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Agenda item 6: Data Dictionaries and Data Standards for the Common Indicators 3, 4 and 5 related to Marine Mammals, Marine Turtles and Sea Birds

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

SPA/RAC
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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 and process data according to the proposed Data Standards and Data Dictionaries (DSs and DDs) that set the basic information on data reporting within IMAP.

It should be noted that proposed DSs and DDs also build on the respective relevant experience of INFO/RAC, as well as the experience gained in building other relevant databases such as EMODnet Chemistry platform, SeaDataNet and WISE Data Dictionary maintained by EEA and available in EIONET. In such a way the IMAP Info System is interrelated with other regional marine databases (e.g. SeaDataNet, SeaDataCloud, EMODNET, etc.), essential to avoid duplication of data transmissions for the Contracting Parties.

The ongoing process of evolution from the pilot to the final IMAP Info System will be also supported by the EU funded project EcAp MED III project and will include the whole set of modules for the IMAP Common Indicators (excluding the candidate C.I.s at the moment).

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 provides 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 collecting a wider set of data also 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.

Starting from the middle of 2019, 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 aim of the current document is to present the "draft" DSs & DDs related to **Common Indicators 3,4&5**. By reviewing this document, the present meeting is expected to provide **guidance, inputs and further reflections** on the proposed "draft" DSs &DDs for the selected Common Indicators. On this basis, a continuous process of harmonization with IMAP guidance factsheets and common indicators monitoring protocols will be assured during **phase II**. Consequently, also the structure of the Data Standards and Data Dictionaries could be revised and harmonized based on the final result of the IMAP developing process. Interactive work will be needed to refine these Data Standards and Data Dictionaries gradually.

As stated by the **CORMON Biodiversity and Fisheries (Marseille 12-13 February 2019)** monitoring protocols should guide data standards development that is carried out in parallel with discussions on the agreed common methodologies. Information systems are a major tool to collect and transfer data. 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.

The appointment and the activation of on-line network of Mediterranean designate qualified experts of the Biodiversity OWG, supporting INFO/RAC on finalization of DSs and DDs for the cluster Biodiversity and Fisheries, as requested during the CORMON of Marseille (12-13 February 2019) and Rome (21 May 2019), will usefully ensure this coherence.

Data Standards and Data Dictionaries for IMAP Biodiversity (EO1): Common Indicators 3,4&5 for Marine Turtles

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

- **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 turtle species as expressly reported in the IMAP guidance factsheets.

3.   This document reflects comments received during the Integrated Meetings of the Ecosystem Approach Correspondence Groups on IMAP Implementation (CORMONs) Videoconference, December 2020, in the sessions and after the sessions, as appropriate. The documents take into account also discussion held during the following OWG meetings.

4.   The reference documents for the species to be monitored are:

o IMAP Guidelines for monitoring marine turtles in the Mediterranean Sea (WG.461/21)

o Scales of monitoring & assessments, assessment criteria and baseline & threshold values for IMAP Common Indicators relating to Marine Turtles (Draft) and related comments – OWG sea turtles.

o Sea turtles in the Mediterranean: Distribution, threats and conservation priorities RAC/SPA.

Marine turtles

1.   Two species of sea turtles – the loggerhead turtle (*Caretta caretta*) and the green turtle (*Chelonia mydas*) – regularly occur and breed in the Mediterranean Sea. The breeding activities of both species are regularly monitored in the main nesting areas of ten countries; namely, Cyprus, Egypt, Greece, Israel, Italy, Lebanon, the Libyan Arab Jamahiriya, the Syrian Arab Republic, Turkey and Tunisia. Leatherback and loggerhead turtles coming from the Atlantic deserve to be taken into account. In particular, the presence of the Atlantic loggerhead population is particularly important to consider in the Western Mediterranean.

2.   The monitoring of sea turtles can be performed using the following techniques: (i) **counting the number of nests** during nesting period, (ii) **collecting stranded and by-caught turtles**, (iii) in-water **capture-mark-recapture** studies, (iv) **telemetry studies**, (v) **boat and aerial surveys.**

3.   It must be noted that the techniques listed above include methods on what Contracting Parties drew attention**, but not all the methods are specified and proposed in the IMAP protocols and about the preferential use of them, the discussion in the related On-line Working Group (OWG) is yet open.**

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

1.   Estimation of the abundance and distribution of marine reptiles can be provided through the line transect distance sampling method. The method consists in covering routes, by air specially designed by specific software in a defined study area. Distance sampling is **useful for turtles when applied by air** to estimate the abundance and distribution of aggregation areas at sea.

2.   **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.

3.   **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.

4.   **Abundance** can be calculated by extrapolating estimated density in the sampled strips 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.

5.   This method, **aerial-based**, can provide estimates of abundance, distribution and density of large-scale marine reptile species for all Mediterranean Sea. At the regional and local level, it appears useful to integrate aerial surveys, to obtain local indications of the conservation status and quality of the habitats through different methods. 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.

6.   The data reporting of distribution and abundance for marine reptiles will be carried out using the Data Standards and Data Dictionaries - Module **BA1** developed for **a large number of taxa** and already discussed in the document "**Data Dictionaries and Data Standards for the Common Indicators 3, 4 and 5 related to Marine Mammals**"

7.   The proposed module **BA1** is in line with the other standards developed for the IMAP Info System but also **compliant with ACCOBAMS metadata templates** currently used for the regional survey carried out in 2018 and the future ones to be planned, include the possibility to monitor also marine reptiles.

8.   As agreed during the last Cormon on Biodiversity held in the December 2020, the module BA1 has been developed by INFO/RAC in close cooperation with ACCOBAMS and is proposed for the monitoring at regional scale and also **for the Contracting Parties survey carried out at national level.**

9.   The Module BA1 is reported in the document "Data Dictionaries and Data Standards for the Common Indicators 3, 4 and 5 related to Marine Mammals" as mainly used for cetaceans monitoring but also referring to a large number of taxa, including marine turtles.

10.   Here are reported the other modules developed according to the *IMAP Guidelines for monitoring marine turtles in the Mediterranean Sea (WG.461/21)* and to the assessment criteria for the IMAP CIs 3,4 and 5 related to marine turtles, described in the document "*Scales of monitoring & assessments, assessment criteria and baseline & threshold values for IMAP Common Indicators relating to Marine Turtles (Draft)*" – OWG sea turtles.

Module BT1 - Nesting Beach (C.I.s 3&4)
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1.   Estimation of the abundance and distribution of marine reptiles in **nesting sites** is necessary to check that the turtles remain present in all parts of the environments monitored annually and in all the sites established during the periodic surveys. From the surveys on the count of the nests it is possible to determine the spatial distribution of the nesting per year. Existing and potential nesting beaches should be monitored during the nesting season.

2.   The abundance of adult females on the beach can be calculated from nest counts, clutch frequency (the number of clutches laid by a female in a nesting season), remigration intervals (the number of years between two consecutive nesting seasons) and adult sex ratio.

3.   The data reporting of distribution and abundance turtle nests will be carried out using the Data Standards and Data Dictionaries - Module BT1 developed on the basis of the *IMAP Guidelines for monitoring marine turtles in the Mediterranean Sea* and the document *Scales of monitoring & assessments, assessment criteria and baseline & threshold values for IMAP Common Indicators relating to Marine Turtles* discussed during the OWG meeting on sea turtles on 29 March 2021.

4.   The structure of this module allows to collect the same data regardless of the monitoring methodology adopted (Foot patrols, UAV, Plane surveys).

Module BT2 - MarineHabitat (Bycatch/Strandings) -(C.I.s 3&4)

1.   Three modules have been developed for monitoring the abundance and distribution of marine reptiles in **marine habitat**, depending on the survey method the Contracting Parties will adopt. In particular, the Module BT2 has been structured for **Bycatch** and **Stranding record** methods in which the information is recorded in reference to a monitoring area.

2.   Population monitoring in water with the Bycatch methodology can be used to estimate the abundance and distribution of a population in a particular area. Sea turtles are a migratory species, so study timing is important and should be carefully selected and a standardized methodology followed.

3.   Two common methods are used for in-water surveys. First, a capture net is set in the sampling area. Second, the turtles are captured using the rodeo technique. In the case of a large study area with low visibility and deeper water, a capture net is preferable. The rodeo technique requires smaller team and can be used in small areas and in shallow waters with high visibility.

4.   Stranded turtles are a good source of data for collecting various data related to the space-time distribution of turtles.

Module BT3 - MarineHabitat (Plane/Boat/UAV) (C.I.s 3&4)

1.   Abundance estimates at sea, where juveniles represent the majority of the population, can been conducted through different method of surveys. Nevertheless, aerial surveys are the best method for determining the abundance of turtles at sea and detecting changes in population, before they translate into changes in nest counts. Drones, for monitoring nesting activities and making individual counts of sea turtles swimming on the surface, are becoming popular in recent years.

2.   BT3 Module has been structured for aerial, boat and UAV surveys. In these cases the information is recorded along transepts, each of which is identified with a unique code. The polylines representative of these transects must be reported in a GIS file with reference to each identification code. Although aerial surveys, albeit more expensive, allow for a more in-depth detection of emerging turtles for the benefit of better estimates of abundance compared to surveys with boats, it has been left to each CP to adopt either method or both. Drones (UAV) can be deployed from boats and determine presence/abundance of offshore habitats. They are not an alternative to planes but a complement to this type of surveys.

Module BT4 - MarineHabitat (Telemetry) - (C.I.s 3&4)

1.   **Satellite tracking** (telemetry) is useful to characterize the movements of, and identify the habitats used (based on residency time) by tagged animals. Scientists generally attach **satellite transmitters** to the carapace of female sea turtles at nesting sites or animals caught at sea (during dedicated campaigns or incidentally caught by fishermen).

2.   The sex and size of tagged animals is generally recorded prior to their release, providing valuable information on their developmental stage.

3.   **Telemetry** is a good method to characterize the distributional range of the species (Common Indicator 3) considering different life stages and populations.

4.   Depending on the type of transmitter, it can also provide information on the environmental conditions of the habitats used by the species. Therefore, this method can lead to a better understanding of drivers of species distribution.

5.   Telemetry is also applied for abundance evaluation (Common Indicator 4) and a feasible method for demographic data collection in breeding areas.

6.   Satellite tracking is a good method to characterize the movements of, and identify the habitats used (based on residency time) by tagged animals.

7.   A satellite telemetry of adult sea turtles is required for identifying the foraging grounds used by the adults of each population. This technique can also be used to assess the surface time of turtles at foraging grounds. A parameter is necessary to derive absolute population estimates for aerial surveys.

Module BT5 - Nesting and Demography (C.I.s 5)

1.   Population demographic parameters need to be collected from nests and nest environments, as well as from in-water observations.

2.   Understanding the demographics of sea turtle metapopulations helps identify which pressures may have the greatest impact on population stability and which conservation measures may have the greatest effect in stabilizing or recovering population levels.

3.   The various elements that allow to reconstruct the demographic characteristics of sea turtles have been considered. This module provides three Data Standards sheets, one dedicated to data collection in **nesting sites** (number of eggs per clutch, hatchling emergence success, etc.), the second to monitoring data in **marine habitat** referable to a specific time interval within the identified monitoring area (number of males/females adults per session, mortality rate of individuals etc.) and a third developed for the collection of demographic characteristics related to each **individual** identified (gender, age, etc.).

Table 1: DSs&DDs **Module BT1** (Nesting Beach) **Nest** for IMAP C. I.s 3&4 **- Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
Sub-Region	Subregion according to the MSFD Article 4 on Marine regions or subregions (acronym).	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
Sub-Division	Subdivision of the subregions (Workshop for the delineation of subdivisions relevant for MSFD assessments/reporting in the Mediterranean Sea)	NWMS = North Western Mediterranean Sea ALBS = Alboran Sea TYRS = Tyrrhenian Sea SWMS = South Western Mediterranean Sea ADRS = Adriatic Sea CENT = Central Mediterranean Sea IONS = Ionian Sea AEGS = Aegean Sea LEVS = Levantine Sea
Nest_ID	Nest identification code.	
Latitude	Latitude of the sampling nest in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the sampling nest 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 2: DSs&DDs **Module BT1** (Nesting Beach) **Nesting Beach** for IMAP C. I.s 3&4 **- Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
NestID	Nest identification code.	
Year	Sampling year in YYYY format	
Month	Sampling month in 1-12 format	
Day	Sampling day in 1-12 format	
Time	Hours-minutes-seconds of sampling in HH:MM:SS format	
Species	Species name, enter one value in the list	CC = *Caretta caretta* CM = *Chelonia mydas*
Method	Method for evaluating nesting distribution. Enter one of the values from the list	FP = Foot patrols UAV = UAV surveys PS = Plane surveys
NestSiteIndicator	Indicate whether the identified cell ('Cell_ID') represents an active nesting site or is a potential nesting site. Enter one of the values from the list	A = active nesting site P = potential nesting site
ActiveNestSiteExtent	Extent, in square km, of active nesting site. If 'NestSiteIndicator' field has been compiled with 'P' enter '0' (zero) in this field	
PotentialNestSiteExtent	Extent, in square km, of potential nesting site. If 'NestSiteIndicator' field has been compiled with 'A' enter '0' (zero) in this field	
NestNumber	Number of nests. If 'NestSiteIndicator' field has been compiled with 'P' enter '0' (zero) in this field	
TracksNumber	Number of tracks. If no track has been found, enter '0' (zero) in this field	
NumHathchedEggs	Number of eggs hatched. If no hatched eggs have been found, enter '0' (zero) in this field	
NumUnopenedEggs	Number of integer eggs (unopened). If no integer eggs have been found, enter '0' (zero) in this field	
NumDeadEmbryosEggs	Number of dead embryos that have only pierced the egg	
NumDeadEmbryosNest	Number of embryos completely hatched from the egg but found dead in the nest	
HatchlingNumber	Number of hatchlings. If no hatchling has been found, enter '0' (zero) in this field	
SurfaceTemperature	Surface sand temperature in °C degrees	
UndersurfaceTemperature	Sand temperature at a depth of 30-40 cm, in °C degrees	
Remarks	Notes	

Table 3: DSs&DDs **Module BT2** (MarineHabitat: Bycatch/Strandings) **Area** for IMAP C. I.s 3&4 **- Marine Turtles**

Field	Description	List of value

CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
Sub-Region	Subregion according to the MSFD Article 4 on Marine regions or subregions (acronym).	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
Sub-Division	Subdivision of the subregions (Workshop for the delineation of subdivisions relevant for MSFD assessments/reporting in the Mediterranean Sea)	NWMS = North Western Mediterranean Sea ALBS = Alboran Sea TYRS = Tyrrhenian Sea SWMS = South Western Mediterranean Sea ADRS = Adriatic Sea CENT = Central Mediterranean Sea IONS = Ionian Sea AEGS = Aegean Sea LEVS = Levantine Sea
AreaName	Survey Area Name. National part of sub-division.	
AreaID	Survey Area code.	
Latitude	Latitude of the centroid of the distribution area of the species in the reference system in decimal degrees WGS84 with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the centroid of the distribution 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).	
ExtensionArea	Total monitored area in square kilometers	
GISfile	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: "ModuleBT2_GISfile_ <Sub-Region> _ <AreaName>.zip", eg. ModuleBT2_GISfile_MAD_GulfofTaranto.zip	
Remarks	Notes	

Table 4: DSs&DDs **Module BT2** (MarineHabitat: Bycatch/Strandings) **MarineHabitat** for IMAP C. I.s 3&4 **- Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Survey Area code.	
Species	Species name, enter one value in the list	CC = Caretta caretta CM = Chelonia mydas
Year_start	Sampling start year in YYYY format	

Month_start	Sampling start month in 1-12 format	
Year_end	Sampling end year in YYYY format	
Month_end	Sampling end month in 1-12 format	
ForagingArea	Foraging area, enter one value in the list	O = Oceanic foraging area N = Neritic foraging area MP = Migratory pathways
Method	Survey methodology for gathering information. Enter one value in the list. This field can be filled in with 'S' only if the 'ForagingArea' field has been filled in with 'N'	B = Bycatch S = Strandings
Seastate	Intensity of the wind according to Beaufort scale (from 0 to 12 degrees)	
NumberTurtles	Number of turtles sighted	
DensityTurtles	Number of turtles sighted per square kilometer, calculated as the ratio between the 'NumberTurtles' and 'ExtensionArea' fields	
Remarks	Notes	

Table 5: DSs&DDs **Module BT3** (MarineHabitat: Plane/Boat/UAV) **Area** for IMAP C. I.s 3&4 - **Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
Sub-Region	Subregion according to the MSFD Article 4 on Marine regions or subregions (acronym).	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
Sub-Division	Subdivision of the subregions (Workshop for the delineation of subdivisions relevant for MSFD assessments/reporting in the Mediterranean Sea)	NWMS = North Western Mediterranean Sea ALBS = Alboran Sea TYRS = Tyrrhenian Sea SWMS = South Western Mediterranean Sea ADRS = Adriatic Sea CENT = Central Mediterranean Sea IONS = Ionian Sea AEGS = Aegean Sea LEVS = Levantine Sea
AreaName	Survey Area Name. National part of sub-division.	
AreaID	Survey Area code.	
Latitude	Latitude of the centroid of the distribution area of the species in the reference system in decimal degrees WGS84 with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the centroid of the distribution 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).	

ExtensionArea **GISfile**	Total monitored area in square kilometers 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: "ModuleBT3_GISfile_<Sub-Region>_<AreaName>_<yyyy_mm_dd>.zip", eg.: ModuleBT3_GISfile_MAD_GulfofTaranto_2020_05_16.zip.	
Remarks	Notes	

Table 6: DSs&DDs **Module BT3** (MarineHabitat: Plane/Boat/UAV) **Site** for IMAP C. I.s 3&4 - **Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Survey Area code.	
SiteID	Study Site Code	
SiteName	Study Site Name	
Latitude	Latitude of the centroid of the distribution area of the species in the reference system in decimal degrees WGS84 with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the centroid of the distribution 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 7: DSs&DDs **Module BT3** (MarineHabitat: Plane/Boat/UAV) **Transect** for IMAP C. I.s 3&4 - **Marine Turtles**

Field	Description	List of value
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SiteID	Study Site Code	
TransectID	Code of the transect	
TransectName	Transect name	
Year	Year of sampling in YYYY format	
Month	Month of sampling in 1-12 format	
Day	Day of sampling in 1-31 format	
Time	Hour-minutes-seconds of sampling in HH:MM:SS format	
LatitudeSTART	Latitude starting point of the transept in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	
LongitudeSTART	Longitude starting point of the transept in the WGS84 decimal degrees reference system with at least 5 digits	

	(xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	
LatitudeEND	Latitude ending point of the transept in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	
LongitudeEND	Longitude ending point of the transept in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	
GISfile	Name of the GIS file that contains the polyline related to each TransectID identifier. In the attributes table of the GIS file, for each polyline, the transect code 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 name of the file must be conform to the following composition rule: "ModuleBT3_GISfile_<TranseptName> _ <yyyy_mm_dd>.zip", eg. ModuloBT3_GISfile_TranseptTaranto1_2020_05_16.zip	
Remarks	Notes	

Table 8: DSs&DDs **Module BT3** (MarineHabitat: Plane/Boat/UAV) **Marine habitat** for IMAP C. I.s 3&4 **- Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
TransectID	Code of the transect	
ForagingArea	Foraging area, enter one value in the list	O = Oceanic foraging area N = Neritic foraging area IA = Internesting areas
Species	Species name, enter one value in the list	CC = Caretta caretta CM = Chelonia mydas
Method	Survey methodology for gathering information. Enter one value in the list	PS = Plane survey BS = Boat survey UAV = UAV survey
Seastate	Intensity of the wind according to Beaufort scale (from 0 to 12 degrees)	
NumberTurtles	Number of turtles sighted	
Remarks	Notes	

Table 9: DSs&DDs **Module BT4** (MarineHabitat: Telemetry) **Area** for IMAP C. I.s 3&4 **- Marine Turtles**

Field	Description	List of value
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Identification code of the survey area	
SubRegion	Sub-region according to the Mediterranean Sea subdivision	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas

Sub-Division	Subdivision of the subregions (Workshop for the delineation of subdivisions relevant for MSFD assessments/reporting in the Mediterranean Sea)	NWMS = North Western Mediterranean Sea ALBS = Alboran Sea TYRS = Tyrrhenian Sea SWMS = South Western Mediterranean Sea ADRS = Adriatic Sea CENT = Central Mediterranean Sea IONS = Ionian Sea AEGS = Aegean Sea LEVS = Levantine Sea
AreaName	Study Area Name	
AreaExtension	Survey Area extension (km2)	
Latitude	Latitude of the centroid or the reference point of the animal location inside the study area in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the centroid or a reference point of the animal location inside the study area in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	
Remarks	Notes	

Table 10: DSs&DDs **Module BT4** (MarineHabitat: Telemetry) **Telemetry** for IMAP C. I.s 3&4 - **Marine Turtles**

Field	Description	List of value
CountryCode	Enter member country code as ISO two digits, for example "IT" for Italy.	
SubRegion	Sub-region according to the Mediterranean Sea subdivision. Choose one of the value of the list	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
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	
Tag	Provide information about the type of tag used.	
ArgosID	Argos identification number (ptt) associated with the tag used.	
Latitude	Latitude of the centroid or the reference point of the animal location inside the study area in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of the centroid or a reference point of the animal location inside the study area in the WGS84 decimal degrees reference system with at least 5 digits (xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	
Depth	Depth (m) of the animal.	
L.C.	Argos location class attributed to the animal location. Choose one of the value of the list	G A

		B Z 1 2 3 0
Sensor	Other data recorded by the tag (e.g. temperature, salinity...)	
Species	Species name, enter one value in the list	CC = Caretta caretta CM = Chelonia mydas
Size	Size (curved carapace length in m) of the tagged individual.	
Sex	Sex of the tagged individual. Choose one of the value of the list	
Positions	Naming the GIS file that contains the positions of the monitored species. 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> _ Telemetry_<gg_mm_aaaa> .zip", eg. ModuleT1_GISfile_Ionian_GulfofTaranto_Telemetry_05_2016.zip. If Region and / or AreaName contains spaces, replace these spaces with "_".	
Remarks	Any notes or comments	

Table 11: DSs&DDs **Module BT5** (Nesting and Demography) **Area** for IMAP C. I. 5 - **Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
Sub-Region	Subregion according to the MSFD Article 4 on Marine regions or subregions (acronym).	MWE = Western Mediterranean Sea MAD = Adriatic Sea MIC = Central and Ionian Seas MAL = Aegean and Levantine Seas
Sub-Division	Subdivision of the subregions (Workshop for the delineation of subdivisions relevant for MSFD assessments/reporting in the Mediterranean Sea)	NWMS = North Western Mediterranean Sea ALBS = Alboran Sea TYRS = Tyrrhenian Sea SWMS = South Western Mediterranean Sea ADRS = Adriatic Sea CENT = Central Mediterranean Sea IONS = Ionian Sea AEGS = Aegean Sea LEVS = Levantine Sea
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 reference system in decimal degrees WGS84 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 12: DSs&DDs **Module BT5** (Nesting and Demography) **Breeding areas** for IMAP C. I. 5 - **Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Survey Area code.	
Year	Sampling year in YYYY format	
Month_start	Sampling start month in 1-12 format	
Day_start	Sampling start day in 1-12 format	
Month_end	Sampling end month in 1-12 format	
Day_end	Sampling end day in 1-12 format	
Species	Species name, enter one value in the list	CC = Caretta caretta CM = Chelonia mydas
ClutchSize	Number of eggs per clutch	
LayingDates	Laying dates in YYYY/MM/DD HH:MM format	
HatchingDates	Hatching dates in YYYY/MM/DD HH:MM format	
IncubationDuration	Elapsed time between LayingDates and HatchingDates	
IncubationTemperature	Nest temperature in °C degrees. Insert the value without the unit of measure (ex. if the nest temperature is 24°C, insert 24)	
HES	Hatchling Emergence Success (HES). Percentage (0-100) of eggs that produced a hatchling that escaped the nest (considering predation and inundation etc.). The evaluation of this index must be carried out considering all the nests of a beach as a single clutch	
NestCondition1	Specify whether the nest has been relocated or not. Enter one of the values from the list	IS = In situ RN = Relocated nests
NestCondition2	Specify whether the nest has been inundated or not. Enter one of the values from the list	I = Inundated NI = Non-inundated
NestCondition3	Specify whether the nest has been depredated or not. Enter one of the values from the list	D = Depredated ND = Non-depredated
InternestingInterval	Elapsed time in days between clutch deposition and the next time the turtle emerges onto the beach to nest- whether successfully or not	
RemigrationInterval	Number of years between successive breeding seasons	
ClutchFrequency	Average number of clutches deposited by a turtle during a single breeding period	
InternestIntervalMethod	Method for evaluating InternestingInterval, RemigrationInterval and ClutchFrequency. Identification from movements (Telemetry), by observation of turtle (Night patrols), by individual-specific DNA analysis (Genetics). Enter one of the values from the list	T = Telemetry NP = Night patrols G = Genetics
SR-H	Sex ratio of hatchlings	
SR-HMethod	Method for evaluating SR-H: derived from laying and hatching dates (ID), from nest/beach temperatures (T) or assessed from from blood sampling/hormone assay (BH). Enter one of the values from the list	ID = Incubation Duration T = Nest/beach temperatures BH = Blood sampling/Hormone assay

SR-BA	Sex Ratio of Breeding Adults. Ratio between the number of adult male and female turtles observed during during the pre-nesting season gathering at sea near the nest site	
SR-BAMethod	Method for evaluating SR-BA. Enter one of the values from the list. Enter "G", in case SR-BA has been determined by identification of males from genetic characteristics and inferred from multi-paternity in clutches	UAV = UAV survey PS = Plane survey BS = Boat survey G = (Genetics - hatchlings)
Longevity	Reproductive longevity expressed in years	
LongevityMethod	Method for evaluating Longevity. Enter one of the values from the list.	FP = Foot patrols CMR = Capture-Mark-Recapture
Remarks	Notes	

Table 13: DSs&DDs **Module BT5** (Nesting and Demography) **Marine habitat** for IMAP C. I. 5 - **Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy.	
AreaID	Survey Area code.	
ForagingArea	Foraging area, enter one value in the list	O = Oceanic foraging area N = Neritic foraging area
Species	Species name, enter one value in the list	CC = Caretta caretta CM = Chelonia mydas
Year_start	Sampling start year in YYYY format	
Month_start	Sampling start month in 1-12 format	
Day_start	Sampling start day in 1-12 format	
Year_end	Sampling end year in YYYY format	
Month_end	Sampling end month in 1-12 format	
Day_end	Sampling end day in 1-12 format	
Method	Survey methodology for gathering information. Enter one value in the list	BS = Boat survey UAV = UAV/Plane survey BCS = Bycatch/Strandings
NumAdultMales	Number of males adults per session	
NumAdultFemales	Number of females adults per session	
NumAdultUndefined	Number of adults with undefined gender per session	
NumSubAdultMales	Number of subadults turtles males per session	
NumSubAdultFemales	Number of subadults turtles females per session	
NumSubAdultUndefined	Number of subadults turtles with undefined gender per session	
NumYoung	Number of young turtles	
BycatchIncidence	Number of turtles captured bycatch	
MortalityBycatch	Mortality rate of individuals, resulting from the bycatch event, in percentage (0-100)	
MortalityTelemetry	Mortality rate of individuals identifiable by telemetry in percentage (0-100)	
MortalityCMR	Mortality rate of individuals identifiable by CMR (capture-mark-recapture) in percentage (0-100)	
MortalityStrandings	If ForagingArea = N enter the number of stranded turtles	
Remarks	Notes	

Table 14: DSs&DDs **Module BT5** (Nesting and Demography) **Individual** for IMAP C. I. 5 **- Marine Turtles**

Field	Description	List of value
CountryCode	Member country code as ISO two digits, for example "IT" for Italy	
AreaID	Survey Area code.	
Species	Species name, enter one value in the list	CC = Caretta caretta CM = Chelonia mydas
Year	Year of finding of the specimen in YYYY format	
Month	Month of finding of the specimen in 1-12 format	
Day	Day of finding of the specimen in 1-12 format	
ID_Specimen	Specimen identification code expressed as follows: CountryCode + Species + progressive number + year (eg. ITCC012019 indicates the first turtle of the Caretta caretta species collected in Italy in 2019)	
Latitude	Latitude of finding of the specimen in the decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx).	
Longitude	Longitude of finding of the specimen in the decimal degrees WGS84 reference system with at least 5 digits (xx.xxxxx). Use negative values for coordinates west of the Greenwich Meridian (0°).	
Survey_type	Surveys typology to assess and sample sea turtles for health assessments	B = Bycatch C = CMR S = Strandings
CCLs	Standard Curved Carapace Length (CCL). Measure in cm of the standard CURVED length of the carapace.	
Weigth	Weight in kg of the specimen (2 decimal places)	
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
Maturation_stage	Maturation stage Insert one of the values of the list	A = Adult S = Subadult Y = Young
Injuries	Major injuries. Specify "None" if there are no injuries or are not visible. Enter one of the values from the list	None Fracture Amputation Abrasion Disease Other
Age	Age of loggerhead turtles found dead, estimated by skeletochronology metodology	
Photo	Enter the name of the zip file defined as follows ID_Specimen_<year>_<month>_<day>.zip	
Remarks	Notes	