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Agenda item 3: Draft Integrated Monitoring and Assessment Programme

Draft Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria

Note by the Secretariat

In line with Decision IG. 21.3, as agreed at the 18th Meeting of the Contracting Parties, the Secretariat was requested to "prepare in cooperation with MAP components and competent partner organizations, through a participatory process involving Contracting Parties and the scientific community, a Monitoring and Assessment Methodological Guidance for consideration during the first meeting of EcAp CG in 2014 and a draft Integrated Monitoring and Assessment Programme to be presented at the 19th Meeting of the Contracting Parties for adoption".

In order to meet the timeline set out in Decision IG. 21.3, an Integrated Correspondence Group (Integrated EcAp CorGest) Meeting was held in February 2014, that gave specific recommendations for the future Integrated Monitoring and Assessment Programme, agreed on a list of common indicators, which would form the basis of the Integrated Monitoring and Assessment Programme (UNEP(DEPI)/MED WG.390/4).

Following this key step, the Correspondence Groups on Monitoring (CORMONs) started their work, with the aim to further specify the common indicators, discuss methodologies and parameters related to them and as such form the core of the Integrated Monitoring and Assessment Programme.

Three CORMON Meetings took place in between May-July 2014, on Pollution and Litter; on Coastal Ecosystems and Landscapes and Hydrographical conditions; and, on Biodiversity and Fisheries. These meetings provided important guidance on and input to the draft Integrated Monitoring and Assessment Guidance of the Secretariat.

The 4th EcAp Coordination Group took place following these specific monitoring and assessment related meetings, in October 2014 and it provided further comments, suggestions, political guidance on the Draft Monitoring and Assessment Methodological Guidance (UNEP(DEPI)/MED WG.401/3) and mandated informal online expert groups, with the leadership of volunteering Contracting Parties, to address the outstanding monitoring and assessment questions, with the overall aim to be able to meet the timelime of the COP18 EcAp Decision and agree on an Integrated Monitoring and Assessment Programme by COP19.

Based on the outcomes of the above meetings and of further input of these informal online working groups, the Secretariat has prepared the "Main elements of a Draft Integrated Monitoring and Assessment Programme", which was discussed in an Integrated CORMON Meeting in April 2015.

This Integrated CORMON Meeting provided further useful input into the development of the draft Integrated Monitoring and Assessment Programme and mandated the informal online working groups to continue their work, while the draft to be further addressed also in the upcoming Focal Points Meetings (MED POL, REMPEC, RAC/SPA and PAP/RAC Focal Points Meetings, which took place in between May-July 2015).

This draft Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (draft IMAP) is building on all the above expert level work, input and aims to set out the key principles, objectives and products of the foreseen monitoring and assessment work in the Mediterranean (including assessment criteria, when available) during the period of 2016-2021 (second phase of the ecosystem approach).

Draft Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria

I. Introduction

Monitoring and assessment, based on scientific knowledge, of the sea and coast is the indispensable basis for the management of human activities. The Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP) describes the strategy, themes, and products that the Barcelona Convention Contracting Parties are aiming to deliver, through collaborative efforts inside the UNEP/MAP Barcelona Convention, over the second cycle of the implementation of the Ecosystem Approach Process (EcAp process), i.e. over 2016-2021, in order to assess the status of the Mediterranean sea and coast, as a basis for further and/or strengthened measures.

Background

IMAP strongly builds on the monitoring and assessment related provisions of the Barcelona Convention and its Protocols, previous Decisions of the Contracting Parties related to monitoring and assessment, and to the EcAp process, including on Decision IG. 21/3 and the expert level discussions mobilized based on this Decision, such as the ones taking place in the Correspondence Groups on Good Environmental Status (COR GEST) and Monitoring (CORMON), as well as the 4th and 5th EcAp Coordination Group.

In addition, the development of IMAP took due account of the Contracting Parties' existing monitoring and assessment programmes, practices of other Regional Sea Conventions', and Regional bodies.

Timeline

IMAP is aiming to deliver over 2016-2021 its objectives as described above. It is introduced first however in an initial phase (in line with Decision IG. 21/3, in between 2016-2019), during which the existing national monitoring and assessment programmes will be integrated, in line with the IMAP structure and principles and based on the agreed common indicators. This implies in practice that the existing national monitoring and assessment programmes will be revised so that national implementation of IMAP can be fulfilled in a sufficient manner.

The main outputs during the initial phase of IMAP will include the update of GES definitions, further refinement of assessment criteria and development of national level integrated monitoring and assessment programmes.

Furthermore, the Quality Status Report in 2017 and the State of Environment and Development Report in 2019 will strongly build on the structure, objectives and data collected under IMAP.

The validity of the IMAP should be reviewed once at the end of every EcAp six year cycle, and in addition it should be updated and revised as necessary on a bi-annual basis (i.e. by the 20th and 22nd upcoming Meetings of the Contracting Parties), based on lessons learnt of the implementation of the IMAP and on new scientific and policy developments.

II. IMAP common principles and structure

1. Overarching principles and the overall IMAP structure

The overarching principles guiding the development of the IMAP include (i) adequacy; (ii) coordination and coherence; (iii) data architecture and interoperability based on common parameters;

(iv) concept of adaptive monitoring; (v) risk-based approach to monitoring and assessment, and (v) the precautionary principle, in addition to the overall aim of integration.

In line with the above overarching principles, data and information is gathered through integrated monitoring activities on the national level and shared in a manner that creates a compatible, shared regional pool of data, usable by each Contracting Party, as described under at point 4.

This regional pool of data allows the production of common indicator assessment reports in an integrated manner, following the monitoring specifics and data provided, which ensures comparability across the Mediterranean region.

In line with the above, integration is achieved through IMAP both at monitoring level, through an integrated monitoring system, following common principles and undertaken in a coordinated manner and at assessment level, with the overall aim to assess the overall status of the marine and coastal environment.

2. IMAP integrated monitoring

The IMAP monitoring requirements focus on, based on agreed common indicators, parameters that are indicative of the state of the environment, the prevailing anthropogenic pressures and their impacts, and the progress towards the good environmental status (ecological objectives and targets). The monitoring is carried out in such a way that an assessment with adequate confidence and precision is achieved.

The IMAP sets out the basis for how the Contracting Parties should design and carry out their national integrated monitoring programmes and work together in the framework of the UNEP/MAP Barcelona Convention to produce and update common indicator based regional assessments on the status of the Mediterranean Sea and coast.

During the initial phase of IMAP (2016-2019), Contracting Parties will:

- During 2016-2017, update their existing monitoring programmes in order to cover all IMAP areas, common indicators in line with the IMAP, and, based on the Integrated Monitoring and Assessment Guidance, Common Indicator Fact Sheets ;

- Continue reporting based on their existing national monitoring programmes until their existing monitoring programmes are updated into a national Integrated Monitoring Programme;

- Following the update of their existing monitoring programmes, send quality assured data following a common regional monitoring reporting template (please see more on this under point 4);

During national implementation, the Contracting Parties are encouraged to coordinate within and between each other in order to use resources in an efficient way. Shared monitoring stations and activities, information, and data could be steps towards this direction.

3. IMAP integrated assessment

The IMAP assessment products, produced by the UNAP/MAP Secretariat, including the Common Indicator Assessment Fact Sheets, and the planned integrated assessments (2017 Status Quality Report, 2019 State of Environment and Development Report, 2023 State of Environment Report), should be mainly based on the Contracting Parties provided common indicator and monitoring data.

In addition, in areas of scientific and/or data gaps, the assessment products can also build on relevant scientific projects, pilot outcomes, and comparable data of other regional organizations and in case

these are not available, on scientific literature. In addition, they will analyze trends, drivers and will build on available socio-economic data.

The common indicator assessment fact sheets provide information on the status of the environment and information needed to evaluate the severity of environmental problems and distance from EcAp targets, ecological objectives and Good Environmental Status (GES) description.

The common indicator assessment fact sheets are linked to specific Ecological Objectives (EOs) and together they indicate whether the GES related to the specific EO is met or not. Following the EO level assessment, the integrated assessment takes place on the state of the Mediterranean Sea and Coast.

The 2017 Status Quality Report will be based on the common indicators, and common indicator assessment fact sheets established for them, following a model to be developed by the Secretariat by the end of 2016, in cooperation with the CORMONs, and will consider the data from the most recent national monitoring (where possible, up to the end of 2016) and relevant scientific projects and pilots undertaken relevant to the IMAP.

During the development of the above integrated assessments, an integrated approach for determining and assessing GES will be used as well, in line with recommendations of the Integrated Monitoring and Assessment Guidance, describing state-based common indicators to be treated in an integrated manner, while explicitly relating them to the pressure-based descriptors (via their impacts on the ecosystem elements).

4. UNEP/MAP Strategy towards an Integrated Data and Information System

Assessments arising from monitoring data are critically dependent upon practical mechanisms for handling data from different activities that ensure that documents, data, and products are managed consistently and are easily available to users. This will support integrated assessments, for example from integrated biological and chemical programmes, or linking the observed changes in spatial distribution and temporal trends in substances or their effects to inputs into the UNEP/MAP Barcelona Convention maritime area.

Data storage and handling processes are therefore central, and it is important that the role of the various components in this is clear and continuously developed and strengthened.

The IMAP thus requires an updated and integrated data and information system for UNEP/MAP Barcelona Convention with clear set roles for data handling and assessment for the various components and with a user-friendly reporting platform for Contracting Parties, based on the following strategic points:

- The UNEP/MAP Barcelona Convention data and information activities aim to achieve a reliable, quantitative assessment of the status of the Mediterranean Sea and Coast;
- The UNEP/MAP Barcelona Convention data and information activities should facilitate access and knowledge of the general public to environmental information.

Basic activities, core elements of the UNEP/MAP Barcelona Convention integrated data and information system should include:

- Based on the structure of the Common Indicator Fact Sheets , develop region-wide, electronic, common indicator based monitoring reporting formats and up-to-date tools for data exchange;
- implement relevant quality control and validation procedures;
- make assessment products available in an integrated manner, on a common platform;
- make data and information available using harmonized standards and practices, following the UNEP access-to-information policy (UNEP/EA. 1/INF/23).

5. Cooperation with other relevant regional bodies in the context of IMAP

The current IMAP covers with agreed common indicators the ecological objectives related to biodiversity (EO1), non-indigenous species (EO2), eutrophication (EO5), hydrography (EO7), coast (EO8), contaminants (EO9), and marine litter (EO10).

In addition, regarding marine noise (EO11), IMAP includes candidate common indicators, with the intention for these candidate common indicators to be further developed, based on pilot monitoring activities, additional expert knowledge, and scientific developments, during the initial phase of IMAP.

While some of the elements of fisheries (EO3) and marine food webs (EO6) are partly covered by the monitoring and assessment of EO1 and EO2 and the Contracting Parties have agreed on the GFCM developed list of common indicators, the monitoring and assessment specifics of EO3 are still being developed by the GFCM, in close cooperation with UNEP/MAP.

In light of the above, it is an absolute necessity for UNEP/MAP to strengthen its cooperation with the relevant regional bodies, especially in relation to:

- EO1, both with the General Fisheries Commission for the Mediterranean (GFCM) for commercial species of fish and shellfish and the Secretariat of the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS), noting that the ACCOBAMS Survey Initiative, to be undertaken during 2016-2019, will provide important inputs (in terms of monitoring methodologies, capacity building and reliable data on abundance and distribution of cetaceans);
- EO3, with the GFCM, noting that the EO3 related common indicators will be further developed and assessed by GFCM (with assessment results provided to UNEP/MAP in order to undertake the 2017 and following integrated assessments);
- EO11, with ACCOBAMS, noting that further development of the candidate common indicators will need to be carried out in a close cooperation between UNEP/MAP and ACCOBAMS in light of pilot monitoring activities, additional expert knowledge, and scientific developments, during the initial phase of IMAP, and considering that ACCOBAMS is undertaking an identification of noise hot spots in the Mediterranean.

In addition, cooperation with other regional and international bodies will be key for the successful implementation of IMAP, to ensure that no double obligation is created for those Contracting Parties, which are Parties to various Regional Seas Convention and/or part of the European Union and undertake monitoring activities under other specific frames.

Furthermore, cooperation with other regional and international bodies can also strengthen the cost-efficiency and scientific adequacy of IMAP. Exchange of best practices and information is encouraged during the IMAP implementation, both in between Contracting Parties participating in various monitoring programmes and in between UNEP/MAP and other relevant regional, international bodies.

III. Key elements of IMAP

1. Common Indicators

The common indicators are the backbone of IMAP.

In the context of the Barcelona Convention, a common indicator is an indicator that summarizes data into a simple, standardized, and communicable figure and is ideally applicable in the whole Mediterranean basin, or at least on the level of sub-regions, and is monitored by all Contracting Parties. A common indicator is able to give an indication of the degree of threat or change in the marine ecosystem and can deliver valuable information to decision makers.

Candidate indicators are indicators which still have many outstanding issues regarding their monitoring and assessment and therefore are recommended to be monitored in the initial phase of IMAP on a pilot basis.

The Common and candidate indicators agreed upon, which are at the core of IMAP, include:

1. Habitat distributional range (EO1);

2. Condition of the habitat's typical species and communities (EO1);

3. Species distributional range (EO1 related to marine mammals, seabirds, marine reptiles);

4. Population abundance of selected species (EO1, related to marine mammals, seabirds, marine reptiles);

5. Population demographic characteristics (EO1, e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates related to marine mammals, seabirds, marine reptiles);

6. Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas (EO2, in relation to the main vectors and pathways of spreading of such species);

7. Spawning stock Biomass (EO3);

8. Total landings (EO3);

9. Fishing Mortality (EO3);

10. Fishing effort (EO3);

11. Catch per unit of effort (CPUE) or Landing per unit of effort (LPUE) as a *proxy* (EO3);

12. Bycatch of vulnerable and non-target species (EO3)];

13. Concentration of key nutrients in water column (EO5);

14. Chlorophyll-a concentration in water column (EO5);

15. Location and extent of the habitats impacted directly by hydrographic alterations (EO7);

16. Length of coastline subject to physical disturbance due to the influence of man-made structures (EO8);

17. Concentration of key harmful contaminants measured in the relevant matrix (EO9, related to biota, sediment, seawater);

18. Level of pollution effects of key contaminants where a cause and effect relationship has been established (EO9);

19. Occurrence, origin (where possible), and extent of acute pollution events (e.g. slicks from oil, oil products and hazardous substances) and their impact on biota affected by this pollution (EO9);

20. Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood (EO9);

21. Percentage of intestinal enterococci concentration measurements within established standards (EO9);

22. Trends in the amount of litter washed ashore and/or deposited on coastlines (including analysis of its composition, spatial distribution and, where possible, source.) (EO10);

23. Trends in the amount of litter in the water column including microplastics and on the seafloor (EO10);

24. Candidate Indicator: Trends in the amount of litter ingested by or entangling marine organisms focusing on selected mammals, marine birds and marine turtles (EO10);

25. Candidate Indicator: Land use change (EO8)

26. Candidate indicator: Proportion of days and geographical distribution where loud, low, and mid-frequency impulsive sounds exceed levels that are likely to entail significant impact on marine animals (EO11)

27. Candidate Indicator: Levels of continuous low frequency sounds with the use of models as appropriate (EO11)

The Correspondence Groups on Monitoring (CORMONs) are encouraged to further develop the candidate indicators towards common indicators during the initial phase of IMAP, as well as to further specify and refine the agreed common indicator specifics in light of the ongoing experience of the initial phase of IMAP.

Note on geographic reporting scales

A scale of reporting units needs to be defined during the initial phase of IMAP taking into account both ecological considerations and management purposes, following a nested approach.

The nested approach aims to accommodate the needs of the above is to take into account 5 main reporting scales:

(1) Whole region (i.e. Mediterranean Sea);

(2) Mediterranean sub-regions, as presented in the Initial Assessment of the Mediterranean Sea, UNEP(DEPI)/MED IG.20/Inf.8;

(3) Offshore areas and areas of coastal influence;

(4) Subdivisions of coastal waters provided by Contracting Parties..

2. Monitoring and assessment of biodiversity and NIS related common indicators

Biodiversity (EO1)

Biological diversity is the "variability among living organisms from all sources, including, interalia, [terrestrial,] marine [and aquatic ecosystems] and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".

The common indicators to be monitored and assessed in relation to biodiversity are as following:

Common Indicator 1: Habitat distributional range (EO1);

Common Indicator 2: Condition of the habitat's typical species and communities (EO1);

Common Indicator 3: Species distributional range (EO1 related to marine mammals, seabirds, marine reptiles);

Common Indicator 4: Population abundance of selected species (EO1, related to marine mammals, seabirds, marine reptiles);

Common indicator 5: Population demographic characteristics (EO1, e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates related to marine mammals, seabirds, marine reptiles)

As it is not possible or even necessary to monitor all attributes and components of biological diversity throughout the region, the IMAP monitoring is focusing, in line with the risk-based approach, on some representative sites and species, which can showcase the relationship between environmental pressures and their main impacts on the marine environment.

In light of the above, a de-minimis list of species and habitats to be monitored is presented in Appendix 1, noting that those Contracting Parties who have the necessary means and are willing to do so can go beyond the monitoring requirements of this de-minimis list.

The Contracting Parties while updating their national monitoring programmes need to include at least the monitoring of the de-minimis list species and habitats with at least two monitoring stations, one in a low pressure area (e.g. marine protected area/ Specially Protected Area of Mediterranean Importance (SPAMI)) and one in a high pressure area from human activity.

The methodologies and quality control and quality assurance measures available for Contracting Parties to consider during the update of their national monitoring programmes are described in the Integrated Monitoring and Assessment Guidance.

Regarding the assessment of biodiversity, it has to be noted that the quantitative definition of GES is difficult, considering the variety of assessment elements. The conceptual approach for a quantitative GES setting can be framed in a way that the resilience of the ecosystem is suited to accommodate the quantified biodiversity, or, in other words, it will be accounted in the determination of the GES boundaries as the "naturally" allowed deviation from the reference point.

The scale of monitoring is of specific importance for biodiversity, due to the nature of the biodiversity related common indicators. The application of the nested approach, as described in Appendix 1, is key here.

For the high quality of assessment, baselines and thresholds will need to be agreed on in line with the possible methods for this set out in the Integrated Monitoring and Assessment Guidance document, following the agreed scales of assessment, during the initial phase of IMAP implementation.

Non-Indigenous Species (EO2)

Non-indigenous species (NIS; synonyms: alien, exotic, non-native, allochthonous) are species, subspecies, or lower taxa introduced outside of their natural range (past or present) and outside of their natural dispersal potential.

Invasive alien species (IAS) are a subset of established NIS which have spread, are spreading, or have demonstrated their potential to spread elsewhere, and which have an effect on biological diversity and ecosystem functioning (by competing with and on some occasions replacing native species), socio-economic values, and/or human health in invaded regions.

The common indicator in relation to NIS is:

Common Indicator 6: Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas (EO2, in relation to the main vectors and pathways of spreading of such species);

Non-indigenous species monitoring in the Mediterranean is a trend monitoring, where it is key to establish reliable, long-term data-sets as a first step of monitoring.

In addition, monitoring of non-indigenous species (NIS), following the risk based approach, needs to be focused on the invasive alien species (IAS) in IAS introduction "hot spots" (ports and their surrounding areas, docks, marinas, aquaculture installations, heated power plant effluents sites, offshore structures). In addition, areas of special interest such as marine protected areas or lagoons may be selected on a case by case basis, depending on the proximity to alien species introduction hot spots.

With the application of the risk based approach as stated above, it is possible to obtain an overview of the non-indigenous species present at a large spatial scope while only monitoring a relatively small number of locations.

Based on existing regional databases, such as the Marine Mediterranean Invasive Alien Species database, (MAMIAS), the "Andromeda" invasive species database for the Mediterranean and Black Sea, and the European Alien Species Information Network (EASIN), each Contracting Party will determine the list of IAS to be monitored in its national monitoring programme during the initial phase of the IMAP and start collecting data regarding these species.

The methodologies and quality control and quality assurance measures available for Contracting Parties to consider during the update of their national monitoring programmes, is described in the Integrated Monitoring and Assessment Guidance.

As the most effective and de-minimis monitoring method, Rapid Assessment Surveys (RAS) will be carried out by the Contracting Parties in hot-spot areas, at least once a year.

In addition, UNEP/MAP will develop during the initial phase of IMAP citizen survey guidance for NIS, to enable Contracting Parties to use this additional cost-efficient methodology, which also strengthens public awareness and participation.

Regarding the assessment of EO2, to be able to specify further GES, it is important to understand which NIS are present within the marine region and sub-regions. A baseline assessment of the extant NIS would provide a reference point against which the success of future actions could be measured. After this baseline data has been gathered during the initial phase of IMAP, it will be possible to set reference levels, following the assessment criteria set out in the Integrated Monitoring and Assessment Guidance.

3. Monitoring and assessment of pollution and litter related common indicators

Eutrophication (EO5)

Eutrophication is a process driven by enrichment of water by nutrients, especially compounds of nitrogen and/or phosphorus, leading to: increased growth, primary production and biomass of algae; changes in the balance of nutrients causing changes to the balance of organisms; and water quality degradation.

Eutrophication related common indicators:

Common indicators related to eutrophication:

Common Indicator 13: Concentration of key nutrients in water column (EO5);

Common Indicator 14: Chlorophyll-a concentration in water column (EO5)

The monitoring of eutrophication under IMAP builds on the existing monitoring system of UNEP/MAP MED POL Monitoring programme, and most of the Contracting Parties already have monitoring programmes in place for eutrophication all over the Mediterranean basin, which constitutes a greater concerns for the Adriatic than for the rest of sub-regions.

The Contracting Parties, building on their existing national monitoring programmes and previous MED POL experience on eutrophication, will update these programmes during the initial phase of IMAP, with the overall aim to establish coherent datasets at the entire regional sea level.

The methodologies and quality control and quality assurance measures available for Contracting Parties to consider during the update of their national monitoring programmes are described in the Integrated Monitoring and Assessment Guidance, noting the differences of needed techniques based on the level of the eutrophication problem in different sub-regions and countries.

The geographical scale of monitoring for the assessment of GES for eutrophication will depend on the hydrological and morphological conditions of an area, particularly the freshwater inputs from rivers, the salinity, the general circulation, upwelling, and stratification.

The spatial distribution of the monitoring stations should thus, prior to the establishment of the eutrophication status of the marine sub-region/area, be risk-based and proportionate to the anticipated extent of eutrophication in the sub-region under consideration as well as its hydrographic characteristics aiming for the determination of spatially homogeneous areas. Consequently, each Contracting Party would be required to determine the optimum frequency per year and optimum locations for their monitoring/sampling stations.

The TRIX index (Vollenweider et al., 1998) may be used for a preliminary assessment of the trophic status of coastal waters in relation to eutrophication, providing that its advantages and shortcomings are taken into account (Primpas and Karydis, 2011).

In addition, it is recommended that the Contracting Parties rely on the classification scheme on chl-a concentration (μg/l) developed by MEDGIG as an assessment method that is easily applicable by all Mediterranean countries, based on the indicative thresholds and reference values adopted therein (see Table 2). In this context, regarding the definition of sub-regional thresholds for chlorophyll-a, water typology is very important for further development of classification schemes of a certain area. This context, regarding the definition of sub-regional thresholds for chlorophyll a water typology, is very important for further development of classification schemes of a certain area.

The assessment methodology is well developed in the Integrated Monitoring and Assessment Guidance for eutrophication. Taking into account sub-regional differences, UNEP/MAP is going to develop eutrophication common indicator based assessment fact sheets during the initial phase of IMAP, based on the assessment specifics described in the Integrated Monitoring and Assessment Guidance. The final report of the Informal Online working group on eutrophication (UNEP((DEPI)/MED WG.420/Inf.11) contains assessment criteria regarding eutrophication which are presented in Appendix 2 of this document.

Contaminants (EO9)

The monitoring of concentrations of a range of chemical contaminants in water, sediments and biota has a long standing history in the Mediterranean, under the auspices of the UNEP/MAP Barcelona Convention, its Land-Based Protocol, and UNEP/MAP MED POL monitoring programmes. The IMAP builds on these existing legislative bases, programmes.

Contaminants related common indicators:

Common Indicator 17: Concentration of key harmful contaminants measured in the relevant matrix (EO9, related to biota, sediment, seawater);

Common Indicator 18: Level of pollution effects of key contaminants where a cause and effect relationship has been established (EO9);

Common Indicator 19: Occurrence, origin (where possible), extent of acute pollution events (e.g. slicks from oil, oil products and hazardous substances), and their impact on biota affected by this pollution (EO9);

Common Indicator 20: Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood (EO9);

Common Indicator 21: Percentage of intestinal enterococci concentration measurements within established standards (EO9)

All Mediterranean countries have programmes already in place in relation to contaminants monitoring, however the scope and scale of this monitoring varies. The IMAP thus aims to build more harmony in between the various existing monitoring programmes, based on the agreed common indicators.

Biological effects monitoring is generally less widely established in both national and international programmes, and the number of countries undertaking such studies (and the intensity of the coverage) is much smaller. Therefore, it will be essential during the initial phase of IMAP to expand and develop further the use of biological effects methods to cover properly the EO9.

In addition, important development areas during the initial phase of IMAP will include harmonisation of monitoring targets (determinants and matrices) within assessment sub-regions, development of suites of assessment criteria, integrated chemical and biological assessment methods, and review of the scope of the monitoring programmes to ensure that those contaminants which are considered to be important within each assessment area are included in monitoring programmes.

Noting the above, the Contracting Parties will update their existing contaminants-related monitoring programmes by building on their existing sampling station networks, existing methodologies and statistical tools, existing data sets, and existing time series as the basis of monitoring against a “no deterioration” objective, aiming to cover the monitoring of all contaminants related common indicators.

While most monitoring stations already exists, there is also a need for Contracting Parties to include in their monitoring programme areas beyond the coastal areas in a representative and efficient way, where risks warrant coverage, in line with the Integrated Monitoring and Assessment Guidance.

The methodologies, quality control and quality assurance measures, and reference methods available for Contracting Parties to consider during the update of their national monitoring programmes, are described in the Integrated Monitoring and Assessment Guidance.

Regarding assessment, the Report UNEP(DEPI)MED WG.394/Inf.3 on the development of assessment criteria for hazardous substances and the final report of the Informal Online working group on contaminants (UNEP((DEPI)/MED WG.420/Inf.12) present key recommendations which will be followed to establish a forward procedure for monitoring the achievement of GES for contaminants during the initial phase of IMAP (Appendix 2 of this Annex).

Until EACs are defined under this follow-up, a two-fold approach could be adopted to support monitoring for the assessment of GES:

a) a threshold value for GES(BAC), to be set using concentrations from relatively unpolluted areas on a sub-regional level and

b) a decreasing trend should be observed from baseline values representing the actual level of contaminants concentrations.

Thus, GES can be defined for toxic metals (Hg, Cd, Pb), chlorinated organic compounds, and PAHs, for which monitoring data exist as a result of running monitoring programmes, already during the initial phase of IMAP, and UNEP/MAP will conclude its relevant common indicator based assessment in light with the above.

In addition, during the initial phase of IMAP, UNEP/MAP will also prepare an adapted manual establishing the BAC and, when possible, the formulation of EAC for selected biomarkers in Mediterranean species.

Regarding acute pollution events, while Contracting Parties already have an existing monitoring obligation under Article 9 of the Prevention and Emergency Protocol, the efforts of which need to be strengthened, it is also foreseen that further analysis of the links in between acute pollution events and their effects on biota and the development of specific assessment criteria for this latter should occur.

Monitoring of contaminants in biota used for human consumption also builds on existing monitoring requirements and only measures contaminants in fish and other seafood for which regulatory limits have been set in national and international regulations for public health reasons.

National monitoring Programmes in this regard should at least consider the following contaminants for which regulatory levels have been laid down: Heavy metals (lead, cadmium, and mercury), polycyclic aromatic hydrocarbons, and dioxins (including dioxin-like PCBs), with the species selection considerations described in the Integrated Monitoring and Assessment Guidance.

Regarding percentage of intestinal enterococci concentration measurements within established standards), the Revised Mediterranean guidelines for bathing waters of 2007 based on the WHO guidelines for “Safe Recreational Water Environments” and on the EC Directive for “Bathing Waters” serve as a basis for monitoring.

The values agreed for the Mediterranean region in COP 17 (Decision IG.20/9 Criteria and Standards for bathing waters quality in the framework of the implementation of Article 7 of the LBS Protocol, (UNEP/MAP, 2012)) will be built on to further define GES for the indicator on pathogens in bathing waters during the initial phase of IMAP.

<u>Marine litter (EO10)</u>

Marine litter monitoring of IMAP is based on the Regional Plan on Marine Litter management (Decision IG. 20/10, the MLRP) and on the following agreed common and candidate indicators:

Common Indicator 22: Trends in the amount of litter washed ashore and/or deposited on coastlines (EO10);

Common Indicator 23: Trends in the amount of litter in the water column including microplastics and on the seafloor (EO10);

Candidate Indicator 24: Trends in the amount of litter ingested by or entangling marine organisms focusing on selected mammals, marine birds, and marine turtles (EO10)

In addition, as marine litter monitoring is a new area for the Mediterranean, IMAP greatly builds on the UNEP Guidelines for Comprehensive Beach Litter Assessment and on the Guidance on Monitoring of Marine Litter in European Seas.

Contracting Parties will establish national monitoring programmes during the initial phase of IMAP in relation to the two common indicators and are encouraged to also consider in their monitoring programmes the candidate indicator related to ingested litter and to undertake pilot monitoring activities on the latter.

Furthermore, is strongly recommended that Contracting Parties, which currently have plans to monitor only in a subset of environmental compartments, start with small pilot research or development projects in other compartments. This would provide baseline data to make an informed decision about future, full-scale monitoring programmes. Without information on trends and amounts in all the marine compartments, a risk-based approach to litter monitoring and measures is not possible.

A considerable number of citizens, communities (NGOs, civil society initiatives), and environmental protection associations and institutes across the Mediterranean are already taking part in activities to tackle marine litter. Contracting Parties are encouraged to enable them in the implementation of IMAP and empower them to help improve the evidence base needed for marine litter monitoring.

Regarding beach litter, cost-efficient and easy to follow monitoring and sampling methodologies and techniques are well established, as described in the Integrated Monitoring and Assessment Guidance, with at least two surveys per year in spring and autumn recommended and ideally 4 surveys per year in spring, summer, autumn and winter.

A reduced master list of litter categories and items is also included in the Integrated Monitoring and Assessment Guidance with the most frequent items found in Mediterranean beaches. The Contracting Parties can build on this reduced list as a de-minimis approach in relation to marine litter monitoring, and it can be used also as a practical guide for the field work, enabling a coordinated and harmonized monitoring (including when operated by NGOs).

Regarding monitoring litter at the sea (Common Indicator 17), due to the low occurrence of litter in midwater, the common indicator focuses on surface and seafloor litter.

Due to the observation methodology (observation from ships), the type of marine litter objects can only be noted during very short visual observation. Therefore, in contrast to beach litter, only rough litter categories can be determined, even though monitoring size categories should also include relevant small items, in line with the Integrated Monitoring and Assessment Guidance.

During the initial phase of IMAP, UNEP/MAP will develop a specific Monitoring of floating litter protocol, on a regional basis.

Regarding sea floor litter (Common Indicator 17), opportunistic monitoring is the most cost-efficient method for sea-floor monitoring, building on the Mediterranean International Bottom Trawl Surveys (MEDITS) and compatible professional trawling operations to couple monitoring efforts may be the best approach to monitor litter on the sea-floor. There may be other opportunities to couple marine litter surveys with other regular surveys (monitoring in marine reserves, offshore platforms, etc.) or programmes on biodiversity, with methodologies and technical requirements prescribed in the Integrated Monitoring and Assessment Guidance.

Regarding ingested litter (Candidate Indicator 18), due to the limited availability of protocols and the state of knowledge, the candidate indicator's focus during the initial phase of IMAP is on sea turtle Caretta caretta. UNEP/MAP thus will develop during the initial phase of IMAP a monitoring protocol for marine litter in sea turtles with focus on relevant parameters for application in the Mediterranean.

As ingested litter is a candidate common indicator, Contracting Parties are not obliged to include its monitoring in their national integrated monitoring programmes during the initial phase of IMAP, but they are encouraged however to undertake pilots, further research on this indicator.

Furthermore, it is important to note that while micro-litter is considered to be part of IMAP, further work is necessary here regional level, recognizing that our understanding of the potential impacts of microplastic on organisms and the environment is still limited. Contracting Parties are thus encouraged also to undertake pilots, further research work in this area.

The Integrated Monitoring and Assessment Guidance includes further specific methodologies, scales, and technical considerations, which can guide the Contracting Parties during the development of their integrated monitoring programme's marine litter component. The report of the Informal Online working group on Marine Litter (UNEP((DEPI)/MED WG.420/Inf.13) present recommendations related to baselines (Appendix II).

4. Monitoring and assessment of coastal ecosystems and landscapes and hydrography related common indicators

Hydrography

Monitoring of hydrographic alterations aim to address developments large enough to have the potential to alter hydrographical conditions, either at broad scale or through acting cumulatively with other developments.

Hydrography related common indicator:

Common Indicator 15: Location and extent of the habitats impacted directly by hydrographic alterations (EO7)

As mentioned above, monitoring under this ecological objective aims to address new developments of permanent alterations (constructions lasting for more than 10 years).

Contracting Parties thus when developing their national integrated monitoring programme's hydrography component, need to first choose a baseline in the (very) near future from which monitoring for good status can be based upon. Furthermore, they should list their available records the licensing applications for any proposed developments that would be considered large enough to have the potential to alter hydrographical conditions (constructions lasting for more than 10 years). The monitoring following this approach, will confirm whether there is need for any additional licensing, monitoring or assessment requirements for Government, marine licensing authorities or developers.

Coastal ecosystems and landscapes

One particularity of the IMAP (compared to other regional/RSC monitoring and assessment programmes) is the inclusion of an Ecological Objective focusing on the terrestrial part of the coastal zone. This reflects that the Barcelona Convention also covers coastal areas in its work, in line with the ICZM Protocol.

The coast related common indicator and candidate common indicator are as follows:

Common Indicator 16: Length of coastline subject to physical disturbance due to the influence of man-made structures (EO8);

Candidate Indicator 25: Land use change (EO8)

In line with the above, the monitoring under this Ecological Objective is meant to address human activities causing coastal artificialisation by sealing the coast with the implementation of coastal structures and therefore impact coastal ecosystems and landscapes.

The term 'manmade structures' typically refers, solely, to coastal defences and ports (and indirectly to land claim). Coastal segments are "artificialised" when all or part of the 100 meter area on both sides (i.e. land and sea) are subject to transformation by Man, modifying their original physical state.

During the development of the national integrated monitoring programmes' coastal component, the Contracting Parties, in line with the above, first need assess the length of coastline affected by man-made structures in the current state, in line with the Integrated Monitoring and Assessment Guidance, noting that the length of coastline subject to physical disturbance due to the influence of manmade structures is an impact indicator, which assumes that the coastlines occupied by manmade structures are potentially impacted areas.

For assessment of indicator on length of coastline influenced by man-made structures, definition of thresholds as % and / or m, to be developed, during the initial phase of IMAP, should be based on expert assisted procedure to take into account the typology of the coast including its ecosystem goods and services related to social and economic benefits. The assessment should also include disturbance that comes from such structures.

In relation to candidate indicator on land use change, Contracting Parties are encouraged to develop monitoring programmes and undertake monitoring activities in line with the outcomes of the EcAp-MED pilot project, undertaken in the Adriatic, noting that the indicator is very important for the analysis of processes in coastal areas and as it is a simple tool it should be promoted and developed during the initial phase of IMAP, so to allow countries to propose adequate measures to achieve GES (to be specified by the countries themselves taking local specificities into consideration) and consequently, to bring more objectivity into reporting on the state and evolution of their coastal zones and implementation of the ecosystem approach in coastal zones.

5. Monitoring Ecological Objective 11: Energy including underwater noise

This part of IMAP has been prepared, thanks to the support of experts from the Joint ACCOBAMS/ASCOBANS/CMS Working Group on Noise

The two candidate common indicators related to energy including underwater noise are:

Candidate Indicator 26: Proportion of days and geographical distribution where loud, low, and mid-frequency impulsive sounds exceed levels that are likely to entail significant impact on marine animals

Candidate Indicator 27: Levels of continuous low frequency sounds with the use of models as appropriate

Compared to Descriptor 11 related indicators (MSFD), candidate indicators 26 and 27 are more closely related to the acoustic biology of key marine mammal species of the Mediterranean which are known to be sensitive to noise, i.e. the fin whale, the sperm whale and the Cuvier's beaked whale. The proposed monitoring strategy of these two candidate indicators, as spelled out in the Integrated Monitoring and Assessment Guidance, represents a basis for further work during the initial stage of IMAP towards an effective and widely agreed monitoring of underwater noise at a regional scale.

In line with the above, Contracting Parties are encouraged to develop monitoring programmes and undertake activities on the two common indicators on a pilot basis during the initial phase of IMAP.

UNEP/MAP and ACCOBAMS, together with other interested partners, will continue during the initial phase of IMAP to further develop these candidate indicators towards common indicators.

For GES assessment related to EO11, three thresholds need to be established: a spatial and a temporal threshold concerning candidate indicator 26 and a noise threshold concerning candidate indicator 27.

During the initial phase of IMAP, the ACCOBAMS Secretariat will carry out the following tasks with a view to find out the thresholds:

1. Reviewing what spatial and temporal thresholds have been selected by European Member States for implementing impulsive noise indicator of D11

2. Fulfilling action CA 2b1 of the 2014-2016 Work Plan ("Identifying Noise Hotpots for cetaceans in the ACCOBAMS area") in order to provide the necessary baseline information on space-time distribution of impulsive noise sources across the Mediterranean

3. Reviewing ambient noise data available for the Mediterranean Sea as a follow up of the present work in order to identify the threshold for continuous noise indicator 11.1.2.

Appendix 1

List of species and habitats

Explanatory Note/Glossary for parameters, criteria and prioritization used here:

EN Term	EN definition	FR Terme	FR définition
Predominant habitat:	Widely occurring and broadly defined habitat types by abiotic characteristics (e.g. EUNIS level 3), referred to in Table 1 of Annex III to the EC Marine Strategy Framework Directive (2008/56/EC)	**Habitats principaux:**	Types d'habitats à un haut niveau typologique, définis par des caractéristiques abiotiques (e.g. EUNIS level 3), cités dans le tableau 1 de l'annexe III de la Directive européenne Cadre Stratégie Milieux Marins (2008/56/EC)
Habitat:	This term addresses (as defined in EC Decision 2010/477/UE) both the abiotic characteristics and the associated biological community, treating both elements together (e.g. EUNIS level 5 or 6). This term may also refer to a number of habitat complexes (which means assessing, where appropriate, the composition, extent and relative proportions of habitats within such complexes) and to some functional habitats (such as spawning, breeding, resting, feeding areas and migration routes)	**Habitat:**	Ce terme (tel que défini dans la Décision CE 2010/477/UE), se réfère à la fois aux caractéristiques abiotiques et à la communauté biologique associée, de façon indissociables (e.g. EUNIS level 5 ou 6). Ce terme peut également se référer à certains complexes d'habitats (impliquant, si approprié, dévaluer la composition, l'étendue et les proportions relatives des habitats composant ce complexe) et à certains habitats fonctionnels (tels que les frayères, les zones de reproduction, de repos, d'alimentation, et les couloirs migratoires)
Functional group (of species):	An ecologically relevant set of species, applied here in particular to the following (highly) mobile species groups: birds, reptiles, marine mammals, fish and cephalopods. Each functional group represents a predominant ecological role (e.g. offshore surface-feeding birds, demersal fish) within the species group. This term is referred to in the EC Decision 2010/477/UE (Part B, species)	**Groupe fonctionnel (d'espèces):**	Un ensemble écologiquement cohérent d'espèces, appliqué ici en particulier aux espèces (largement) mobiles suivantes: oiseaux, reptiles, mammifères marins, poissons et céphalopodes. Chaque groupe fonctionnel représente un rôle écologique majeur (e.g. oiseaux se nourrisant au large en sub-surface, poissons démersaux) au sein du groupe d'espèces. Ce terme est cité dans la Decision CE 2010/477/UE (Partie B, espèces)
Texel-Faial Criteria	Cf. document downloadable at: http://www.google.fr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCYQFjAA&url=http%3A%2F%2Fwww.ospar.org%2Fdocuments%2Fdbase%2Fdecrecs%2Fagreements%2F03-13e_texel_faial%2520criteria.doc&ei=r1MQVPP7GYvuaPm7gBA&usg=AFQjCNFFBqKlpeixMYiLZD1JqGJC_rAwTw&sig2=wG6kTCw1ZQvZJwazTNX7iw&bvm=bv.74649129,d.d2s	**Critères de Texel-Faial:**	Cf. document téléchargeable à: http://www.google.fr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CCIQFjAAahUKEwjzto-7punGAhWIPxQKHYo0B1k&url=http%3A%2F%2Fwww.ospar.org%2Fdocuments%2Fdbase%2Fdecrecs%2Fagreements%2F03-13f_criterestexel-faial.doc&ei=i7KsVbPFKYj_UIrpnMgF&usg=AFQjCNEVmuntg7oEq-C4n4tbGPpuM3B_0w&sig2=eVctr-Vg5--1LEVuFv97-A&bvm=bv.98197061,d.d24
(sub)regional importance (Texel-Faial Criteria)	A high proportion of the habitat or species population (at any time of its life cycle) occurs within a specific biogeographic region and/or (sub)region of national responsibility, within the Mediterranean Sea	**importance (sous-)régionale (critère Texel-Faial):**	Une grande proportion de l'habitat ou de la population de l'espèce (quel que soit le stades de vie considéré) est situé dans une zone biogéographique spécifique et/ou une (sous-)région relevant d'une responsabilité nationale, en Méditerranée
Rarity (Texel-Faial Criteria)	A habitat is assessed as being rare if it is restricted to a limited number of locations or to small, few and scattered locations in the Mediterranean Sea. A species is rare if the total population size is small. In case of a species that is sessile or of restricted mobility at any time	**Rareté (critère Texel-Faial):**	Un habitat est dit rare s'il est restreind à un nombre limité de sites ou à quelques petits sites dispersés en Méditerranée, Une espèce est rare si sa population totale est faible. Dans le cas d'une espèce sessile ou à mobilité restreinte, quel que soit le stade de vie considéré, cette espèce est rare si son occurence est limitée à

	of its life cycle, a species is rare if it occurs in a limited number of locations in the Mediterranean Sea, and in relatively low numbers. In case of a highly mobile species, the total population size will determine rarity		nombre réduit de sites en Méditerranée, et en faibles abondances. Dans le cas d'espèces largement mobiles, la taille de la population détermine sa rareté éventuelle
Key functional role (from Texel-Faial Criteria)	A species (population) or habitat, which function(s) as a key role to support ecosystem processes and interactions. These key functions may be associated to natural productivity, trophic role, remarkable biodiversity or "species functional habitats", such as spawning, breeding, resting and feeding areas and migration routes	**Rôle fonctionnel clé (d'après critère Texel-Faial):**	Une espèce (population) ou un habitat, dont la(es) fonction(s) ont un rôle clé dans les processus et interactions de l'écosystème. Ces fonctions clés peuvent être associées à une productivité naturelle, un rôle trophique, une biodiversité remarquable, ou aux "habitats fonctionnels d'espèces", tels que les zones de frayères, de reproduction, de repos, d'alimentation et les couloirs migratoires
Sensitivity (Texel-Faial Criteria):	A species (population) or habitat is “sensitive” when: a. it has low resistance (that is, it is easily adversely affected by human activity); and/or b. it has low resilience (that is, after an adverse effect from human activity, recovery is likely to be achieved only over a long period)	**Sensibilité (critère Texel-Faial):**	Une espèce (population) ou un habitat est "sensible" si: a. il a une faible résistance (c’est-à-dire qu'il est facilement impacté par les activités humaines); et/ou b. il a une faible résilience (c’est-à-dire, qu'après un impact dû à une activité humaine, il n'est susceptible de récupérer qu'après une longue période)
Vulnerability:	A species (population) or habitat is "vulnerable" when it is exposed to a pressure, to which it is sensitive (cf. column N to V)	**Vulnérabilité:**	Une espèce (population) ou un habitat est "vulnérable" si il est exposé à une pression, à laquelle il est sensible (cf. colonnes N à V)
Declining or threatening (from Texel-Faial Criteria):	A "declining" species (population) or habitat means an observed or indicated significant decline in numbers, extent or quality (quality refers for a species to its life history parameters). The decline may be historic, recent or current. The decline can occur in the whole Mediterranean Sea area or (sub)regionally. Where the decline is “clear and present”, and can be linked directly or indirectly to human activity, the species (population) or habitat is also considered to be “currently threatened”. Where there is a high probability of significant decline linked directly or indirectly to human activity, the species (population) or habitat is considered to be “potentially threatened”	**En déclin ou menacé (d'après critère Texel-Faial):**	Une espèce (population) ou un habitat en "déclin" implique une diminution, observée ou mesurée de façon significative, en abondance, étendue ou qualité (qualité se réfère pour une espèce à ses paramètres démographiques). Le déclin peut être historique, récent ou actuel. Le déclin peut avoir lieu sur toute la Méditerranée ou une (sous-)région. Quand le déclin est "clair et avéré", et peut être lié directement ou indirectement à une activité humaine, l'espèce (population) ou l'habitat est aussi considéré comme "actuellement menacé". Quand il y a une forte probabilité de déclin significatif, lié directement ou indirectement à une activité humaine, l'espèce (population) ou l'habitat est considéré comme "potentiellement menacé"
Feasability (for monitoring):	Existence of methods and protocols to monitor a species (population) or habitat. Resources needed (logistic, technical and human) and actually existing monitoring are detailed in column W to AG	**Faisabilité (pour la surveillance):**	Existance de méthodes et protocoles pour réaliser le suivi d'une espèce (population) ou d'un habitat. Les ressources nécessaires (logistiques, techniques et humaines) et les suivis actuellement existant sont détaillés dans les colonnes W à AG
Priority:	If a species or habitat meet at least 1 of the Texel-Faial criteria AND is vulnerable AND then it's monitoring is technically feasible, its monitoring should be highly prioritized. Besides, redundancies in selected species or habitats representing specific functional groups/predominant habitats, should be considered.	**Priorité:**	Si une espèce ou habitat réponds à au moins 1 des critères de Texel-Faial ET est vulnérable ET que son suivi est techniquement faisable, son suivi doit être hautement prioritaire. Par ailleurs, la redondance entre les espèces ou habitats sélectionnés, représentatifs d'un groupe fonctionnel ou habitat principal spécifique, doit être considérée. La priorité haute signifie que des

	Priority mean than sufficient resources (national and/or joint at (sub) regional scale) should be dedicated to acquire relevant data at sufficient spatial and temporal resolution. Low prioritized species or habitats should also be monitored, but data could be acquired at a minimum relevant spatial and temporal resolution, according to available resources (cf. pragmatic approach for assessment scale)		ressources suffisantes (nationales et/ou jointes à l'échelle de la (sous-)région) devraient être dédiées pour acquérir des données pertinentes à une résolution spatiale et temporelle suffisante. Les espèces et habitats moins prioritaires devraient aussi être suivis, mais les données pourraient être acquises à une résolution spatiale et temporelle minimale, mais pertinente, en fonction des ressources disponibles (cf. approche pragmatique pour l'échelle d'évaluation)
Assessment monitoring scale:	For monitoring issue, assessment scale is expressed as the relevant spatial and temporal resolution of required data. These resolutions (number and location of sampling stations, accuracy of remote detection, sampling frequencies, etc.) are likely to be a compromise (cost-efficiency) between "high resolution" (which enable a very accurate and complete assessment, but more expensive assessment) and a more pragmatic approach, identifying a resolution and sampling design in accordance with available resources (less expensive, but which could lead to an incomplete or partial assessment)	**Échelle d'évaluation pour la surveillance:**	Pour la surveillance, l'échelle d'évaluation correspond au plan d'échantillonnage et aux résolutions spatiale et temporelle pertinentes pour acquérir les données requises. Ces résolutions (nombre et position des stations d'échantillonnage, précision de la télédétection, fréquence d'échantillonnage, etc.) devraient être définies selon un compromis (coût/efficacité) entre une "haute résolution" (permettant une grande précision et une évaluation complète, mais à un coût supérieur), et une approche plus pragmatique, adaptant la résolution et/ou le plan d'échantillonnage, selon les ressources disponibles (moins couteux, mais pouvant conduire à une évaluation partielle ou incomplète)
Mediolittoral:	Bathymetric level, corresponding to the intertidal benthic area (from higher to lower tide levels); organisms are in there submitted to alternating immersion and emersion	**Mediolittoral:**	Étage bathymétrique correspondant à la zone benthique intertidale (comprise entre les niveaux des plus hautes et des plus basses mers) ; les peuplements y sont régulièrement soumis aux alternances d'émersion et immersion
Infralittoral:	Bathymetric level, associated to preferential benthic distribution area of photophilic organisms (approximatively, for Mediterranean Sea, from 0 to -50 meters depth, on official marine bathymetric maps)	**Infralittoral:**	Étage bathymétrique correspondant à la zone benthique de répartition préférentielle des organismes photophiles (approximativement, en Méditerranée, de 0 à -50 mètres, sur les cartes marines bathymétriques officielles)
Circalittoral:	Bathymetric level, associated to preferential benthic distribution area of sciaphilic organisms (approximatively, for Mediterranean Sea, from -50 to -200 meters depth, on official marine bathymetric maps)	**Circalittoral:**	Étage bathymétrique correspondant à la zone benthique de répartition préférentielle des organismes sciaphiles (approximativement, en Méditerranée, de -50 à -200 mètres, sur les cartes marines bathymétriques officielles)
Bathyal:	Bathymetric level, associated to darkness and continental slope (approximatively from -200 to -2000 meters depth, on official marine bathymetric maps)	**Bathyal:**	Étage bathymétrique correspondant à la zone aphotique et la pente continentale (approximativement de -200 à -2000 mètres, sur les cartes marines bathymétriques officielles)
Abyssal:	Last bathymetric level, associated to darkness and plains after the continental slope (approximatively below -2000 meters depth, on official marine bathymetric maps)	**Abyssal:**	Dernier étage bathymétrique correspondant à la zone aphotique et des plaines au bas de la pente continentale (approximativement sous -2000 mètres, sur les cartes marines bathymétriques officielles)
Coastal waters:	This term of "coastal waters" addresses here, for pelagic habitats, relatively low depth marine waters, directly influenced by terrigeneous and freshwaters inputs (approximatively from the coast to the beginning of the	**Eaux côtières:**	Le terme "d'eaux côtières" se réfère ici, pour les habitats pélagiques, à des eaux marines de profondeurs relativement faible, soumises à l'influence directe des apports terrigènes et des eaux douces (approximativement de la côte au début du plateau

	continental shelf)		continental)
Shelf and Oceanic waters:	This term of "shelf and oceanic waters" addresses here, for pelagic habitat, offshore marine waters (shell, bathyal and abyss), less directly influenced by terrigeneous and freshwaters inputs. They are characterized by specific physico-chemical conditions and biological communities	**Eaux du plateau et océaniques:**	Les "eaux du plateau et océaniques" se réfère ici, pour les habitats pélagiques, aux eaux marines situées au large (plateau, bathyal et abysses), moins soumises directement à l'influence des apports terrigènes et des eaux douces. Elles sont caractérisées par des conditions physico-chimiques et des communautés biologiques spécifiques

Species class	**Species functional groups**	
	CE/OSPAR	**FR experts proposal** (subdivision of toothed whales)
Marine mammals / Mammifères marins	Baleen whales	baleines à fanons (Mysticètes)
	toothed wales	Odontocètes épipélagiques stricts (alimentation entre 0 à -200 m)
		Odontocètes épi- et méso-bathy-pélagiques (alimentation de 0 à >-200 m)
	Seals	Phoques (pinnipèdes)
Reptiles	Turtles	Tortues marines
Birds / Oiseaux	Coastal top predators	Prédateur supérieur côtier
	intertidal benthic-feeders	à alimentation benthique littoral, côtier (côtier)
	inshore benthic feeders	à alimentation benthique subtidale, côtier (eaux côtières)
	inshore surface-feeders	à alimentation pélagique de surface, côtier (eaux côtières)
	inshore pelagic feeders	à alimentation pélagique de sub-surface, côtier (eaux côtières)
	offshore surface feeders	à alimentation pélagique de surface, au large (eaux du plateau et océaniques)
	offshore pelagic feeders	à alimentation pélagique de sub-surface, au large (eaux du plateau et océaniques)
Fish / Poissons	Diadromous bony fish	Poissons diadromes
	Demersal coastal bony fish	Poissons osseux démersaux côtiers (eaux côtières)
	Demersal coastal elasmobranch	Elasmobranches démersaux côtiers (eaux côtières)
	Pelagic coastal bony fish	Poissons osseux pélagiques côtiers (eaux côtières)
	Pelagic coastal elasmobranchs	elasmobranches pélagiques côtiers (eaux côtières)
	Demersal offshore bony fish	Poissons osseux démersaux du large (eaux du plateau et océaniques)
	Demersal offshore elasmobranchs	elasmobranches démersaux du large (eaux du plateau et océaniques)
	Pelagic offshore bony fish	Poissons osseux pélagiques du large (eaux du plateau et océaniques)
	Pelagic offshore elasmobranchs	elasmobranches pélagiques du large (eaux du plateau et océaniques)
Cephalopods / Céphalopodes	Coastal cephalopods	Céphalopodes côtiers (eaux côtières)
	Offshore cephalopods	Céphalopodes du large (plateau et océaniques)

Minimum list			Trust-Fatal Criteria							Typology/listed species/habitats		Main pressures (binary-occuring or not: to be prioritized (ranked) for each specific representatives species or habitats)									Feasibility								
Predominant habitat or "Functional" group of species	**Specific habitat type or species to be monitored**	**ADDITIONAL INFORMATION (to be further discussed): specific representatives species or habitats (invertebrates associated with habitats)**	**(sub)regional importance**	**Rarity**	**Key functional role**	**Declining or threatening**	**Sensitivity/Vulnerability (exposure to pressures): cf. column N to V**	**feasability (for monitoring): cf. column W to AG**	**Priority (estimated from column D to I)**	**Assessment monitoring scale**	**EUNIS 2015**	**Habitats Directive**	**Physical loss of habitat (construction ports, marinas)**	**Physical damage to habitat**	**Nutrient enrichment**	**Contaminants**	**Removal by fishing (target, non-target)**	**Hydrological changes (thermal, salinity regime)**	**Other disturbances to species (e.g. litter, visual disturbance)**	**UW noise**	**NIS**	**Vessel**	**Lab facilities, equipment, consumables**	**Taxonomic expertise (technicians, scientists)**	**Monitoring techniques developed**	**Aerial**	**Land-based**	**In-water**	**Indicators established**	**Existing observatories / long term monitoring programmes**	**Satellite / Remote Sensing / aerial platforms**	**Oceanographic platforms**
Seabed - mediolittoral - infralittoral rock	Communities in the mediolittoral and infralittoral that are based on bio-construction	(e.g. vermetid reefs, e.g. Dendropoma pacteum, Cladocora, Astroides calicularis, ; some Cystoseira spp. belts, ...)	Subregional distribution in Southern Mediterranean (Chemmakh & Sifeiat, 2011)	Patchiness of subregional distribution	Biodiversity, keystone/habitat formers, sediment transport , carbon flux, protection from coastal erosion		high sensitivity and vulnerability	1. (ship/video/photo/quadrats/diving)	*1*	fine scale assessment = community level (EUNIS 5)		1170 Reefs									No	Yes	Low	Diving, ROVs, drop cameras,quadrats, photo quadrats, Side scan sonar, Multibeam bathymetry							No
Seabed - infralittoral rock	Hard beds (bottoms, substrates, reefs) associated with communities of photophilic algae	e.g. facies with *Cystoseira amentacea, Mytilus galloprovincialis, Coralina elongata/Herposiphonia secunda, Danyclados vermicularis, Alsidium helminthochorton, Gelidium spinosum, Lobophora variegata, Cladocora caespitosa, Cystoseira brachycarpa, Cystoseira crinita, Cystoseira crinitophylla, Cystoseira sauvageauana, Cystoseira spinosa, Sargassum vulgare, Dictyopteris polyloides, Caljosmania sinuosa, Stypocaulon scoparium, Cystoseira compressa, Pterothamnion crisgum/Compsothamnion thuyoides, Schottera nicaeensis, Rhodymenia ardissonei/Rhodophyllis divaricata* or facies with big hydrozoans	Wide regional distribution	Patchiness of wide regional distribution	Biodiversity, keystone, Carbonate flux, nutrient fluxes		high sensitivity and vulnerability	1. (ship/video/photo/quadrats/diving)	*1*	fine scale assessment = community level (EUNIS 5)		1170 Reefs									No	Yes	High	Diving, ROVs, drop cameras,quadrats, photo quadrats etc				WFD	WFD monitoring network		No
Seabed - mediolittoral-infralittoral sediment	Seagrass meadows	*Posidonia oceanica, Cymodocea nodosa, Zostera* sp	Wide regional distribution (Gerovasilaki et al., 2013; Caskenmet et al, 2013)	Patchiness of wide regional distribution	Biodiversity, keystone/habitat formers, carbon sink, spawning and nursery grounds, critical food resources, water quality and transparency, water oxygenation, sediment stabilization, protection from coastal erosion		high sensitivity and vulnerability	1. (ship/sonar/video/photo/diving)	*1*	fine scale assessment = community level (EUNIS 5)		1120 Posidonia beds, 1110				?					Yes	Yes	Moderate	Diving, ROVs, drop cameras,quadrats, photo quadrats, Side scan sonar, Multibeam bathymetry				WFD	WFD monitoring network		No
Seabed - mediolittoral-infralittoral sediment	Infralittoral sands or muddy sands	e.g. facies with *Pinna nobilis, Asterina pancerii, Callianassa tyrrhena/Kellia corbuloides, Cerastoderma glaucum, Cyathura carinata, Loripes lacteus* or *Tapes* spp.	Wide regional distribution	Patchiness of wide regional repartition	Biodiversity, sediment properties, organic nutrient fluxes		lower sensitivity and vulnerability	1. (ship/sonar/video/photo/grabs)	*2*	fine scale assessment = community level (EUNIS 5)		1140, 1110			?	?	?				Yes	Yes	High	Grabs, cores; dredges				WFD	WFD monitoring network		
Seabed - circalittoral rock	Hard bottom habitats associated with coralligenous communities, sciaphilic algae and semi dark caves, deep reefs (dominated by sponges and other filter feeders)	e.g. facies with *Cystoseira zosteroides, Mesophyllum lichenoides, Lithophyllum frondosum/Halimeda tuna, Rodriguezella strafforelli, Eunicella* spp., *Lophogorgia, Paramuricea, Paracaanthus* spp. or facies of *Corallium rubrum, Leptosammia* spp.	Wide regional distribution (Caskeumt et al, 2013)	Patchiness of wide regional distribution	Biodiversity, keystone species/habitat formers, carbonate flux		high sensitivity and vulnerability	1. (ship/sonar/video/photo)	*1*	fine scale assessment = community level (EUNIS 5)		1170+1130 Submerged or partially submerged sea caves				?	?				Yes	Yes	Moderate	Diving, ROVs, drop cameras,quadrats, photo quadrats, Side scan sonar, Multibeam bathymetry				For coralligenous indicators under development (e.g. CIGESMED)	?		
Seabed - circalittoral sediment	Communities of the coastal detritic bottom	e.g. facies with *Laminaria rodriguezii, Osmanderia and Peyssonnelia, Ophiothrix quinquemaculata, Neolampas rostellata* or *Leptometra phalangium*	Wide regional distribution	Patchiness of regional distribution	Biodiversity, sediment properties and fluxes		lower sensitivity and vulnerability	1. (ship/sonar/video/photo/grab)	*2*	fine scale assessment = community level (EUNIS 5)		1110?				?					Yes	Yes	High	Grabs, cores; dredges, / ROVs, drop cameras,quadrats, photo quadrats, Side scan sonar, Multibeam bathymetry				For the soft bottom communities WFD indicators / For coralligenous indicators under development (e.g.	partly covered by WFD monitoring network for soft bottom comm		
Seabed - circalittoral sediment	Maerl communities	e.g. *Lithothamnion corallioides, Phymatolithon calcareum*	Wide Regional repartition (cf. Martin et al., 2014; DOI: 10.1038/srep06646)	Patchiness of wide regional repartition	↑ Biodiversity, Carbonate flux)		(high sensitivity and vulnerability)	1. (ship/sonar/video/photo/grab)	*1*	fine scale assessment = community level (EUNIS 5)		1160 (*L. corallioides*), 1110 (*P. Calcareum*)				?					Yes	Yes	High	Grabs, cores; dredges, / ROVs, drop cameras,quadrats, photo quadrats, Side scan sonar, Multibeam bathymetry				For the soft bottom communities WFD indicators / For coralligenous indicators under development (e.g.			
Seabed - circalittoral sediment	Bioconcrosis of coastal terrigenous muds	e.g. facies with *Turritella tricarinata communis, Virgularia mirabilis/Pennatula phosphorea* or *Alcyonium palmatum/Stichopus regalis*	regional	Patchiness of wide regional repartition	Biodiversity, sediment properties and fluxes		lower sensitivity and vulnerability	1. (ship/sonar/video/photo/grab)	*2*	fine scale assessment = community level (EUNIS 5)					?	?	?		?		Yes	Yes	High	Grabs, cores; dredges				WFD?	partly covered by WFD monitoring network ?		
Seabed - circalittoral sediment	Communities of shell-edge detritic bottom	e.g. facies with *Leptometra phalangium*	regional		Biodiversity		lower sensitivity and vulnerability	1. (ship/sonar/video/photo/grab)	*2*	fine scale assessment = community level (EUNIS 5)		1110				?				?	Yes	Yes	High	Grabs, cores; ROV, Side scan sonar, Multibeam bathymetry				No			
Seabed - bathyal-abyssal	Communities of deep-sea corals	e.g. facies with *Lophelia pertusa* or *Madrepora oculata*	regional / not yet comprehensive mapping of the populations (Bo et al., 2015)	rare	Biodiversity, habitat formers		Extremely vulnerable species but less exposed to pressures	1. (ship/sonar/video/photo/grab)	*2*	fine scale assessment = community level (EUNIS 5)		1170 reefs				?					Yes	Yes	High	ROVs, Side scan sonar, Multibeam bathymetry				No			
Seabed - bathyal-abyssal	Seeps and communities associated with bathyal muds	e.g. facies with *Isidella elongata, Funiculina quadrangularis, Thenea muricata, Brissopsis lyrifera , Apporhais serresianus* or *Pheronema carpenteri*	regional		Biodiversity / keystone /		lower sensitivity and vulnerability	1. (ship/sonar/video/photo/grab)	*2*	fine scale assessment = community level (EUNIS 5)		1180?				?					Yes	Yes	High	ROVs, covers, Side scan sonar, Multibeam bathymetry				No			
Seabed - bathyal-abyssal	Communities associated with seamounts	(cf. mediterranean deep sea experts)?	regional		Biodiversity		lower sensitivity and vulnerability	1. (ship/sonar/video/photo/grab)	*2*	fine scale assessment = community level (EUNIS 5)		1170 reefs; 1180 ? Submarine structures made by leaking gases				?					Yes	Yes	High	ROVs, covers; Side scan sonar, Multibeam bathymetry							
Water column - coastal waters	Coastal waters phytoplankton communities	HABs	wide regional repartition	No but depends of the level of taxonomy considered (can be true at the species level)	biodiversity, food webs, fluxes and nutrient recycling		high sensitivity and vulnerability		*1*	national/regional										Yes	Yes	High to low (depends of the laboratory where are analysed the samples)	Niskin bottles				yes /chl-a	yes (to check for each country. Yes for: FRSP)	sea surface temperature, chlorophyll etc	Buoys
Water column - coastal waters	Coastal waters zooplankton communities	cf. jellyfish population dynamics and blooms; Jellyfish species : *Phyllorhiza punctata* and *Mnemiopsis leidyi. Secondary Cassiopea andromeda Catostylus tagi Geryonia proboscidalis Marrugia stellata Pelagia benovici Rhopilema nomadic, Beroe ovate*	wide regional repartition	No but depends of the level of taxonomy considered (can be true at the species level)	biodiversity, food webs, fluxes and nutrient recycling		high sensitivity and vulnerability		*1*	national/subregional						?					Yes	Yes	High to low (depends of the laboratory where are analysed the samples)	Plankton nets, LOPC, UVP, PCR, CUFES, pump, trawling net (for jellyfishes), ZooCam and zooscan (for analyse)				No	yes (to check for each country. Yes for: FRSP)	No	Buoys
Water column - shelf and oceanic waters	Shelf and oceanic waters phytoplankton communities		wide regional repartition	No but depends of the level of taxonomy considered (can be true at the species level)	biodiversity, food webs, fluxes and nutrient recycling				*to define*	subregional						?					Yes	depends of the ship	High to low (depends of the laboratory where are analysed the samples)	Niskin bottles				yes (chl-a	yes (to check for each country. Yes for: FRSP)	sea surface temperature, chlorophyll etc	Buoys, gliders, argo floats
Water column - shelf and oceanic waters	Shelf and Oceanic waters zooplankton communities	cf. jellyfish population dynamics and blooms; HABs	wide regional repartition	No but depends of the level of taxonomy considered (can be true at the species level)	biodiversity, food webs, fluxes and nutrient recycling				*to define*	subregional										Yes	depends of the ship	High to low (depends of the laboratory where are analysed the samples)	Plankton nets, LOPC, UVP, PCR, CUFES, pump, trawling net (for jellyfishes), ZooCam and zooscan (for analyse)				No	yes (to check for each country. Yes for: FRSP)	No	Buoys, gliders, argo floats
Seabirds - coastal top predators																				No	No		Birdwatching, breeding areas				Yes	teledetection Tracking ?	No
Seabirds - intertidal benthic-feeders																				No	No		Birdwatching, breeding areas				Yes	teledetection Tracking ?	No
Seabirds - inshore benthic-feeders	*Phalacrocorax aristotelis* (Linnaeus, 1761)		regional	*wide regional distribution*					*1*	regional											No	Moderate	Shipboard or breeding areas					Teledection Tracking		
Seabirds - offshore surface-feeders	*Larus audouinii* (Payraudeau, 1826)		subregional	*wide subregional distribution*					*1*	subregional											No	Moderate	Shipboard or breeding areas					Teledection Tracking		
Seabirds - inshore surface-feeders	*Sterna* spp.	*Sterna albifrons* (Pallas, 1764) or *Sterna nilotica (Gmelin, JF, 1789)* or *Sterna sandvicensis* (Latham, 1878)	regional						*1*	regional											No	Moderate	Shipboard or breeding areas					Teledection Tracking		
Seabirds - offshore (surface or pelagic ?) feeder	*Puffinus* spp.	*Puffinus mauretanicus* (Lowe, PR, 1921), *Puffinus yelkouan* (Brünnich, 1764)	regional						*1*	regional											No	Moderate	Shipboard or breeding areas					Teledection Tracking		
Mammals - seals	*Monachus monachus* (Hermann, 1779)		subregional						*1*	subregional		priority species								Yes	Yes	Moderate	Quadrat sampling of colonies				Yes	Yes	Teledection Tracking		
Mammals - baleen whales	*Balaenoptera physalus* (Linnaeus 1758)		subregional						*1*	subregional										Yes	Yes	Moderate	Shipboard, acoustic or aerial strip transects				Yes	Yes	Teledection Tracking		
Mammals - toothed whales (deep feeder)	*Physeter macrocephalus* (Linnaeus, 1758)		subregional						*1*	subregional										Yes	Yes	Moderate	Shipboard surveys;Acoustic surveys ;Aerial surveys (but not optimum due to long dives				Yes	Yes	Teledection Tracking		
Mammals - toothed whales (deep feeder)	*Ziphius cavirostris* (Cuvier G., 1832)		subregional						*2*	subregional										Yes	Yes	Moderate	Shipboard surveys, Acoustic surveys (but not easy to detect), Aerial surveys (but not optimum				Yes	Yes	Teledection Tracking		

Appendix 2

Pollution/Litter related Assessment Criteria

Pollution/Litter related assessment criteria

a) Eutrophication

It is accepted that surface density is adopted as a proxy indicator for static stability as both temperature and salinity are relevant in the dynamic behaviour of a coastal marine system. More information on typology criteria and setting is presented in document UNEP(DEPI)/MED WG 417/Inf.15.

The different coastal water types, in an ecological perspective, can be described as follows:

- Type I coastal sites highly influenced by freshwater inputs
- Type IIA coastal sites moderately influenced not directly affected by freshwater inputs (Continent influence)
- Type IIIW continental coast, coastal sites not influenced/affected by freshwater inputs (Western Basin)
- Type IIIE not influenced by freshwater input (Eastern Basin)
- Type Island: coast (Western Basin)

In addition, coastal water type III was split in two different sub basins, the Western and the Eastern Mediterranean ones, according to the different trophic conditions and is well documented in literature.

It is recommended to define the major coastal water types in the Mediterranean that have been inter calibrated (applicable for phytoplankton only) as presented in the table 1 [1].

Table 1

	Type I	Type IIA, IIA Adriatic	Type IIIW	Type IIIE	Type Island-W
σ t (density)	<25	25<d<27	>27	>27	All range
salinity	<34.5	34.5<S<37.5	>37.5	>37.5	All range

With the view to assess eutrophication, it is recommended to rely on the classification scheme on chl-a concentration (µg/l) in coastal waters as a parameter easily applicable by all Mediterranean countries based on the indicative thresholds and reference values presented in Table 2.

Table 2 Coastal Water types reference conditions and boundaries in the Mediterranean

Coastal Water Typology	Reference conditions of Chla (µg L^{-1})		Boundaries of Chla (µg L^{-1}) for G/M status	
	G_mean	90 % percentile	G_mean	90 % percentile
Type I	1,4	**3,33[2] - 3,93[3]**	6,3	**10[2] - 17,7[3]**
Type II-FR-SP		1,9		3,58 – 3,6
Type II-A Adriatic	0,33	0,8	1,5	4,0

[1] Reference and threshold (Good/Moderate status) derived values (G-mean annual values based on long time series (>5 years) of monthly sampling at least) differ from type to type on a sub-regional scale and were build with different strategies.

[2] Applicable to Golf of Lion Type I coastal waters

[3] Applicable to Adriatic type I coastal waters

Type II-B Tyrrhenian	0,32	0,77	1,2	2,9
Type III-W Adriatic			0,64	1,7
Type III-W Tyrrhenian			0,48	1,17
Type III-W FR-SP		0,9		1,80 – 1,8
Type III-E		0,1		0,4
Type Island-W		0,6		1,2 – 1,22

For a complete assessment of eutrophication and GES achievement, GES thresholds and reference conditions (background concentrations) are needed not only for chlorophyll-a, but such values must be set in the near future, through dedicated workshops and exercises also for nutrients, transparency, and oxygen as minimum requirements. Nutrient, transparency, and oxygen thresholds and reference values may not be identical for all areas, since is recognized that area-specific environmental conditions must define threshold values. GES could be defined on a sub-regional level, or on a sub-division of the sub-region (such as the Northern Adriatic), due to local specificities in relation to the trophic level and the morphology of the area.

Following the evaluation of information provided by a number of countries and other available information, it has to be noted that the Mediterranean countries are using different eutrophication non-mandatory assessment methods such as TRIX, Eutrophication scale, EI, HEAT, OSPAR, etc. It is very important that these tools continue to be used at sub-regional or national levels, because there is a long term experience within countries which can reveal/ can be used for assessing eutrophication trends. However, in order to increase coherency and comparability regarding eutrophication assessment methodologies, it is recommended that further efforts be made to harmonize existing tools through workshops, dialogue, and comparative exercises at regional/sub-regional/subdivision levels in the Mediterranean with a view to further develop common assessment methods..

b) **Marine litter baselines values**

Indicator	minimum value	maximum value	mean value	Proposed baseline
16.**Beache**s (items/100 m)	11	3600	920	**450-1400**
17. **Floating litter** (items/km^2)	0	195	3.9	**3-5**
17**. Sea floor** (items/km^2)	0	7700	179	**130-230**
17. **Microplastics** (items/km^2)	0	892000	115000	**80000-130000**
18. **Sea Turtle**s Affected turtles (%) Ingested litter(g)	 14% 0	 92.5% 14	 45.9% 1.37	 **40-60%** **1-3**

"It must be noted that the amount of existing information is limited to set definitive baselines that may be adjusted once the national monitoring programs could provide additional data. Moreover, average values over large areas are difficult to harmonize, in particular for beach litter. Also, the setting or derivation of baselines should take the local conditions into account and may follow a more localized approach. Finally, additional specific baselines may be decided by CPs on specific litter categories, especially when they may represent an important part of litter found or a specific interest (targeted measures, etc.)."

c) Contaminants

It is recommended to follow the OSPAR approach of a "traffic light" system for both contaminant concentrations and biological responses where there are two "thresholds" $_{T0}$ and $_{T1}$ to be defined (OSPAR, 2008; Davies et al., 2012);

It is recommended to adopt background concentrations (BCs) and background assessment concentrations (BACs) of contaminants (for naturally occurring substances) in sediments obtained from the analysis of pre-industrial layers of dated sediment cores established for the Mediterranean region (UNEP(DEPI)/MED WG. 365/Inf.8) where appropriate, based on data availability;

It is recommended to use for indicative purposes the existing environmental assessment criteria (EACs) of contaminants in sediments and biota and of biological responses established by ICES/OSPAR until new eco-toxicological information is available including for Mediterranean species, (OSPAR, 2008; Davies et al., 2012);

It is recommended to use the existing BACs and EACs of LMS, SoS, MN frequency and AChE activity biomarkers established (Davies et al., 2012) and further work to develop and discuss new BAC by using data from organisms sampled at sites/areas which the Mediterranean contracting parties consider to be reference stations/areas, to be defined based on commonly agreed criteria.

Table 1(a): UNEP/MAP BAC Levels for Trace Metals in Sediments
UNEP/MAP, 2011. Development of Assessment Criteria for hazardous Substances in the Mediterranean. UNEP(DEPI)/MED WG. 365/Inf.8. Athens, 2011.

Contaminant	Sediments (µg/kg d.w.)
Cd	1. 150
Hg	2. 45
Pb	3. 30,000

Table 1(b): Benedetti BAC Levels for Trace Metals in Mussels and Fish
Benedetti M.,Ciaprini F., Piva F., Onorati F., Fattorini D., Notti A., Ausili A., Regoli F. (2012). A multidisciplinary weight of evidence approach toward polluted sediments: integrating sediment chemistry, bioavailability, biomarkers responses and bioassays. Environ. Intern. 38:17-28).

Contaminant	Mussels (*Mytilus galloprovincialis*)	Mussels (*Brachidontes variabilis*)	Fish
Cd	4. 1.088	5. 1.00	6. 0.008
Hg	7. 0.188	8. 0.17	9. 0.600
Pb	10. 3.80	11. 1.00	12. 0.559

Table 2: OSPAR EAC Levels
OSPAR Commission, Agreement number 2009-2. Agreement on CEMP Assessment Criteria for the QSR 2010. Publication number 2009/461.

2(a) Polycyclic Aromatic Hydrocarbons

Contaminant	Mussels (µg/kg d.w.)	Sediments (µg/kg d.w.)
Phenantrene	13. 1700	14. 240
Anthracene	15. 290	16. 85
Fluorantene	17. 110	18. 600
Pyrene	19. 100	20. 665
Benzo[a]anthracene	21. 80	22. 261
Chrysene	23. -	24. 384
Benzo[k]fluoranthene	25. 260	26. -
Benzo[a]pyrene	27. 600	28. 430
Benzo[ghi]perylene	29. 110	30. 85
Indene[123-c,d]pyrene	31. -	32. 240

2(b) Organochlorinated Contaminants

Contaminant	Mussels (µg/kg w.w.)	Fish (µg/kg lipid)
CB28	33. 0.64	34. 64
CB52	35. 1.08	36. 108
CB101	37. 1.20	38. 120
CB105	39. -	40. -
CB118	41. 0.24	42. 24
CB138	43. 3.16	44. 316
CB153	45. 16.00	46. 1600
CB156	47. -	48. -
CB180	49. 4.80	50. 480
∑7CBS ICES	51. -	52. -
Lindane	53. 0.29	54. 11
α-HCH	55. -	56. -
pp'DDE	57. 10.00	58. -
HCB	59. -	60. -
Dieldrin	61. 10.00	62. -

Table 3: Davies Levels for Biomarkers

Davies, I.M., Gubbins, M., Hylland, K., Maes, T., Martínez-Gómez, C., Giltrap, M., Burgeot, T., Wosniok, W., Lang, T., Vethaak, A.D. 2012. Technical annex: assessment criteria for biological effects measurements, 209-212. *In* Davies, I.M., and Vethaak, A.D (Eds). 2012. Integrated monitoring of chemicals and their effects. ICES Cooperative Research Report No. 315. 277 pp.

Biomarkers/Bioassays	BAC levels in Mussels (*Mytilus galloprovincilais)*	EAC levels in Mussels (*Mytilus galloprovincilais*)
Stress on Stress (days)	63. 10	64. 5
Lysosomal membrane stability Neutral Red Retention Assay (minutes)	65. 120	66. 50
Lysosomal membrane stability Cytochemical method (minutes)	67. 20	68. 10
AChE activity (nmol min-1 mg-1 protein) in gills (French Mediterranean waters)	69. 29	70. 20
AChE activity (nmol min-1 mg-1 protein) in gills (Spanish Mediterranean waters)	71. 15	72. 10
Micronuclei frequency (0/00) in haemocytes)	73. 3,9	74. -