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Agenda item 6: Marine Litter Metadata Templates and Monitoring Protocols

Marine Litter Metadata Templates

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Introduction

1. The Regional Plan on Marine Litter Management in the Mediterranean (Decision IG21/7 – COP 18, Istanbul, Turkey, 2013) includes specific provisions on marine litter assessment and monitoring.
2. Article 11 of the Regional Plan on Marine Litter Management in the Mediterranean includes specific provision on the Assessment of Marine Litter in the Mediterranean. The Contracting parties in the framework of the Ecosystem Approach (EcAp) should assess the state of marine litter, the impact of marine litter on the marine and coastal environment and on human health as well as the socio-economic aspects of marine litter management based on coordinated and, if possible, common agreed methodologies, national monitoring programmes and surveys. Moreover, the Secretariat shall prepare an assessment report for the Mediterranean every six years based on the results of the national monitoring programmes and applied measures with the view to address priority issues and major information and data gaps.
3. Article 12 of the Regional Plan on Marine Litter Management in the Mediterranean includes specific provision on the establishment of Mediterranean Marine Litter Monitoring Programmes. Based on Ecosystem Approach (EcAp) ecological objectives and integrated monitoring programme, and in synergy with the relevant international and regional guidelines and documents the Contracting Parties, on the basis of the proposals of the Secretariat shall undertake the following activities:
 - a. Prepare the Regional Marine Litter Monitoring Programme, as part of the integrated regional monitoring programme;
 - b. Establish by 2016 a Regional Data Bank on Marine Litter which should be compatible with other regional or overarching databases and;
 - c. Establish by the year 2014 Expert Group on Regional Marine Litter Monitoring Programme, in the framework of the Ecosystem Approach implementation.
4. National Monitoring Programme on Marine Litter should be also designed by 2017 which should take into account the need for harmonization and consistency with the integrated regional monitoring programme based on ecosystem approach and consistency with other regional seas.
5. During the 19th COP of the Barcelona Convention, the Mediterranean countries adopted in 2016 the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP - Decision IG.22/7¹), committing to assess and monitor two common and one candidate indicators for Ecological Objective 10 (EO10); marine litter:
 - Common Indicator 22: The trends in the amount of litter washed ashore and/or deposited on coastlines (including analysis of its composition, spatial distribution and, where possible, source).
 - Common Indicator 23: The trends in the amount of litter in the water column including microplastics and on the surface.
 - Candidate Indicator 24: Trends in the amount of litter ingested by or entangling marine organisms focusing on selected mammals, marine birds and marine turtles.
6. Data collection for marine litter is rapidly growing at regional level in the Mediterranean. The fact that marine litter is high in the national, EU, and global agendas from policy and science aspects, makes more and more funding opportunities available to support initiatives and projects resulting in new knowledge (i.e. data generation) on marine litter. Taking also into account the necessity in expanding the monitoring on marine litter at regional level, this will lead in significant data generation and flow which

¹<https://wedocs.unep.org/rest/bitstreams/8385/retrieve>

needs to be effectively and efficiently managed. Well-managed data should be stored in the right place (i.e. database), available at the right time (immediate reaction), in the right format (validated, standardized, data is made usable) and should be available for all interested users (usage governed).

7. Today data on marine litter in the Mediterranean are still inconsistent, in some cases not comparable and geographically restricted to the northern part of the Mediterranean. The picture on marine litter is still fragmenting and several aspects of marine litter (i.e. beach marine litter, seafloor marine litter, floating microplastics, etc.) cannot be assessed at regional level. The proper storage and management of all data that will become available in the near future is thus becoming a real challenge.

8. Following the update/revision of the existing national monitoring programmes of the Contracting Parties according to the Integrated Monitoring and Assessment Programme (IMAP) Assessment Criteria, a need to report quality assured data on marine litter emerges. The data should be reported following a common regional monitoring reporting template to suit a corresponding regional database. In that respect, the Secretariat has prepared the present document presenting the state of play of existing marine litter databases and the corresponding data and metadata reporting templates to facilitate the development of the relates IMAP reporting templates on marine litter.

Towards a Shared Environmental Information System (SEIS) based Marine Litter Data and Metadata Reporting and Database for the Mediterranean

9. Contracting parties are at various stages in the revision of their national monitoring programmes for the two IMAP Marine Litter common indicators and are encouraged to also consider piloting monitoring for the candidate indicator related to ingested litter. In order to establish a harmonized and comparable database for the Mediterranean, common methodologies for sampling, analysis and data reporting are required. The Secretariat is supporting Contracting Parties in this regard through the following actions:

- i. Development of Indicator Guidance Factsheets, regarding methodologies for sampling and analysis by 2017. These build upon the IMAP Guidance document prepared and presented at the last 19th COP of the Barcelona Convention in 2016, and will be reviewed by Contracting Parties for submission to MAP and EcAp Focal Points in September 2017.
- ii. The development of data and meta-data templates for the two common Marine Litter Indicators
- iii. The development of an Information System by the Regional Activity Center on Information (INFO/RAC) for the integration of IMAP monitoring data.

10. The data and meta-data templates developed will be integrated into the online information system, so as to allow Contracting Parties to report data and meta-data online in the future. A data quality control protocol will be developed and applied to ensure quality control of the database.

11. Once a standardized and comparable approach is undertaken for the sampling, handling and analysis of the Marine Litter indicators, future Mediterranean wide assessments will be more accurate in reporting on the current status of Marine Litter (and the other IMAP related indicators) and to be able to assess whether or not Good Environmental Status is being achieved.

12. A significant problem which still remains is the submission of quality assured data accompanied by the best suited metadata. Metadata is data that describes other data, summarizing basic information about data, which can then make findings and working with data much easier. Having the ability to filter data through metadata makes it much easier for someone to locate a specific aspect, in particular for

marine litter. The value of metadata lies in its ability to more efficiently classify and organize information, as well as to yield deeper insight into the submitted data providing more intelligence and higher quality information to fuel big data initiatives, automation, compliance, data sharing, collaboration and more.

Existing Marine Litter Databases

13. The development of dedicated databases on marine litter is highly desired and such initiatives should be promoted at regional level. The past year several attempts have been done by projects and initiatives to develop corresponding marine litter databases. The IPA-Adriatic DeFishGear2 project, the European Environment Agency (EEA) Marine LitterWatch3 (MLW) smartphone application, the FP7 MARLISCO project⁴, and the International Bottom Trawl Surveys in the Mediterranean (MEDITS)⁵ project are some of the examples of the developed databases on marine litter. The OSPAR Commission for protecting and conserving the North-East Atlantic and its recourses, has developed a good example of a regional database on beach marine litter⁶. The OSPAR beach litter database stores marine litter data collected on references beaches using the standardized OSPAR beach litter monitoring guidelines. The online database has been developed to manage that data and allow it to be interrogated at the regional, sub-regional and beach level.

14. These databases are geo-referenced in order to spatially illustrate the collected information on marine litter types, amounts, abundance and distribution. Databases should be user-friendly so that scientists, policy makers and all interested stakeholders may access them and take the corresponding information they are interested for. The databases should serve as a mechanism for the effective management of the collected data and information, ensure proper data flow, to better drive science-judgment and facilitate decision and policy making at local, national and regional level.

Detailed Analysis of the Existing Metadata Reporting on Marine Litter

15. The IPA-Adriatic DeFishGear project has developed several reporting metadata templates to facilitate and ensure the proper data management of the submitted data and information. Ten different reporting templates have been prepared corresponding to each different marine litter aspect i.e. beach macro-litter, beach micro-litter, biota-macro, biota-micro, fishing litter, sea surface macro, sea surface micro, seafloor macro scuba, seafloor macro trawl, and seafloor micro.

16. Each metadata templates comprises of three different sheets requesting from the users information on: i) Location; ii) Survey; and iii) Items. These reporting templates are not identical and include corresponding adjustments and deviations depending on the different marine litter aspect that the user is interested in surveying. Each metadata reporting template also includes a sheet with a detailed item code list (item name and type, and code). The required information and related features are summarized under the following Table 1:

²<http://defishgear.izvrs.si/PassAuth/AutoAuth.aspx?ReturnUrl=/defishgear>

³http://www.eea.europa.eu/themes/coast_sea/marine-litterwatch/data-and-results/marine-litterwatch-data-viewer-1

⁴<http://www.marlisco.eu/marine-litter-database.el.html>

⁵ http://www.sibm.it/MEDITS%202011/docs/Medits_Handbook_2016_version_8_042016.pdf

⁶ <http://www.mcsuk.org/ospar/>

Table 1: An overview of the information and features required in the DeFishGear marine litter reporting templates.

Location	Location features: country, compartment, location name, beach coordinates and length, date, sea currents, winds, beach orientation, beach material and type, etc.
	Beach usage: primary , secondary, tertiary, seasonal, etc
	Town and development features: distance from town, town name, population, developments close to the beach, etc.
	Food and drink features: food and drink services, distance to services, seasonality of services, etc.
	Ship features: distance to shipping lane, ships/year, prevailing ship type, etc.
	Harbor features: harbor name, distance to harbor, type of harbor, harbor size, etc.
	River features: river name, distance to river mouth, etc.
	Waste water disposal features
	Cleaning features: beach clean-ups, clean-up method, etc.
Other data: additional notes and comments, surveyor name and email	
Survey	Location features
	Sample features
	Survey features
	Animal features
	Items aggregated
	Other survey data ; vii) observation features
Items	sample features
	information on items

17. The international bottom trawl survey in the Mediterranean (MEDITS) in their instruction manual (Version 8 – Annex XIII) includes a proposal for collecting data on litter collected during the MEDITS trawl surveys under the name “L files” (litter recording) together with a corresponding protocol. This protocol is aimed to standardize the procedure to collect data on litter caught during the MEDITS trawl surveys. While recording marine litter found during the MEDITS surveys the following information re required :

- Country (ISO code);
- Area (GFCM code);
- Vessel (MEDITS code);
- Year / month / day;
- Haul number;
- Litter category;
- Litter sub-category;
- Total weight per category per haul;
- Total number per category per haul;
- Total weight per sub-category per haul; and
- Total number per sub-category per haul.

18. In total thirty four (34) different typologies were identified including 9 main categories (plastic, rubber, metal, glass/ceramic/concrete, cloth/natural fibres, wood processed (palettes, crates, etc.), paper and cardboard, other and unspecified).related to litter material and 25 sub-categories related to source and main litter findings.

19. Litter data are reported in a specific form to be integrated with haul information included in TA files (haul characteristics), in order to estimate a standardized index of total and by categories litter abundance per square kilometer, aiming to future recommendation depending on litter sources. It is mandatory to record or estimate total weight, regardless the categories and subcategories, and number of items for each main category: It is facultative to register weight by categories and number of items by sub-category. In case of large amount of litter in the catch, all big sized objects of litter must be recorded while a subsample could be analyzed for small sized litter (e.g. lids). Litter should be coded as total, by category and sub-category. Detailed data on total weight and litter composition must be reported in the specific form on litter. Qualitative and quantitative data on the litter have to be connected to data regarding the characteristics of the haul (Date, code of haul, the GPS positions of the haul (start and end), trawled distance, average speed, characteristics of the haul (horizontal opening), depth of haul etc.), contained in the TA file (haul characteristics).

20. The OSPAR Commission for protecting and conserving the North-East Atlantic and its resources has developed a detailed and informative marine litter beach questionnaire to accompany the Marine Litter Monitoring Survey Form for marine litter found along the coasts of the OSPAR maritime area.

21. For each OSPAR reference beach a questionnaire must be completed by the national coordinator. The questionnaire includes information on the location and the physical and geographical characteristics of each beach, including the proximity of possible sources of marine litter. Also included are questions regarding factors that could help explain the amounts, types, and composition of marine litter found on that beach, for example, cleaning schemes. The questionnaire provides background information for the analysis of beach survey data. The coordinator is asked to gather as much relevant information as possible. It is advisable to contact local, regional or national authorities for information on cleaning schemes etc. For questions on the proximity of shipping lanes, river mouths, waste water outlets, etc. only official data and information from authorities responsible should be used. When circumstances change, for example, the development of a new residential area nearby, then the questionnaire should be updated. The Marine Litter Beach Questionnaire includes the following information on:

- Beach name and OSPAR beach ID;
- Country name;
- Beach width and length;
- GPS coordinates: start and end of the 100 m or 1 km beach stretch;
- Prevailing currents and winds;
- Direction of the beach
- Beach material and topography;
- Major beach usage;
- Access to the beach;
- Distance to nearest town;
- Development behind the beach;
- Food and drink outlets;
- Distance to the nearest shipping lane;
- Distance to the nearest Harbor;
- Distance to the nearest river mouth;
- Beach location near to discharge of waste water;
- Beach cleaning; and
- Additional comments and observations;
- Additionally, a map of the beach and local surrounding and a regional map should be also submitted.

22. The OSPAR Marine Litter Monitoring Survey Form has been developed according to the two corresponding sampling units that are used within the OSPAR area: i) 100-metres: for identifying all marine litter items; ii) 1-km: for identifying objects generally larger than 50 cm. For both units a separate survey form has been developed. The Monitoring Survey Forms include information on:

- Beach name and OSPAR beach ID;
- Country name;
- Surveyor name and contact information;
- Data;
- Last cleaning of the beach;
- Diversion from the predetermined 100 meters;
- Weather conditions;
- Stranded animals and related information,;
- Any circumstances influencing the survey;
- Any unusual type and/or amounts of litter;
- A detailed list of marine litter items (OSPAR ID, UNEP ID, name and type) one for the 100 metres area and another one for the 1 km area (for items bigger than 50 cm);
- Presence of pellets; and
- Special observations.
- A detailed multilingual photo guide has been developed to facilitate the monitoring and to further help users on the visual identification and categorization of litter found on the beaches.

23. In the international sphere, initiatives to tackle the growing marine debris accumulation and the impacts of macro- and micro- litter in the marine environment have been developed during the latest decades. Particularly, the Marine Debris Programme (<https://marinedebris.noaa.gov/>) of the National Oceanographic and Atmospheric Agency (NOAA, USA) is leading the efforts at the science-policy interface to both investigate and prevent the adverse impacts of marine debris. The NOAA Marine Debris Program is authorized by Congress to work on marine debris through the Marine Debris Act, signed into law in 2006 and amended in 2012. On the other hand, the International Pellet Watch (IPW) initiative (<http://www.pelletwatch.org/>), initiated and coordinated by Japan aims to the global monitoring of plastic pollution, as well as the monitoring of POPs using beached plastic resin pellets. IPW is based on the fact that POPs are accumulated in resin pellets (plastic raw material) from the surrounding seawater by a factor of millions. Similar accumulation occurs with broken plastic fragments in the ocean (microlitter). Both programmes offers an extensive free-online material, such as metadata templates, reporting templates, monitoring strategies, etc. from scientific, educational and stakeholder perspectives.

Main Elements to build Data and Metadata Reporting on Marine Litter in the Mediterranean

[A] Beach Marine Litter

24. Reporting template should be developed by the Secretariat including information on data and metadata based on commonly agreed features to ensure the harmonization of the submitted data, and to facilitate the assessment of marine litter at regional level on beach marine litter. This could be implemented with the following two forms: one form corresponding to the Beach Identification (hereinafter referred to as “Beach ID Form”) which will be submitted on a yearly basis for each beach, and another one corresponding to the Beach Survey Form which will be submitted each time a beach marine litter survey is carried out as part of the official national monitoring programme. The following elements/features are proposed by the Secretariat to be included in the corresponding Beach ID Form and Beach Survey Form:

25. The Beach ID Form is proposed to include the following elements/features:

- Name of the beach;
- National beach ID;
- Country;
- Date;
- Name and contact information (phone, e-mail, etc.)
- Beach width (m);
- Total length of the beach (m);
- Back of the beach (e.g. dunes);
- GPS coordinates start 100m;
- GPS coordinates end 100m;
- Prevailing currents at the beach: N/E/S/W;
- Prevailing winds: N/E/S/W;
- Direction towards the beach is facing: N/E/S/W;
- Type of beach (e.g. pebble, sand, rocky, mixed, etc.);
- Any objects in the sea influencing the currents;
- Major beach usage (e.g. local people, swimming, sunbathing, fishing, surfing, etc.);
- Access to the beach (e.g. public transportation, private vehicle, on foot, boat, etc.);
- Nearest town;
- Distance from the nearest town;
- Developments behind the beach (Y/N);
- Specify developments;
- Food and/or drink outlets on the beach (Y/N);
- Distance of the food/drink outlets from the survey areas (m/km);
- Period over the year where the food/drinks are open (specify months);
- Distance of the beach to the nearest shipping lane (km);
- Estimated traffic density (number of ships/year);
- Distance of the beach to the nearest harbor (km);
- Is the harbor entrance facing the survey area (Y/N);
- Distance of the beach to the nearest river mouth (km);
- Name of the river;
- Water flow in the river/river mouth when the survey is taking place (Y/N);
- Distance of the beach to the nearest discharge or discharges of waste water (km);
- Beach clean-ups on the selected beach (Y/N);
- Frequency of the beach clean-ups (specify months);
- Map of the beach
- Additional comments and observations;

26. The Beach Survey Form is proposed to include the following elements/features:

- Name of the Beach;
- National beach ID;
- Country;
- Date of survey;
- Surveyor information (name, phone number, e-mail);
- Previous conducted survey (dd/mm/yy);
- Did you divert from the pre-determined 100 metres (Y/N; give new coordinates);
- Weather conditions (wind, rain, sand storm, fog, high tide, etc);
- Stranded animals (Y/N);
- Describe the stranded animal;

- Stranded animal dead or alive (D/A);
- Stranded animal entangled in litter (Y/N, specify litter item);
- Any factors influencing the survey (specify; e.g. track/vehicles on the beach, etc.);
- Any unusual marine litter items and/or marine litter loads (specify);
- Master list of categories agreed for beaches (IMAP Marine Litter Master List Categories: UNEP(DEPI)/MED IG.22/Inf.7 – Annex VII), including UNEP Code, General Name, and total number of recorded items (per category and sub-category), listed per different Material (Level 1);
- Any pellets observed (Y/N);
- Additional comments and observations.

[B] Seafloor Marine Litter

27. A reporting template should be developed by the Secretariat including information on data and metadata based on commonly agreed features to ensure the harmonization of the submitted data, and to facilitate the assessment of marine litter at regional level on seafloor marine litter. The below listed elements/features could be included in the corresponding survey forms for assessing seafloor marine litter:

- Country;
- Date (dd/mm/yy);
- Surveyor information (name, phone, e-mail, etc.);
- Area (EcAp Code);
- Campaign name;
- Vessel name;
- Haul number;
- Gear (e.g. bottom trawl, etc.);
- Speed (knot);
- Opening of the net (m) (e.g. SCANMAR Trawl Sensor or SIMRAD);
- Cod-end mesh size (mm);
- Latitude (Start and End);
- Longitude (Start and End);
- Depth (Start and End);
- Haul duration (minutes);
- Distance covered (km);
- Weight (total) of litter per haul (kg);
- Weight (total) per category and sub-category (kg);
- Master list of categories agreed for seafloor (IMAP Marine Litter Master List Categories: UNEP(DEPI)/MED IG.22/Inf.7 – Annex VII), including UNEP Code, General Name, and total number of recorded items (per category and sub-category), listed per different Material (Level 1);
- Additional comments and observations (e.g. any unusual marine litter items).

28. The following steps are proposed towards establishing common data and metadata reporting templates on beach and seafloor marine litter in the Mediterranean:

- a. Discussion of the corresponding elements/features during the Meeting of the Ecosystem Approach Correspondence Group (CORMON) on Marine Litter Monitoring (Madrid, Spain, 28 February – 2 March 2017) and request for feedback from CORMON by 20 March 2017;
- b. The secretariat develops the draft marine litter data and metadata templates to be shared with the CORMON (using the online INFO system) for further comments and feedback by the 15 April 2017;

- c. The final version of the data and metadata reporting templates will be finalized and presented at the next MED POL Focal Point Meeting (May 2017).