale** and also for the **Contracting Parties surveys** carried out with the same method to ensure standardized information on cetaceans.

22.	For the data collected by ACCOBAMS at the regional level INFO/RAC will liaise directly with ACCOBAMS on the basis of the interoperability principle between the IMAP Info System and ACCOBAMS Databases supporting system. On the other side Contracting Parties will report monitoring data according to correspondent data flow in the IMAP Info System individuating the proper subregion including the country data.

23.	Mediterranean Sea presents **4 marine subregions**, according to EcAp/IMAP namely Western Mediterranean Sea, Adriatic Sea, Central and Ionian Seas, Aegean and Levantine Seas.

24.	As ACCOBAMS will represent, at this stage, an important source of information for the reporting of C.I.3 & C.I.4 for cetaceans monitored with the distance sampling method, synchronization of future periodic surveys with the needs of IMAP requirements should be taken into account. This aspect is particularly relevant in the context of the current development of the ACCOBAMS Long Term Monitoring Programme that will be fully in line with IMAP requirements.

25.	Fine scale distribution of marine mammals may vary on annual, seasonal or monthly basis. Ideally, monitoring programmes should be conducted focusing breeding and feeding seasons. Monitoring and assessment (temporal and spatial) scales are already defined in the document UNEP/MED WG.514/Inf.11.

26.	Another important topic to be discussed in the near future is the modality of elaboration of the baseline data collected through module BA1. It is pending to agree the analysis processes, in particular for the preparation of the next regional assessment report (2023 MEDQSR), giving special attention to the comparability of all reported information.

27.	The effort spreadsheets provide data about research efforts, information about transects and platforms for observation as well as weather, sea state and wave height. Furthermore, data about glare, visibility and condition influencing visual sighting by boat and plane are provided.

28.	The sighting sheets aim to collect information about species sightings, size of pods (groups of more than 2-3 animals), age and composition of group as well as cue and direction of swimming. Each sighting survey refers to an effort identification code.

Module BC1 - Photo-Identification (or photo-ID) (C.I.s 3&4)

29.	Scientists use the photo-identification to distinguish cetaceans from each other and recognize them. The technique relies on being able to obtain good quality photos of animals' body parts that constitute unique recognizable markings during their whole life.

30.	The animals are photographed and catalogued individually based on natural markings criteria (e.g., pigmentation on the body, shape of the dorsal fin) and "life" markings (notches and scars) that identify them.

31.	A number of assumptions are made, particularly relating to recognisability, representativeness of sampling and capture probabilities that should be homogeneous. When an already identified individual is re-sighted, or photographically re-captured, this can provide a response to various issues, such as: population size, site fidelity, distribution, movements, social structure, etc. This means that

there is a need for storing photos and associated data within a catalogue which should be regularly updated.

32. Photo-identification is a good method to estimate population size (Common Indicator 3&4) through mark- recapture models, and for specific areas that populations or part of populations occupy during one or more seasons of the year. It is also one of the methods to provide population parameters e.g. survival and calving rate.

33. Photo-identification is a good method to study small populations of cetacean's resident in relatively specific small areas, as bottlenose dolphins (close to shore) but it can be used for a large number of species that have the potential to be exposed to a greater level of human activity and due to the small size of the area they inhabit.

34. The study of the ecology and ethology of populations and information on the short and medium range movements of the specimens as well as a series of demographic elements, are usually obtained by photo-ID, a non-invasive technique that allows the identification of specimens through the distinctive and permanent signs present on the body.

35. Photo-ID allows estimates of numbers of animals in a population (either obtained by mark-recapture or in the case of small populations, by direct census), although in their absence, abundance estimates are derived from line-transect surveys.

36. In particular, for Bottlenose dolphins (*Tursiops truncatus*) are long-lived top predators and are highly susceptible to change in their environment. Changes in abundance and distribution provide important information on the state of the population.

37. The standard is structured to collect information about group composition and ages of elements for each sighting.

Module BC2 - Acoustic Sampling (C.I.s 3&4)

38. All cetaceans produce sounds like "clicks" for echolocation or "whistles" (frequency modulated sounds) for intraspecific communication. Acoustic methods allow the near-continuous detection and monitoring of those sounds, allowing the collection of information on spatial and temporal habitat use, as well as estimation of relative density for some species and even abundance for sperm whale.

39. One array with at least two hydrophones is towed by a moving boat. Listening and recording can be continuous or by samples. The array enables to determine angle at perpendicular distance, which is the base of the analysis of the "line transect" method. The trajectory of the boat should be constant in speed and heading, following a predefine design or random transects.

40. The area covered is bounded by the probability of detection by the hydrophone and the frequency and power of the sound made by the animals.

41. This is the **most effective method to survey long-deep diving species as sperm whale**, which use "clicks" during the entire duration of their dives. Acoustic data from sperm whales can be used to assess both relative and absolute abundance and also distribution, provided that the appropriate equipment and survey design is followed. For other species, acoustic results might be complementary to visual ones for Common Indicator 3, but not for indicator 4 as methods to relate **sounds to abundance of animals are not efficient yet**.

Module BC3 - Population demographic characteristics (C.I. 5)

42. 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.

43. The objective of IMAP Common Indicator 5 is to focus on the population demographic characteristics of marine mammals within the Mediterranean waters, with a special emphasis to those species selected by the Contracting Parties.

44. 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.

45. Demographic characteristics of a given population may be used to assess its conservation status by analysing demographic parameters as the age, 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. Some demographic characteristics can be obtained counting population individuals grouped by age or by stages in a given time period.

46. This indicator is aimed at providing information about the population demographic characteristics of marine mammals 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 several teams using standard methodologies and covering sites of particular importance for the key life stages of the target species.

47. The present standard has been developed on the reference IMAP documents and with a **different structure**. Due to the high amount of possible available methodologies for monitoring and monitoring protocols, the DSs has been focused on the main demographic parameters as body size or age class structure, sex ratio, fecundity rates, survival/mortality rates, **without requesting associated monitoring data**.

48. The standards, as developed, allow each Contracting Party to report final data related to Common Indicator 5, **independently from the method applied in its sub-region**. Demographic data can be provided by numerous monitoring protocols as photo-identification, stranded animal monitoring, biopsy and by-catch

49. **Photo-identification** (mark-recapture models) 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.

50. **Stranded animal monitoring** can provide sex and size measurements at death. This information may be uneven, since in many cases sex and exact size measurements may be imprecise due animal decomposition. 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.

51. **Biopsy** consists in collecting on living animals at sea fragments of skin and blubber. This can be done by throwing with a crossbow darts with tip, dart gun, riffle or even a pole with biopsy tip or skin swabbing when dealing with bowriding animals for example. Such samples allow to gather information on biodemographic parameters (C.I. 5): To determine the sex of the animal, the genetic specificity of individuals (fragment of DNA) of the same species, information on the reproductive status of individuals (e.g., pregnancy for females) based on the level of hormones. Several parameters included in the indicator 5 can be obtained through the analysis of the skin and blubber collected with the biopsy method: sex ratio, pregnancy rates. Also, the genetic structure of the animals allows to

better determine the limit of a "population", or a sub-population, which helps to know when looking for the distribution or abundance of this population.

52.   **By-catch**. Marine mammals are frequently captured in fishing gear. "By-catch" means cetaceans accidentally captured by commercial fishing, sometimes but rarely by recreational fishing. Scientific observers can be embarked on board professional fishing ships, to observe captures and fishing conditions, and to take measures and biological samples. Analysis of the measures and samples collected on carcasses provide a lot of information on demography (C.I. 5) such as size of animals, age at maturity, rate of pregnancy, sex ratio etc.

53.   The module BC3 is structured with three different data standards spreadsheets (for each DD and DS) aiming at collecting data about Survey Area, demographic characteristics related to sighted group of species (Species) and demographic characteristics for each specimen identified within the survey (Individual). The Species spreadsheet collets information about composition group, number of elements, group size, behaviour and mortality rate/fecundity rate. Individual sheet is designed to collect data such as gender, structure size as well as methodology used for survey (Biopsy, Stranding, By-catch, Photo-identification)

Mediterranean monk seal

Module BM1 - Monk seal (C.I.3,4&5)

54. The Mediterranean is also the original habitat for a pinniped species, the Mediterranean monk seal (*Monachus monachus*). Although the species occurs only regularly in the eastern basin, mainly along the coasts of Greece and Turkey, some individuals have been sighted during the last decade in the western basin.

55. The Mediterranean monk seals spends most of their time in the water, however, **monitoring them in the aquatic environment is a challenging job** and provide **little information on the population**. On the other hand, they **marine caves** while haul out to rest and breed and this period is the **best option** to collect data on the species.

56. The monk seal cave might have underwater entrance with very narrow passage and a long corridor, so it is not always easily recognizable from surface. When an entrance is found, a team member should enter the cave with necessary precautions taken in order not to disturb the animals. **Caves with underwater entrances** should always be investigated by **free diving**.

57. Cave surveys aim to identify caves that are suitable for monk seal use. The caves that are actively used by monk seals are monitored by **non-deterring camera traps**, the most suitable method in order to minimize disturbance while monitoring the population. Surveys should be conducted in areas not investigated before to explore caves which meet the requirements and descriptions of a Mediterranean monk seal cave (IUCN/UNEP, 1998).

58. The cave inventory includes the coordinates of the cave and various characteristics including number of entrances and dimension, resting platforms, air chambers, its photograph, total length, seal tracks etc.

59. **Land based survey** is conducted by a team of **two observers**. Observers collect information on date, start and end times of observation, name and coordinates of observation point, weather conditions (taken at hourly intervals or when it changes), time of seal sighting, seal morphology and behaviour. Photos/videos are taken when possible.

60. Information on stranded animal is recorded including the ID number, observation date, stranding location, latitude and longitude coordinates, length and weight of the animal (where possible to measure), age class, sex, stranding condition (live or dead), and other observational comments, including evidence of injury or human interaction.

61. Module **BM1** (DS and DD) is structured with 6 different spreadsheets, aiming to provides information on the distribution and extent of study areas investigated for monk seal monitoring purposes, the type of surveys (i.e. investigative surveys conducted to identify caves, or surveys to monitor for monk seal cave use) and timeframe in which different activities are conducted within the study area. This information allows to set the context of spatial monitoring effort and allows to track country effort over time and space.

62. Module **BM1** (DS and DD) provide also information on the distribution of each surveyed cave, their potential use by seals, the typology and frequency of monitoring in the caves, observed cave use by seals for resting or reproductive activities within the reporting period. The overall output can support indicators on survey effort and pattern of seal distribution and cave use.

63. Furthermore, module **BM1** aims to collect information on the number of photo identified individuals or estimated population size on the basis of the outcomes of the cave monitoring activities conducted during the reporting period, as well as general information summarising population demographic structure for each year per Study area.

Table 1: DS&DD **Module BA1** (Line transect distance sampling) **Aerial Effort** for IMAP C.I.s 3&4 - **Cetaceans**

Field	Description (EN)	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SurveyID	Survey Identification code.	
SubRegion	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
StratumID	Identification code of the strata block	
StratumLabel	Label of the strata block. An example of a map of strata with strata blocks is reported in the "Map of Strata" sheet	
TransectID	Transect label (strata number/Line number. E.g. 02/101)	
Flight	Flight number incremented by team.	
ComputerID	Computer ID allocated to a team for a period of time	
RouteType	Specify if LEG or other type of route. For ACCOBAMS data only LEG is selected	LEG= LEG Other=Other
EffortGrpID	Key index for a transect between beginning and end of the effort. The code should be structured as follow "G+ progressive number + date (YYYYMMdd)+letter_ ex: G1-20210210-A	
EffortID	Key index for a Leg with homogenous environmental condition. The code should be structured as follow "L+ progressive number + date (YYYYMMdd)+letter_ ex: L1-20210210-A	
Status	Status of the effort. Choose one of the values of the list	BEGIN = Beginning of the effort ADD = Adding phase due to conditions change END = End of the effort
Date	Date of the effort. Use format YYYY/mm/dd.	
Time	Hour Minutes Second in HH:MM:SS format (local time)	
SeaState	Sea state based of Beaufort scale. Specify one of the value of the Beaufort scale sheet	
Swell	Indicate if swell is present. Choose one of the values of the list	0 = no 1 = presence without affecting the detection 2 = presence affecting detection

Turbidity	Indicate the water turbidity level. Choose one of the values of the list	0 = clear water: objects and animals probably visible several meters under the surface 1 = moderately clear water: objects and animals visible under the surface 2 = turbid water (e.g. muddy): objects and animals only visible very close (<50 cm) to the surface 9 = unknown turbidity
SkyGlint	Silvery shine (present or not). Choose one of the value of the list	0 = no or slight 1 = medium or strong affecting the detection by transparency
GlareFrom	Angle of the beginning of the glare measured clockwise (0-360°). Use the 360° system (NB dead ahead is 360 not 0) with glare from xx to xx measured clockwise - e.g. 360° to 180° means the right side of the plane is covered in glare, whereas 180° to 360° means the left side of the plane is covered in glare. Please enter 0,0,0 in all three glare fields if there is no glare.	
GlareTo	Angle of the end of the glare measured clockwise (0-360°). Use the 360° system (NB dead ahead is 360 not 0) with glare from xx to xx measured clockwise - e.g. 360° to 180° means the right side of the plane is covered in glare, whereas 180° to 360° means the left side of the plane is covered in glare. Please enter 0,0,0 in all three glare fields if there is no glare.	
GlareSever	Indicate the glare severity. Choose one of the value of the list	0 = no glare 1 = slight glare – will affect observer's sightings within that sector very little 2 = moderate glare – may affect observer's ability to detect sightings within that sector 3 = strong glare – will severely affect observer's ability to detect sightings within that sector
GlareUnder	Specify if glare affect the view under the plane. Enter one value from the list.	0 = glare does not affect the view 1= glare affects the view
CloudCover	Cloud cover. Use the octaves system (i.e. full cloud cover = 8, clear sky = 0), evaluate by the navigator above the plane.	

| **SubjectiveR** | Observer subjective (right) view given all condition. This represents each observer's subjective view of the likelihood that, given all of the conditions, they would see a small specimen within the primary search area should one be present. Specify one of the values of the list.

NOTE : The navigator needs to change the conditions when the observer is back on effort or when the land is gone; i.e. from XG back to GG or from ML to MM or whatever the conditions are at that moment. | E = Excellent - absolutely nothing affects the detection of a small specimen (no glare, no glint, sea state 0 or slight 1
G = Good - observer believes that the likelihood is good. Normally will require at least a sea state of 2 or less, no or slight glare, and a turbidity of less than 2
M = Moderate - Observer believes that the likelihood while not good is not poor
P = Poor - when the observer believes that it is unlikely to see a small specimen unless for example it is showing exuberant behavior and/or is very close to the trackline
L = Land - when over land (e.g. an island)
X = Exceptional - circumstances, an observer may decide to go off effort even if the conditions are suitable (e.g. illness) – he will also go off effort if there is fog or rain that makes searching impossible |
| **SubjectiveL** | Observer subjective (left) view given all condition. This represents each observer's subjective view of the likelihood that, given all of the conditions, they would see a small specimen within the primary search area should one be present. Specify one of the values of the list.

NOTE : The navigator needs to change the conditions when the observer is back on effort or when the land is gone; i.e. from XG back to GG or from ML to MM or whatever the conditions are at that moment | E = Excellent - absolutely nothing affects the detection of a small specimen (no glare, no glint, sea state 0 or slight 1
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L = Land - when over land (e.g. an island)
X = Exceptional - circumstances, an observer |

		may decide to go off effort even if the conditions are suitable (e.g. illness) – he will also go off effort if there is fog or rain that makes searching impossible
Latitude	Latitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Altitude	Approximate altitude of the plane in m (from GPS)	
Aircraft_ID	Aircraft registration code	
Remarks	Notes	

Table 2: DS&DD **Module BA1** (Line transect distance sampling) **Vessel Effort** for IMAP C.I.s 3&4 **- Cetaceans**

Field	Description (EN)	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
EffortID	Key index for a Leg with homogenous environmental condition. The code should be structured as follow "L+ progressive number + date (YYYYMMdd)+letter_ ex: L1-20210210-A	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
SurveyID	Survey Identification code.	
Date	Date of the effort. Use format YYYY/mm/dd.	
TimeInterval	Hour Minutes Second in HH:MM:SS format (local)	
Latitude	Latitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
StratumID	Identification code of the strata block	
StratumLabel	Label of the strata block. An example of a map of strata with strata blocks is reported in the "Map of Strata" sheet	
Transect_visual_ID	Transect label (stratum/line number) on visual effort. The code should be structured as follow "T+ progressive number + date (YYYYMMdd)+letter_ ex: T1-20210210-A	
Transect_acoustic_ID	Transect label (stratum/line number) on acustic effort. The code should be structured as follow "TA+ progressive number + date (YYYYMMdd)+letter_ ex: TA1-20210210-A	
Observers_platform	Number of observers on the elevated observation	

	platform	
Observers_deck	Number of observers on deck	
Sea_state	Sea state based of Beaufort scale. Specify one of the value of the "Beaufort_scale" sheet	
CloudCover	Cloud cover. Use the octaves system (i.e. full coud cover = 8, clear sky = 0), evaluated by the navigator above the vessel.	
Visibility	Visibility. Use a subjective scale from 0 to 3 (i.e. Excellent = 3, very bad = 0)	
GlareSever	Indicate the glare severity. Enter one of the value of the list	0 = no glare 1 = slight glare – will affect observer's sightings within that sector very little 2 = moderate glare – may affect observer's ability to detect sightings within that sector 3 = strong glare – will severely affect observer's ability to detect sightings within that sector
GlareStart	Start of the angular sector of the glare (° relative to boat) in degrees (For example if the sector is 40°-70° enter 40)	
GlareStop	End of the angular sector of the glare (° relative to boat) in degrees (For example if the sector is 40°-70° enter 40)	
Remarks	Notes	

Table 3: DS&DD **Module BA1** (Line transect distance sampling) **Sighting Aerial** for IMAP C.I.s 3&4 **- Cetaceans**

Field	Description (EN)	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SurveyID	Survey Identification code. For ACCOBAMS data please specify the name of the survey	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
StratumID	Identification code of the strata block	

StratumLabel	Label of the strata block. An example of a map of strata with strata blocks is reported in the "Map of Strata" sheet	
Transect_visual_ID	Transect label (stratum/line number) on visual effort. The code should be structured as follow "T+ progressive number + date (YYYYMMdd)+letter_ ex: T1-20210210-A	
Flight	Flight number incremented by team.	
ComputerID	Computer ID allocated to a team for a period of time	
RouteType	Specify if LEG or other type of route. For ACCOBAMS data only LEG is selected	LEG= LEG Other=Other
EffortGrpID	Key index for a transect between beginning and end of the effort. The code should be structured as follow "G+ progressive number + date (YYYYMMdd)+letter_ ex: G1-20210210-A	
EffortID	Key index for a Leg with homogenous environmental condition. The code should be structured as follow "L+ progressive number + date (YYYYMMdd)+letter_ ex: L1-20210210-A	
SightingID	Key index for the sighting. The code should be structured as follow "S+ progressive number + date (YYYYMMdd)+letter ex: (ex S2-20210210-A)	
Date	Date of sighting. Use format YYYY/mm/dd.	
TimeInterval	Hour Minutes Second in HH:MM:SS format (local)	
Group	Indicate the group or genus of the sighting. Choose one of the values in the "Species_list" sheet, column "GROUPE"	
Family	Indicate the family of the sighting. Choose one of the values in the "Species_list" sheet, column "FAMILLE"	
SpeciesCode	Indicate the species code of the sighting. Choose one of the values in the "Species_list" sheet, column "CODE"	
SpeciesNam	Indicate the species name of the sighting. Choose one of the values in the "Species_list" sheet, column "NOM_COMM"	
SpeciesLat	Indicate the species latin name of the sighting. Choose one of the values in the "Species_list" sheet, column "NOM_LAT"	
PodSize	Group size of the sighting. Enter the total school size including calves. If you are unsure of the exact number, enter your best estimate and put the range in the Remark field. A group is defined as containing individuals not more than 2-3 animal lengths from each other, and exhibiting the same swimming pattern and/or general behaviour. When animals are distributed in loose aggregations, it is better to identify smaller, homogeneous groups within the aggregation. Note in a comment that the groups belong to the same aggregation.	
Age	Specify if Adult, Immature, Juvenile. Choose one of the values of the list	J = Juvenile I = Immature A = Adult M = mixed groups U = Unknown

DecAngle	Angle measurement (of the perpendicular distance). This is the declination angle (to the nearest degree – do not round to the nearest 5°) to the animal (or centre of a school) when the sighting is abeam (or estimated to come abeam if it has dived). Use the left hand scale of the inclinometer (the horizon=0 and directly below the plane=90). Keep the inclinometer in your hand so that you are quickly ready to record the angle. Where more than one animal is involved measure the angle to the centre of the pod. Note: At a height of 183 m (600 feet), an angle of 45° corresponds to 183 m. An angle of 20° corresponds to around 500m.	
Cue	Enter the appropriate code for the first visual signal allowing to detect the animal(s). Choose one of the values of the list	U = Body seen under water surface A = Body seen at water surface 2 = Splash 3 = Blow 4 = Breach-jump 5 = Vessel-Gear 6 = Slick, 'footprint' or ring 7 = Birds 8 = Other associated wildlife (e.g. fish) 9 = Other cue, put in comment
Behaviour	Dominant behaviour. Record the code for the most dominant behaviour for a sighting. Choose one of the values of the list	SW = directional swimming MI = Non-directional swimming (milling) BR = Breaching, jumping FE = Feeding, foraging FA = Multi species feeding aggregation LO = Logging, Sleeping, Resting SB = Interaction with vessels (bowriding, following fishing vessels, scavenging) OT = Other, put in comment
SwimDir	Swimming direction. Enter one of the 4 swimming direction of the animal(s) relative to the plane using the 360° system, where 360° is the same direction of the plane and 180° is the opposite direction. Enter one of the values of the list	360 90 180 270
Calves	Number of calves in the pod. Record the number of calves in the pod, using the size of the animal and behaviour to determine calves. If there is no calve, leave the field blank.	
Photo	Specify if photo(s) were taken. Choose one of the values of the list	Yes No
Side	Side of the sighting. Choose one of the values of the list	Right=RIGHT Left=LEFT
Status	Status of the sighting. Choose one of the values of the list	NEW = new sighting CB = Circle back
Latitude	Latitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Speed	Speed from the GPS in km/h	

Altitude	Altitude from the GPS in m	
AircraftID	Aircraft registration code	
PerpDist	Perpendicular distance of the sighting (m)	
HumanActivity	Specify human activities typology identified. Choose one of the values in the "CODE" column of the "Species_list" sheet for "Human activity" typology	
Remarks	Notes	

Table 4: DS&DD **Module BA1** (Line transect distance sampling) **Vessel Sighting** for IMAP C.I.s 3&4 **- Cetaceans**

Field	Description (EN)	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SightingID	Key index for the sighting. The code should be structured as follow "S+ progressive number + date (YYYYMMdd)+letter ex: (ex S2-20210210-A)	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
SurveyID	Survey Identification code. For ACCOBAMS data please specify the name of the survey	
Date	Date of sighting. Use format YYYY/mm/dd.	
Time	Hour Minutes Second in HH:MM:SS format (local time)	
Latitude	Latitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
StratumID	Identification code of the strata block	
StratumLabel	Label of the strata block. An example of a map of strata with strata blocks is reported in the "Map of Strata" sheet	
Transect_visual_ID	Transect label (stratum/line number) on visual effort. The code should be structured as follow "T+ progressive number + date (YYYYMMdd)+letter_ ex: T1-20210210-A	
Group	Indicate the group or genus of the sighting. Choose one of the values in the "Species_list" sheet, column "GROUPE"	
Family	Indicate the family of the sighting. Choose one of the values in the "Species_list" sheet, column "FAMILLE"	
SpeciesCode	Indicate the species code of the sighting. Choose one of the values in the "Species_list" sheet, column "CODE"	

SpeciesNam	Indicate the species name of the sighting. Choose one of the values in the "Species_list" sheet, column "NOM_COMM"	
SpeciesLat	Indicate the species Latin name of the sighting. Choose one of the values in the "Species_list" sheet, column "NOM_LAT"	
SpeciesCode2	Indicate the species code for second species (if any) in group, for responsive movement. Choose one of the values in the "Species_list" sheet, column "CODE"	
SpeciesNam2	Indicate the species name for second species (if any) in group, for responsive movement. Choose one of the values in the "Species_list" sheet, column "NOM_COMM"	
SpeciesLat2	Indicate the species Latin name for second species (if any) in group, for responsive movement. Choose one of the values in the "Species_list" sheet, column "NOM_LAT"	
Confidence	Confidence level of the species (subjective scale). Choose one of the values of the list	Definite=Definite Possible=Possible Probable=Probable
Cue	Visual cue that alerted the observer to the animals' presence. e.g. blow. Choose one of the values of the list	U = Body seen under water surface A = Body seen at water surface 2 = Splash 4 = Breach-jump 5 = Vessel-Gear 6 = Slick, 'footprint' or ring 7 = Birds 8 = Other associated wildlife (e.g. fish) 9 = Other cue, put in comment
PodSize	Indicate the group size of the sighting (mean number)	
PodSizeMin	Indicate the group size of the sighting (minimum number)	
PodSizeMax	Group size of the sighting (maximum number)	
Adults	Indicate the number of adults in group (if identifiable)	
Juveniles	Indicate the number of juveniles in group (if identifiable)	
Calves	Indicate the number of calves in group (if identifiable)	
Birds	Indication of any birds associated with the sighting. Choose one of the values of the list	Yes No
Turtles	Indication of any birds associated with the sighting. Choose one of the values of the list	Yes No
ObserverEffort	Observer's effort status for sighting. Choose one of the values of the list	Dedicated=Dedicated Incidental=Incidental
Platform	Observation platform from which the sighting was made . e.g. A-frame, deck	
Heading	Direction of travel (if any) of the animals relative to the plane using the 360° system, where 360° is the same direction of the plane and 180° is the opposite direction.	
Orientation	Orientation of the animals when first observed relative to the plane using the 360° system, where 360° is the same direction of the plane and 180° is	

Field	Description (EN)	List of values
	the opposite direction.	
Behaviour1	Observed behaviour (e.g. bowriding, travelling, resting, breaching feeding and socializing)	
Behaviour2	Observed behaviour (e.g. bowriding, travelling, resting, breaching feeding and socializing)	
Behaviour3	Observed behaviour (e.g. bowriding, travelling, resting, breaching feeding and socializing)	
HumanActivity	Specify human activities typology identified. Choose one of the values in the "CODE" column of the "Species_list" sheet for "Human activity" typology	
Remarks	Notes	

Table 5: DS&DD **Module BA1** (Line transect distance sampling) **Vessel Litter Sighting** for IMAP C.I.s 3&4 **- Cetaceans**

Field	Description (EN)	List of values
SightingID	Key index for the sighting. The code should be structured as follow "S+ progressive number + date (YYYYMMdd)+letter ex: (ex S2-20210210-A)	
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SurveyID	Survey Identification code. For ACCOBAMS data please specify the name of the survey	
Date	Date of sighting. Use format YYYY/mm/dd.	
Time	Hour Minutes Second in HH:MM:SS format (local time)	
Latitude	Latitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
StratumID	Identification code of the strata block	
StratumLabel	Label of the strata block. An example of a map of strata with strata blocks is reported in the "Map of Strata" sheet	
Material	Type of material. Choose one of the values of the list	Glass Metal Plastic Polystyrene Wood Other

Category	Category of litter. Choose one of the values of the list	balloons clothing & shoes fishing gear food packaging packaging sanitary item timber other
N_Objects	Number of objects for each category	
Size	Size class. Choose one of the values of the list	1 = 10-50 cm 2 = 50-100 cm 3 = >100 cm
Colour	Colour of litter. Choose one of the values of the list	Black/brown Blue/Green fluorescent metallic multi-coloured red/orange white/yellow
Cluster	Is the litter part of a cluster? Choose one of the values of the list	Yes No
Remarks	Notes	

Table 6: DS&DD **Module BA1** (Line transect distance sampling) **Abundance Estimates** for IMAP C.I.s 3&4 **- Cetaceans.** The whole module has to be considered not mandatory but if filled in all the parameters are mandatory.

Field	Description (EN)	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SurveyID	Survey Identification code. For ACCOBAMS data please specify the name of the survey	
StratumID		
StratumLabel	Label of the strata block. An example of a map of strata with strata blocks is reported in the "Map of Strata" sheet	
Year	Year of survey in YYYY format	
Abundance	The estimate of the abundance of the animals in the stratum	
C.V.	Coefficient of variation. The ratio of the standard deviation to the mean (average) expressed as a percentage	
C.I.LowLimit	Confidence interval is the range of values which is expected to include the true population size Insert the low limit value of the confidence interval	
C.I.HighLimit	Confidence interval is the range of values which is expected to include the true population size. Insert	

	the high limit value of the confidence interval	
Remarks		

Table 6: DSs&DDs **Module BA1** (Line transect distance sampling) **& Module BC2** (Acoustic Sampling) **Species List** for IMAP C.I.s 3&4 **- Cetaceans**

CODE	NOM_COMM	NOM_LATIN	FAMILLE	GROUPE
BALACU	Minke whale	*Balaenoptera acutorostrata*	Baleinopteridae	Small Baleinopteridae
BALBOR	Sei whale	*Balaenoptera borealis*	Baleinopteridae	Large Baleinopteridae
BALPHY	Fin whale	*Balaenoptera physalus*	Baleinopteridae	Large Baleinopteridae
BALSPP	Balaenopterid sp.	*Balaenopteridae sp.*	Baleinopteridae	Large Baleinopteridae
CETSPP	Cetacea	*Cetacea*	Cetacea	Cetacean unidentif.
DELDEL	Common dolphin	*Delphinus delphis*	Delphininae	Small Delphininae
DELSPP	Delphinid sp.	*Delphinidae sp.*	Delphinidae	Delphinid
FERATT	Pygmy killer whale	*Feresa attenuata*	Globicephalinae	Small globicephaline
GLOMAC	Short-finned pilot whale	*Globicephala macrorhynchus*	Globicephalinae	Large globicephaline
GLOMEL	Long-finned pilot whale	*Globicephala melas*	Globicephalinae	Large globicephaline
GLOPSE	pilot whale / False killer whale	*Globicephala / Pseudorca*	Globicephalinae	Large globicephaline
GLOSPP	Short / Long finned pilot whale	*Globicephala melas / Macrorhynchus*	Globicephalinae	Large globicephaline
GRAGRI	Risso's dolphin	*Grampus griseus*	Globicephalinae	Small globicephaline
KOGBRE	Pygmy sperm whale	*Kogia breviceps*	Kogiidae	Sperm whale
KOGSIM	Dwarf sperm whale	*Kogia sima*	Kogiidae	Sperm whale
KOGSPP	Pygmy / Dwarf sperm whale	*Kogiidae sp.*	Kogiidae	Sperm whale
LARCET	Large Cetacea	*Large Cetacea*	Cetacea	Cetacean unidentif.
LARDEL	Large delphininae sp	*Large delphininae*	Delphininae	Large Delphininae
MEDCET	Medium Cetacea	*Medium Cetacea*	Cetacea	Cetacean unidentif.
MEGNOV	Humpback Whale	*Megaptera novaeangliae*	Baleinopteridae	Large Baleinopteridae
MESBID	Sowerby's beaked whale	*Mesoplodon bidens*	Ziphiidae	Mesoplodon
MESDEN	Blainville's beaked whale	*Mesoplodon densirostris*	Ziphiidae	Mesoplodon
MESEUR	Gervais' beaked whale	*Mesoplodon europaeus*	Ziphiidae	Mesoplodon
MESSPP	Mesoplodont whales sp	*Mesoplodon sp.*	Ziphiidae	Mesoplodon
ORCORC	Killer whale	*Orcinus orca*	Globicephalinae	Large globicephaline

PEPELE	Melon-headed whale	*Peponocephala electra*	Globicephalinae	Small globicephaline
PEPFER	Melon-headed / Pygmy killer whale	*Peponocephala / Feresa*	Globicephalinae	Small globicephaline
PHOCID	Seal und.	*Phocidae sp*	Phocidae	Seal
PHOPHO	Harbour porpoise	*Phocoena phocoena*	Phocoenidae	Phocoenidae
PHYMAC	Sperm whale	*Physeter macrocephalus*	Physeteridae	Sperm whale
PSECRA	False killer whale	*Pseudorca crassidens*	Globicephalinae	Large globicephaline
SMACET	Small Cetacea	*Small Cetacea*	Cetacea	Cetacean unidentif.
SMADEL	Small delphininae	*Small delphininae /*	Delphininae	Small Delphininae
SOUCHI	Humpback dolphin	*Sousa chinensis / plumbea*	Delphininae	Small Delphininae
STEBRE	Rough-toothed dolphin	*Steno bredanensis*	Delphininae	Large Delphininae
STECOE	Striped dolphin	*Stenella coeruleoalba*	Delphininae	Small Delphininae
STEDEL	Striped dolphin / Common dolphin	*Stenella coeruleoalba / Delphinus delphis*	Delphininae	Small Delphininae
TURTRU	Bottlenose dolphin	*Tursiops truncatus*	Delphininae	Large Delphininae
ZIPCAV	Cuvier's beaked whale	*Ziphius cavirostris*	Ziphiidae	Other beaked whale
ZIPSPP	Ziphiid sp. (Beaked whale)	*Ziphiidae sp.*	Ziphiidae	Other beaked whale

	Eleven species of cetaceans considered to regularly occur in the Mediterranean area. See IMAP factsheet on Biodiversity. "Factsheet Bio and Fisheries"

Table 7: DS&DD **Module BC1** (Photo Identification) **Area** for IMAP C.I.s 3&4 **- Cetaceans**

Field	Description (EN)	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Survey Area code	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
AreaName	Survey Area name	
AreaExtension	Survey Area extension (km^2)	
Latitude	Latitude of the centroid of the sighting area in WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the centroid of the sighting area in WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	

AreaFile	Name of the file containing the Area. Naming the GIS file that contains the polygon (s) of the survey area. In the attribute table of the GIS file, for each polygon (s) of the survey area, the survey area code in the AreaID field must be reported. The file must be returned in a georeferenced shapefile format (WGS84) and compressed in a single .zip file that includes .zip, .prj, .dbf, etc ... files. The filename must conform to the following Rule of composition: "ModuleBC1_GISfile_ <Sub-Region> _ <AreaName> _<gg_mm_aaaa> .zip", eg. ModuleTT1_GISfile_Ionian_GulfofTaranto_05_2016.zip. If Region and / or AreaName contains spaces, replace these spaces with "_".	
SightingArea	Name of the file containing the sighting area. Naming the GIS file that contains the polygon (s) of the survey area including sighting of monitored species. In the attribute table of the GIS file, for each polygon (s) of the survey area, the survey area code in the AreaID field must be reported. The file must be returned in a georeferenced shapefile format (WGS84) and compressed in a single .zip file that includes .zip, .prj, .dbf, etc ... files. The filename must conform to the following Rule of composition: "ModuleTT1_GISfile_<Sub-Region> _ <AreaName> _ Distribution_<gg_mm_aaaa> .zip", eg. ModuleBC1_GISfile_Ionian_GulfofTaranto_Distribution_05_20 16.zip. If Region and / or AreaName contains spaces, replace these spaces with "_".	
Remarks	Notes	

Table 8: DS&DD **Module BC1** (Photo Identification) **Navigation Effort** for IMAP C.I.s 3&4 - **Cetaceans**

Field	Description (EN)	List of values
AreaID	Identification code of the survey area	
Year	Year of sampling in YYYY format	
Month	Month of sampling in 1-12 format	
Day	Day of sampling in 1-31 format	
Time	Hours-minutes-seconds of sampling in HH:MM:SS: format (local time)	
SeaState	Refer to the Beaufort scale of the wind strength that has effect on the sea surface. Enter one of the values from the "Beaufort_scale_List" sheet, column "Force"	
CloudCover	Cloud cover. Use the octaves system (i.e. full cloud cover = 8, clear sky = 0), evaluate by the navigator above the plane.	
GeneralConditions	Subjective indication relative to how the observer feels the general conditions (poor, moderate or good) for the goal of the sighting. The effects of the sea state and the cloud covering together with other factors that could have an effect on the capacity of seeing the animals (ship velocity, sun reflection on the sea) should be evaluated on the whole.	

Sighting	Indicate if at least one sighting has been obtained. Insert one of the list values. In the case the value is 'N' leave empty the fields N_sighting, GroupDimension, N_adults, N_subadults. Insert one of the List values	N = No/No Y = Yes/Oui
SightingID	Key index for the sighting. The code should be structured as follow "S+ progressive number + date (YYYYMMdd)+letter ex: (ex S2-20210210-A)	
N_individuals	Number of individuals for each identification code	
Remarks	Every information considered useful to complete the indications on the sighting conditions or the sighting itself (i.e. behaviours, particular signs of the individuals, boundary conditions elements). In the case the text exceeds 255 characters, give indication of the report in which such information are contained	

Table 9: DS&DD **Module BC1** (Photo Identification) **Photo Identification** for IMAP C.I.s 3&4 - **Cetaceans**

Field	Description (EN)	List of values
AreaID	Identification code of the survey area	
Year	Year of sampling in YYYY format	
Month	Month of sampling in 1-12 format	
Day	Day of sampling in 1-31 format	
Time	Hours-minutes-seconds of sampling in HH:MM:SS: format (local time)	
Sighting	Indicate if at least one sighting has been obtained. Enter one value of the list values. In the case the value is 'N' leave empty the fields N_sighting, GroupDimension, N_adults, N_subadults. Insert one of the List values	N = No Y = Yes
SightingID	Key index for the sighting. The code should be structured as follow "S+ progressive number + date (YYYYMMdd)+letter ex: (ex S2-20210210-A)	
PhotoSequence	Photo sequence (numeric interval relative to the photos i.e. 138-150) related to the sighted group. Please separate and rename different photo sequences for each sighting ID specifying it in the name	
SpeciesID	Species reference code, enter one of the list values from "Species_List", column "SpeciesID"	
GroupDimension	Indication of the total number (best estimate) of individuals present (for each sighting).	
Adults	Indicate the number of adults in group (if identifiable)	
Juveniles	Indicate the number of juveniles in group (if identifiable)	
Calves	Indicate the number of calves in group (if identifiable)	

	Any further information on the photo sequence and/or the photographed individuals (indication on particular signs could be also eventually reported on the drawing of the dorsal fins). In the case the text exceeds 255 characters, give the indications of the report in which such information are contained.	
Remarks		

Table 10: DS&DD **Module BC2** (Acoustic Sampling) **Recording** for IMAP C.I.s 3&4 **- Cetaceans**

Field Name	Definition_Eng	List of values
EffortID	Key index for a Leg with homogenous environmental condition. The code should be structured as follow "L+ progressive number + date (YYYYMMdd)+letter_ ex: L1-20210210-A	
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SurveyID	Survey Identification code. For ACCOBAMS data please specify the name of the survey	
Date	Date of the effort. Use format YYYY/mm/dd. For Month (mm) and Day (dd) use 1-12 format	
Time	Hour-minutes-seconds of survey in HH:MM:SS format	
Size_mb	File size (mb)	
Filename	Name of .wav file (E.g. 192_20120524_015122_844.wav)	
Sample_rate	Sample rate of recordings (kHz). Choose one of the value of the list	048 192
Latitude	Latitude at beginning of the segment of survey effort in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude at beginning of the segment of survey effort in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Stratum	Label of the strata block. The strata block is a part of study area as defined in the "Map of Strata" sheet	
Effort	Status of survey effort for the segment of survey effort. Choose one of the value of the list	T = transect; P = passage; A = acoustic; V = visual; VA= visual and acustic WA = with animals; OT = other
Transect_acoustic_ID	Transect label (stratum/line number) for acustic effort. The code should be structured as follow "TA+ progressive number + date (YYYYMMdd)+letter_ ex: TA1-20210210-A	
Sea_state	Sea state based of Beaufort scale. Specify one of the value of the Beaufort scale sheet	
Wave_height	Wave height (m)	
Swell_height	Swell height (m)	

CloudCover	Cloud cover. Use the octaves system (i.e. full cloud cover = 8, clear sky = 0), evaluate by the navigator above the plane.	
Visibility	Visibility. Use a subjective scale from 0 to 3	
Pressure	Barometric pressure in millibars	
GlareSever	Indicate the glare severity. Choose one of the value of the list	0 = no glare 1 = slight glare – will affect observer's sightings within that sector very little 2 = moderate glare – may affect observer's ability to detect sightings within that sector 3 = strong glare – will severely affect observer's ability to detect sightings within that sector
GlareStart	Angle of the start of any glare (° relative to boat) in degrees	
GlareStop	Angle of the end of any glare (° relative to boat) in degrees	
SailStart	Angle of the start of any obstructive sails (° relative to boat) in degrees	
SailStop	Angle of the end of any obstructive sails (° relative to boat) in degrees	
Remarks	Notes	

Table 11: DS&DD **Module BC2** (Acoustic Sampling) **Acoustic Detection** for IMAP C.I.s 3&4 **- Cetaceans**

Field Name	Definition_Eng	List of values
KeyID	Key index for the sighting. The code should be structured as follow "S+ progressive number + date (YYYYMMdd)+letter ex: (ex S2-20210210-A)	
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SurveyID	Survey Identification code. For ACCOBAMS data please specify the name of the survey	
Date	Date and time of the effort. Use format YYYY/mm/dd. For Month (mm) and Day (dd) use 1-12 format	
Time	Hour-minutes-seconds of sampling in HH:MM:SS format	
Latitude	Latitude at beginning of the segment of survey effort in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude at beginning of the segment of survey effort in decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Stratum	Label of the strata block. An example of a map of strata with strata blocks is reported in the "Map of Strata" sheet	
Transect_acoustic_ID	Transect label (stratum/line number) for acoustic effort. The code should be structured as follow "TA+ progressive number + date (YYYYMMdd)+letter_ ex: TA1-20210210-A	
Group	Indicate the group or genus of the sighting. Choose one of the values in the "Species_list" sheet, column "Group"	
Family	Indicate the family of the sighting. Choose one of the values	

	in the "Species_list" sheet, column "Family"	
SpeciesCode	Indicate the species code of the sighting. Choose one of the values in the "Species_list" sheet, column "CODE"	
SpeciesNam	Indicate the species name of the sighting. Choose one of the values in the "Species_list" sheet, column "Species Name"	
SpeciesLat	Indicate the species latin name of the sighting. Choose one of the values in the "Species_list" sheet, column "Latin Name"	
TrainType	Type of acoustic detection (subjective scale). Choose one of the value of the list	Track = Track Event = Event Single click = Single click
Confidence	Confidence level of train type ID (subjective scale). Choose one of the value of the list	Certain = Certain Likely = Likely
PodSize	Group size of the acoustic detection (best estimate). Specify a value	
PodSizeMin	Group size of the acoustic detection (minimum number). Specify a value	
PodSizeMax	Group size of the acoustic detection (maximum number). Specify a value	
Remarks	Notes	

Table 12: DS&DD **Module BC3** (Population demographic characteristics) **Area** for IMAP C.I. 5 - **Cetaceans**

Field	Description (EN)	List of values
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
AreaName	Survey Area Name. National part of sub-division.	
AreaID	Survey Area code.	
Latitude	Latitude of the centroid of the survey area of the species in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the centroid of the survey area of the species in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx). Use positive values without '+' before numbers (for ex. 13.98078) for coordinates east of the of the Greenwich Meridian (0°) and negative values with '-' for coordinates west of the Greenwich Meridian (0°) (for ex. -2.6893).	
Remarks	Notes	

Table 13: DS&DD **Module BC3** (Population demographic characteristics) **Species** for IMAP C.I. 5 - **Ceataceans**

Field	Description (EN)	List of values
CountryCode	Member country code as ISO two digits, for example "IT" for Italy	
AreaID	Survey Area code	
Species	Monitored species. Enter one value of the column 'SpeciesID' of the list 'List_species'	
Year	Sampling year in YYYY format	
Month	Sampling month in 1-12 format	
Day	Sampling day in 1-12 format	
TimeInterval	Hour-minutes-seconds of sampling in HH:MM:SS format	
GroupSize	Group size of the sighting. A group is defined as containing individuals not more than 2-3 animal lengths from each other, and exhibiting the same behaviour	
Behaviour	Code for the most dominant behaviour during the sighting. Enter one value in the list	SW = Directional swimming MI = Non-directional swimming (milling) BR = Breaching/jumping FE = Feeding/foraging FA = Multi species feeding aggregation LO = Logging/Sleeping/Resting SB = Interaction with vessels (bowriding, following fishing vessels, scavenging) OT = Other
BehaviourOther	Specify the most dominant during the sighting in case the 'Behaviour' field has been filled with 'OT' (e.g. dive up or dive down, fast swimming, Fluking/fluke up)	
NumAdults	Number of adults in the pod	
NumJuveniles	Number of juveniles in the pod	
NumCalves	Number of calves in the pod	
Mortality	Mortality rate of individuals in percentage (0-100)	
MortalityCalves	Mortality rate of calves in percentage (0-100)	
Remarks	Notes	

Table 14: DS&DD **Module BC3** (Population demographic characteristics) **Individual** for IMAP C.I. 5 - **Cetaceans**

Field	Description (EN)	List of values

CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Survey Area code.	
Species	Monitored species. Enter one value of the column 'SpeciesID' of the list 'List_species'	
Year	Sampling year in YYYY format	
Month	Sampling month in 1-12 format	
Day	Sampling day in 1-12 format	
Time	Hour-minutes-seconds of sampling in HH:MM:SS format	
ID_Specimen	Specimen identification code expressed as follows: CountryCode + Species + '_' + progressive number + year (eg. IT137091_012019 indicates the first Balaenoptera physalus collected in Italy in 2019)	
Method	Survey methodology for gathering information. Enter one value in the list	B = Biopsy S = Stranding BC = By-catch PI = Photo-identification
Gender	Specify the gender of the specimen if male female or Not determined. Insert one of the values of the list	M = Male F = Female ND = not detected or not determined
Length	Measure, expressed in cm, of the total length of the animal (if the survey methodology allows to collect this data)	
Width	Measure, expressed in cm, of the total width of the animal (if the survey methodology allows to collect this data)	
Height	Measure, expressed in cm, of the total height of the animal (if the survey methodology allows to collect this data)	
Photo	Enter the name of the zip file defined as follows ID_Specimen_<year>_<month>_<day>.zip	
Remarks	Notes	

Table 15: DS&DD **Module BC1** (Photo Identification) & **Module BC3** (Population demographic characteristics) **Species List** for IMAP C.I.s 3,4 &5 **- Cetaceans**

SpeciesID	SpeciesName
137091	*Balaenoptera physalus*
137119	*Physeter macrocephalus*
137127	*Ziphius cavirostris*
137097	*Globicephala melas*
137098	*Grampus griseus*
137094	*Delphinus delphis*
137107	*Stenella coeruleoalba*
137111	*Tursiops truncatus*
137117	*Phocoena phocoena*
137110	*Steno bredanensis*
137102	*Orcinus orca*

Table 16: DS&DD **Module BM1** (Monk seal) **Area** for IMAP C.I.s 3,4 & 5– **Monk Seal**

Field	Description EN	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Study Area Code	
AreaName	Study Area Name	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
SurveyID	Survey Identification code	
SurveyType	Typology of the survey. Enter a value from the list.	1= Initial assessment of potential monk seal caves 2 = Survey to verify monk seal traces/collect samples 3 = Survey to install/recover cameratraps 4 = Other
SurveyTypeOther	If "Other" is selected in SurveyType, please specify	
Procedure used	Specify the typology of survey inspection procedure followed	1 = Direct visit to historical/known caves; 2 = Visual inspection from boat followed by swimming inspection of observed aerial openings; 3 = Inspection of coast by swimming followed by entrance of aerial openings or underwater ones through free breath dives; 4 = Inspection of submerged cave entrances through free breath/scubadiving entrance into caves
YearStart	Starting year of sampling in YYYY format	
MonthStart	Starting month of sampling in 1-12 format	
DayStart	Starting day of sampling in 1-31 format	
YearEnd	Ending year of sampling in YYYY format	
MonthEnd	Ending month of sampling in 1-12 format	
DayEnd	Ending day of sampling in 1-31 format	
Latitude	Latitude in the WGS84 decimal degrees reference system of centroid or reference point in monitoring area.	
Longitude	Longitude in the reference system WGS84 decimal degrees of centroid or reference point in monitoring area. Use negative values for coordinates west of the Greenwich Meridian (0°).	-

Wind speed	Weather conditions: Wind speed class, write one of the value of the list	Calm = Calm Medium = Medium Strong = Strong
Cloudiness	Weather conditions: Cloudiness class. Write one of the value of the list	Bright = Bright Partl = Partially Cloud Cloud= Cloudy Rainy = Rainy
WaveDirection	Weather conditions: Wave direction in degree	
WaveStrength	Weather conditions: Wave strength class. Write one of the value of the list	Cal = Calm Mo = Moderate Ro = Rough Sto = Storm Sw = Strong wave
Turbidity	Weather conditions: level of turbidity. Write one of the value of the list	Clear = Clear Blur = Blur Green = Green Brown = Brown
Tide	Weather conditions: Specify tide class. Write one of the value of the list	U = Up tide N = Normal L = Low tide
CaveID	Identification code for the cave discovered	
CoastalFrom	Name of the location of coastal monitoring start point Indicate name of nearest topographical landmark, followed by town or city of pertinence	
CoastalTo	Name of the location of coastal monitoring end point Indicate name of nearest topographical landmark, followed by town or city of pertinence	
GPSfile	Naming the GIS file that contains information about the coast object of survey. The file must be returned in a georeferenced shapefile format (WGS84) and compressed in a single .zip file that includes .zip, .prj, .dbf, etc ... files. The filename must conform to the following Rule of composition: "ModuleT1_GISfile_ <Sub-Region> _ <AreaName> _ <gg_mm_aaaa> .zip" eg.ModuleT1_GISfile_Ionian_GulfofTaranto_05_2016.zip. If Region and / or AreaName contains spaces, replace these spaces with "_".	
Remarks	Notes	

Table 17: DS&DD **Module BM1** (Monk seal) **Cave Inventory** for IMAP C.I.s 3,4 & 5– **Monk Seal**

Field	Description EN	List of values
SurveyID	Identification code for Survey	
CaveID	Identification code for the Cave	
CaveID_Reference	Name of eventual national/regional official cave registry within which the cave is registered/described	
DegreeUse	Degree of usage of the cave by seals. Enter a value from the list	P = Potentially used H = Historically used A = Active current

		use
UseType	Type of activity for which the cave is used currently	RC =Resting cave BC =Breeding cave B =Both
MonitoringTypology	Specify the type of monitoring activity conducted in the cave. For "Other" specify the methodology in "MonitoringTypologyOther" field	V =Visual inspection for seals/tracks etc. C =Camera/Videotra p deployment N = None O = Other: (specify)
MonitoringTypologyOther	Specify "other" type of monitoring activity conducted in the cave.	
MonitoringFrequencyType	Specify the monitoring frequency type based on MonitoringTypology. For "Other" specify the methodology in "MonitoringFrequencyTypeOther" field	1 = N. inspections/year: 2 = Days of planned camera deployment:(speci fy period) 3 = Days of actual camera functioning: (specify duration) 4 = Continuous camera deployment 5 = Other
MonitoringFrequencyTypeOt her	Specify "other methodology used for monitoring frequency	
MonitoringFrequency	Specify the monitoring frequency	
MonitStartDate	Beginning of monitoring activities in cave	
MonitEndDate	End of monitoring activities in cave	
YearsCaveUseStart	Specify the start year in which cave has been used by seals during the reporting cycle	
YearCaveUseEnd	Specify the end year in which cave has been used by seals during the reporting cycle	

NumYearsCaveUse	Specify the number of years in which cave has been used by seals during the reporting cycle.	
YearsCaveUseBirthsStart	Specify the start year in which births have been recorded in the cave during the reporting cycle	
YearCaveUseBirthsEnd	Specify the end year in which births have been recorded in the cave during the reporting cycle	
NumYearsCaveUseBirths	Specify the number of years in which births have been recorded in the cave during the reporting cycle.	
MaxNoSeals	Specify the maximum number of photoidentified seals observed using the cave during the reporting period	
GPSfile	Naming the GIS file that contains information about the cave object of survey. The file must be returned in a georeferenced shapefile format (WGS84) and compressed in a single .zip file that includes .zip, .prj, .dbf, etc ... files. The filename must conform to the following Rule of composition: "ModuleBM1_GISfile_ <Sub-Region> _ <CaveID> _ <gg_mm_aaaa> .zip" eg.ModuleBM1_GISfile_Ionian_GulfofTaranto_05_201 6.zip. If Region and / or CaveID contains spaces, replace these spaces with "_".	
Remarks	Notes	

Table 18: DS&DD **Module BM1** (Monk seal) **Seal sightings at sea** for IMAP C.I.s 3,4 & 5

Field	Description EN	List of values
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
AreaID	Insert the Study Area Code if the sighting occurs in a surveyed area	
AreaName	Insert the Study Area Name if the sighting occurs in a surveyed area	
SighterCategory	Type of sighter	F = fisherman D = diver B = boater T = tourist S = scientist
PhotographicDoc available	Specify if Photographic documentation is available	Y = Yes N = no
SealNumber	Indicate number of seals sighted	
SightingYear	Year of sighting in YYYY format	
SightingMonth	Month of sighting in 1-12 format	
SightingDay	Day of sighting in 1-31 format	

Sighting Latitude	Latitude in the WGS84 decimal degrees reference system of centroid or reference point for the cave with at least 2 digits (xx.xx).	
Sighting Longitude	Longitude in the reference system WGS84 decimal degrees of centroid or reference point for the cave with at least 2 digits (xx.xx). Use negative values for coordinates west of the Greenwich Meridian (0°).	
Remarks	Notes	

TABLE 19 DS&DD **Module BM1** (Monk seal) **Population size** for IMAP C.I.s 3,4 & 5

Field	Description EN	List of values
AreaID	Study Area Code or list of study area codes to which the population estimate refers	
Sub-Region	Mediterranean Subregion. Enter one of the values from the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
Population size	Number of individuals estimated in the study area	
MethodPopulationSize	Specify the methodology used to inform on the population size. For "Other" specify the methodology in "MethodPopulationSizeOther" field	1 = Minimum n. photoidentified individuals 2 =Mark-recapture 3 = Other
MethodPopulationSizeOther	Specify "other" methodology used to inform on the population size	
Timeframe (Interval time da BC3)	Indicate time period (date start-date end) to which the data refer with respect to the AreaID for which you are estimating population size	
Remarks		

Table Table 20: DS&DD **Module BM1** (Monk seal) **Specimen characteristics** for IMAP C.I.s 3,4 & 5 – **Marine mammals**

This table provides general information summarising population demographic structure for each year per Study area.

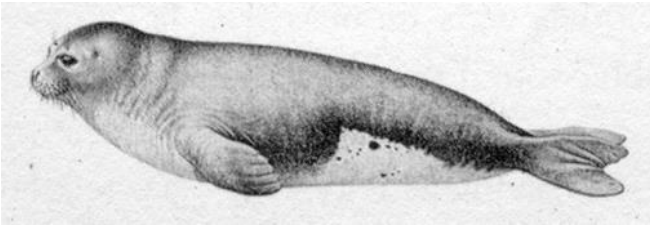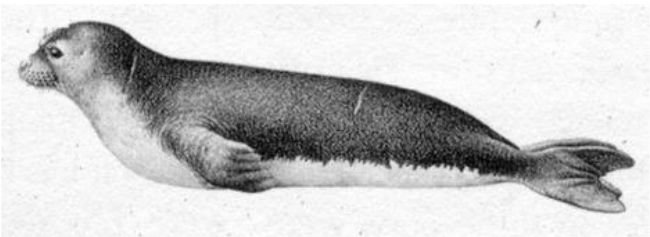| Field	Description EN	List of values
AreaID	Study Area Code or list of study area codes to which the reported demographic data refer	
Year	Sampling year in YYYY format	
SealID	Identification number for monitored seal	

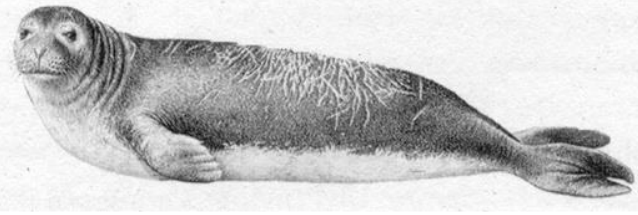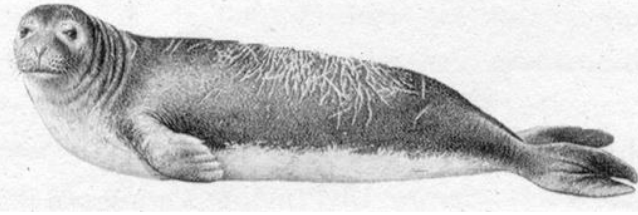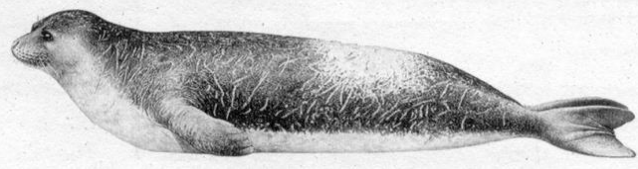| Sex	Seal gender	M = Male F = Female U = Unknown

Table 21: DS&DD **Module BM1** (Monk seal) **Demographic Structure** for IMAP C.I.s 3,4 & 5 – **Marine mammals**

Field	Description EN	List of values
AreaID	Study Area Code or list of study area codes to which the reported demographic data refer	
Year	Sampling year in YYYY format	
Mature	Total number of mature females (Category 7&9) and males (Category 8 & 10)	
Subadults	Total number of subadults (Category 5&6)	
Pups	Number of pups born within a year	
Total	Total number of individuals (all categories)	
Death	Number of deaths within a year (All individuals except pups)	
PupsDeath	Number of deaths within a year (Pups)	
BirthRate	Annual birth rate. Annual birth rate of the population is calculated according to Gazo et al. (1999) $$ABRt = Pt/ AFt$$ - ABRt = Annual birth rate at time t - Pt = Number of pups born at time t - AFt = Number of sexually mature females (categories starting from 7 in Table 2) at time t	
MortalityRate	Overall population annual mortality rate Number of individuals and deaths (mainly stranded animals) are recorded for each year and used to calculate the annual mortality rate and subtract from one to obtain overall survival rate to the next year. Following formula of Akçakaya et al. (1999) summarizes the calculation: $$St= 1- (D\ t+1\ /\ Nt)$$ - St: Survival of the individuals at time t. - Nt: Number of individuals at time t. - Dt+1: Number of deaths at time t+1.	
Remarks		

Table 22: DS&DD **Module BM1** (Monk seal) **Morphological categories List** for IMAP C.I.s 3,4 & 5 – **Marine mammals**

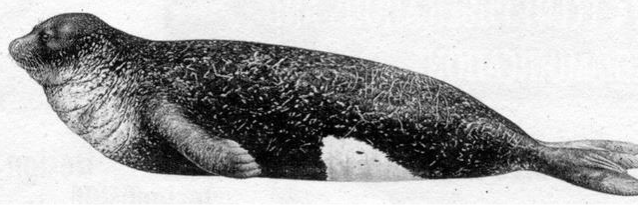| Stage	Characteristics of the category (EN)	Period (years)	Photo/illustration Photos taken from Dendrinos et al. 1999 Illustrations taken from Samaranch and Gonzales, 2000

1	skinny (pup-premolted; pms)	0.00-0.03	
2	fat (pup-premolted; pmf)	0.03-0.08	
3	pwm moulting (pup-preweaned; pwm)	0.08-0.14	
4	pup-preweaned (pw)	0.14-0.33	
5	youngster- weaned (y)	0.33-2.50	
6	subadult (sa)	2.50-6.00	

7	adult female young (afy)	6.00-7.00	
8	adult male young (amy)	7.00-8.00	
9	adult female elder (afe)	8.00-20.00	
10	adult male elder (ame)	9.00-20.00	
11	senesce female (sf)	20.00 >	