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**Agenda Item 6: Technical Guiding Elements on IMAP Implementation: Assessment Criteria and Scales, Thresholds, Baseline Values**

**Updated Baseline Values and Proposal for Threshold Values for IMAP Common Indicator 22**

**Note by the Secretariat**

In 2016, the 19th Meeting of the Contracting Parties adopted the marine litter Baseline Values (Decision IG.22/10). The 2016 Baseline Values were established for IMAP Common Indicator 22 (i.e. beach macro-litter), Common Indicator 23 (i.e. seafloor macro-litter, and floating micro- and macro-litter), and Candidate Indicator 24 (i.e. affected (%) sea turtles and ingested (gr) marine litter). The 2016 Baseline Values were complimented with marine litter environmental reduction targets (Decision IG.22/10) including a reduction target of 20% for beach marine litter by 2024, and significant and measurable decrease of other marine litter types.

With the view to further updating the marine litter assessment criteria and related baseline values; and taking into consideration the work undertaken in this field, and in line with UNEP/MAP Programmes of Work (PoW) for the biennia 2018-2019 and 2020-2021; MED POL was assigned the task for proposing updated Baseline Values (BV), and recommending Threshold Values (TV) for IMAP Ecological Objective 10 (Marine Litter) and its Common Indicator 22 (CI22). Those values were initially presented for review during the Regional Meeting on Pilot Projects and Assessment Tools for Marine Litter (Athens, Greece, 19-20 November 2019 - UNEP/MED WG.476/3) and to the Integrated Meetings of the Ecosystem Approach Correspondence Groups on IMAP Implementation (Videoconference, 1-3 December 2020 – UNEP/MED WG.482/23).

Based on the comments received during the Integrated CorMon Meeting (Dec. 2020) and the relevant conclusions and recommendations, MED POL prepared an advanced version of the working document (i.e. UNEP/MED WG.482/23/Rev.1) with updated datasets from Italy. This version was further submitted to the participants of the Integrated CorMon Meeting requesting for their non-objection on the suggested changes during a period of two weeks. Further to received inputs, MED POL prepared its updated version (i.e. UNEP/MED WG.509/11) which was presented, reviewed and approved during the resumed session of the MED POL Focal Points Meeting on 9 July 2021. The MED POL Focal Point Meeting recommended its submission to EcAp CG meeting for its consideration and pending their approval, the Table with the proposed Updated Baseline Values and Establishment of Threshold Values for Marine Litter CI 22 may also be presented to the MAP Focal Points meeting as part of the proposed Decision on the Marine Litter Regional Plan for COP 22 consideration.

**Table of Contents**

# List of Abbreviations / Acronyms

| | |
|---|---|
| **AD** | Adriatic Sea |
| **CI** | Common Indicator |
| **CM** | Central Mediterranean |
| **DD** | Data Dictionaries |
| **DS** | Data Standards |
| **EM** | Eastern Mediterranean |
| **EU** | European Union |
| **IMAP** | Integrated Monitoring and Assessment Program of the Mediterranean Sea and Coast and Related Assessment Criteria |
| **MED POL** | Mediterranean Pollution Assessment and Control Programme |
| **ML** | Marine Litter |
| **MSFD** | Marine Strategy Framework Directive |
| **TGML** | Technical Group on Marine Litter |
| **TV** | Threshold Values |
| **UN** | United Nations |
| **WM** | Western Mediterranean |

## 1. Objective

1.      The objective of the present document is to elaborate/formulate/update marine litter assessment criteria at regional and sub-regional levels, taking into account recent developments on the national and regional levels concerning marine litter monitoring and assessment, and most importantly the outcomes of implementation of the Integrated Monitoring and Assessment Program of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP). This document includes a proposal for updated the Baseline Values (BV) for IMAP Common Indicator 22 (CI22) (beach macro-litter), to replace those agreed in 2016 (Decision IG.22/10 – Annex III), as well as to establish Threshold Values (TV) for IMAP CI22 underpinning comparable and compatibly assessment criteria at regional and sub-regional levels.

## 2. Conceptual Approach, Definition and Estimation of Marine Litter Baseline and Threshold Values

### 2.1     Baseline Values

2.      After the adoption of the Regional Plan on Marine Litter Management in the Mediterranean in 2013 (Decision IG.21/7), UNEP/MAP adopted in 2016 the Marine Litter Baseline Values (Decision IG.22/10 – Annex II) against which the implementation of the Regional Plan programs of measures could be assessed. These baseline value would enable the establishment of Marine Litter Environment Reduction Targets (Decision IG.22/10), as well as assessing whether Good Environmental Status (GES) is met. They also provide guidance on the way forward for the effective marine litter management in the region.

3.      <u>Definition of Baseline Values:</u> According to definition provided by the UNEP/MAP Informal Online Group on Marine in 2015[1], "*A baseline is a description of environmental state at a specific point against which subsequent values of state are compared. It may refer to a specified level of an impact or a pressure and act as a reference against which limit can be set or trends for the assessment of GES. Baselines can be derived from reference conditions, initial assessment values, the present state or a potential/predicted issue.*"

4.      The Joint Research Centre (JRC) of the European Commission (EC), introduced a similar definition: "*A baseline value for marine litter refers to the information related to marine litter abundance that can be used as reference point in time in order to test the achievement of quantitative litter reduction goals (JRC, 2019).*"

5.      In the framework of the Ecosystem Approach (EcAp), UNEP/MAP adopted in 2016 a series of Baseline Values for marine litter based on a thorough analysis of existing marine litter data and information, taking into consideration the IMAP marine litter-related indicators 22, 23 and 24. This analysis was conducted by the UNEP/MAP Informal Online Group on Marine Litter in 2014-2015 and was considered and approved by the Meeting of the Integrated Monitoring Correspondence Group in 2015 (Athens, Greece, 30 March – 1 April 2015).

6.      Baseline values will and can be used at different organizational levels for evaluating the compliance with reduction goals, and thus their setting is crucial in the entire process for reducing marine litter.

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[1] UNEP/MED WG.411/Inf.10: First Report of the Informal Online Group on Marine Litter. Meeting of the Integrated Monitoring and Assessment Group (Athens, Greece, 30 March – 1 April 2015).

### 2.2    Threshold Values

7.    <u>Definition of Threshold Values:</u> The New GES Decision (2017/848) of the European Commission (EC) provides a definition for the Threshold Values for marine litter: "*Threshold value means a value or range of values that allows for an assessment of the quality level achieved for a particular criterion, thereby contributing to the assessment of the extent to which good environmental status is being achieved.* "

8.    For the determination of Threshold Values (TV), pristine or next to pristine areas/ environments should be considered. Due to the ubiquity of plastic in the marine environment worldwide, it is very difficult to define/find a pristine area, which for some experts does not even exists (Matiddi M. et Al., 2019).

9.    The European Union (EU) Marine Strategy Framework Directive (MSFD) Technical Group on Marine Litter (TGML) proposes a threshold value, not based on evidence of ecological harm, which cannot be assessed in practice. Rather, it considers that there is some degree of freedom to establish a threshold value and an assessment method which shows a good level of ambition, is feasible (e.g. by selecting a low percentile value; percentile 1 and percentile 5), practical, and robust to apply (e.g. using the low percentile threshold value and the median assessment value). In that respect, a lower threshold value results in a lower residual risk of ecological harm (Willem van Loon et al. 2019).

10.    For the determination of the baseline and threshold values in the Mediterranean, UNEP/MAP has embarked on the IMAP implementation, establishing and implementing national monitoring programmes for marine litter across the Mediterranean. Relevant data sets deriving from national monitoring programmes will be gradually available during the 2020-2021 biennium. These programmes are expected to support the process for achieving GES with quality controlled and quality assured data.

### 3.    Data Sets and Data Management

11.    Marine litter Baseline and Threshold Values are strongly linked and associated with data availability and data quality. Data should be acquired through harmonized monitoring methodologies in order to provide comparable data. This continues to be a challenge, though much progress has been made in the framework of IMAP, whereby data are streamlined through the development of relevant information standards (i.e. Data Standards (DS) and Data Dictionaries (DD)) for the pollution and marine litter indicators, as well as the finalization of the IMAP InfoSystem.

12.    Quantitative data necessary to assess abundance, trends and distribution of marine litter are required in order to put in place and implement targeted and effective prevention and reduction measures for marine litter in the Mediterranean. While monitoring of marine litter has been ongoing for several years, it is not yet possible to get a comprehensive overview and thus to analyze the abundance of marine litter; distribution; categories; and trends in different spatial scales from local areas throughout the Mediterranean Sea. In that regard, there is still a need to further harmonize data collection methods, protocols and their analysis at all levels (e.g. categories, units, etc.).

13.    The following information and data are required in order to establish marine litter baseline values:
- Ideally, data collected using the same, or a comparable, monitoring protocol;
- Data with sufficient spatial coverage;
- Data with sufficient temporal coverage;
- Data with sufficient "fit-for-purpose" quality;
- Agreement on a procedure for data clean-up; and
- Agreement on a baseline calculation method.

14.     Moreover, it is crucial to agree on several variables related to data management and treatment (JRC, 2019), which include the following:

- The time period from which data is used for the calculation of baselines;
- The temporal aggregation of data;
- The spatial aggregation of data; and
- The mathematical procedure used for baseline calculation.

15.     Guidance elements, to further strengthen data submission via corresponding data flows, as well as how these can be used for the determination of baseline and threshold values for marine litter are provided under Annex I to the present document.

**4.     Methodological Approach to determine Baseline and Threshold Values on Marine Litter at Regional and Sub-Regional Levels in the Mediterranean**

16.     For the definition of baseline and threshold values for each common IMAP marine litter indicator (i.e. beaches, sea bottom and water column), the data used correspond to data collected from Contracting Parties to the Barcelona Convention between 2016 and 2018 deriving from monitoring programmes, projects and initiatives, after taking into consideration the comparability of the submitted data sets. The selection of the 2016-2018 period is due to the availability of full years data in a significant number of countries compared to previous years in which data availability was rather limited.

17.     Considering all available information from Contracting Parties, all steps have been undertaken in close collaboration with, scientific community and other sources from the literature. The discussion and set-up of baseline values has also taken into consideration the ongoing discussions on marine litter monitoring, top-litter item identification and establishment of threshold values (i.e. JRC, 2019).

**4.1     IMAP Candidate Indicator 22: Beach Marine Litter**

18.     For IMAP Common Indicator 22 (beach marine litter), thirteen (13) Countries have contributed with data for the present exercise. The set of data resulting from different surveys and initiatives were based on protocols with several differences. Therefore, the datasets were homogenized towards ensuring comparability, before performing the statistical analysis. Under the present exercise, it is presumed that data provided by the respective Focal Points have undergone thorough quality checks and do not contain erroneous data.

19.     All the surveys have been collected in a database in accordance with the templates proposed by UNEP/MAP in accordance with monitoring programs on marine litter in the Mediterranean (UNEP/MAP, 2017). The extreme values that have been observed (outliers) were retained in the datasets and were checked and verified case by case. The number of surveys conducted in each country and the year when it was undertaken for beach marine litter (IMAP CI22) are presented in Table 1.

**Table 1:** Number of surveys by country (beach litter)

| Sub-regions[2] | Country | Surveys | Years | Sources |
|---|---|---|---|---|
| **WM** | Algeria | 111 | 2018 | SWIM H2020 Support Mechanism |
| | France | 88 | 2016, 2017, 2018 | MED POL Focal Point France |
| | Italy | 162 | 2016, 2017, 2018 | MEDPOL Focal Point Italy |
| | Malta | 24 | 2017, 2018 | MED POL Focal point Malta |
| | Morocco | 16 | 2018 | MED POL Focal point Morocco |
| | Spain | 139 | 2016, 2017, 2018 | MED POL Focal Point Spain |
| **CM** | Greece | 3 | 2018 | MED POL Focal Point Greece |
| | Italy | 66 | 2016, 2017, 2018 | MED POL Focal Point Italy |
| | Libya | 12 | 2018 | MED POL Adopt-a-Beach Pilots in Libya |
| **AD** | Italy | 132 | 2016, 2017, 2018 | MED POL Focal Point Italy |
| | Slovenia | 16 | 2017 | MED POL Focal Point Slovenia |
| | Montenegro | 4 | 2018 | MED POL Adopt-a-Beach Pilots in Montenegro |
| | Albania | 4 | 2018 | MED POL Adopt-a-Beach Pilots in Albania |
| | Croatia | 6 | 2017, 2018 | MED POL Focal Point Croatia |
| **EM** | Cyprus | 31 | 2016, 2018 | EMODnet |
| | Israel | 8 | 2017, 2018 | MED POL Focal Point Israel |

## 5. Determination of Baseline and Threshold Values

### 5.1 IMAP Candidate Indicator 22: Beach Marine Litter

20. For each country and subregion, the basic statistical values have been calculated together with average and median values corresponding to the total amounts of marine litter found in each survey by year and then by country as illustrated in Table 4. The beach litter data distribution is shown in Fig. 1.

**Table 4:** Descriptive statistics parameters by country

| Country | Average | Standard Deviation | Median |
|---|---|---|---|
| Albania | 757 | 375 | 681 |
| Algeria | 782 | 587 | 625 |
| Croatia | 936 | 928 | 768 |
| Cyprus | 339 | 409 | 218 |
| France | 893 | 1513 | 436 |
| Greece | 1502 | 1501 | 708 |
| Israel | 157 | 154 | 128 |
| Italy | 762 | 872 | 475 |
| Libya | 2206 | 1185 | 2002 |
| Malta | 204 | 237 | 127 |
| Montenegro | 1440 | 1372 | 968 |
| Morocco | 1744 | 1398 | 1327 |
| Slovenia | 374 | 273 | 328 |
| Spain | 306 | 367 | 167 |
| **Total average** | **924** | **832** | **659** |

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[2] Western Mediterranean (WM); Central Mediterranean (CM); Adriatic Sea (AS); Eastern Mediterranean (EM)
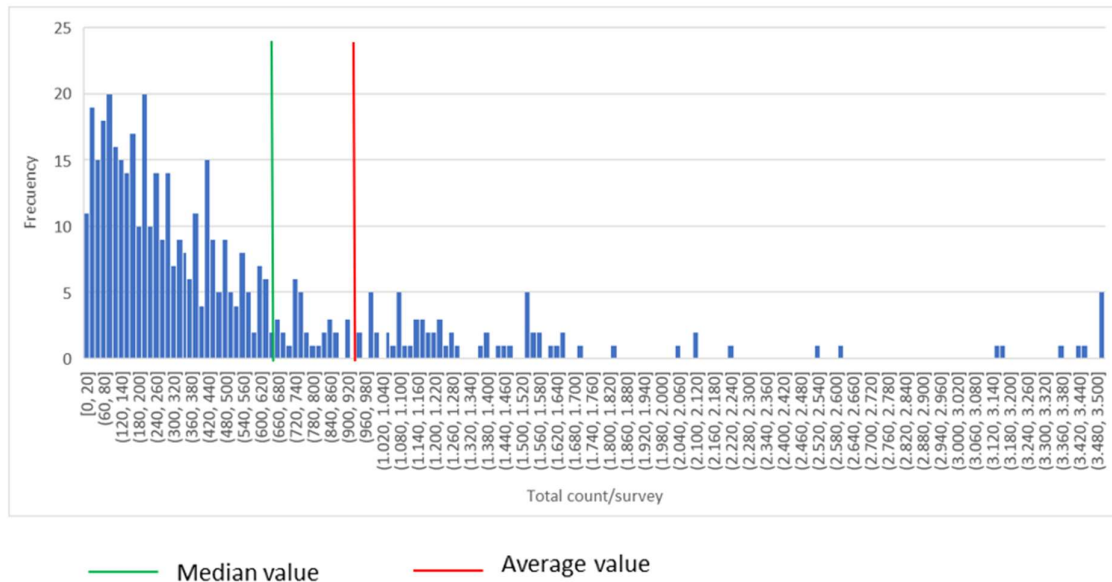
**Figure 1:** Beach litter data distribution

21.     As can be seen, non-symmetrical distributions are predominant in the marine litter count (Table 4 and Figure 1). Further examination of data presented in both Figure 5 and Table 2 indicate that the standard deviation is very high, even greater than the average for some countries, and at the level of the Mediterranean, it gives a very wide range of average values (i.e. Spain: average 306 items/100 m; standard deviation 367 items/100 m, Table 4). The graphic representation under Figure 1 shows that the data distribution for IMAP CI22 (beach marine litter) is very irregular; and thus, **the median value is the most representative**. In fact, the median value is considered a better measure of the central location of a value than the average value in the case of a non-symmetric distribution (Baggelaar, Paul K. and Van der Meulen Eit C.J., 2014; Willem van Loon et al., 2019). This is due to the reason that, the median value is not sensitive to extreme values (Willem van Loon et al. 2019). For example, the median beach litter abundance values of France (Table 4) are much more comparable with other countries' median abundance values than the average values. Extreme values may sometimes occur, e.g. due to a storm event or an accidental loss of litter at sea. For all countries, the use of the median value will make the assessment insensitive to these occasional extreme values (Willem van Loon et al. 2019).

22.     The best spatial coverage is considered to be the combination of "Country" and "Sub-region" (i.e. Country-SubRegion) (JRC, 2019). The Top-X calculation was conducted for each consecutive year for the period 2016-2018 (i.e. 2016, 2017 and 2018), and for each Country-SubRegion (e.g. IT-AD, IT-CM, IT-WM, etc.).

23.     The Mediterranean Top-X marine litter items list that contributed to the 80th percentile of the total recorded items for the period 2016-2018 for each Country-SubRegion are presented in Table 5 (Baggelaar, Paul K. and Van der Meulen Eit C.J., 2015). The Top-X and Top-10 marine litter lists per country can be found under Annex II to this document.

**Table 5:** Relative and cumulative frequency of marine litter in the Mediterranean (Top 10 and Top X)[3]

| | UNEP Code | Item name | Relative Frequency.[4] | Cumulative Frequency |
|---|---|---|---|---|
| **Mediterranean Top-10 Marine Litter Items** | G76 | Plastic/polystyrene pieces 2.5 cm > < 50 cm | 0,16504423 | 0,16504423 |
| | G27 | Cigarette butts and filters | 0,12921627 | 0,2942605 |
| | G21/G24 | Plastic caps and lids (including rings from bottle caps/lids) | 0,08743357 | 0,38169407 |
| | G95 | Cotton bud sticks | 0,05249481 | 0,43418888 |
| | G7/G8 | Drink bottles | 0,04973091 | 0,48391979 |
| | G30/G31 | Crisps packets/sweets wrappers/Lolly sticks | 0,03998183 | 0,52390162 |
| | G124 | Other plastic/polystyrene items (identifiable) including fragments | 0,03299665 | 0,55689827 |
| | G50 | String and cord (diameter less than 1 cm) | 0,02712216 | 0,58402043 |
| | G208a | Glass fragments >2.5cm | 0,02302928 | 0,60704971 |
| **Mediterranean Top-X (80%) Marine Litter Items** | G200 | Bottles (including identifiable fragments) | 0,02032637 | 0,62737608 |
| | G73 | Foam sponge items (i.e. matrices, sponge, etc.) | 0,01956879 | 0,64694487 |
| | G34/G35 | Cutlery, plates and trays / Straws and stirrers | 0,01892997 | 0,66587484 |
| | G3 | Shopping bags incl. pieces | 0,0179509 | 0,68382574 |
| | G10 | Food containers incl. fast food containers | 0,01342144 | 0,69724718 |
| | G33 | Cups and cup lids | 0,01306833 | 0,71031551 |
| | G204 | Construction material (brick, cement, pipes) | 0,01288535 | 0,72320086 |
| | G152 | Cigarette packets | 0,01184849 | 0,73504935 |
| | G67 | Sheets, industrial packaging, plastic sheeting excluding agriculture and greenhouse sheeting | 0,01109412 | 0,74614347 |
| | G4 | Small plastic bags, e.g. freezer bags incl. pieces | 0,01085015 | 0,75699362 |
| | G175 | Cans (beverage) | 0,01072495 | 0,76771857 |
| | G54 | Nets and pieces of net > 50 cm | 0,01030122 | 0,77801979 |
| | G158 | Other paper items (including non-recognizable fragments) | 0,01023381 | 0,7882536 |
| | G145 | Other textiles (including pieces of cloths, rags, etc.) | 0,01013108 | 0,79838468 |

24.    The Mediterranean Top-X list includes 23 items (from G76 to G145) and represents approximately 80% of the information collected, while the Top-10 list only represents 63% of the information (Table 5).

25.    The parameter used in the analysis (median) was defined and a weighing factor was applied. The weighing factor has been calculated as the percentage of the length of the coast corresponding to each country within its subregion and within the entire Mediterranean coast (JRC, 2019) (Table 6).

26.    Accordingly, it was found that the data provided by the Contracting Parties represent 60% of the total length of the Mediterranean coastline. The analysis must take into account a weighting factor based on the length of coast of each country in each subregion, and of each subregion in the total Mediterranean coast to increase spatial representativeness. This approach significantly increased the data representativeness as illustrated in Table 6.

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[3] The Relative and cumulative frequency for the full UNEP/MAP list for beach marine litter items is presented under Annex III.

[4] Objects with relative frequencies <0.01 are excluded from the Top X (Baggelaar, Paul K. and Van der Meulen Eit C.J., 2015).
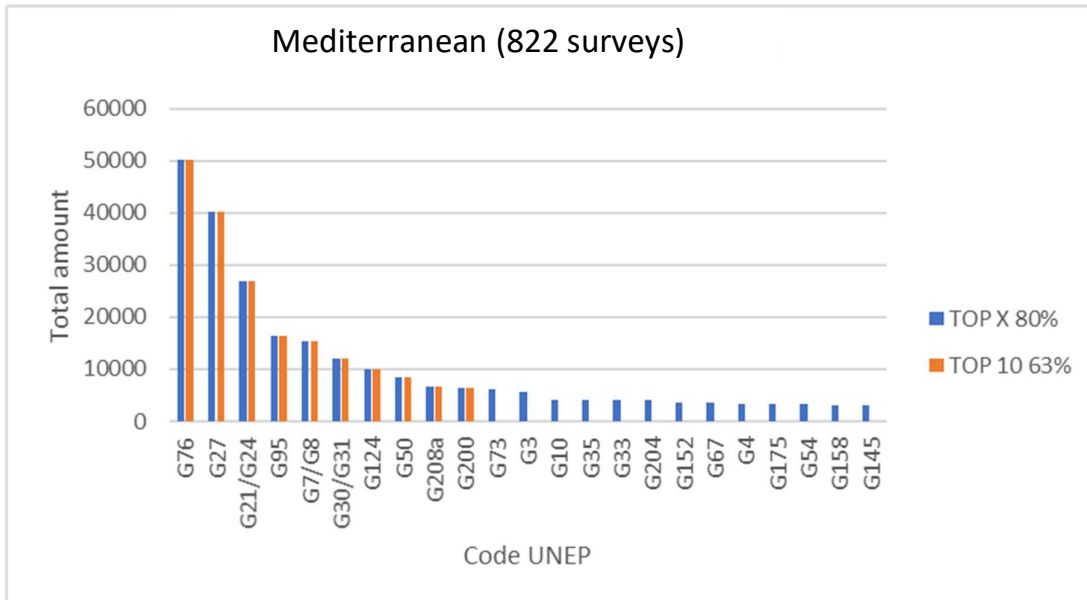
**Figure 2:** Top-X vs. TOP-10 marine litter items per Mediterranean (Table 6)

**Table 6:** Percentage of the Mediterranean coast by country (World Resources Institute, 2016)

| Mediterranean Sub-region | % Coast Length | Country Code | % subregion coast length |
|---|---|---|---|
| WM | 29 | DZ | 14 |
| | | ES | 27 |
| | | FR | 15 |
| | | IT | 20 |
| | | MA | 5 |
| | | MT | 2 |
| | | TN | 17 |
| CM | 12 | AL | 2 |
| | | GR | 42 |
| | | IT | 15 |
| | | LY | 43 |
| AD | 34 | AL | 4 |
| | | BA | 0,4 |
| | | HR | 44 |
| | | SI | 0,6 |
| | | IT | 50 |
| | | ME | 1 |
| EM | 25 | CY | 7 |
| | | EG | 11 |
| | | GR | 30 |
| | | IL | 2 |
| | | LB | 3 |
| | | TR | 47 |

27.    This methodology was applied to 100% of the data obtained to determine the baseline that will be compared to the values previously proposed (UNEP/MAP, 2016). Further to the above analysis, the baseline values for beach marine litter were calculated as depicted in Table 7:

**Table 7:** Median by sub-region and Mediterranean

| Mediterranean Sub-regions | Median (item/100m) 100% data set |
|---|---|
| WM | 384 |
| CM | 338 |
| AD | 547 |
| EM | 205 |
| **Mediterranean Sea AVERAGE** | **369** |

28.    Hence**, for IMAP Common Indicator 22 (beach marine litter), the proposed, updated Baseline Value for the Mediterranean is 369 item/100 m** (Table 8). The beach litter baseline proposed by 19th Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols (Athens, Greece, 9-12 February 2016) was 450-1400 items/100 m.

29.    To calculate the threshold value, it was proceeded with the estimation of the 15th percentile of the baseline results (Willem van Loon, David Fleet and Georg Hanke, 2019). Against which to compare the state of beach marine litter in the Mediterranean, following the marine litter descriptor aim.

30.    In order to give each sub-region an equal contribution, it is proposed to give each an equal weight while calculating the corresponding threshold value/s in accordance with the 15th percentile as shown in Table 8. This method will prevent data of one or more countries with many surveys or with extremely high or low total abundance values from dominating the threshold value (Van Loon et al, 2019).

31.    As can be inferred from Table 8 (Q15), for **IMAP Common Indicator 22 (beach marine litter), the proposed Threshold Value is 130[5] items/100 m**.

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[5] The proposal of a Threshold Value is a strategic decision. The value 130 items/100m corresponds to the average value for the Mediterranean.

**Table 8:** Percentile calculation

| Sub regions | Q15 (items/100m) |
|---|---|
| | **100% data set** |
| WM | 87 |
| CM | 135 |
| AD | 225 |
| EM | 73 |
| **Total average** | **130** |

32.    In order to reach achieve GES, a reduction percentage should be applied in order to give overall information about the reduction level that should be applied on the baseline value in order to comply with the proposed/calculated Threshold Value. The reduction percentage is calculated as per Van Loon et al. (2019) as follows:

$$\text{Reduction Percentage} = ((\text{median} - TV) / \text{median}) \times 100$$

33.    Accordingly, it is found that the reduction percentage between the proposed Baseline Values and the proposed Threshold Value for the Mediterranean is approximately 65%

## 6   Proposal for Updated Baseline Values and Establishment of Threshold Values for Marine Litter

34.    Based on the datasets that were made available to UNEP/MAP and its MED POL Programme and the relevant analysis elaborated to the present document a proposal for updated Baseline Values and Threshold Values, at this stage can be considered only for IMAP Common Indicator 22 (beach macro-litter). Those proposals are presented hereunder under Table 12.

**Table 11:** 2016 (Agreed) and 2019 (Proposed/Updated) Baseline Values; Proposed Threshold Values; and percentage reduction in baseline values to achieve GES.

| IMAP Indicators | Categories of Marine Litter | BV-2016 | Proposed BV-2021 | Proposed TV-2021 |
|---|---|---|---|---|
| CI22 | Beach Marine Litter | 450-1400 items/100m | **369 items/100m** | **130 items/100m** |

**Annex I**

**List of References**

**Annex I:       List of References**

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**Annex II**

**Guidance elements, to further strengthen data submission and corresponding data flow for marine litter for the determination of baseline and threshold values**

**Annex II:** **Guidance elements, to further strengthen data submission and corresponding data flow for marine litter, for the determination of baseline and threshold values**

1    Field guides and litter identification tools are important elements which ensure sampling consistency throughout the region. Guides should be developed in local languages and address cultural aspects.

2    Under UNEP/MAP IMAP framework, the most comprehensive document for data collection is provided through the "Integrated Monitoring and Assessment Guidance" (UNEP, 2016) where the sampling and data collection methodologies are detailed for different environments under study. The aforementioned document addresses the following survey categories:

   A. Beach litter surveys.
   B. Benthic litter surveys, which include:
      a. Observations made by divers, submersibles or camera tows.
      b. Collection of litter via benthic trawls.
   C. Floating litter surveys, which include:
      a. Observations made from ship or aerial based platforms.
      b. Collection of litter via surface trawls.

3    During the 2019 Meetings of the MED POL Focal Points (Istanbul, Turkey, 29-31 May 2019), and 7th EcAp Coordination Group (Athens, Greece, 9 September 2019), Data Standards (DS) and Data Dictionaries (DD) for marine litter IMAP Common Indicators were agreed based on the work of CorMon on Marine Litter (Podgorica, Montenegro, 4-5 April 2019), including a detailed list of parameters and relevant elements that should be recorded during the monitoring surveys. Based on these parameters, single forms in excel format were recommended for reporting of marine litter data in different environments (e.g. beach, seafloor, floating, etc.). The forms are to include relevant information for subsequent data analysis (e.g. country, sub-region, location, survey date, etc.). The following steps are recommended for the submission and analysis of relevant data for marine litter items in a coherent and coordinated manner:

4    Step 1: Development of Datasets

5    Contracting Parties' Focal Points should send a file in excel format annually with data corresponding to each survey category.

6    The file name should have the following labeling:

*Sub-regionCode_CountryCode_Year (yyyy)*

7    Step 2: Statistical analysis (beach macrolitter, seafloor macrolitter and floating macrolitter)

8    The collected marine litter data and relevant excel sheets are subsequently developed in R-Language[6] with which data files are read and analyzed. Accordingly, a final report is generated.

9    For the exercise elaborated under the present document, the 2016-2018 datasets were consolidated in R-Language in ".csv" format under schematic representation shown in Figure 1:
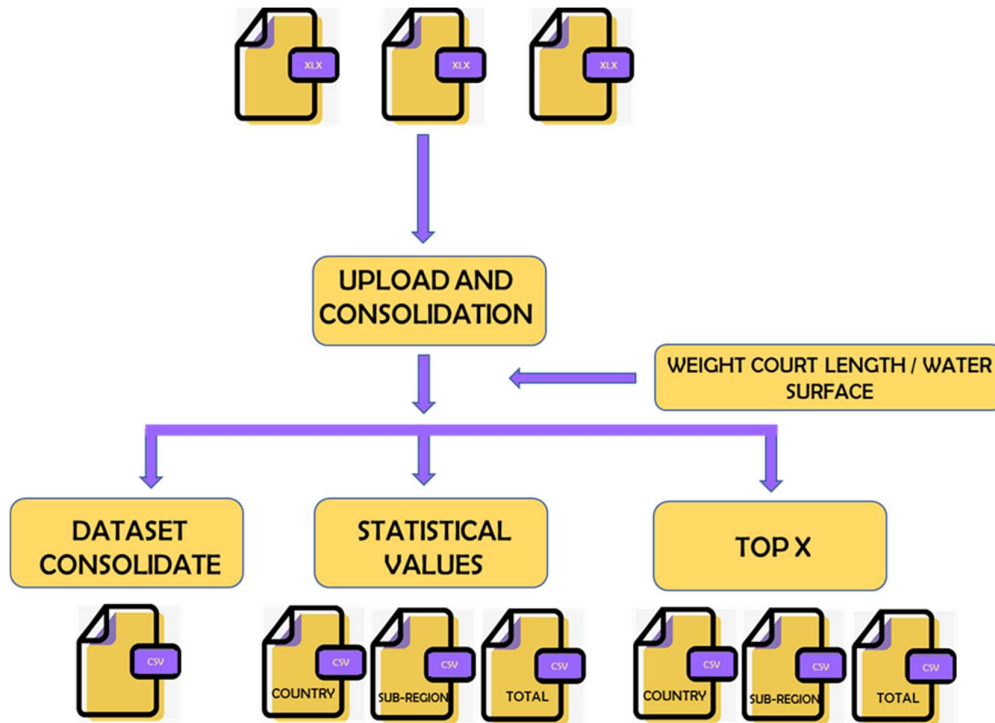
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[6] Statistical programme

**Figure 1:** Schematic representation of the methodological approach for the collection of the available datasets and the statistical treatment of the data.

10      Step 3: Calculation of Baseline and Threshold Values

A.   Baseline Values: The schematic representation of the methodological approach for the calculation of baseline values based on median approach are depicted in Figure 2.
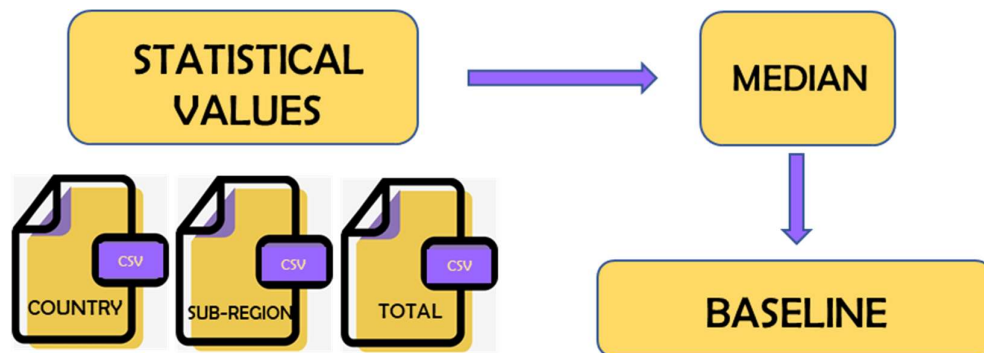


**Figure 2:** Schematic representation of the methodological approach for the calculation of baseline values.

B.   Threshold Values: There is some freedom to establish a threshold value and an assessment method which shows a good level of ambition and is considered feasible and realistic. Here we show one possibilities based on the 15Q) (Figure 3).
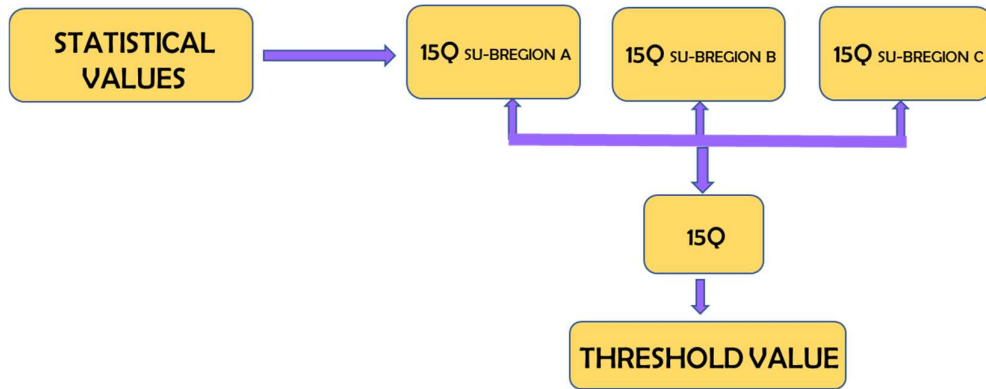
**Figure 3:** Schematic representation of the methodological approach for the calculation of threshold values.

**Annex III**

**Top-X vs. TOP-10 marine litter items per different Country contributing with the data to the current exercise for updating the Baseline Values and proposing Threshold Values for Beach Marine Litter**

**Annex III:** Top-X vs. TOP-10 marine litter items per different Country contributing with the data to the current exercise for updating the Baseline Values and proposing Threshold Values for Beach Marine Litter.

FRANCE



GREECE



ISRAEL

SPAIN
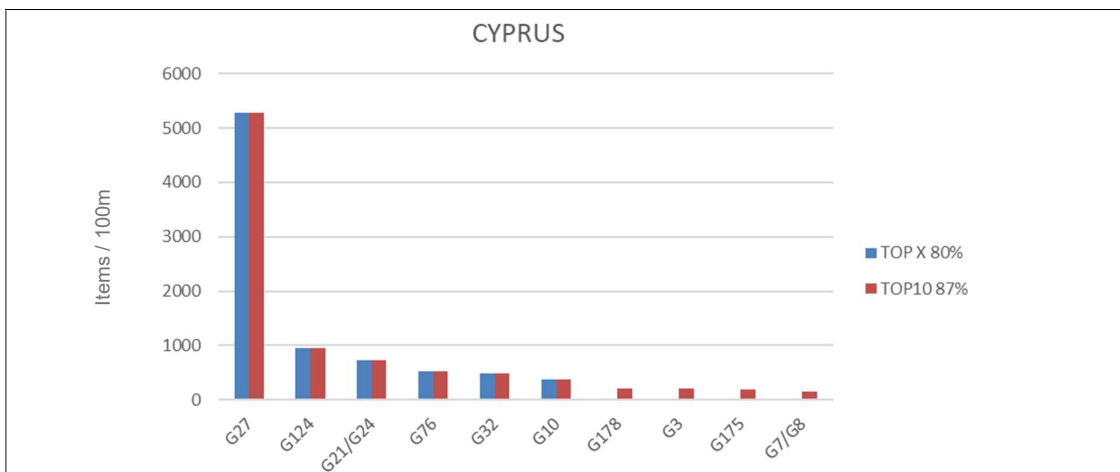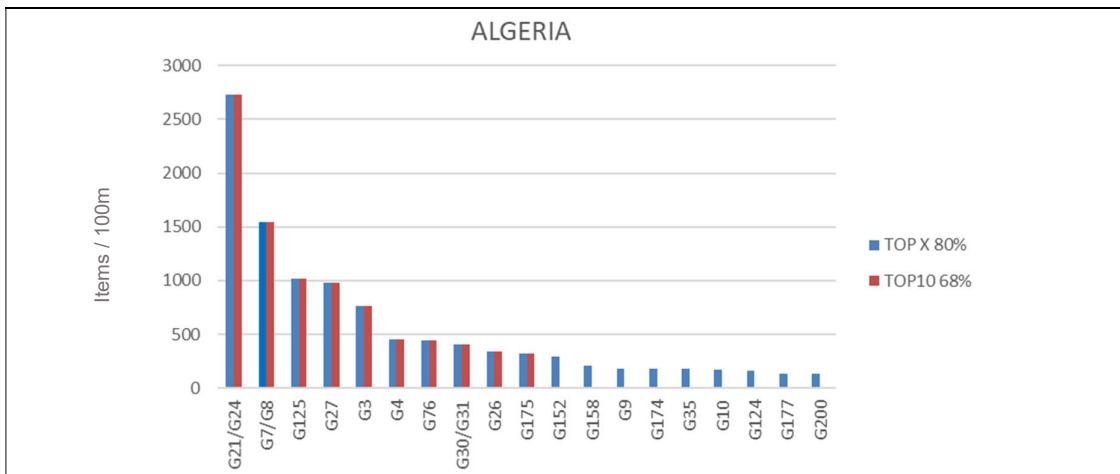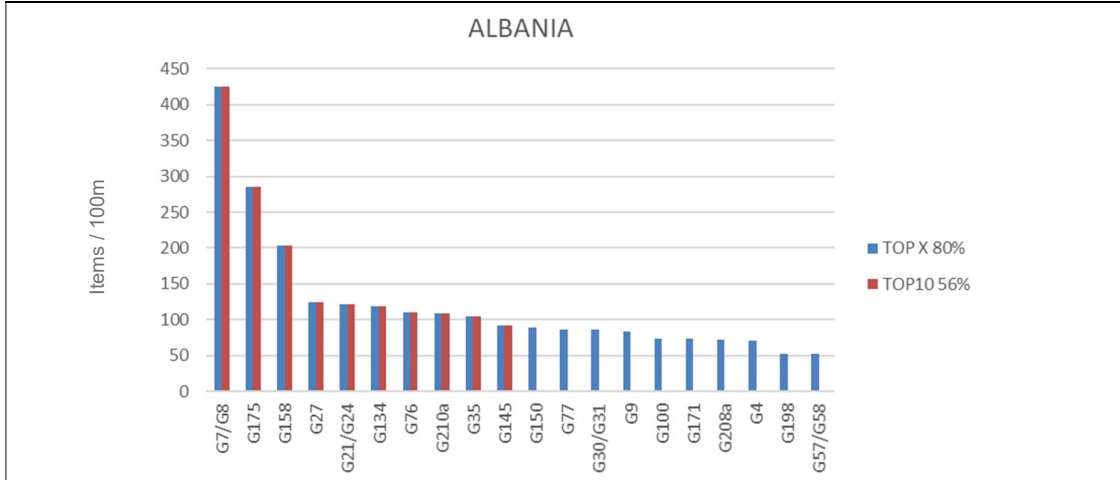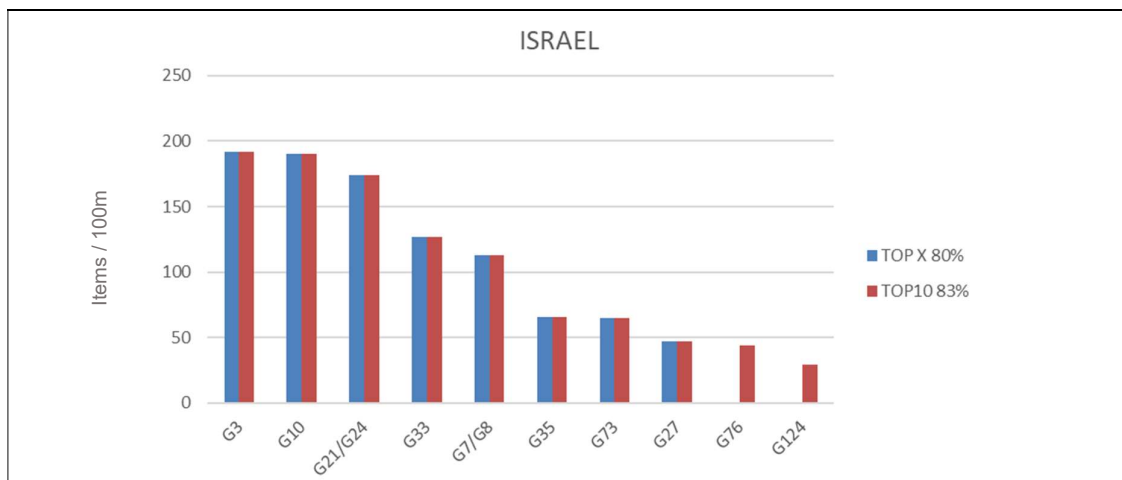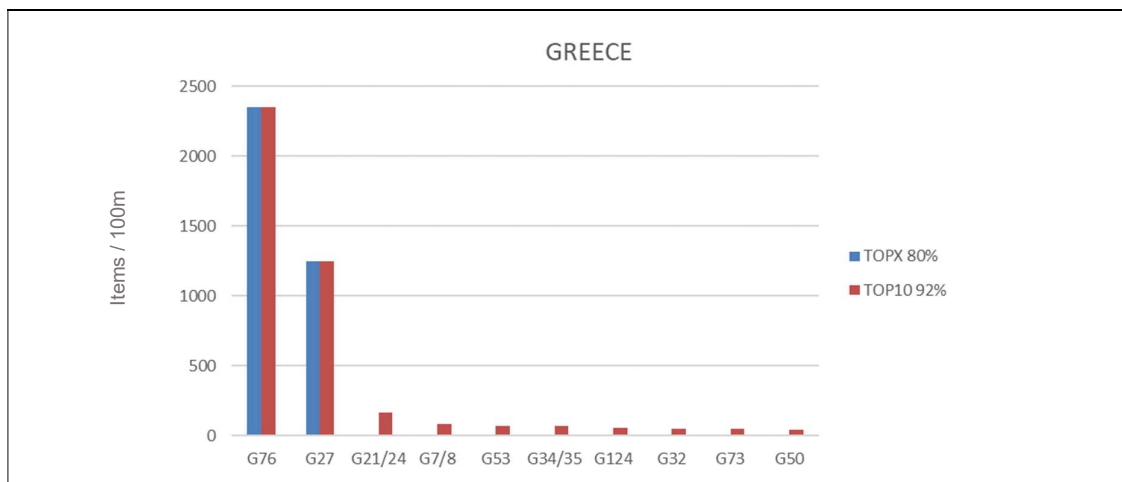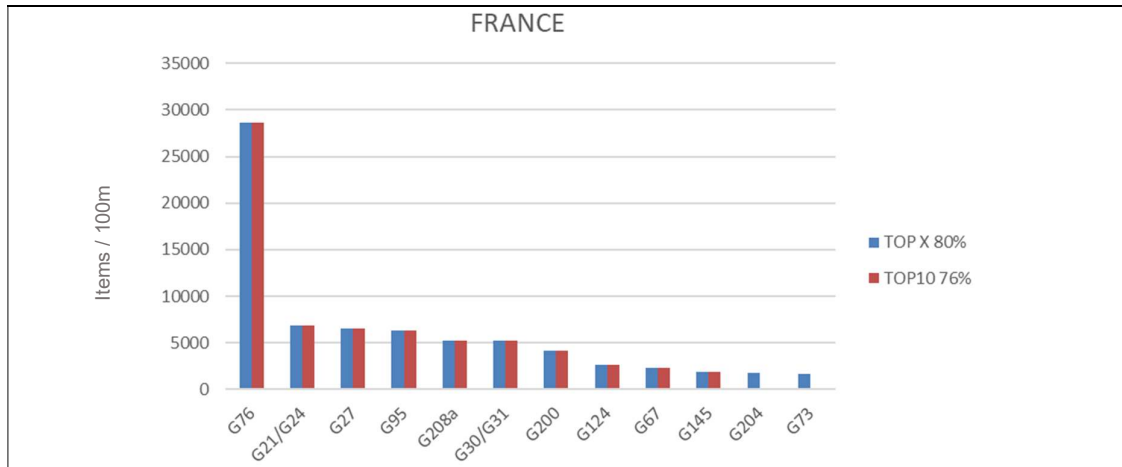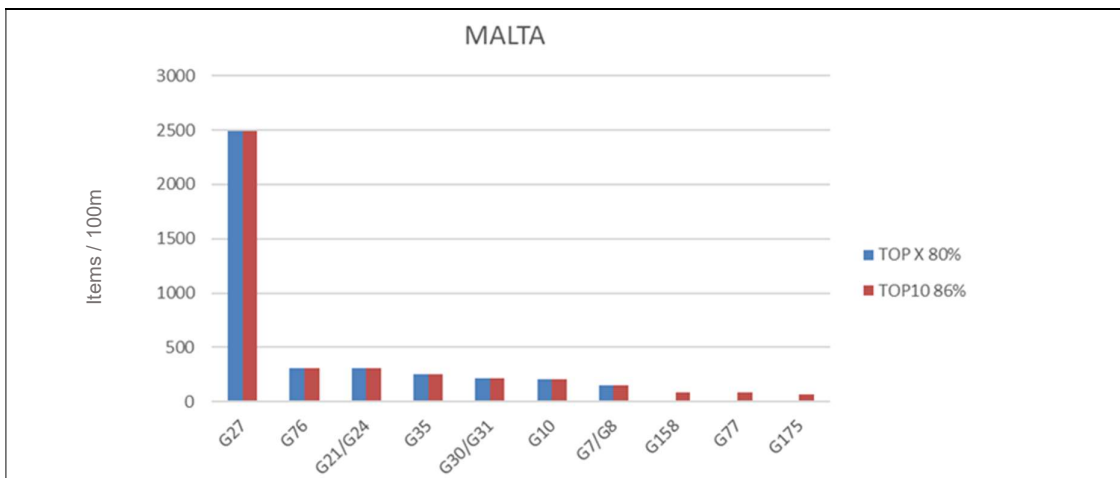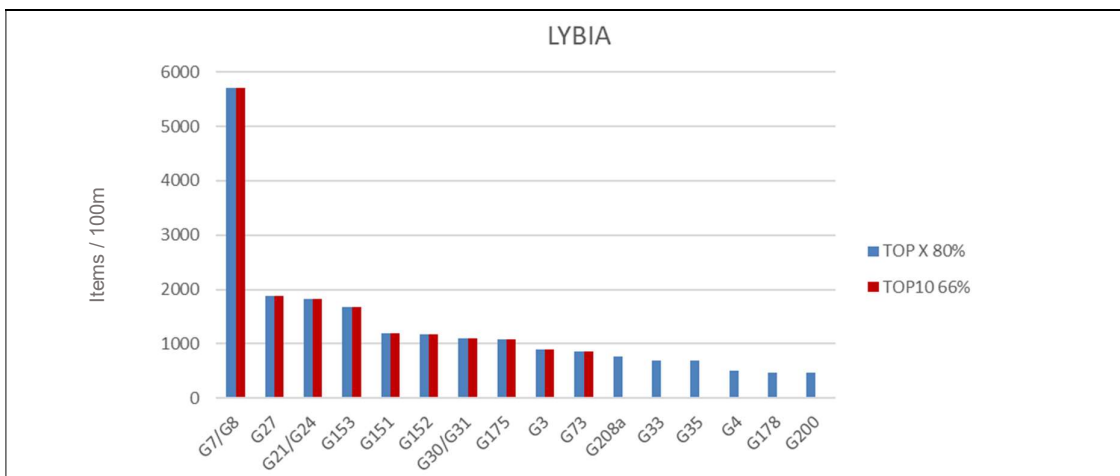
**Annex IV**

**Relative and Cumulative Frequency for the Full UNEP/MAP List
for Beach Marine Litter Items**

**Annex IV:    Relative and Cumulative Frequency for the Full UNEP/MAP List for Beach Marine Litter Items**

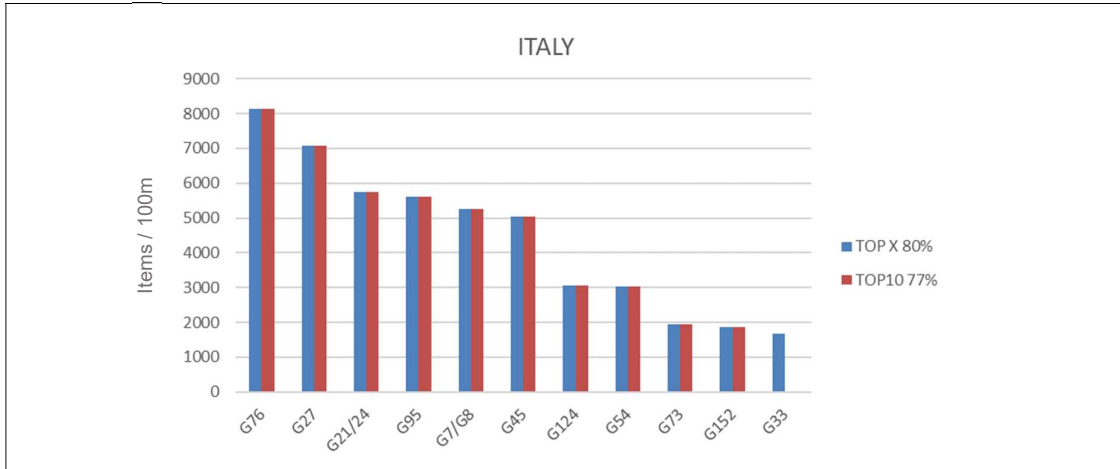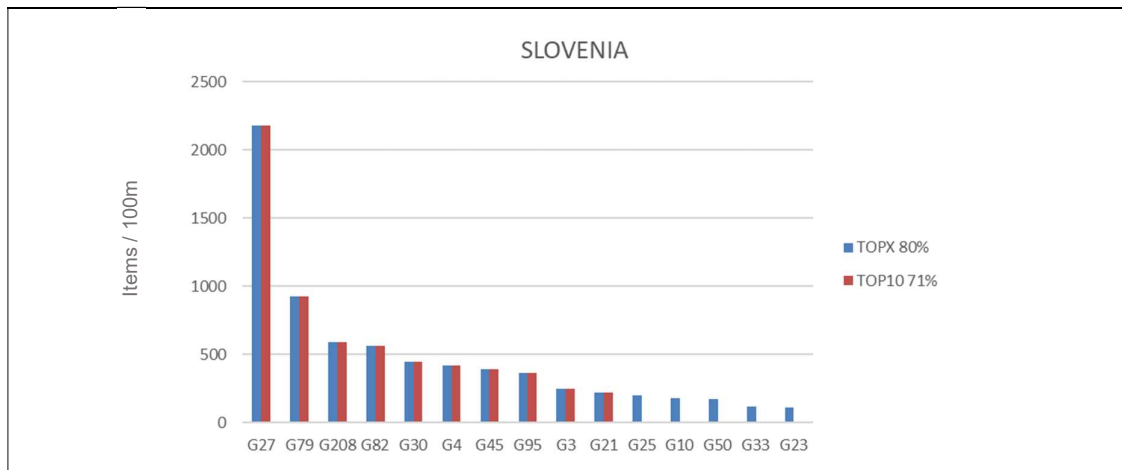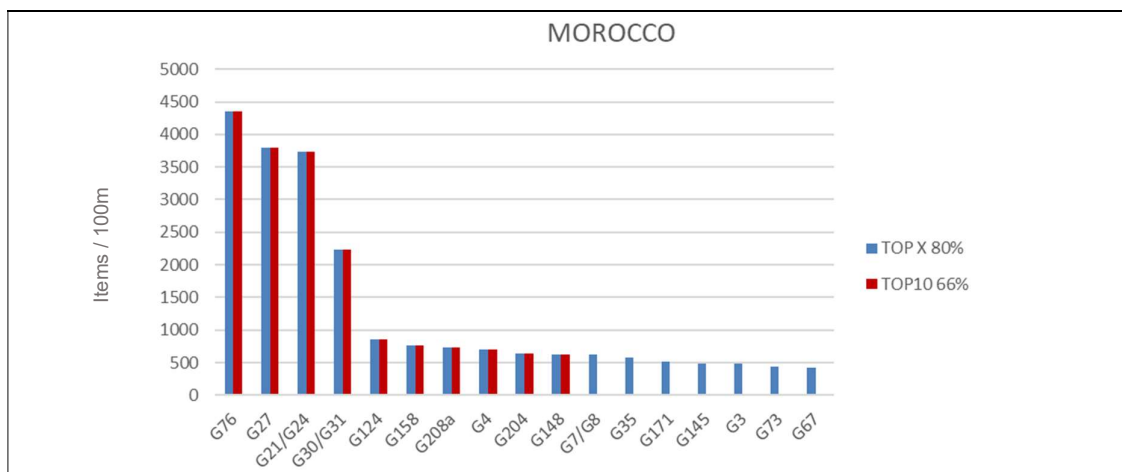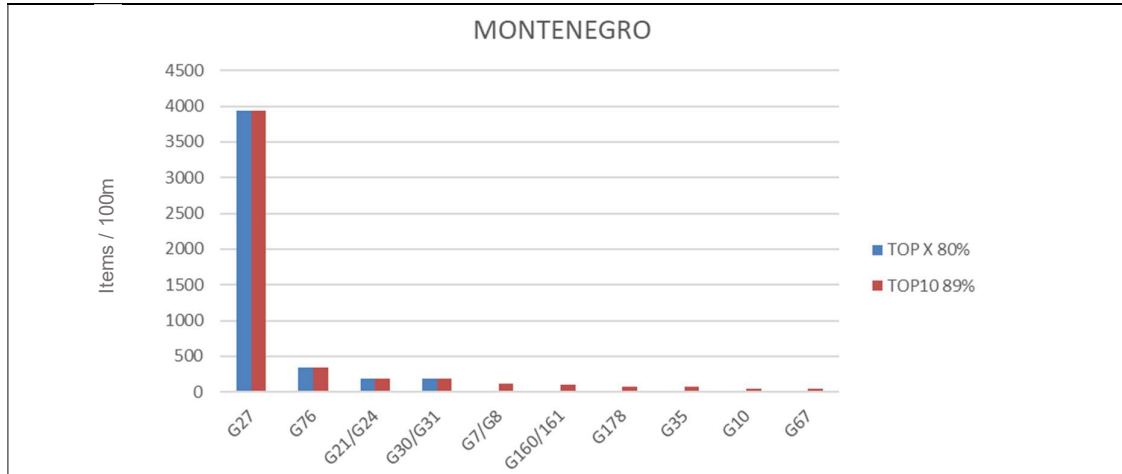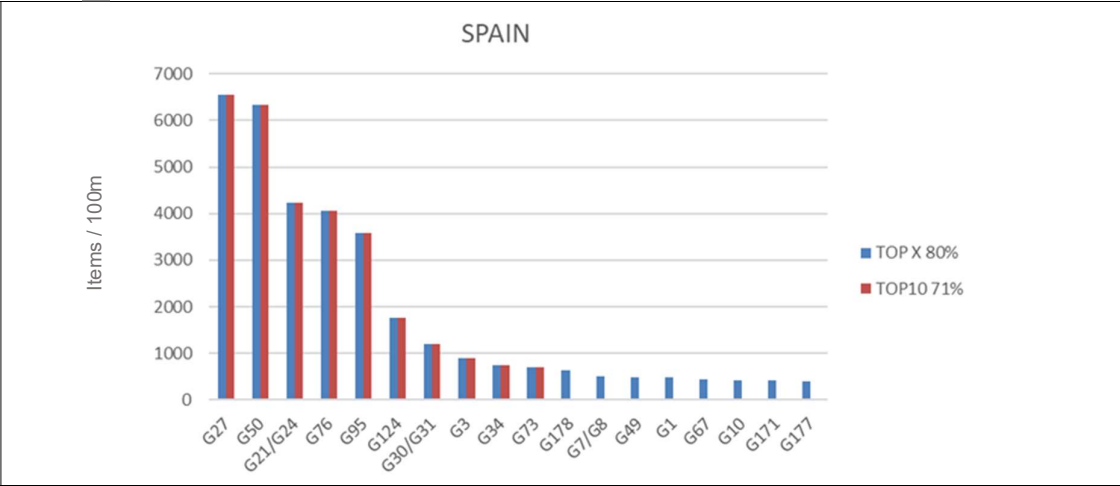| | | UNEP Code | Item name | Relative Frequency. | Cumulative Frequency |
|---|---|---|---|---|---|
| Mediterranean Top-10 Marine Litter Items | Mediterranean Top-X (80%) Marine Litter Items | G76 | Plastic/polystyrene pieces 2.5 cm > < 50 cm | 0,16504423 | 0,16504423 |
| | | G27 | Cigarette butts and filters | 0,12921627 | 0,2942605 |
| | | G21/G24 | Plastic caps and lids (including rings from bottle caps/lids) | 0,08743357 | 0,38169407 |
| | | G95 | Cotton bud sticks | 0,05249481 | 0,43418888 |
| | | G7/G8 | Drink bottles | 0,04973091 | 0,48391979 |
| | | G30/G31 | Crisps packets/sweets wrappers/Lolly sticks | 0,03998183 | 0,52390162 |
| | | G124 | Other plastic/polystyrene items (identifiable) including fragments | 0,03299665 | 0,55689827 |
| | | G50 | String and cord (diameter less than 1 cm) | 0,02712216 | 0,58402043 |
| | | G208a | Glass fragments >2.5cm | 0,02302928 | 0,60704971 |
| | | G200 | Bottles (including identifiable fragments) | 0,02032637 | 0,62737608 |
| | | G73 | Foam sponge items (i.e. matrices, sponge, etc.) | 0,01956879 | 0,64694487 |
| | | G34/G35 | Cutlery, plates and trays / Straws and stirrers | 0,01892997 | 0,66587484 |
| | | G3 | Shopping bags incl. pieces | 0,0179509 | 0,68382574 |
| | | G10 | Food containers incl. fast food containers | 0,01342144 | 0,69724718 |
| | | G33 | Cups and cup lids | 0,01306833 | 0,71031551 |
| | | G204 | Construction material (brick, cement, pipes) | 0,01288535 | 0,72320086 |
| | | G152 | Cigarette packets | 0,01184849 | 0,73504935 |
| | | G67 | Sheets, industrial packaging, plastic sheeting excluding agriculture and greenhouse sheeting | 0,01109412 | 0,74614347 |
| | | G4 | Small plastic bags, e.g. freezer bags incl. pieces | 0,01085015 | 0,75699362 |
| | | G175 | Cans (beverage) | 0,01072495 | 0,76771857 |
| | | G54 | Nets and pieces of net > 50 cm | 0,01030122 | 0,77801979 |
| | | G158 | Other paper items (including non-recognizable fragments) | 0,01023381 | 0,7882536 |
| | | G145 | Other textiles (including pieces of cloths, rags, etc.) | 0,01013108 | 0,79838468 |
| | | G26 | Cigarette lighters | 0,00905249 | 0,80743717 |
| | | G178 | Bottle caps, lids & pull tabs | 0,00897545 | 0,81641262 |
| | | G13 | Other bottles, drums and containers | 0,00709112 | 0,82350374 |
| | | G77 | Plastic/polystyrene pieces > 50 cm | 0,00704297 | 0,83054671 |
| | | G153 | Cups, food trays, food wrappers, drink containers | 0,00675406 | 0,83730077 |
| | | G171 | Other wood < 50 cm | 0,00615056 | 0,84345133 |
| | | G151 | Cartons/Tetrapack (non-milk) | 0,00594190 | 0,84939323 |
| | | G9 | Cleaner bottles & containers | 0,00591301 | 0,85530624 |
| | | G32 | Toys and party poppers | 0,00583276 | 0,861139 |
| | | G177 | Foil wrappers, aluminium foil | 0,00575571 | 0,86689471 |
| | | G125 | Balloons, balloon ribbons, strings, plastic valves and balloon sticks | 0,00531593 | 0,87221064 |
| | | G148 | Cardboard (boxes & fragments) | 0,00468675 | 0,87689739 |
| | | G49 | Rope (diameter more than 1cm) | 0,00462576 | 0,88152315 |
| | | G100 | Medical/Pharmaceuticals containers/tubes | 0,00446204 | 0,88598519 |
| | | G70 | Shotgun cartridges | 0,00432722 | 0,89031241 |
| | | G45 | Mesh bags (e.g. mussels nets, net sacks, oyster nets including pieces and plastic stoppers from mussel lines | 0,00406720 | 0,89437961 |

| | | | | |
|---|---|---|---|---|
| | G134 | Other rubber pieces | 0,00397411 | 0,89835372 |
| | G198 | Other metal pieces < 50 cm | 0,00394201 | 0,90229573 |
| | G53 | Nets and pieces of net < 50 cm | 0,00384249 | 0,90613822 |
| | G11 | Beach use related cosmetic bottles and containers, e.g. Sun blocks | 0,00370125 | 0,90983947 |
| | G137 | Clothing / rags (clothing, hats, towels) | 0,00368841 | 0,91352788 |
| | G66 | Strapping bands | 0,00360816 | 0,91713604 |
| | G71 | Shoes and sandals made of artificial polymeric material | 0,00327751 | 0,92041355 |
| | G59 | Fishing line/(tangled and not tangled) | 0,00288267 | 0,92329622 |
| | G96 | Sanitary towels/panty liners/backing strips | 0,00287946 | 0,92617568 |
| | G5 | The part that remains from rip-off plastic bags | 0,00279279 | 0,92896847 |
| | G28 | Pens and pen lids | 0,00269970 | 0,93166817 |
| | G208b | Ceramic fragments >2.5cm | 0,00263549 | 0,93430366 |
| | G159 | Corks | 0,00261302 | 0,93691668 |
| | G160/G161 | Pallets / Processed timber | 0,00262586 | 0,93954254 |
| | G176 | Cans (food) | 0,00246536 | 0,9420079 |
| | G199 | Other metal pieces > 50 cm | 0,00244931 | 0,94445721 |
| | G1 | 4/6-pack yokes, six-pack rings | 0,00237869 | 0,9468359 |
| | G150 | Cartons/Tetrapack Milk | 0,00215719 | 0,94899309 |
| | G191 | Wire, wire mesh, barbed wire | 0,00212830 | 0,95112139 |
| | G210a | Other glass items | 0,00209299 | 0,95321438 |
| | G172 | Other wood > 50 cm | 0,00200310 | 0,95521748 |
| | G98 | Diapers/nappies | 0,00199668 | 0,95721416 |
| | G174 | Aerosol/Spray cans industry | 0,00193809 | 0,95915225 |
| | G133 | Condoms (incl. packaging) | 0,00190359 | 0,96105584 |
| | G128 | Tyres and belts | 0,00184581 | 0,96290165 |
| | G144 | Tampons and tampon applicators | 0,00183297 | 0,96473462 |
| | G68 | Fibre glass items and fragments | 0,00182655 | 0,96656117 |
| | G60 | Light sticks (tubes with fluid) incl. Packaging | 0,00182334 | 0,96838451 |
| | G165 | Ice-cream sticks, chip forks, chopsticks, toothpicks | 0,00178161 | 0,97016612 |
| | G56 | Tangled nets/cord | 0,00173988 | 0,971906 |
| | G147 | Paper bags | 0,00156974 | 0,97347574 |
| | G99 | Syringes/needles | 0,00149912 | 0,97497486 |
| | G138 | Shoes and sandals (e.g. Leather, cloth) | 0,00148307 | 0,97645793 |
| | G57/G58 | Fish boxes | 0,00131293 | 0,97777086 |
| | G202 | Light bulbs | 0,00121663 | 0,97898749 |
| | G18 | Crates and containers / baskets (excluding fish boxes) | 0,00120700 | 0,98019449 |
| | G211 | Other medical items (swabs, bandaging, adhesive plaster etc.) | 0,00119095 | 0,98138544 |
| | G37 | Mesh bags (e.g. vegetables, fruits and other products) excluding aquaculture mesh bags | 0,00105933 | 0,98244477 |
| | G154 | Newspapers & magazines | 0,00098229 | 0,98342706 |
| | G141 | Carpet & Furnishing | 0,00089883 | 0,98432589 |
| | G44 | Octopus pots | 0,00087957 | 0,98520546 |
| | G19 | Vehicle parts (made of artificial polymer or fiber glass | 0,00083142 | 0,98603688 |
| | G91 | Biomass holder from sewage treatment plants and aquaculture | 0,00082179 | 0,98685867 |
| | G14 | Engine oil bottles & containers <50 cm | 0,00079932 | 0,98765799 |

| | G16 | Jerry cans (square plastic containers with handle) | 0,00079932 | 0,98845731 |
|---|---|---|---|---|
| | G166 | Paint brushes | 0,00078327 | 0,98924058 |
| | G62/G63 | Buoys (e.g. marking fishing gear, shipping routes, mooring boats etc.) | 0,00078327 | 0,99002385 |
| | G65 | Buckets | 0,00069980 | 0,99072365 |
| | | Other sanitary waste | 0,00066128 | 0,99138493 |
| | G29 | Combs/hair brushes/sunglasses | 0,00063239 | 0,99201732 |
| | G17 | Injection gun containers (including nozzles) | 0,00061955 | 0,99263687 |
| | G186 | Industrial scrap | 0,00060671 | 0,99324358 |
| | G97 | Toilet fresheners | 0,00058103 | 0,99382461 |
| | G101 | Dog faeces bag | 0,00049115 | 0,99431576 |
| | G162 | Crates and containers / baskets (not fish boxes) | 0,00045583 | 0,99477159 |
| | G43 | Tags (fishing and industry) | 0,00038521 | 0,9951568 |
| | G15 | Engine oil bottles & containers >50 cm | 0,00037558 | 0,99553238 |
| | G40 | Gloves (washing up) | 0,00036916 | 0,99590154 |
| | G23 | Plastic caps and lids (including rings from bottle caps/lids) | 0,00033706 | 0,9962386 |
| | G187 | Drums and barrels (e.g. oil, chemicals) | 0,00033385 | 0,99657245 |
| | G36 | Heavy duty sacks (e.g. fertilizer or animal feed sacks | 0,00031780 | 0,99689025 |
| | G182 | Fishing related (weights, sinkers, lures, hooks) | 0,00030175 | 0,997192 |
| | G47 | Plastic sheeting from mussel culture (Tahitians) | 0,00028891 | 0,99748091 |
| | G41 | Gloves (industrial/professional rubber gloves) | 0,00027286 | 0,99775377 |
| | G210b | Other ceramic/pottery items | 0,00027286 | 0,99802663 |
| | G69 | Hard hats/Helmets | 0,00026965 | 0,99829628 |
| | G140 | Sacking (hessian) | 0,00022792 | 0,99852420 |
| | G164 | Fish boxes | 0,00019582 | 0,99872002 |
| | G42 | Crab/lobster pots and tops | 0,00019582 | 0,99891584 |
| | G127 | Rubber boots | 0,00018619 | 0,99910203 |
| | G180 | Appliances (refrigerators, washers, etc.) | 0,00018298 | 0,99928501 |
| | G190 | Paint tins | 0,00015730 | 0,99944231 |
| | G46 | Oyster trays (round from oyster cultures) | 0,00011235 | 0,99967985 |
| | G213 | Paraffin/Wax | 0,00010112 | 0,99978097 |
| | G179 | Disposable BBQ's | 9,63E-05 | 0,99987727 |
| | G207 | Octopus pots | 4,82E-05 | 0,99992547 |
| | G184 | Lobster/crab pots | 3,85E-05 | 0,99996397 |
| | G163 | Crab/lobster pots | 3,60E-05 | 1 |