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MEDITERRANEAN ACTION PLAN**

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Guidelines for updating National Action Plans for the implementation of the LBS Protocol and its Regional Plans in the framework of SAP MED to achieve Good Environmental Status for pollution related ECAP ecological objectives

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Abbreviations

ACCOBAMS	Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area
BAT	Best Available Techniques
BEP	Best Environmental Practices
BOD ₅	Biochemical Oxygen Demand
COP	Conference of the Parties
DDT	Dichlorodiphenyltrichloroethane
ECAP	Ecosystem Approach
EEA	European Environment Agency
E-PRTR	The European Pollutant Release and Transfer Register
EU MSFD	European Union Marine Strategy Framework Directive
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GES	Good Environmental Status
GFCM	General Fisheries Commission for the Mediterranean
GPA	Global Programme of Action
H2020	Horizon 2020 initiative
ICZM Protocol	Protocol on Integrated Coastal Zone Management in the Mediterranean
LBS Protocol	Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities
MAP	Mediterranean Action Plan
MEHSIP	Mediterranean Partnership Programme
MEAs	Multilateral Environmental Agreements
NAPs	National Actions Plans
NBB	National (Baseline) Budget of Pollutants
NGO	Non-Governmental Organization
NIPs	National Implementation Plans
NSC	National Steering Committee
PoM	Programme of Measures
POPs	Persistent Organic Pollutants
RACs	Regional Activity Centres
SAICM	Strategic Approach to International Chemicals Management
SAP BIO	Strategic Action Plan for the Conservation of Biological Diversity in the Mediterranean
SAP MED	Strategic Action Programme to combat pollution from land-based sources
SCP	Sustainable Consumption and Production
SEIS	Shared Environmental Information System
TC	Technical Committee
TDA	Transboundary diagnostic analysis
TPB	Toxic, Persistent and Liable to Bioaccumulate
UfM	Union for the Mediterranean
WWTP	Wastewater treatment plant

Note by the Secretariat

The formulation, for the first time in 2004-2005, of National Actions Plans for protection of the Mediterranean Sea from land-based sources marked a significant step by the Contracting Parties towards the implementation of the LBS Protocol and the Barcelona Convention and the respective Strategic Action Programme to combat pollution from land-based sources (SAP-MED).

The process for preparation of the NAPs was supported by a set of guidelines, presented as part of a regional training workshop organized in Izmit, Turkey in 2004. These documents addressed several aspects including preparation of national baseline budget of pollutants; introduction of institutional arrangements for preparation of the NAPs; promotion of public participation and development of economic instruments.

Further to COP 18 Decisions in Istanbul, Turkey in 2013, and as a follow-up to Decision IG 18/X adopted by COP 16 in Almeria, Spain in 2008, the Contracting Parties were requested to initiate the process of updating their NAPs with the view to achieve good environmental status through implementation of the LBS Protocol and Regional Plans.

In order to ensure, to the extent possible, coherence and harmonization of structures and contents of the updated NAPs, and in view of supporting the sound identification of priorities and realistic selection of national measures, and where appropriate national targets, it is recommended to put in place processes and approaches to guide all Countries in a harmonized manner. In this context, there is a need to revisit the NAP guidelines that were discussed and approved in Izmit, Turkey in 2004, and to update them taking into account new developments in particular the adoption of GES and ecological objectives 5, 9 and 10 targets related to pollution and marine litter as well as the 10 regional plans adopted in the framework of Article 15 of the LBS Protocol. The updated guidelines can be also used as an opportunity to use up-to-date principles as well as tools of policy analysis and prioritization.

The “Guidelines for Updating National Action Plans for the Implementation of the LBS Protocol and its Regional Plans in the Framework of the SAP-MED to Achieve Good Environmental Status for Pollution-Related ECAP Ecological Objectives” represents a further substantive development of the 2004-Izmit Guidelines. It attempts to reflect and capture the new spirit and dimensions stemming from the important momentum that MAP and the Region are experiencing through stronger regional governance and intensified efforts by several actors towards pollution prevention and control of the Mediterranean Sea. Specifically, the new Guidelines consider:

- i) The findings of the midterm evaluation of NAP/SAP- MED implementation (2005-2012), and lessons learned, which demonstrate great successes as well as serious gaps towards achieving 2010 and 2025 SAP-MED/NAP and H2020 initiative to “de-pollute the Mediterranean by 2020”.
- ii) Additional commitments of binding and non-binding measures taken by the Parties at global, regional and national levels such as the 10 LBS Protocol regional plans adopted in 2009, 2012 and 2013 by COP 16, 17 and 18, ECAP targets, new Mercury Convention, UNEP/GPA, H2020, EU-MSFD, SAICAM, New POPs under the Stockholm Convention, UNEP/MAP Barcelona Offshore Action Plan and SAP BIO update.
- iii) Several ongoing policy preparation processes at national level addressing pollution prevention and control such as NIPs (Stockholm Convention), SCP Action Plans, ICZM national plans (ICZM Protocol) and enhanced national coordination for hazardous wastes and chemicals recently promoted by UNEP, as well as the process related to preparation of programmes of measures under EU directives with a particular focus on MSFD and the Water Framework Directive.
- iv) The specificities of each Contracting Party to be captured in individually-tailored NAPs that meet the needs of the Party; building on existing relevant work and assessments and not in isolation of existing social, economic and environmental policies and actions. This is in particular valid for a considerable number of Contracting Parties that reached an advanced phase of formulating

programmes of measures covering all 11 ECAP ecological objectives vis-à-vis the three ecological objectives targeted by the NAPs.

The updated NAPs will constitute a powerful national marine pollution control and prevention policy tool that will promote strategic planning for sustainable development. The NAPs' endorsement by COP 14 drew the attention of other major actors and several donor agencies. Its implementation was the main driver for establishing the Mediterranean Partnership Programme (MEHSIP), UfM/former EuroMed H2020 initiative to de-pollute the Mediterranean by 2020, and GEF UNEP/MAP Medpartnership Project. Therefore, it is of utmost importance that the updated NAPs are developed utilizing effective participatory processes, taking into consideration the recently adopted binding measures and achieving the respective good environmental targets adopted by COP 18.

The present guidelines address in an integrated manner various aspects of the NAP preparation process such as institutional, legal, technical, follow-up and reporting, investment needs, capacity building and public participation. Specific in-depth analyses are also presented in the accompanying Appendixes with a view to provide technical guidance to the Countries for identification of potential measures and formulation of a programme of measures. The Appendixesⁱ are complemented with examples, where appropriate, addressing among others:

- i) Specific obligations and implementation timetables under the 10 Regional Plans and ECAP (Ecological Objectives 5, 9 and 10).
- ii) Updated criteria to define hotspots and sensitive areas.
- iii) Prioritization criteria of environmental issues (sectors, substances or other considerations) to be addressed in the NAP.
- iv) NBB key principles; PRTR vis-à-vis NBB
- v) Proposed set of indicators to follow-up and report on NAP implementation in accordance with Article 13 of the LBS Protocol.

1. Background

1.1 The Strategic Action Programme to Combat Pollution from Land- Based Sources

In 1975, the Mediterranean Countries recognized the importance of protecting the Mediterranean Sea from pollution and adopted the Mediterranean Action Plan. One year later, the Barcelona Convention was endorsed. These two instruments were expanded and strengthened in 1980 with the adoption of the LBS Protocol and its amendments in 1996. These developments led in 1997 to the adoption of the Strategic Action Programme to address Pollution from Land-Based Activities (SAP-MED) funded by GEF to support the long term implementation of the LBS Protocol. The SAP-MED identified priority target categories of polluting substances and activities to be eliminated or controlled by the Mediterranean Countries through a planned timetable of pollution prevention and control measures and interventions. It is an action-oriented initiative translating the objectives of the 1995-Global Programme of Action (GPA) of UNEP into regional specific activities. The key activities addressed in the SAP-MED are linked to urban environment and to industrial activities, targeting those responsible for the release of toxic, persistent and bio-accumulative substances into the marine environment, giving special attention to persistent organic pollutants (POPs). The reduction and phasing-out of targets are formulated to take into account the needs and specificities of the region, and as appropriate, in coherence with global and regional commitments under relevant international Conventions and Programmes.

1.2 The National Action Plans

The NAPs were prepared during 2004-2005 by all Mediterranean Countries through a participatory approach in accordance with Article 5 of the LBS Protocol and aimed at operationalizing the objectives of the SAP-MED nationally. The NAPs considered the environmental and socio-economic issues, policy and legislative frameworks, and the management, institutional and technical infrastructure available in the country. The NAPs described the policies and actions on the ground that each country intended to undertake to reduce pollution in line with SAP- MED targets. They incorporated mechanisms for information exchange, technology transfer and promotion of cleaner technology, public participation and sustainable financing. Their fundamental goal was to develop and implement concrete pollution prevention and control projects that enhance economic, technological, and social development at the local level; thus making a concrete contribution towards sustainable development. The NAPs were formally endorsed by the Contracting Parties to the Barcelona Convention in the 14th Contracting Parties' meeting in Slovenia in 2005 (COP 14).

1.3 The 2004 Guidelines for Preparation of National Action Plans

In order to assist the Mediterranean Countries to elaborate National Action Plans that comply with SAP-MED commitments, UNEP/MAP-MED-POL programme developed in 2004 the "Guidelines for Preparation of National Action Plans for the Reduction of Pollution of the Mediterranean From Land-Based Sources". This guidance document was presented in March 2004 in Izmit, Turkey, as part of a workshop for preparation of Sectoral Plans and National Action Plans in the framework of the SAP- MED. It comprised four guidelines:

- i) Guidelines for preparation of National Action Plans for the Reduction of Pollution of the Mediterranean from land-based sources;
- ii) Guidelines for the preparation of the baseline budget of pollutants releases for the Mediterranean region;
- iii) Public participation in the National Action Plans (NAPs) for the strategic Action programme (SAP-MED) to address pollution from land-based activities in the Mediterranean; and
- iv) Guideline for economic instruments for the preparation of the SAP-MED/NAP to address marine pollution from land-based activities in the 12 GEF eligible countries.

The 2004 NAP guidelines presented a phase-by-phase approach for formulating the NAPs based on six steps:

- i) Undertaking national diagnostic analysis and baseline budget.

- ii) Developing national/administrative region(s) issue/impacts matrix.
- iii) Setting-up of administrative region(s) plan.
- iv) Setting-up of national sectoral plans.
- v) Formulating national action plans.
- vi) Setting-up of the national list of priority actions for 2010.

These guidelines were instrumental in developing the 2004-2005 NAPs. Their key aspect was the methodology proposed for elaborating the NAPs based on National Diagnostic Analysis designed to identify the nature and severity of problems. They also presented a system for assessing the relative importance of different impacts on the coastal areas and marine environment based on a process for scoring environmental issues with potential adverse effects on human health and marine environment. The results of this assessment were used to help in selecting the priority issues at national and administrative region(s) levels for the final preparation of the NAP.

1.4 Rationale for Updating the NAP Guidelines

In 2008, the Contracting Parties to the Barcelona Convention adopted Decision IG 17/8 regarding NAP implementation in Almeria (Spain). This Decision, which marked ten years after the adoption of the SAP-MED and three years after endorsing the NAPs, requires Countries to “continue the implementation of NAPs endorsed in 2005 to the greatest possible extent foreseeing their revision in 2011.”

Although the aforementioned obligation constitutes the basis for updating the NAPs; however, the main reason is the further development of the Barcelona Convention system. This entails implementation of the ecosystem approach with the view to achieve Good Environmental Status as well as the adoption of new legally binding measures consisting of the regional plans adopted in the context of the implementation of Article 15 of the LBS Protocol. The updated NAPs will provide the Countries with a unique opportunity for streamlining the new commitments by taking into account the following aspects:

- Streamlining ECAP objectives and targets into the updated NAPs leading to the achievement of Good Environmental Status.¹
- Ensuring that the updated NAP includes, where appropriate, in accordance with country specificities, commitments and obligations of the regional plans and legally binding standards adopted by the Meetings of the Contracting Parties in 2009, 2012 and 2013.²
- Providing some basic principles and technical guidance for assessing existing measures vis-à-vis ECAP-GES and Regional Plans targets in the framework of SAP-MED; identification of gaps; and formulation of programme of measures and their implementation.

¹ Decision IG.20/10 “Adoption of the Strategic Framework for Marine Litter Management”.

Decision IG.21/3 “on the Ecosystems Approach including Adopting Definitions of Good Environmental Status (GES) and Targets”.

² Decision IG.19/7 “Regional Plan on the Reduction of BOD₅ from Urban Wastewater”.

Decision IG.19/8 “Regional Plan on the Elimination of Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene”.

Decision IG.19/9 “Regional Plan on the Phasing Out of DDT”.

Decision IG.20/8.1 “Regional Plan on the Reduction of Inputs of Mercury”.

Decision IG.20/8.2 “Regional Plan on the Reduction of BOD₅ in the food sector”.

Decision IG.20/8.3.1 “Regional Plan on the Elimination of Alpha hexachlorocyclohexane; Beta hexachlorocyclohexane; Hexabromobiphenyl; Chlordecone; Pentachlorobenzene; Tetrabromodiphenyl ether and Pentabromodiphenyl ether; Hexabromodiphenyl ether and Heptabromodiphenyl ether; Lindane; Endosulfan, Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride”.

Decision IG.20/8.3.2 “Regional Plan on the Phasing out of Lindane and Endosulfan

Decision IG.20/8.3.3 “Regional Plan on the Phasing out of Perfluorooctane, Sulfonic Acid, its salts and Perfluorooctane Sulfonyl Fluoride

Decision IG.20/8.3.4 “Regional Plan on the Elimination of Alpha hexachlorocyclohexane, Beta hexachlorocyclohexane, Chlordecone, Hexabromobiphenyl, Pentachlorobenzene

Decision IG.21/7 “Regional Plan on Marine Litter Management in the Mediterranean”.

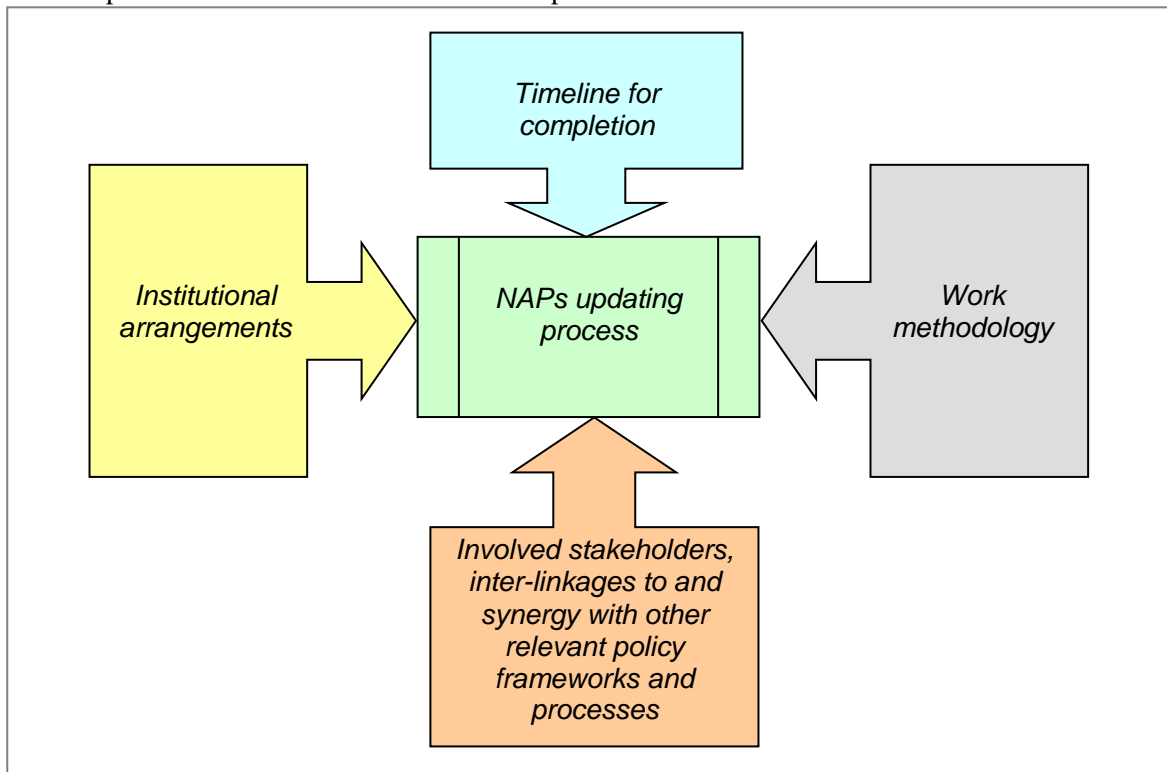
Decision IG.20/9 “Criteria and Standards for bathing waters quality”.

- Providing common updated criteria for assessing pollution hotspots and sensitive areas.
- Providing the main elements for follow-up and reporting on NAP implementation and its effectiveness through a restricted set of potential indicators with a view to undertake periodical assessments of NAP implementation on national and regional levels.
- Better promoting the NAP as an important sectorial policy tool fully reflected in the Parties' development policies, at national, regional and local levels.
- Ensuring better complementarities between NAP priorities/targets and implementation under UNEP/MAP-Barcelona Convention and its Protocols with similar commitments and obligations under relevant MEAs, and as well as, where appropriate, in synergy with relevant EU Directives, with a particular focus on EU MSFD, water-related and waste directives.
- Promoting a clear structure of the NAP covering selected priority sectors of the LBS Protocol and legally binding measures implementation (i.e. policy, regulatory, pollution prevention, control and phase-out measures, hotspot elimination, pollution monitoring, pollution assessment, enforcement, effectiveness, capacity building and investment needs).
- Ensuring a sustained participatory process of relevant stakeholders and other relevant policy processes, in particular the Horizon 2020 initiative.

These aspects present new elements which can be incorporated into the process for updating the NAPs, as far as possible, and in a coherent manner by the Countries.

2. The NAP updating process

The principal objective of the NAP update is to identify and prioritize national programmes of measures to achieve Good Environmental Status with regard to pollution-related ecological objectives under ECAP. This update can also provide an opportunity for the Countries to develop a concrete NAP structure that covers a variety of policy, regulatory, institutional, pollution prevention, control and phase-out measures, investment needs, hotspot elimination, monitoring, enforcement, follow-up, reporting and NAP implementation cost. These aspects constitute a framework for the updated NAP.



The NAP updating process consists of a series of tasks, with clearly defined responsibilities to implement a well-defined work methodology, empowered by selected stakeholders, governed by special institutional arrangements to accomplish the updated NAP in a fixed timeframe, as shown in the following illustration.

The NAP updating guidelines address two key aspects in the development of the NAP guideline document:

- i) The “institutional” aspects of the NAP updating process consisting of:
 - Institutional arrangements.
 - Work methodology.
 - Stakeholders involved and synergy with other relevant policy processes.
 - Timeline for completion of work.
 - Mechanism for approval and endorsement.
- ii) The “methodological” aspects, or tasks and responsibilities, for undertaking the NAP updating process including:
 - Assessing the midterm implementation benchmark.
 - Defining quantifiable objectives, and where appropriate, operational targets to be achieved with a view to comply with ECAP-GES and Regional Plans targets in the framework of SAP-MED.
 - Identifying gaps and issues between the assessed midterm baseline and SAP- MED targets.
 - Updating list of hotspots, prioritizing issues and identifying potential measures.

- Selecting specific and integrated pollution prevention and control measures to be addressed by the NAP on national, regional and local levels based on cross-cutting analyses, environmental impact, implementation timetable and cost effectiveness.
- Preparing a prioritized list of investment needs.
- Developing a NAP implementation follow-up and reporting plan.
- Developing a capacity building plan.
- Drafting the NAP document.

Details of the institutional and methodological aspects for accomplishing the NAP update are presented in the following sections. Countries formulating relevant integrated programmes of measures for implementation of the 11 ECAP ecological objectives may submit their integrated programmes of measures being the NAPs. In that respect, it is expected that all Mediterranean Countries will be in a position to prepare National Action Plans covering all 11 ecological objectives under the UNEP/MAP-Barcelona system in the future. In fact, the NAPs can be viewed as the first step for preparing programmes of measures by all Mediterranean Countries for pollution prevention and control in line with the ECAP ecological objectives and targets. To facilitate this aim, the Secretariat will organize consultations in the course of the NAPs updating process among all the Countries to promote exchange of information, carry out consultations, and where appropriate, to agree on common measures.

3. Institutional set-up of the NAP updating process

In order to update the NAPs, a number of institutional measures need to be established by the Country in order to successfully develop a proper NAP document that captures the critical issues of relevance. In case the institutional set-up is not developed or is not adequate in the Country, the following measures are recommended.

3.1 Institutional Arrangements

Institutional arrangements are crucial elements to ensure proper coordination and organizational development of the planned activities for updating the NAP. It is recommended to build on relevant existing processes, as appropriate, in order to avoid duplication and overlapping.

The following elements regarding the institutional arrangements for the NAP updating process are recommended:

- i) A national lead agency, possibly a ministry or government agency of equivalent level, which hosts the MAP and/or MED POL Focal Point functions, would be officially assigned the “primary responsibility” for managing the NAP updating process. This agency would be given the authority to establish or activate a multi-stakeholder coordinating and stakeholder input mechanism, provide it with administrative support and ensure the integration of substantive work, as appropriate.
- ii) A high level stakeholder review committee or a national steering committee (NSC). The NSC would be responsible for planning how public and stakeholder awareness should be raised, how stakeholders will be consulted, how information should be communicated and how questions and concerns should be managed. It is recommended that the MED POL focal point is assigned either the post of secretary or of co-chair of this committee.
- iii) An executive unit or a technical committee (TC) responsible for managing the process and for carrying out the preparation and coordination work. The TC would be also responsible for identifying and establishing “thematic groups” to take the lead on technical issues, and for ensuring that links are made to existing programmes and initiatives that affect the implementation of the NAP.
- iv) Thematic groups and experts who would be brought into the project for technical tasks identified by the TC.

3.2 Work Methodology

The recommended work methodology for updating the NAP is based on the following four steps:

- i) A meeting of key Government Departments and agencies is initiated by the NAP national lead agency to establish the TC. The outcomes of this meeting would be the expected membership of the TC; an agreed strategy for stakeholder involvement; and an outline of an initial national steering committee (NSC) or equivalent body including its composition and chair.
- ii) The first meeting of the TC is convened to agree on the rules for updating the NAP. Technical aims and objectives are outlined; responsibilities for areas of NAP updating are assigned; a mechanism for stakeholder involvement is agreed; establishment of the NSC is initiated; and a project outline plan is developed along with estimated resources required and key players that must be involved.
- iii) Periodic briefings and meetings of the TC could be used to ensure that all members are aware of the progress being made by the thematic groups, and to review the aims and findings as they progress.
- iv) The first meeting of the NSC or initiation workshop is held to brief stakeholders on the NAP and its information requirements, rationale and objectives. The project plan for NAP updating is presented. Feedback is gathered on composition of the NSC, interests and aims of stakeholders and issues that need to be addressed. Proposed project plan for the development of the NAP is

presented to the TC, finalized and communicated back to the NSC and wider stakeholder group as appropriate.

3.3 Involved Stakeholders; Inter-linkages to and Synergy with other Relevant Policy Frameworks and Processes

Many of the governmental bodies and nongovernmental organizations that had participated in the development of the initial NAP may also be involved in the NAP update process. In principle, all interested parties, including the ECAP responsible officials, should be given the opportunity to participate and to gain free access to information. The following lists some of the main groups to consider:

- *Policy makers* needed to ensure that the issues raised by the NAP are accorded appropriate priority in their sectoral policies, strategies and plans, and to seek further commitment from legislative bodies. In that respect, it is advisable to encourage politicians with responsibility for international environmental agreements to participate in the process in order to enhance coordinated implementation with other relevant international environmental agreements.
- *Government officials* needed to ensure that key staff are communicating and coordinating the necessary inputs and facilitating the implementation of actions produced by the NAPs. Consideration should be given to officials representing municipalities, environment agencies, public utilities (wastewater and solid waste), industry, agriculture and local authorities.
- *Representatives from industry and commerce* including trade associations and professional bodies. Examples include manufacturing industry, the agricultural sector, the power sector, the waste management industry, and other industrial concerns affected by potential measures to be included in the NAPs.
- *Representatives of the private sector* needed to mobilize new and additional financial resources to address priority pollution and degradation problems in partnership with public agencies.
- *Community representatives* including NGO groups representing civil society, including MAP partners, in order to ensure that their communities' concerns are taken on board.
- *Academic and research institutions* needed to address environmental issues of highly technical nature that may require specialist knowledge.
- *Focal points of international conventions and initiatives* needed to ensure programmatic linkages, where appropriate, to focal points of the relevant MEAs and to other Protocols of the Barcelona Convention, in particular the Dumping and Hazardous Wastes Protocols. Also needed are focal points of initiatives and institutions/organizations such as the Horizon 2020 network, Union for the Mediterranean (UfM), European Environment Agency (EEA), the SEIS Project, UNEP/MAP Regional Activity Centres (RACs), FAO, GFCM, ACCOBAMs, representatives of pollution monitoring institutions, and members of ECAP correspondent group, etc.

3.4 Timeline for Completion

The Contracting Parties should transmit their updated NAPs by COP 19.

3.5 Approval and Endorsement

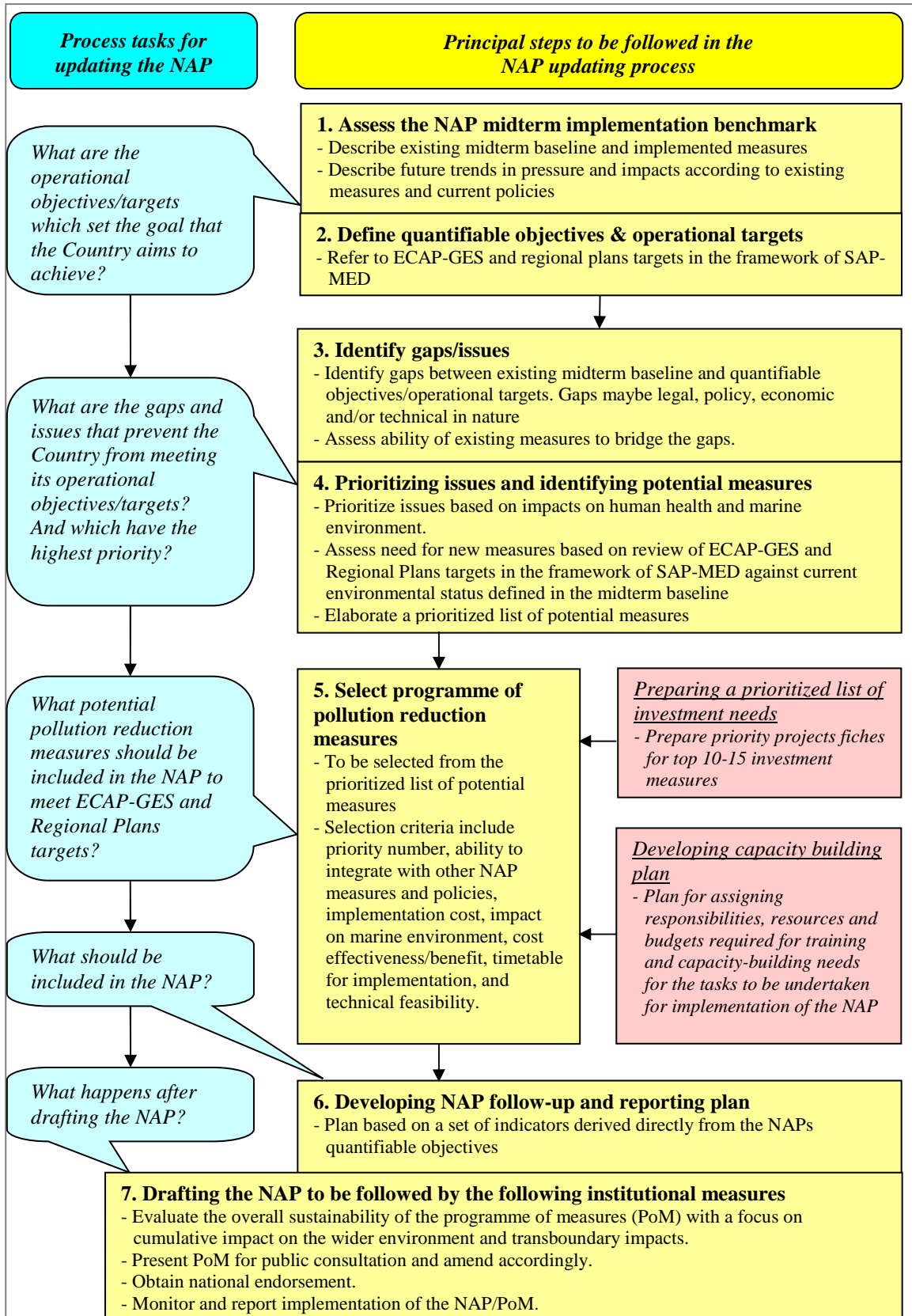
NAP document should be endorsed by the NSC. With the view to enhance public and decision makers' awareness on the importance of the NAP and its added value, it is recommended to carry out the following tasks:

- Producing suitable communication and public relations materials which convey the contents, intentions and need for and benefits of the NAP for stakeholders.
- Establishing a consultation mechanism, with suitable commentary and explanation if necessary, to ensure that stakeholders within and outside Government are made aware of the NAP, and to gather feedback for assessment.
- Reviewing the feedback from the consultation process and adopting the NAP.

- Submitting the final version of the NAP for endorsement by the relevant national authorities (government ministers, heads of agencies, etc).
- Publishing the official version of the NAP in on the MAP and Environmental Ministry/Agency websites.
- Submitting the NAP to the Secretariat and to the Meeting of the Contracting Parties for endorsement.

4. Methodology for the NAP updating process

The following flow chart recommends the process tasks, principal steps and key issues to be considered in the NAP updating process.



The recommended NAP updating methodology consists of the following steps:

1. Assess the state of play of existing measures and the current status of marine and coastal pollution, referred to as the NAP midterm baseline.
2. This is followed by the performance of a gap analysis to evaluate the need for implementing additional actions to fill the gap between existing measures and status of the marine pollution with reference to the defined ECAP–GES and regional plan targets in the framework of the SAP-MED.
3. Gap analysis would lead to prioritization of issues and identification of potential new measures, as appropriate.
4. The potential prioritized measures are assessed for their technical feasibility and analyzed in an integrated manner taking into account their resulting impacts on the marine environment, implementation cost, cost effectiveness/benefit, duration for implementation with the view to develop an integrated programme of measures for inclusion in the NAP.

A practical example illustrating the process for developing pollution prevention and control measures for marine litter, including a description of the quantifiable targets, midterm baseline, gaps and the selected measures to be included in the NAP, is presented in Appendix F.

Details of the recommended methodology for the NAP updating process are presented in the following sections.

4.1 Assessing the NAP Midterm Implementation Benchmark

The midterm baseline³ captures the outcomes of actions taken by the Contracting Parties in the framework of SAP- MED/NAP implementation since the initiation of this process in 2004-2005 until 2013. There is a need for the Contracting Parties to evaluate the effectiveness of these actions and existing measures vis-à-vis the long-term provisions of the SAP-MED; the legally binding provisions of the 10 Regional Plans and their timetables for implementation standards, and the GES targets of ECAP Ecological Objective 5 on eutrophication, Objective 9 on contaminants and Objective 10 on marine litter.⁴ Furthermore, there is a need to describe future trends in pressures and impacts according to the present national budget of pollutants (NBB), existing policies and measures, and their effect on the current status of the identified hotspots.

Proposed tasks and responsibilities for the thematic groups

It is expected that the main effort for assessing the midterm baseline would be the responsibility of the thematic groups. The technical committee (TC) would form these groups. However, the participation of key stakeholders in the process would be essential for obtaining reliable results. It is therefore important for the TC to identify those groups and individuals and to ensure their involvement. The following table proposes the formation of eight thematic groups to be established as appropriate in line with the specificities of each Country, and illustrates their contribution to addressing the SAP- MED sectors/pollutants.

³ The term "Midterm" is introduced as the Countries are presently half way, time wise, towards the SAP-MED targets set for the year 2025 since the adoption of the NAPs in 2005.

⁴ UNEP(DEPI)/MED ID.21/9. Decision IG.21/3 on the Ecosystems Approach including adopting definitions of Good Environmental Status (GES) and targets.

Pollutants/sectors included in Annex (I) of the LBS Protocol	Thematic groups on municipal/urban			Thematic groups on industrial			Group on agriculture	Group on monitoring
	Waste water	Solid waste	Air pollution	Waste water	Solid waste	Air pollution		
Urban municipal wastewater								
Urban Solid waste and marine litter								
Air pollution in urban areas								
Toxic, Persistent and Liable to Bioaccumulate (TPB)								
Heavy metals								
Organohalogen compounds (halogenated aliphatic and aromatic hydrocarbons, Chlorinated phenolic compounds and organo-halogenated pesticides)								
Radioactive substances								
Nutrients and suspended solids from the food industry, livestock farming, and other industrial activities								
Hazardous wastes (obsolete chemicals, lubeoil and batteries)								

Members of the thematic groups may consist of legal, policy and technical experts in their fields (wastewater, solid waste and air pollution in urban or industrial setting), in addition to marine environment experts. For the agricultural thematic group, technical experts should be qualified in best environmental practices in agriculture.

Regarding the marine environment monitoring group, it may be composed of monitoring experts from the other seven groups. It is highly recommended that members of the group coordinate with the experts of the correspondence monitoring group under ECAP. The monitoring group applies an integrated approach to examine the monitoring issue vis-à-vis the sectoral approach used by the other groups. The marine environment monitoring group should fully take into account the ongoing work for preparation of the integrated monitoring programme based on the agreed ecosystem approach indicators on eutrophication, contaminants and marine litter. The monitoring group also follows-up and reports on NAP implementation prior to presentation to the NSC for final approval.

Each thematic group describes the midterm baseline in terms of aspects related to existing legal, policy, and technical measures, in addition to the state of marine and coastal pollution as described below:

- i) **Legal Measures** (national laws and regulations) that support:
 - Implementation of measures for the prevention and control of priority substances.
 - Implementation of measures provided for in the 10 Regional Plans.
 - Ecosystem approach targets, monitoring requirements and any related measures.
 - Phasing out inputs of substances included in Annex (I) of the LBS Protocol from land-based sources.
 - Authorization and regulation of point source discharges.
 - Establishment of inspection system to assess compliance.
 - Application of sanctions in event of non-compliance.
 - Established legal and institutional structures that support:
 - Monitoring and inspection of the inputs of the priority pollutants to the Mediterranean environment.
 - Authorization and regulation of discharges of wastewater and air emissions from industrial and urban installations.
 - Public participation in decision-making processes.
 - Public access to information.
 - Reporting of measures taken and results achieved.

- ii) **Economic Measures**
 - Use of incentive policy tools such as economic and financial instruments in support and combination with traditional pollution control and command tools.

- iii) **Policy Measures** (National and regional policy frameworks) consisting of:
 - Strategies and action plans addressing treatment and disposal of municipal sewage; reduction, recycling and composting of urban solid waste; control of levels of air pollutants in cities; reduction of point source discharges and air emissions from industrial installations; disposal of hazardous wastes; safeguarding the ecosystem and maintaining the integrity and biological diversity of species and habitats.
 - Strategies that promote sustainable development, ICZM and integration of environmental protection into national development policies.
 - National strategies that promote:
 - Raising public environmental awareness and supporting educational activities.
 - Capacity building to improve the scientific base, environmental policy formulation, professional human resources, institutional capacity and capability.

- iv) **Technical measures**
 - Pollution prevention, control and phase-out schemes regarding releases of SAP- MED priority substances and groups of pollutants; BAT, BEP, SCP, etc. In that respect, the National Budget (NBB) reports for 2008 and 2013 (latter in progress), which include data on pollution loads for priority substances, should be evaluated in relation to:
 - The extent to which a comprehensive inventory of the existing pollution sources in each river basin/administrative region in the coastal zone has been performed;
 - Classification of pollution sources into sectors according to Annex (I) of the LBS protocol;
 - Identification of the potential pollution sources (point versus diffuse sources) of each pollutant targeted by the SAP;
 - Quantification/estimation of the emissions/releases on the basis of the river basin/administrative region approach; and,

Guidelines on the preparation of 2013 national budget of pollutants (NBB) are presented in Appendix B.

- Use of PRTR for reporting purposes.
- Status of hotspots and sensitive areas:
 - The Contracting Parties had recognized in 2003 the list of pollution hotspots and sensitive areas in the Mediterranean. They were listed in the NAPs as priority areas for which interventions should be targeted.
 - There is a need for assessing the hotspots and sensitive areas against the updated criteria included in Appendix C⁵ which fully take into account GES targets.

The thematic groups are strongly recommended to refer to the midterm evaluation of SAP-MED/NAP implementation report⁵; country profiles and fact sheets completed by UNEP/MAP MED POL with contribution from the Contracting Parties; the national country and regional reports prepared by the UfM with regards to the investment portfolio of NAP implementation⁶; national state of the environment reports prepared during the period 2003-2013; Mediterranean state of environment reports for 2009, 2011 and 2012; ECAP sub-regional reports on pollution prepared by UNEP/MAP MEDPOL in 2010-2011; the initial integrated assessment report elaborated under ECAP in 2011; the joint report EEA-UNEP/MAP on the progress of H2020; In addition to the UNEP/MAP transboundary analysis report and hotspot reports, information on pollutants' releases and trends can be found in the initial assessment, GES and targets reports prepared in the framework of the EU Marine Strategy Directive by the respective EU member countries, as well as through EPRTR.

4.2 Defining Quantifiable Objectives, and as appropriate, Operational Targets

In line with the NAP midterm baseline assessment, the Contracting Parties need to establish a set of “quantifiable objectives” and as appropriate “operational targets” for land-based sources. The aim is to achieve the ECAP–GES and Regional Plans targets in the framework of the SAP-MED. In this regard, it is noted that the SAP- MED objectives are defined based on the TDA 2003 baseline.

A comprehensive list of key commitments and obligations stipulated in the ECAP–GES and regional plans targets in the framework of the SAP-MED has been compiled in Appendix A for indicative purposes and with the view to facilitate the work of the Parties (i.e. the thematic groups) when elaborating their specific quantifiable objectives and where appropriate operational targets. These requirements are classified according to policy frameworks, legal/institutional structures and pollution prevention and control measures. For each of these three headings, commitments and obligations are highlighted based on SAP- MED sector/substance, along with deadlines for achievement. In referring to these requirements, it is possible for each thematic group to define the specific quantifiable objectives and operational targets needed for the NAP updating process.

4.3 Identifying Gaps/Issues

A gap analysis is performed to define the gaps between the existing baseline,⁷ which reflects the current situation, and the desired targets that constitute the aim. This process is referred to as “baseline mapping”.

Based on the list of quantifiable objectives, and where appropriate operational targets, and with reference to the elaborated midterm baseline, the thematic groups would investigate and assess the gaps between the midterm baseline and the requirements of the binding measures. This analysis would focus on:

- i) Description of the gaps and issues at the policy/legal/regulatory levels, in addition to other pollution prevention and control measures and monitoring/reporting aspects.

⁵ UNEP(DEPI)/MED WG.393 inf.3. Midterm Evaluation of SAP/NAP Implementation.

⁶ UNEP(DEPI)/MED WG.393 inf.4. Final Report on Update Priority Investment Projects for Protecting the Mediterranean Sea from pollution.

⁷ With an extrapolation up to 2025 and population and economic growth.

- ii) Description of information gaps and issues for optimal monitoring required under the ecosystem approach for Objective 5 regarding eutrophication, Objective 9 dealing with contaminants, and Objective 10 on marine litter and other LBS Protocol requirements.
- iii) Assessment of hotspots based on the updated criteria included in Appendix C with the aim to reclassify hotspots as appropriate whereby each newly classified hotspot is an issue on its own that needs to be addressed in the updated NAP.

Hence, the outcome of the gap analysis is a list of issues of legal, policy or technical nature. Since it is not possible to address all issues at the same time in the NAP, some sort of prioritization to rank from most to least important is required. Prioritization of issues and identification of potential measures derived from the gap analysis is presented in the next step.

4.4 Prioritizing Issues and Identifying Potential Measures

In this step, a systematic methodology for ranking issues and hotspots, which were identified through the gap analysis and for identifying potential measures, is presented. In principle, each sector/substance has its own gaps or issues, which may be legal, policy or technical in nature. Different administrative region(s)/river basins will have different issues for the same sector/substance. The degree of importance of each issue will depend on its impact and the significance of that impact on aspects such as human health and the marine environment. For the purpose of ranking issues, the criteria of the 2004 NAP Guidelines are proposed in Appendix D⁸ for indicative purposes. An issue/impact matrix can be utilized in order to make the preliminary assessment of the relative importance of the different impacts on the coastal areas including marine environment. The derived issues are scored in the matrix according to their relevance to the national environmental priorities taking into consideration the legally binding measures, the ECAP GES targets, the SAP targets and the requirements of the regional plans. The thematic groups are encouraged to agree on the weights assigned to different sector/substances with a view to ensure consistency in assessing the required impacts

Following the prioritization process, potential measures are identified/prioritized. These measures and their programme consist of possible actions for the management of land-based activities in order to meet commitments under the ECAP-GES and Regional Plans targets in the framework of SAP-MED. The measures may take several modes of action such as technical, legislative/regulatory, economic and policy-driven. Actions that may indirectly and only over long timeframes affect environmental status, such as research activities, should be considered as supplementary and contributing to specific measure implementation.

The TC coordinates with the thematic groups for identifying appropriate programme of measures to be included in the NAP. The TC also coordinates between all actors for common intervention areas such as policy and legal issues, monitoring, enforcement and reporting. In developing the management options, the TC should focus on the SAP- MED sectoral programmes, namely:

- i) Municipal wastewater collection and treatment.
- ii) Municipal solid waste and marine litter.
- iii) Air pollution.
- iv) Toxic, Persistent and Liable to Bioaccumulate (TPB).
- v) Heavy metals.
- vi) Organohalogen compounds.
- vii) Radioactive substances.
- viii) Industrial wastewater treatment including food industry.
- ix) Agricultural activities including livestock and farming.
- x) Hazardous wastes.

The prioritized lists of potential measures are first developed on the regional level. These are collected by the TC and combined into a single list, for each region/river basin, and for all SAP sectors/substances. The

⁸ This Appendix may be adjusted following the update of the list of priority contaminants in the Mediterranean.

regional lists are subsequently combined by the TC into a single national priority list of potential measures for all sectors/substances.

4.5 Selecting the Programme of Measures for Pollution Prevention and Control

The key objective of this phase is to select the programme of measures for pollution prevention and control from the single combined national priority list of potential measures. The purpose of this exercise is to identify the specific and integrated measures to be included in the NAP. This is accomplished by conducting cross-cutting analyses for the potential measures of national priority. Measures need to be evaluated based ability to integrate with other NAP measures and policies, implementation cost, impact on marine environment, cost effectiveness/benefit, timetable for implementation, and technical feasibility. Some of these measures will require investment projects; implementation of BAT and BEP, SCP tools; others will need updates of legal instruments, institutional structures, policy frameworks, a major revision in a national sectoral strategy, some specific actions in hotspots, improved monitoring and enforcement legislation and institutional arrangements, or even new strategies for public participation and reporting. Guidance on cost-effectiveness and cost-benefit analysis is presented in Appendix G. Reference information on selecting management options that can be found in the technical guidelines produced by UNEP/MAP are listed in Appendix H.

The following factors should be considered when selecting the appropriate pollution prevention, control and phase-out and elimination measures:

- i) Details of the principal requirements under the ECAP-GES and Regional Plans targets in the framework of SAP-MED. These constitute a time-tabled list of actions that should be addressed in the NAP. These requirements (tabulated in Appendix A) should be examined on a case-by-case basis. Some of these actions have past deadlines and should have been accomplished in the initial NAP. Others do not have a fixed date (as per the SAP- MED); hence the Country has some freedom in specifying a suitable deadline. Actions may be policy, legal, institutional or technical in nature. Some require substantive investment and need additional preparatory work in order to develop its investment portfolio.
- ii) Links should be made, when appropriate, to relevant national initiatives to eliminate duplication or conflict and maximize efficiency (e.g. chemicals management, waste management and disposal, pollution prevention and control, sustainable development, etc.).
- iii) Improved complementarities should be achieved between NAP implementation under the Barcelona Convention with similar commitments and obligations under other relevant MEAs.
- iv) The administrative requirements for implementation of NAP actions should be considered. For actions requiring institutional and regulatory strengthening measures, it is recommended to address mechanisms for adoption into local law, and responsibilities for implementation. Therefore, it is proposed to develop a detailed “road map” to show what measures will be required, what actors are needed and what resources are necessary. The roles and responsibilities of key players should be detailed, along with a mechanism for implementation. The role and inputs required of international organizations and financial and technical resources required should also be detailed.
- v) A sustained participatory process of relevant stakeholders should be ensured.

In order to facilitate the implementation of critical measures that require significant investments, Countries are recommended to refer to the UfM study on midterm evaluation of the implementation of the investment portfolio of NAP⁶. The study contains recommendations regarding potential investment needs in the Mediterranean Countries to comply with Regional Plans obligations and targets and as appropriate with SAP MED 2025 targets. For that purpose, Countries are recommended to (i) update the list of projects identified in the UfM study with the main information attached to each of them (i.e. location, state of progress and funding, capacity and estimation of pollutants loads or costs) and (ii) develop projects’ fiches for the top 10 to 15 priority national investment projects. Each fiche should include:

- i) Project rationale.
- ii) Clear de-pollution objectives.
- iii) Investment needs.

- iv) Potential internal/external financial resources for implementation.
- v) Link to national public investment policy.
- vi) Identification of key partners (including private sector).

It is also strongly recommended that roundtable or partnership meetings with representatives from key sectors and financial institutions be convened in order to involve them as stakeholders from the outset and promote the investment process. It is the responsibility of the NSC to undertake this task. The Secretariat will collaborate with relevant partners to provide the necessary support to Countries for the selection of priority investment needs and projects' fiches development based on common and environmental sound criteria. UfM has developed a number of criteria in cooperation with UNEP/MAP⁶ that require further analysis and finalization. These will be provided to the Countries for consideration at a later stage following discussion and agreement by the MEDPOL FPs.

It has to be noted that the existing Horizon 2020 Initiative is entering into a new phase 2015-2020 which will provide funding for capacity building, technical assistance and investments to support the implementation of the NAPs. Every effort should be made at national and regional levels to maximize the effectiveness of funding for the implementation of the NAPs.

In addition, it is recommended that Countries (i.e. technical committees) formulate a plan that assigns responsibilities, resources and budgets required for implementation of the NAP programme of measures. The plan should be presented and approved by the NSC.

It is recommended that the capacity building plan addresses the following issues:

- i) Formation of task teams composed, whenever possible, of existing specialized institutions and agencies already appointed by relevant ministries to perform specific tasks. Representatives of academia and various other sectors may also be involved.
- ii) Identification of priority areas where current capacity and capability need to be strengthened to implement the NAP. Priorities based on the need to meet obligations and country-priority issues would be highlighted.
- iii) Timetable for implementation of training plan summarizing the principal targets contained in the training strategy, outlining specific targets, milestones and performance and outcome indicators to allow progress to be reviewed and monitored.
- iv) Cost for implementation including projected costs of training measures. Incremental costs for measures would be identified and potential sources of funding for both incremental costs and baseline costs would be noted.

4.6 Developing the NAP Implementation Follow-up and Reporting Plan

The purpose of the NAP follow-up and reporting plan is to track performance of NAP implementation; to inform stakeholders and the Secretariat on work progress and achievements made; assess effectiveness of measures taken including capacity building and technical assistance activities/plans; and propose corrective measures as appropriate.

The Secretariat will assess the information provided by the Countries on NAP implementation to identify progress made and difficulties related to NAP implementation, and to tailor country-driven assistance to overcome challenges. In addition, the Secretariat will undertake regional synopsis for contributing to the preparation of the State of the Mediterranean Environment Report.

The outcome of the NAP follow-up and reporting plan is a set of time-bound performance indicators derived from: (i) ECAP pollution monitoring indicators in accordance with Article 12 of the Convention, Article 8 of the LBS Protocol, and (ii) the sources and management actions taken. It is recommended to streamline the regional plan indicators with NAP indicators to the extent possible.

It is the responsibility of the monitoring thematic group to develop the appropriate plan needed to follow-up performance of NAP implementation. This is achieved by means of follow up indicators whereby each

indicator provides a measure of the level of performance of the corresponding objective. The follow-up and reporting plan consists of:

- i) Details on type of information and data that need to be collected for each indicator (indicator fact sheet).
- ii) Frequency for collecting the relevant information and data that can assist in evaluating performance of NAP implementation.
- iii) Responsibility for collecting and analyzing collected information and data.
- iv) Responsibility for reporting the findings on the indicators.
- v) The Parties to whom the results of the indicators should be provided, with specific details on:
 - Public access to NAP implementation indicators.
 - National information system established or updated based on the SEIS principles.

The monitoring group derives the indicators from approved targets, and incorporates the state indicators already developed for the ECAP operational objectives. The monitoring group provides guidance for each indicator regarding:

- i) The required data and information;
- ii) Where this information can be found; and
- iii) Responsibility for data collection and analysis.

The monitoring group obtains approval of the TC and the NSC for the follow-up and reporting plan. The monitoring group coordinates with the Lead Agency for approval of the guidance notes for collection and analysis of information needed for the indicators. The monitoring group also coordinates with the Lead Agency for the development of the reporting mechanism on work progress and achievements made.

A list of indicators to be used for LBS, Dumping, HW Protocols, RPs and NAP implementation follow-up and reporting to the Secretariat is included in Appendix E. The Lead Agency is delegated with the responsibility for information collection and data analysis. The reporting frequency is yearly with a midterm evaluation in 2020 and final evaluation in 2025.

4.7 Drafting the NAP

The objective of this step is to produce a draft NAP document which is ready for distribution and discussion with relevant stakeholders. The TC is responsible for drafting the NAP document and for coordinating with the NSC for review and approval. The TC could draw on assistance from consultants, external experts and organizations if necessary.

The following points need to be considered during the drafting of the NAP document:

- i) The NAP should be presented as a policy tool at national, regional and local levels, fully reflected in the national policy documents.
- ii) The NAP should be developed as a solid communication tool for reach out to government officials and the public.
- iii) It is useful to present a clear structure of the NAP covering all aspects of implementation of the LBS protocol (i.e. policy, regulatory, pollution prevention, control and phase-out measures, hotspot elimination, monitoring, assessment and enforcement), and regionally legally binding measures to achieve Good Environmental Status.
- iv) A logical framework matrix may be useful to show clearly what steps must be taken to implement a proposed option, and what actions and resources are needed to make them possible. The log frame, illustrated in Appendix F, should address the following points:
 - Quantifiable objective/operational target and timetable for implementation.
 - SAP- MED area(s) where reduction will take place linked to the ECAP objectives and targets, and the relevant Regional Plan/Standards.
 - Measure/activity cost.
 - Leading institution and other stakeholders/partners and institutions involved.

- The reduction tracking method/monitoring (NBB, PRTR, and marine pollution monitoring).
 - Capacity building needs.
 - Indicators to measure performance.
 - Monitoring tracking method.
 - Risks and assumptions.
- v) A NAP document may include the following main topics:
- Summary of achievements made in the initial NAP and challenges facing implementation of the updated NAP.
 - Assessment of the midterm implementation benchmark.
 - Quantifiable objectives or national targets.
 - Gaps analysis and identification and prioritization of issues.⁹
 - Priority measures/programmes of measures for the National Action Plan and timetable for implementation of measures.
 - Capacity building and technical assistance plan.
 - NAP implementation financial sustainability plan.
 - NAP implementation follow-up and reporting system plan.
 - Public information, awareness raising and education plan.
 - Revised list of hotspots and sensitive areas.
 - List of investment needs with analysis of coherence between them and ECAP, regional plans and, as appropriate, SAP targets, and with 10 to 15 summary project fiches on priority investment measures.

Appendix F contains detailed outline and guidance information for drafting the updated NAP.

5. Other technical aspects of the NAP updating process to be further developed in consultation with the Contracting Parties

Updating of some of the technical aspects of the NAPs will require further elaboration in consultation with all Contracting Parties. These include:

1. Criteria proposed for prioritizing sectors, substances and other environmental considerations.
2. Considerations for future regional plans in the framework of art. 15 of the LBS Protocol.
3. UfM developed a number of criteria in cooperation with UNEP/MAP with regards to project prioritization.⁶ Such criteria require further analysis and finalization by the Contracting Parties.

⁹ In case of past legally binding targets not met, more detailed actions to get in conformity will be described.

APPENDIX A. Requirements of the Ecosystem Approach targets and Regional Plans in the framework of SAP-MED

This Appendix includes a list of the requirements and obligations to be fulfilled by the Contracting Parties for implementation of their National Action Plans (NAPs).

These requirements were derived from the following measures:

- a) Strategic Action Programme (SAP-MED), 1997.
- b) Decision IG.19/7 “Regional Plan on the Reduction of BOD₅ from Urban Wastewater”.
- c) Decision IG.19/8 “Regional Plan on the Elimination of Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene”.
- d) Decision IG.19/9 “Regional Plan on the Phasing Out of DDT”.
- e) Decision IG.20/8.1 “Regional Plan on the Reduction of Inputs of Mercury”.
- f) Decision IG.20/8.2 “Regional Plan on the Reduction of BOD₅ in the food sector”.
- g) Decision IG.20/8.3.1 “Regional Plan on the Elimination of Alpha hexachlorocyclohexane; Beta hexachlorocyclohexane; Hexabromobiphenyl; Chlordecone; Pentachlorobenzene; Tetrabromodiphenyl ether and Pentabromodiphenyl ether; Hexabromodiphenyl ether and Heptabromodiphenyl ether; Lindane; Endosulfan, Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride”.
- h) Decision IG.20/8.3.2 “Regional Plan on the Phasing out of Lindane and Endosulfan
- i) Decision IG.20/8.3.3 “Regional Plan on the Phasing out of Perfluorooctane, Sulfonic Acid, its salts and Perfluorooctane Sulfonyl Fluoride
- j) Decision IG.20/8.3.4 “Regional Plan on the Elimination of Alpha hexachlorocyclohexane, Beta hexachlorocyclohexane, Chlordecone, Hexabromobiphenyl, Pentachlorobenzene
- k) Decision IG.20/9 “Criteria and Standards for bathing waters quality”.
- l) Decision IG.20/10 “Adoption of the Strategic Framework for Marine Litter Management”.
- m) Decision IG.21/3 on the Ecosystems Approach including Adopting Definitions of Good Environmental Status (GES) and Targets.
- n) Decision IG.21/7 “Regional Plan on Marine Litter Management in the Mediterranean”.

The requirements are categorized into three groups:

- a) Policy framework.
- b) Legal instruments and institutional arrangements.
- c) Pollution prevention and control measures.

For each of these groups, the requirements are further classified into the following SAP- MED sectors, along with its origin in *[brackets]*:

- a) Urban environment
- b) Industrial development
- c) Physical alterations and destruction of habitats
- d) Monitoring and inspection
- e) Capacity building
- f) Public participation
- g) Reporting.

Sector Substance		Policy Requirements of ECAP and Regional Plans Targets in the framework of the SAP-MED	Timetable
Urban Environment	Municipal Wastewater Treatment	Promotion of separate collection of rain waters and municipal wastewaters <i>[SAP- MED Requirement]</i>	Not specified ¹
		Promotion of reuse of treated effluents for the conservation of water resources <i>[SAP- MED Requirement]</i>	Not specified ¹
		Limit concentrations of key nutrients in the marine environment to levels which are not conducive to eutrophication ² <i>[ECAP Requirement]</i>	2015
		Prevention of direct and indirect effects of nutrient over-enrichment in the marine environment <i>[ECAP Requirement]</i>	2015
		Ensuring that water quality in bathing waters and other recreational areas does not undermine human health ³ <i>[Regional Plan Requirement]</i>	2015
	Solid Waste	Minimization of impacts related to properties and quantities of marine litter in the marine and coastal environments ⁴ <i>[Regional Plan Requirement]</i>	2015
		Control of impacts of litter on marine life to the maximum extent practicable ⁵ <i>[Regional Plan Requirement]</i>	2015
		Reduction of fraction of plastic packaging waste that goes to landfill or incineration <i>[Regional Plan Requirement]</i>	2019
		Ensuring adequate urban sewer systems, WWTP and waste management systems to prevent run-off and riverine inputs of Marine Litter <i>[Regional Plan Requirement]</i>	2020
		Application of cost effective measures to prevent any marine littering from dredging activities <i>[Regional Plan Requirement]</i>	2020
		Urban solid waste management is based on reduction at source with the following waste hierarchy: prevention, re-use, recycling, recovery, and environmentally sound disposal <i>[SAP- MED Requirement]</i>	2025
	Air Pollution	Promotion of traffic management that prioritize the use of public transport <i>[SAP- MED Requirement]</i>	Not specified ¹

¹ Deadline is not specified in the SAP.

² Concentrations based on local hydrological, chemical and morphological characteristics of the un-impacted marine region.

³ Based on concentrations of intestinal enterococci.

⁴ Measured based on trends in amounts of litter in the water column, including micro-plastics, and on seafloor.

⁵ Measured based on trends in the amount of litter ingested by or entangling marine organisms, especially mammals, marine birds and turtles.

Sector Substance		Policy Requirements of ECAP and Regional Plans Targets in the framework of the SAP- MED (<i>continued</i>)	Timetable
Industrial Development	POPs, Heavy Metals (Hg, Cd, Pb), Organometallic Compounds	Application of BAT and BEPs for environmentally sound management of POPs <i>[Regional Plan Requirement]</i>	Deadline passed ⁶
		Concentration of priority ⁷ contaminants in biota, sediment or water is kept within acceptable limits <i>[SAP- MED Requirement]</i>	Not specified ¹
		Minimization of effects of released contaminants to the marine environment such as not to give rise to acute pollution events <i>[ECAP Requirement]</i>	2015
		Prevention of acute pollution events and minimization of their impacts <i>[ECAP Requirement]</i>	2015
Physical Alterations and Destruction of Habitats	Safeguard of the ecosystem function and maintenance of the integrity and biological diversity of species and habitats <i>[SAP- MED Requirement]</i>	Not specified ¹	
Capacity Building	Support, promotion and facilitation of programmes of assistance in pollution control and reduction in the area of scientific, technical and human resources <i>[SAP- MED Requirement]</i>	Not specified ¹	
	Support, promotion and facilitation of capacities to apply, develop and manage access of cleaner production technologies as well as Best Available Techniques (BAT) and Best Environmental Practices (BEP) <i>[SAP- MED Requirement]</i>	Not specified ¹	
Public Participation	Facilitation of public access to scientific knowledge and activities for protection and management of the environment <i>[SAP- MED Requirement]</i>	Not specified ¹	
	Mobilization, participation and involvement of major actors concerned in protection and management of the environment (local and provincial communities, economic and social groups, consumers, etc.) <i>[SAP- MED Requirement]</i>	Not specified ¹	
	Enhancement of public awareness and education of pollution, and involvement of various stakeholders with regard to marine litter management including activities related to prevention and promotion of sustainable consumption and production <i>[Regional Plan Requirement]</i>	2015	
	Seek direct cooperation with other Contracting Parties, with assistance of the MEDPOL or competent international and regional organizations, to address trans-boundary marine litter cases <i>[Regional Plan Requirement]</i>	As appropriate	
	Provision of information to the public about bathing water quality and implemented management measures <i>[Regional Plan Requirement]</i>	2016	
Reporting	Application of a unified reporting system for implementing the provisions of the Barcelona Convention, the Protocols, the SAP- MED, the Regional Plans and ECAP objectives <i>[SAP- MED Requirement]</i>	Not specified ¹	

⁶Deadline specified in the binding measure precedes the date of this document.

⁷Priority contaminants as listed under the Barcelona Convention and LBS Protocol.

Sector Substance		Legal Requirements of the Regional Plans in the framework of the SAP- MED	Deadline
Urban Environment	Municipal Wastewater Treatment	Adopt emission limit values (ELV) for BOD5 in urban wastewater after treatment in accordance with the requirements of the “regional guideline on the reduction of BOD5 from urban waste water” <i>[Regional Plan Requirement]</i>	2015 or 2019 ⁸
		Enforce the adopted ELVs by monitoring discharges from municipal wastewater treatment plants into the environment <i>[Regional Plan Requirement]</i>	2015 or 2019 ⁸
	Solid Waste	Adopt preventive measures to minimize inputs of plastic in the marine environment ⁹ <i>[Regional Plan Requirement]</i>	2017
		Enforce measures to combat illegal dumping including littering on beaches and illegal sewage disposal in coastal zones and rivers <i>[Regional Plan Requirement]</i>	2020
Air Pollution	Improve processes for inspection and maintenance of vehicles and renovation of the oldest vehicles <i>[SAP- MED Requirement]</i>	Not specified ¹	
Industrial Development	POPs, Heavy Metals (Hg, Cd, Pb), Organometallic Compounds	Prohibit and/or take legal and administrative measures necessary to eliminate the production and use, import and export of POPs and their wastes <i>[Regional Plan Requirement]</i>	Deadline passed ⁶
		Prohibit the installation of new Chlor alkali plants using mercury cells and vinyl chloride monomer production plants using mercury as a catalyst <i>[Regional Plan Requirement]</i>	Deadline passed ⁶
		Adopt National ELVs for mercury emissions based on values included in the “regional plan on the reduction of inputs of mercury” from other than Chlor Alkali industry ¹⁰ <i>[Regional Plan Requirement]</i>	2019
		Cease releases of mercury from the activity of Chlor alkali plants <i>[Regional Plan Requirement]</i>	2020

⁸ Depending on national circumstances and respective capacities.

⁹ Measures may include “Extended Producer Responsibility”, “Sustainable Procurement Policies”, “Voluntary Agreements with Retailers and Supermarkets”, fiscal and economic instruments”, establishment of [mandatory] deposits, return and restoration systems, and establishment of procedures and manufacturing methodologies.

¹⁰ Chemical industries using mercury catalysts, batteries industry, non-ferrous metal industry, waste treatment, incineration plants.

Sector Substance	Legal Requirements of the Regional Plans in the framework of the SAP- MED (<i>continued</i>)	Deadline
Monitoring and Inspection	Establish a monitoring programme of the inputs of priority pollutants identified in the SAP- MED and of the quality of the marine environment [<i>SAP- MED Requirement</i>]	Deadline passed ⁶
	Establish systems of inspection to ensure compliance with conditions laid down in the authorizations and regulations [<i>SAP- MED Requirement</i>]	Deadline passed ⁶
	Establish a permanent river water quality/quantity register [<i>SAP- MED Requirement</i>]	Deadline passed ⁶
	Monitor releases of mercury into water, air and soil in order to verify compliance with the requirements [<i>Regional Plan Requirement</i>]	2015
	Monitor discharges from municipal wastewater treatment plants and take necessary measures to enforce national regulations [<i>Regional Plan Requirement</i>]	2015 or 2019 ⁸
	Monitor bathing water quality ¹¹ [<i>Regional Plan Requirement</i>]	2016
	Design National Monitoring Programme on Marine Litter [<i>Regional Plan Requirement</i>]	2017
Public Participation	Provide to the public access to information available on the state of the environment of the Mediterranean and its evolution, and of the measures taken to improve it [<i>SAP- MED Requirement</i>]	Not specified ¹
Reporting	Collect information on the state of treatment and disposal of liquid and solid wastes [<i>SAP- MED Requirement</i>]	Not specified ¹
	Prepare bathing water profiles or beach profiles ¹² [<i>Regional Plan Requirement</i>]	2016
	Establish Regional Data Bank on Marine Litter [<i>Regional Plan Requirement</i>]	2016
	Publish a report on the State and Evolution of the Mediterranean Environment [<i>SAP- MED Requirement</i>]	On regular intervals
	Report on the implementation of the measures on the reduction of BOD5 from urban waste water and on their effectiveness [<i>Regional Plan Requirement</i>]	On a biannual basis
	Report on the implementation of the National Marine Litter Monitoring Programme [<i>Regional Plan Requirement</i>]	On a biannual basis

¹¹ Classify findings as “excellent”, “good”, “sufficient” or “poor quality”, with each classification linked to bacteriological quality.

¹² Profiles consist of information about physical, geographical and hydrological characteristics of a bathing water and use to assess sources of pollution, dispersion routes, risks of contamination and negative impacts in order to implement appropriate mitigation measures.

Sector Substance		Pollution Reduction Measures under the Regional Plans in the framework of the SAP- MED and ECAP	Deadline
Urban Environment	Municipal Wastewater Treatment	Coastal cities and urban agglomerations of more than 100,000 inhabitants are connected to a sewer system <i>[SAP- MED Requirement]</i>	Deadline passed ⁶
		Ensure that all agglomerations of more than 2000 inhabitants collect and treat their urban wastewater before discharging them into the environment ¹³ <i>[Regional Plan Requirement]</i>	2015 or 2019 ⁸
		Take necessary measures to establish adequate urban sewer and wastewater treatment plants that prevent run-off and riverine inputs of litter <i>[Regional Plan Requirement]</i>	2020
	Solid Waste	Establish environmentally suitable and economically feasible systems of collection and disposal of urban solid waste in cities of more than 100,000 inhabitants <i>[SAP- MED Requirement]</i>	Deadline passed ⁶
		Implement programmes on regular removal and sound disposal of accumulations/hotspots of marine litter <i>[Regional Plan Requirement]</i>	2019
		Implement adequate waste reducing/reusing/ recycling measures in order to reduce the fraction of plastic packaging waste that goes to landfill or incineration without energy recovery <i>[Regional Plan Requirement]</i>	2019
		Close to the extent possible existing illegal solid waste dump sites <i>[Regional Plan Requirement]</i>	2020
	Air Pollution	Promote the introduction of buses using gaseous fuel or other alternative forms of energy instead of diesel oil <i>[SAP- MED Requirement]</i>	Not specified ¹
		Pursue increased regional and domestic natural gas development projects in order to substitute high sulfur fuel oil with natural gas and natural gas conversion for urban proximities <i>[SAP- MED Requirement]</i>	Not specified ¹
Industrial Development	POPs, Heavy Metals (Hg, Cd, Pb), Organometallic Compounds	Identify stock piles consisting of or containing POPs <i>[Regional Plan Requirement]</i>	Deadline passed ⁶
		Phase out inputs of the 9 pesticides and PCBs and reduce inputs of unwanted contaminants: hexachlorobenzene, dioxins and furans <i>[Regional Plan Requirement]</i>	Deadline passed ⁶
		Phase out to the fullest possible extent discharges, emissions and losses of organomercuric compounds and reduce those of organolead and organotin compounds <i>[SAP- MED Requirement]</i>	Deadline passed ⁶
		Identify existing sites which have been historically contaminated with mercury <i>[Regional Plan Requirement]</i>	Deadline passed ⁶
		Apply environmentally sound management measures to sites which have been historically contaminated with mercury <i>[Regional Plan Requirement]</i>	2015

¹³ Secondary treatment shall be applied for discharges from urban wastewater treatment plants. Primary treatment shall be applied for discharges from marine outfalls.

Sector Substance	Pollution Reduction Measures of the Regional Plans in the framework of the SAP- MED and ECAP(<i>continued</i>)	Deadline
Industrial Development (<i>continued</i>)	Achieve environmentally sound management of metallic mercury from the decommissioned plants <i>[Regional Plan Requirement]</i>	To be achieved following decommission
	Progressively reduce total releases of mercury (to air, water and to products) from existing Chlor alkali plants until their final cessation <i>[Regional Plan Requirement]</i>	2020
	Take appropriate measures to isolate and contain mercury containing wastes <i>[Regional Plan Requirement]</i>	2025
	Phase out inputs of PAHs <i>[SAP- MED Requirement]</i>	2025
	Phase out discharges and emissions and losses of mercury, cadmium and lead <i>[SAP- MED Requirement]</i>	2025
	Eliminate to the fullest possible extent pollution of the Mediterranean Sea caused by discharges, emissions and losses of zinc, copper and chrome <i>[SAP- MED Requirement]</i>	2025
	Eliminate to the fullest possible extent pollution caused by discharges, emissions and losses of organohalogen compounds <i>[SAP- MED Requirement]</i>	2025
	Eliminate to the fullest possible extent inputs of radioactive substances <i>[SAP- MED Requirement]</i>	2025
	Reduce nutrient inputs, from agriculture and aquaculture practices into areas where these inputs are likely to cause pollution <i>[SAP- MED Requirement]</i>	2025
	Dispose all wastewater from industrial installations which are sources of BOD, nutrients and suspended solids <i>[SAP- MED Requirement]</i>	2025
Dispose all hazardous wastes in a safe and environmentally sound manner <i>[SAP- MED Requirement]</i>	2025	

¹⁴ Other heavy metals include Zinc, Copper, chromium.

¹⁵ Halogenated aliphatic and aromatic hydrocarbons, Chlorinated phenolic compounds and organo-halogenated pesticides.

¹⁶ These include industrial wastewater and agriculture.

¹⁷ These include obsolete chemicals, lubeoil and batteries.

Sector Substance	Pollution Reduction Measures of the Regional Plans in the framework of the SAP- MED and ECAP (<i>continued</i>)	Deadline
Physical Alterations and Destruction of Habitats	Restore marine and coastal habitats that have been adversely affected by anthropogenic activities <i>[SAP- MED Requirement]</i>	Not specified ¹
	Remove existing accumulated litter from Specially Protected Areas of Mediterranean Importance (SPAMI) and litter impacting endangered species ¹⁸ <i>[Regional Plan Requirement]</i>	2019
Public Participation	Explore and implement National Marine Litter Cleanup Campaigns; participate in International Coastal Cleanup Campaigns and Programmes; apply “Adopt-a-Beach” or similar practices; and apply “Fishing for Litter” practices <i>[Regional Plan Requirement]</i>	2019

¹⁸ Endangered species listed in Annexes II and III of the SPA and Biodiversity Protocol.

APPENDIX B. Guidelines on National Budget of Pollutants (NBB)

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1. Introduction

In the framework of the operational strategy for the implementation of the Strategic Action Programme (SAP-MED), adopted by the 12th Meeting of the Contracting Parties to the Barcelona Convention (Monaco, November 2001), the Mediterranean countries should prepare a National Budget (NBB) of emissions/releases for the SAP-MED targeted pollutants covering all the substantial Land Based Sources. The assessment of pollutants' loads constitute an important tool for both identifying and prioritizing issues to be addressed in the NAPs and evaluating the level of achievement of SAP MED targets through the implementation of the NAPs. In this context, the Countries prepared their first NBB in 2003 followed by the second in 2008 based on 2003 agreed NBB guidelines.

In view of NAP update as mandated by COP 18, Istanbul Turkey, 2013, the Secretariat developed the Guidelines for updating NAPs that comprised a number of technical annexes including one annex containing the updated NBB guidelines.

The updated NBB guidelines presented in this Appendix B take into account comments made during the meetings of MED POL FP in March and December 2014 including proposals to ensure the NBB harmonisation with PRTR. The guidelines contain four principal sections addressing:

- a) NBB object and scope
- b) NBB calculation
- c) NBB InfoSystem
- d) NBB and PRTR harmonization

2. Object and scope of the NBB updated guidelines

These guidelines have been prepared in order to assist the countries in the estimation of Baseline Budget (NBB) for the SAP MED targeted pollutants. They are designed to be applicable to all countries.

They include the methodological principles for the gathering of data and information concerning the loads of pollutants discharged in the Mediterranean by land based sources in case no monitoring of inputs in the marine environment is in place. It also includes a detailed description of the steps that should be followed for the calculation of the total loads discharged by the various land based sources of pollution, either from PRTR data or discharge permits or on the basis of Emission Factors.

The scope of the loads of pollutants is:

- Liquid loads discharge by industrial activities, municipal wastewater, effluents from wastewater treatment plants, leachates from landfills, pollution loads from coastal streams and runoff.
- Atmospheric emissions – point source emissions and major area sources.

As for sector categories and pollutants, SAP MED covers the following categories of substances based on Annex I.C of the LBS Protocol and selected as priorities. They both cover urban environment and industrial development, radioactive substances and hazardous waste have been removed for not being within NBB scope:

Table 1. SAP MED sectors, categories and substances.

Sector	Category	Substances
Urban environment	Municipal wastewater Municipal solid waste Air pollutants	
Industrial development	Toxic, Persistent and Liable to Bioaccumulate (TPB)	Aldrine DDT Dieldrine Endrine Chlordane Heptachlor Mirex Toxaphene Hexachlorobenzene PCB/PCT PCDD/PCDF PAH Mercury Cadmium Lead Organometallic compounds
	Other heavy metals	Zinc Copper Chrome
	Organohalogen compounds	Chlorinated solvents Chlorinated paraffins Chlorobenzenes Polychlorinated naphthalenes (PCNs) Polybrominated diphenyl ethers and polybrominated biphenyls Chlorophenols Lindane Chlorophenoxy acids
	Nutrients and suspended solids	BOD ₅ Nutrients Suspended solids

As a minimum, NBB should cover all the pollutants evaluated as priority substances agreed by MEDPOL Focal points at their meeting held in Aix en Provence, France in November 2009 and listed in Annex II of Decision IG.21/3. Currently, this list is in the update process.

Sector categories (30) are established in Annex I.A of the LBS Protocol. Thus a number of subsectors (up to 97) are defined for each sector.

3. NBB calculation

The approach to 2013 NBB includes the following primary stages:

1. Determine the areas from which liquid and air emissions may reach the Mediterranean.
2. Map all emission sources in the area of interest.
3. Gather emission data for all emissions sources.
4. Assess the portion of total emissions that eventually reach the Mediterranean.
5. Consolidate data and avoid redundancy where duplicates occur.

3.1. Determining the administrative region/s

The first step for estimating the NBB is to identify the administrative region/s in which the land-based sources of pollution affecting the Mediterranean Sea are located, that is, the identification of the administrative region/s that best fits the basin area. This should be done for liquid and air emissions separately.

(a) Basin Area for liquid emissions

In this area, liquid emissions discharged by various sources have the potential to eventually be deposited in the Mediterranean, either by direct disposal of wastewater into the sea, or indirectly by runoff and wastewater disposal in streams reaching the Mediterranean.

The main contributors of liquid emissions are industrial activities, urban sewage and wastewater, runoff, and agricultural activities.

The determination of the basin area will be made with respect to the following routes of marine of emission:

- Direct marine discharge by point sources.
- Discharge to coastal streams by point sources.
- Runoff (into coastal streams).
- Direct Runoff (to seawater).

The determination of the area of influence has to be made individually for every territory or region. Generally, the boundaries set by the drainage basin can be used to determine the area of influence. In case this basin is too vast, it can be divided into sub basins according to the geographical characteristics while considering the potential reduction in pollutant loads along the route (e.g. according to degradation, adsorption etc.).

As an alternative to assessing the total runoff pollutant loads, it can also be assumed that all runoff drain goes to stream channels. Based on this assumption, pollutant loads can be assessed by sampling the pollutant loads downstream prior to the intersection with the sea.

(b) Air Basin for Atmospheric Emissions

The determination of the area from which atmospheric emissions have the potential to be carried and deposited into the Mediterranean is based on climatic and geographical analysis for each basin. The air basin will be determined for every territory or region with respect to the following:

- Proximity to the Mediterranean coast.

- Characteristic wind regime (significant portion of time in which the wind blows with a seaward component).

3.2. Mapping the emission sources within the basin

Accurate information on liquid and atmospheric sources of pollution and related activities should be mapped within their suitable basin. The general categories of emission sources are:

- Industrial activities,
- Transportation sources,
- Stream heads,
- Waste water treatment plants,
- Landfill runoffs,
- Any other category.

Once sources of pollution are determined, they should be classified according to the corresponding sector (Annex I.A of the LBS Protocol) and subsector.

3.3. Preparing the NBB database

After identifying all emission sources in the basin, a database containing emission data from all sources has to be established. Accurate, local data should be preferred wherever possible. After the available information was examined and verified, information gaps should be identified and completed if possible.

The following are the principle data sets required for a complete estimation of all pollutant loads reaching the Mediterranean Sea:

- Information concerning all industrial activities in the relevant area – liquid and atmospheric emission loads.
- Information concerning atmospheric emissions from vehicles.
- Information concerning all streams that flow into the Mediterranean – specific pollutant loads/concentration, flow volume.
- Information concerning unregulated landfills - leachate loads, runoff, and pollutant permeation to groundwater bodies that are linked to the Mediterranean water.
- Information concerning domestic wastewater discharge – direct marine discharge, collection and treatment, and effluent quality in the WWTP outlet when disposed to streams/sea.

Recommended data sources for each category are described in the next sections:

3.3.1. Industrial activities

The recommended data sources are prioritized according to the following order of precedence:

(a) Using PRTR data

PRTR reported data constitutes a good database for liquid and atmospheric emissions which is based upon actual installation-level data on production, energy and resource consumption, emission reduction, etc. This data usually undergoes quality control and is generally the best source of overall emission estimation.

Concerning E-PRTR initiative in particular, Mediterranean countries are required to address some gaps in order to convert E-PRTR into NBB data. The following table shows main differences between NBB and E-PRTR approaches:

Table 2. Comparison between NBB and E-PRTR.

<i>Issue</i>	<i>NBB</i>	<i>E-PRTR</i>
Geographical scope	Administrative regions located in drainage basins that outflow into the Mediterranean.	All regions and river basin districts
Source type	Point sources (industry and urban centers).	Industrial facilities and diffuse sources ¹ .
Scope of point sources	All point sources irrespective of their capacity.	Only if the facility exceeds the following thresholds: a) falls under at least one of the 65 E-PRTR economic activities listed in Annex I of the E-PRTR Regulation and exceeds at least one of the E-PRTR capacity thresholds b) transfers waste off-site which exceed specific thresholds set out in Article 5 of the Regulation c) releases pollutants which exceed specific thresholds specified for each media - air, water and land - in Annex II of the E-PRTR Regulation
Media	Water and air	Amounts of pollutant releases to air, water and land as well as off-site transfers of waste and of pollutants in waste water
Emission scope	Direct emissions to drainage basins or into the sea.	Direct emissions and indirect emissions (going to an external treatment plant).
Sector categories	1) Sectors according to LBS Protocol 30 categories 2) Subsectors: 97 categories	1) Annex I of the E-PRTR Regulation: 9 sector categories 2) NACE Main Economic Activity 65 categories
Groups of pollutants	<ul style="list-style-type: none"> • Hydrocarbons • Metals and compounds • Nutrients, SS and BOD/TOC • Organohalogen • Other atmospheric pollutants 	<ul style="list-style-type: none"> • Greenhouse gases • Other gases • Heavy metals • Pesticides • Chlorinated organic substances • Other organic substances • Inorganic substances

¹ The E-PRTR Regulation (Article 8) requires the Commission, assisted by the European Environment Agency, to include in the E-PRTR information on releases from diffuse sources, where such information exists and has already been reported by Member States.

<i>Issue</i>	<i>NBB</i>	<i>E-PRTR</i>
	<ul style="list-style-type: none"> • Other inorganic compounds • Other organic compounds 	
Method of quantification	<ul style="list-style-type: none"> a) Measurement of the concentration levels of emissions at the source and quantification using additional data on the source activity. b) Estimation of emissions based on emission factors and industrial activity rates, material flow, etc. 	<ul style="list-style-type: none"> a) Measured (M): Release data are based on measurements. Additional calculations are needed to convert the results of measurements into annual release data. b) Calculated (C): Release data are based on calculations using activity data (fuel used, production rate, etc.) and emission factors or mass balances. c) Estimated (E): Release data are based on non-standardized estimations.

To address such gaps and in view of NBB and E-PRTR harmonization, some conceptual and technical adjustments are proposed within these guidelines, which are described in section 5.

(b) Direct measurements

Where a PRTR program is not implemented or available PRTR data need to be complemented with additional sources/installations, the elementary database should be composed using the next best information source available, which is installation-specific data on direct measurements.

This calculation usually provides the most reliable and exact results, assuming that the equipment complies with common standards, is fit for use, calibrated for the correct emission rate, is suitable for the emission that is measured and if the sampling is performed at the proper frequency.

Direct measurement includes:

- Calculation of emissions into the air from sampling results:
 - *By creating an emission factor,*
 - *By activity hours.*
- Calculation of emissions into the air from continuous monitoring data.
- Calculation of releases and transfers to effluents from sampling data.

(c) Indirect monitoring

Indirect monitoring is based on a connection between the characteristics of the industrial process and the emissions.

This method may be applied in a process in which the emissions depend directly on the conditions of the process for which the measurement is performed. Releases and transfers to effluents from industrial processes are usually a function of process characteristics, such as temperature, pressure or acidity; and therefore constitute a candidate for calculating the quantity using indirect monitoring

data. In any case indirect monitoring is used to verify the connection between the monitored parameter and the emission.

(d) Discharge permits

If no reporting data from the industrial installation is available, the assessment of pollutant loads can be made according to the discharge loads approved in the permit.

(e) Emission factors

Industrial activities for which previous emission data/information are not available, pollutant loads can be evaluated using emission factors. Emission factors are numbers that may be multiplied by a rate of activity or rate of production of any installation (such as energy generation, water consumption, fuel consumption).

The UNEP/MAP report on industrial emission factors (UNEP/MAP, 2014b) includes a set of emission factors for liquid and atmospheric emission from the majority of industrial activities.

3.3.2. Atmospheric emissions from transport

Assessing the emission loads from transportation activities is typically complex and requires the use of modeling. Because of the inherent complexity of the models, previous analysis of the transportation sector is preferable. If no such analysis is available, calculation could be done using the overall fuel consumption and available emission factors as described in UNEP/MAP report on industrial emission factors (UNEP/MAP, 2014b).

3.3.3. Information concerning streams flowing into the Mediterranean

The coastal streams that flow into the Mediterranean act as an output for both area source emissions such as agricultural and urban runoff, and point source emissions such as industrial activities with direct discharge to the streams. The assessment of pollutant loads from these sources can be done by sampling as far downstream as possible, and multiplying the average pollutant concentration by the average flow volume. In order to avoid redundancy, data from stream sampling and point source emissions should be prioritized (see section 3.5 for database consolidation).

3.3.4. Information concerning unregulated landfills

Unregulated landfills are a source of leachate, polluted runoff, and possible groundwater pollution that can potentially reach the Mediterranean. Additionally, landfills in close proximity to the coast can be a source of solid waste washing to the sea. Site specific evaluation of the landfill infrastructure should be done in order to assess the pollution loads.

3.3.5. Information concerning domestic wastewater discharge

Information should be gathered concerning the amounts of domestic wastewater directly discharged to the Mediterranean and to the coastal streams. Pollutant concentration and flow volumes should be monitored and assessed for the determination of the final loads of pollutants discharged to the Mediterranean.

3.4. Estimating air pollutants that are deposited into the Mediterranean

The assessment of the liquid loads deposited into the Mediterranean from most land based sources is usually derived directly from the discharged loads.

Nevertheless, air pollutants released to the atmosphere by various sources will only be partly deposited into the Mediterranean. Air pollution facilitates a major source of seawater pollution (heavy metals, acids, etc.) and should be carefully assessed due to its inherently complex variety of mechanisms for marine deposition. The effect of air pollution on seawater quality arises from dry and wet deposition processes occurring naturally in the atmosphere. The mechanisms of deposition vary for different kinds of particles and gases. In order to take into account all the different types of pollutants and mechanisms of deposition, very complex models should be used. Since this information is complicated to acquire and some of it is still being researched, a simplified assessment should be carried out.

The basic assumption for the evaluation is that all substances carried towards the sea by wind will eventually reach the seawater. This assumption may be too strict, but it is simple to calculate and represents a good basic evaluation of the maximum, potential pollutant loads reaching the Mediterranean.

Under this basal assumption, the amount of pollutants deposited into the Mediterranean is mainly dependent on wind direction. Air pollution will be carried and deposited onto the sea surface only with an adequate wind component and sufficient wind speed depending on the location of the source. The evaluation is based on a sea/land factor which is multiplied by the pollutant load of all sources according to their location.

The determination of sea/land factors includes several steps:

- 1 Partitioning the air basin for atmospheric emissions into several zones. Each zone should contain wind data (wind rose) from a single source (e.g. meteorological station) or an area-wide average.
- 2 Determining a minimal wind speed for areas that are not adjacent to the coastline (around 1 m/s). Every fraction of the wind rose below the minimal wind speed will not be considered as wind blowing to the Mediterranean. This is mostly true for particles settling and not for gases, but will be used for the general evaluation.
- 3 Determining a sea/land factor for every zone according to the fraction of time the wind blows towards the Mediterranean at a minimal speed. (e.g. if the wind blows towards the sea for half of the year, then only half of the atmospheric emissions from that zone will be deposited into the Mediterranean).
- 4 Allocating a sea/land factor to every emission source according to the zones defined in step 1 or according to the closest wind data source. This can be done easily using a GIS software.
- 5 Multiplying all emission loads by their allocated sea/land factor.

3.5. Consolidating the NBB database

After all available data has been collected, it has to be summarized to obtain the final pollutant loads. The following flow-chart (Figure 1) schematically illustrated the process of data processing and classification required to achieve a comprehensive assessment of the pollutant loads discharged into the Mediterranean. Orange boxes indicate the data processing activities, and the green boxes indicate the classification criteria's of the source categories.

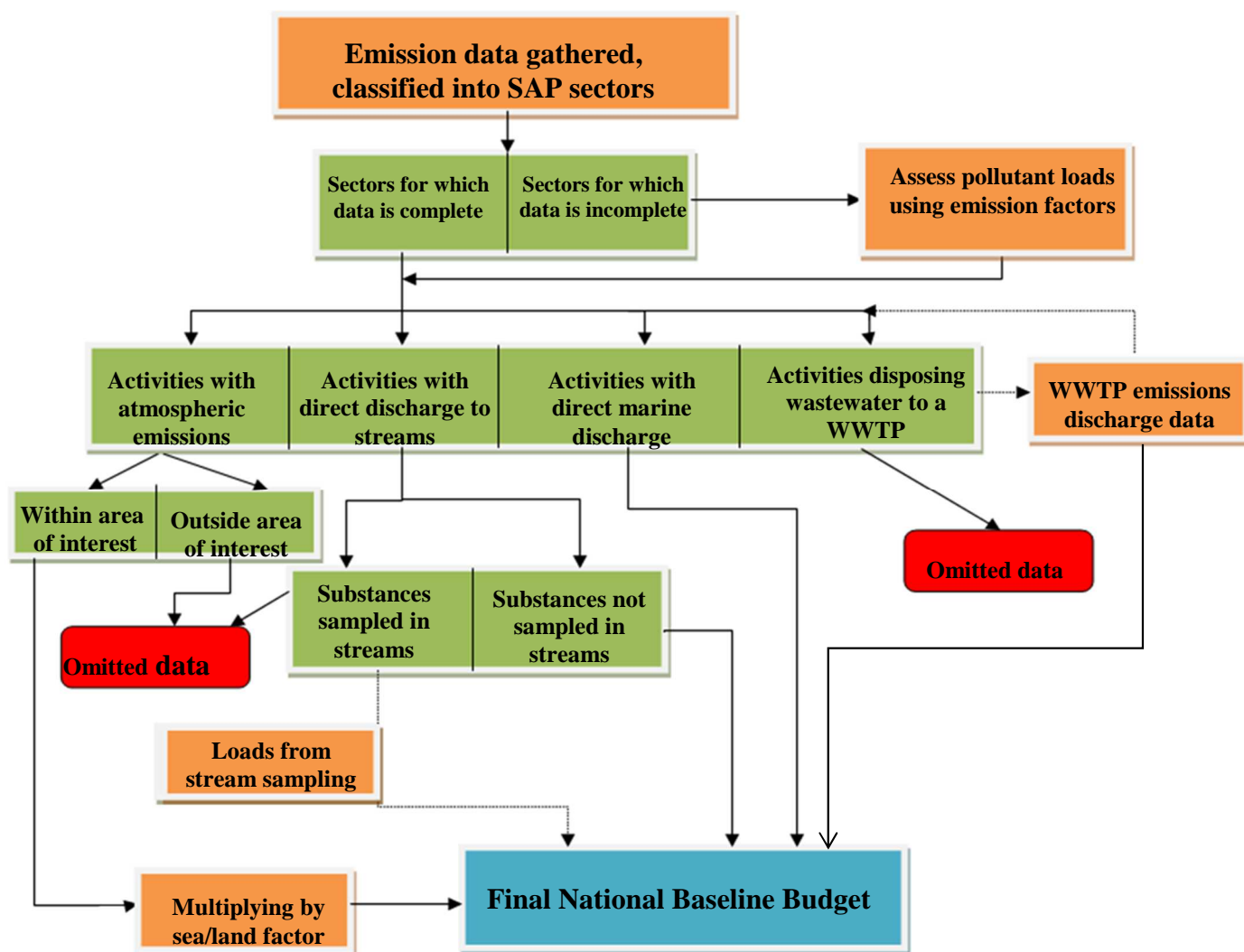


Figure 1: Flow chart of data processing and classification for the assessment of the pollutant loads discharged into the Mediterranean.

4. MED POL Info System on NBB

4.1. Introduction

In this section, the system design of the NBB-Info System, in the following the “system”, is briefly described. The “NBB Info System” is a networked information system that is intended to provide an overall support to NBB reporting and related assessment. The system provides tools for managing, sharing and preserving data and information for MEDPOL users and partners.

4.2. System overview

Interaction between the system and users can be described by functionality blocks, where implemented technologies are interconnected basing the focus on the logical functionalities they refer to. The logical view of the system is described in Figure 2.

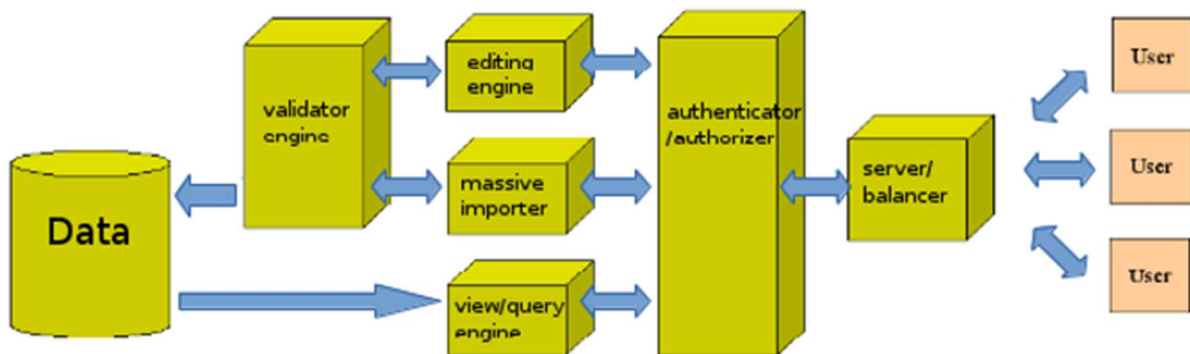


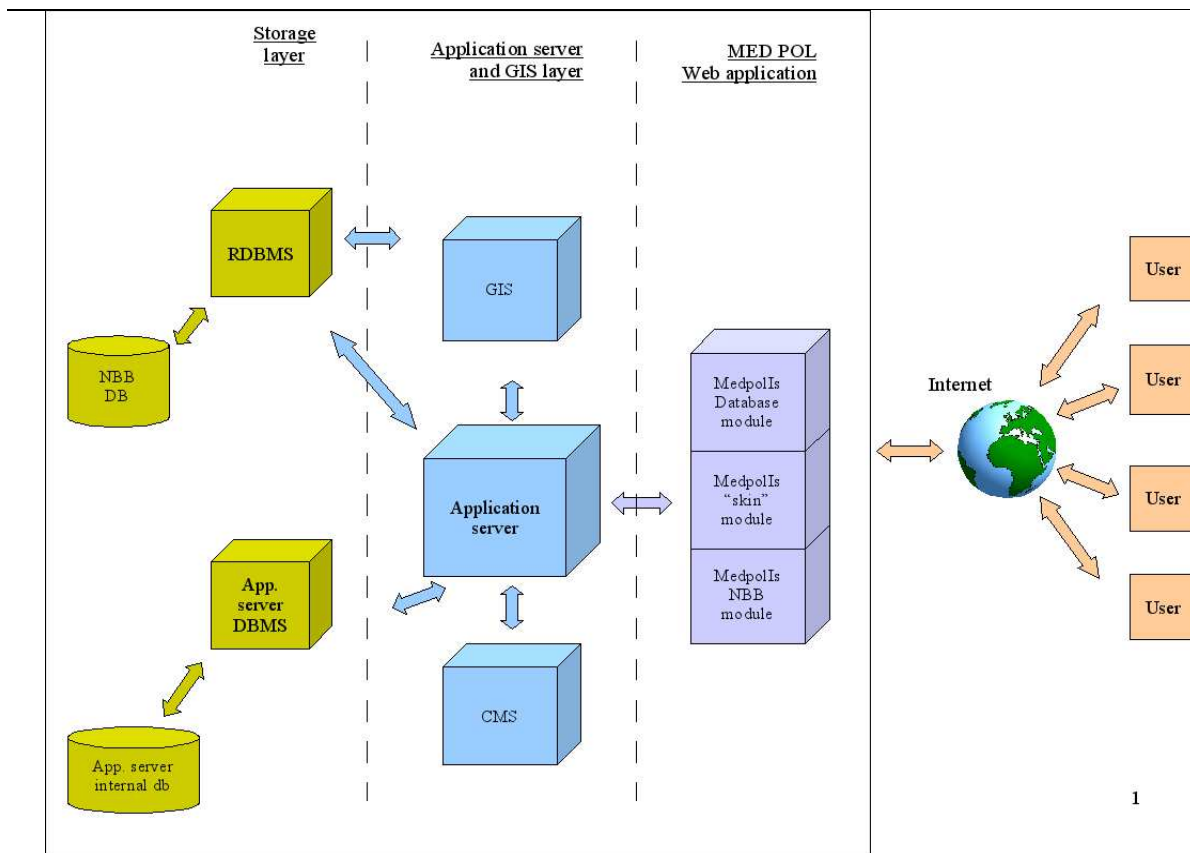
Figure 2: Logical architecture of NBB IS.

The system main components are:

- a storage layer, which manages data semantics, storage and retrieval;
- an application server and GIS layer;
- a dedicated MED POL Web application.

The system components are displayed in Figure 3.

Figure 3: NBB Info system Intranet architecture diagram.



4.3. User profiles and roles

Each user of MED POL Info system is given a definite role, which defines the amount of information/data and the kind of actions they are allowed to access. Role permissions can be modified as needed.

The user profiles are:

- System administrator: Unrestricted user management; user and data management; report creation;
- Data Definer: Unrestricted data access, editing, management, querying and distribution; some report management;
- Data Provider: data access, editing and querying restricted to user's own country data;
- Data validator: data access and querying restricted to the user's own country data; some report management;
- Anonymous: Data access and querying restricted to public data.

Any user will be given a user name and a password.

System administrator and Data Definer are reserved to MED POL members.

Data Provider is reserved to each specific country user to manage drafts of new data and searching/analysing of submitted data.

Data Validator is reserved to the National Focal Point for each country; this profile is responsible of official submission of new data.

Anonymous is the profile reserved for not logged users.

4.4. NBB Database description

NBB data are stored into the NBB database. The structure of NBB database is shown in **¡Error! No se encuentra el origen de la referencia..**

The Database has several users access points, according to the different roles in the data reporting. The main entities corresponding to the different data types which can be managed by the database are:

- reports (table report),
- facilities (table company),
- value of the pollutant (table budge baseline).

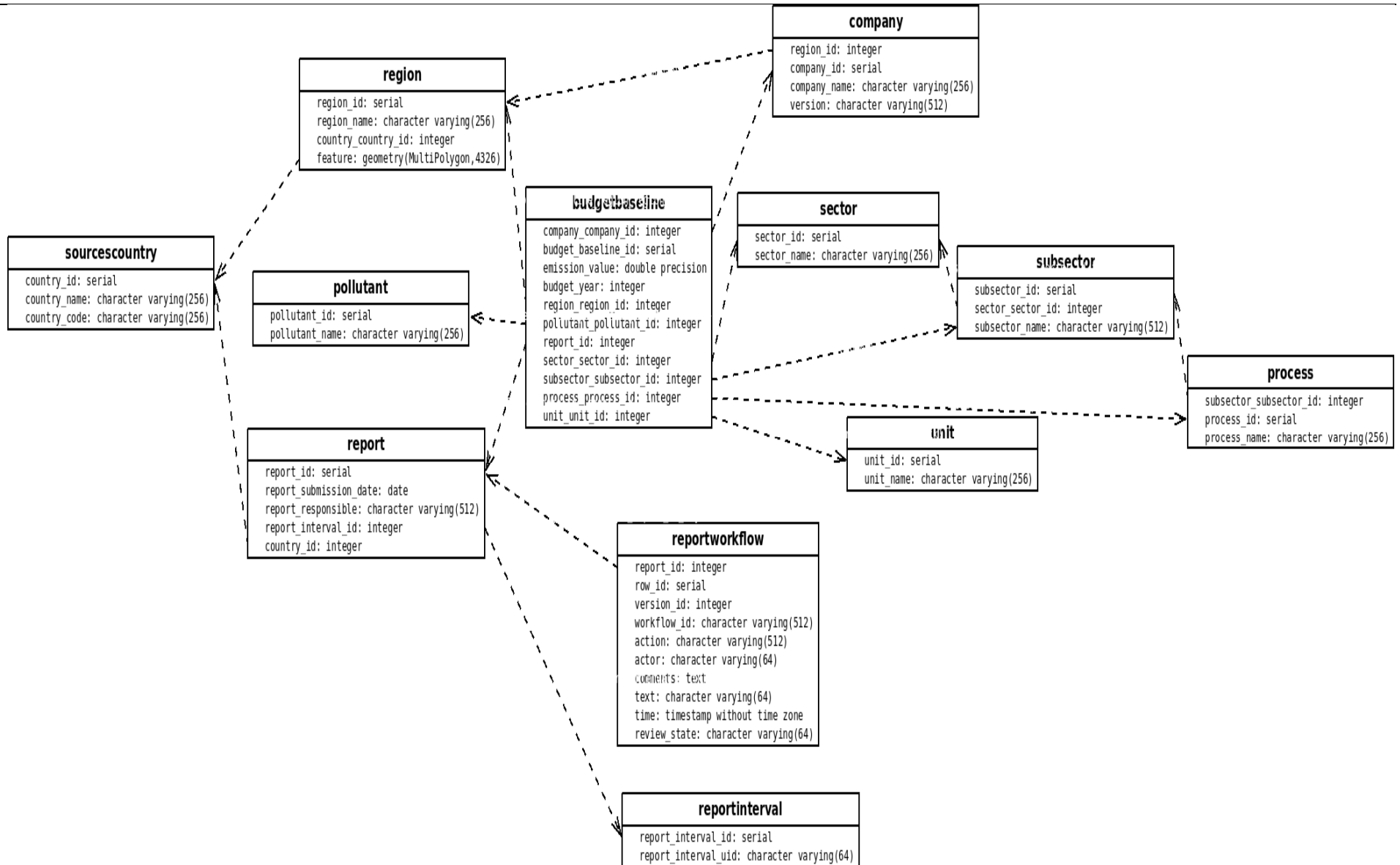
The hierarchical structure is the following:

The report is the envelope which encases all the data of a single country. It contains several measures of pollutants, organized in the region where the measures has been performed. Each measure can be associated to a facility

Among the attributes of a specific measure, there are:

- pollutant (table pollutant),
- unit of measure (table unit),
- the hierarchical tern sector- subsector-process (tables sector, sub sector, process),
- the region (table region).

The geographical features of the NBB is at moment limited to the geometry of the region, which is included in the system in order to provide geographical queries (in the upload of PRTR values, the system performs a determination of the region from the geo coordinates of the PRTR facility).



4.5. Reporting data flow

The reporting activity is the main target of the NBB Info System. The data flow is sketched in Figure 4. It is organized in the following main activities:

- initial creation of an empty report in a draft state by the MED POL staff/Data Validator (National Focal Point),
- entry of the facilities by the Data Provider,
- filling and editing of the report and change of state to official submission (performed by Data Provider and Data Validator). It is implemented an intermediate final state for the report in order to facilitate the management of the report among the Data Provider and Data Validator. Once the Data Provider has completed the data entry in the draft state, he can change the state of the report from draft to final. In this state the report is managed only by the Data Validator (usually the National Focal Point) in charge for the validation of the data entered. If the Data Validator needs to change/modify the data and needs the
- support from the Data Provider can revert the state of the report to Draft too allow the Data Provider to access to the Report and starting a new session of data entry,
- Report workflow managing which include 4 states (draft, final, officially submitted and archived) and allows to manage the data flow among Data Provider, Data Validator and Data Definer/MED POL staff.
- Data validated are always stored into the database, but at the same time linked to the corresponding report (which contains them from a logical point of view) and to its state.
- The sections of query and statistical analysis, available in specific sections of the system, refer always to the data stored into the database and belonging to the report officially submitted and archived.

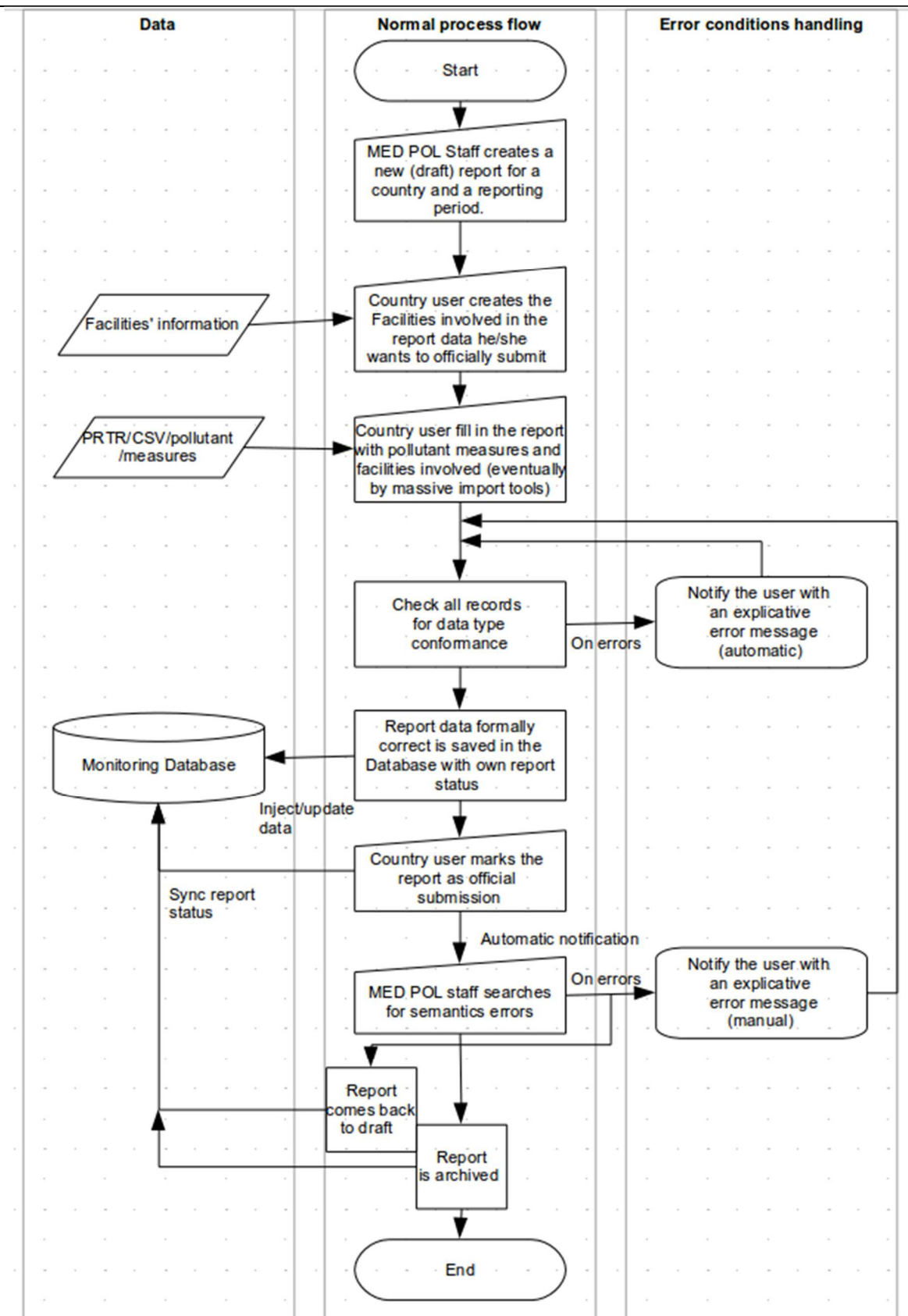


Figure 4: Data flow in the NBB IS Intranet.

4.5.1. H2020 indicators

H2020 indicators are visualized in the public section of the system. The public section has the same structure of the other sections, but it can be accessed by the anonymous users without password. H2020 indicators are organised in national folders and data can be downloaded as csv files.

The public section will include the link to the EEA webpage with the H2020 indicators. Similarly, the EEA webpage will host a link to the corresponding public page of the MED POL Info System.

4.6. GUI – System Functionalities/Modules

“NBB-IS System” GUI is designed to give quick access to most of the system functionalities and modules. Figure 6 shows a schematic illustration of the GUI typical areas (the figure refers to the Sources Data page).

Area 1 contains links to the system main sections ('navigation tabs') and the path to the current position inside the system. Area 2 is the system header, the same all over the system. Area 3 is the system 'navigation box', that is the main tool to move through the web pages of the system. Area 4 represents the content area of the current page: its content depends of the context. At last, area 5 displays personal user information/links, if login procedure was done, else the link to the login page.

4.6.1. Import process design

(a) Importing from PRTR XML file

The system accounts for the data upload from the MED POL PRTR and EPRTR XML files.

However, since the two systems are quite different and not fully interoperable, the implementation is still on-going. The system upload a subset of PRTR data which can be fitted in the data specifications of the NBB. In order to allow the upload of the data, we are performing a mapping between the data dictionaries of the system, which is still in the process.

Mapping has been performed for:

- Sectors,
- subset of subsectors,
- subset of pollutants.



Figure 5: GUI of the NBB-IS Intranet: main elements.

5. NBB and E-PRTR harmonization

The conceptual and technical adjustments for harmonization between NBB and E-PRTR are summarized as follows:

1. To select/filter only regions and river basin districts located in drainage basins that outflow into the Mediterranean.
2. To omit records regarding indirect emissions (going to an external treatment plant).
3. To compare the sector and subsectors dictionaries under NBB and under PRTR in order to identify the corresponding loads source categories and to identify not fully matching sectors/subsectors or sectors/subsectors under NBB which are not included under PRTR. Consequently:
 - dictionary entries not corresponding to any coded item in any list should be left in the NBB dictionaries;
 - the sector dictionaries are the union of the PRTR and NBB sector dictionaries;
 - for a specific sector the subsectors dictionaries are the union of the PRTR and NBB subsectors dictionaries;
4. To gather all emission data from industrial facilities regardless of specific capacity thresholds set by Annex I of E-PRTR Regulation or, alternatively, ensure that data collected are representative of the total discharges from such sector/subsector at national level, i.e.:
 - For NBB reporting purposes, it is recommended neither to adopt E-PRTR capacity thresholds nor to set national capacity thresholds.
 - If national capacity thresholds are set, to ensure that emissions gathered from each industrial sector/subsector in the country are representative of the total sector/subsector emissions in the country, i.e. they are at least 80% of the total emissions per sector/subsector. It is then up to each country to set such national capacity thresholds.
5. To compare the pollutant dictionaries under NBB and under PRTR in order to identify the corresponding loads of pollutants and to identify not matching pollutants.
 - dictionary entries not corresponding to any coded item in any list should be left in the NBB dictionaries;
 - the pollutant dictionaries in the NBB are the union of the PRTR and NBB pollutant dictionaries.
6. To gather all emission data from industrial facilities regardless of specific pollutant thresholds set by Annex II of E-PRTR Regulation or, alternatively, ensure that data collected are representative of the total discharges from such pollutants at national level, i.e.:
 - For NBB reporting purposes it is recommended neither to adopt E-PRTR pollutant thresholds nor to set national pollutant thresholds.
 - If national pollutant thresholds are set, to ensure that pollutant emissions gathered in the country are representative of the total pollutant emissions in the country, i.e. they are at least 80% of the total emissions per pollutant. It is then up to each country to set such specific pollutant thresholds.

7. In order to assure the coherency among NBB data and PRTR it is proposed to use in the NBB the same codification of the method of estimation of emissions used in the PRTR. For the sectors which do not allow the PRTR coding it is proposed to add a text field where the operator can draft the estimation method used.
8. The system should allow the prefilling of a new NBB report. This is thought to facilitate the reporting process for the following years since the operator will be able to readily check the values in the old report and update them in the new report, without retyping all from the beginning.
9. PRTR data can be massively uploaded from an XML into the database. However, since PRTR data provide only a portion of the NBB data, the solution envisaged is to allow 2 different types of prefilling:
 - prefilling of every data, using the old NBB data. In this case the Data Provider can recover all the NBB data and then update them to create the new NBB report.
 - prefilling of the old PRTR data. In this case the Data Provider can recover only the PRTR portion of the NBB data and then update only the integration to the PRTR data in order to create the new NBB data.

Moreover, the system allows adding data with the same attributes (sector, subsector, pollutant, region etc.) and only at the submission will perform the aggregation. In such a way, it is possible to integrate (adding simply a new record) data upload corresponding to a partial load.

6. References

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Appendix C. Updated criteria and methodology to assess hotspots and sensitive areas in the Mediterranean

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1. Introduction

The 18th meeting of the Contracting parties to the Barcelona Convention (COP 18), held in Istanbul, Turkey in December 2013, requested the Contracting parties to update the National Action Plans adopted between 2003-2005 in the framework of Article 5 of the LBS Protocol of the Barcelona Convention. With the view to support countries in following a harmonized methodology to update the NAPs, the Secretariat developed NAP update Guidelines.

The meeting of the MEDPOL FP held on 26-28 March 2014 (Athens, Greece) reviewed and endorsed the main body of the Guidelines for Updating National Action Plans (NAPs): “Guidelines for updating National Action Plans for the implementation of the LBS Protocol and its Regional Plans in the framework of SAP MED to achieve Good Environmental Status for pollution-related ECAP ecological objectives” (UNEP(DEPI)MED WG.394/10). The Secretariat was asked to particularly continue the work for finalization of the technical annexes of NAP update Guidelines including one annex on the updated criteria on hotspots and sensitive areas assessment.

The main purpose of updating the criteria for the evaluation of national hotspots and sensitive areas is to address additional developments and updated legal and technical standards to meet ECAP GES targets and the legally binding commitments under the Regional Plans (Article 15 of the LBS Protocol). The preparation of updated criteria took into account comments received from Israel, France and UfM Secretariat and benefited from experiences of other international frameworks on hotspots identification and assessment such as World Bank (WB), Union for the Mediterranean (UfM) and Regional Seas Conventions and Action Plans (RSC).

The meeting of MED POL FP held on 18 – 19 December 2014 in Barcelona reviewed and endorsed the criteria as presented in sections 2 and 3 of this Annex 4, Appendix C.

2. Updated criteria and methodology to assess hot spots and sensitive areas in the Mediterranean

The main purpose of updating hot spot and sensitive area assessment criteria is to take into account the GES targets adopted by COP 18 as well as the commitments under the Regional Plans of the LBS Protocol adopted by COP 17, 18 and 19. This ensures a better balance among health, environmental and socio economic aspects as well as pressures and related state/impact on marine and coastal environment.

The Contracting Parties may build on comparable processes including pressures and impact analysis and environmental status assessment. In other cases, the methodology for evaluation of the hot spots and sensitive areas in the Mediterranean region based on updated assessment criteria comprises the two following main steps:

Step 1: Screening for the listing of potential pollution hot spots and sensitive areas.

Step 2: Assessing potential hot spots and sensitive areas based on updated criteria.

2.1. STEP 1: Screening for the listing of potential pollution hot spots and sensitive areas

An initial list of potential hot spots needs to be prepared to be evaluated with the proposed criteria in section 2.2. Table 1 describes general criteria for the sites which should be included in the potential list of hot spots. A nation-wide list of sites has to be assembled for each screening criteria, leading to a final list in which all sites answer the description of at least one of the screening criteria. The list will be based on:

- a) Knowledge of the emission loads, ambient pollutant concentrations, emission trends, development programs, etc.
- b) Where pollution data is missing, the list will also include sites for which there is a reason to assume some type of unmonitored environmental pressure is present.

Table 1. Screening criteria proposed for establishing a list of potential hot spots sites.

Criteria	Description	Environmental Pressures
Densely populated areas	Large population centres, popular touristic areas or densely populated coastal areas without adequate wastewater treatment (municipal pollution hot spot site)	Wastewater, organic matter, marine litter and solid waste
Coastal industry	Sites with large untreated wastewater outlets in the sea	Wastewater, contaminants, organic matter
Big ports	Intense maritime transport routes and ports	Wastewater, solid waste, contaminants, hazardous waste

Criteria	Description	Environmental Pressures
Landfills and dump sites	Non sanitary landfills and dump sites located in proximity of the coastline or at sea	Marine litter and solid waste, Contaminants
Oil/gas exploration and exploitation, and mining sites	Oil/gas exploration and explotations and mining activities in proximity of the coastline or at the sea	Contaminants
Big aquaculture areas	Areas with intensive fish and shellfish farming	Nutrients, pharmaceutical products
Large river discharges	Large river discharges, carrying along a) solid waste, b) urban wastewater, c) industrial wastewater, d) agricultural run-offs	Nutrients, solid waste, wastewaters
Intensive agriculture areas	Sea waters receiving substantial agricultural run-offs from the intensively cultivated coastal agriculture areas	Nutrients, contaminants
Historical pollution sites	Sites where pollution occurred in the past, but the risk to the environment is still present	Accumulated nutrients, contaminants, solid waste

Generally, in order to facilitate the work of the Countries in listing and screening potential pollution hot spots and sensitive areas, the use of the criteria defined in “Negligible Effects” for each of the subcategories is recommended as described in step 2 of the methodology.

With the view to address all pollution related hot spot including marine and land areas it is recommended to include also potential sea based sources in the list, e.g. oil offshore activities, ports.

2.2. STEP 2: Assessing potential hot spots and sensitive areas based on updated criteria

2.2.1. Categorization for hotspots and sensitive areas

In 2003 UNEP/MAP evaluation, all hot spots were grouped into five categories, according to the magnitude of impacts and pressures. The five categories A, B, C, D, and E covered a range from extreme (category A) to insignificant effect (category E).

The updated methodology sets only four categories: A, B, C and D based on the resulting score for the assessment of pressures and the state of the environment (impacts).

- Priority hot spot (A),
- Hot spot (B),

- Potential hot spot / sensitive area (C),
- No hotspot (D).

The latter category is for the purpose of assessing the cases where a hot spot is eliminated.

Hotspots Definition:

- Point sources** on the coast of the Mediterranean Sea which potentially **affect** human health, ecosystems, biodiversity, sustainability or economy in a significant manner. They are the **main points where high levels of pollution loads** originating from domestic or industrial sources are being **discharged**;
- Defined **coastal areas** where the **coastal marine environment is subject to pollution** from one or more point or diffused sources on the coast of the Mediterranean which potentially **affect** human health in a significant manner, ecosystems, biodiversity, sustainability or economy.

2.2.2. Criteria for evaluation of hot spots/sensitive areas

The criteria categories are built based on categories and criteria established in 2003. The major changes have been made regarding:

- the organisation of categories and criteria has been approached from four different points of view: public health, environmental status, economics and transboundary effects,
- the inclusion of specific criteria regarding GES,
- the inclusion of alternative sub criteria for each category,
- the multipliers for balancing the importance of categories.

Thus, the criteria categories for 2014 evaluation are:

PUBLIC HEALTH	ENVIRONMENTAL STATUS and PRESSURES	ECONOMICS	TRANSBOUNDARY EFFECTS
Population Wastewater treatment Drinking water quality Bathing water quality	Organic matter Nutrients and biological status Contaminants Marine litter	Economic activities (and ecosystem services underpinning them) Investment	Transboundary effects.

Rationale and description of particular adjustments made in 2014 with respect to 2003 for each category are described below:

(a) Public health

Public health category is composed of four subcategories: population, wastewater treatment, drinking water quality and bathing water quality. The category aims to measure the potential effect of hot spots on public health. In 2003, criteria on public health was based on discharges of BOD and hazardous substances, while drinking water quality was a separate category. In the updated methodology, the size of potential population affected and the characteristics/effectiveness of wastewater collection and treatment system are the main considered criteria, in line with WB methodology (WB, 2011).

Drinking water quality (a separate category in 2003) has been included, with some minor adjustments, as a subcategory of public health in the proposed updated methodology. Bathing water quality has been introduced as a new subcategory in proposed updated methodology, in line with Decision IG.20/9.

(b) Environmental Status and Pressures:

It contains four subcategories on organic matter (BOD), nutrients (P, N), contaminants and marine litter. Different alternatives have been developed to score each category: trends in discharges to the sea (pressure) or compliance with GES targets or other related thresholds.

In 2003 evaluation, indicators on substance discharges were not defined as categories but particularly considered to rank the effects on aquatic life (discharges reducing O₂ content, heavy metals and oil), recreation (oil) or other beneficial uses (solid waste).

(c) Economics

It assesses the effects of the potential hot spot on tourism, aquaculture/fisheries and other recreational activities as well as the level of investment needed to provide for environmentally sound solutions for potential hot spots. As seen from the description of the environmental status category, in 2003 recreation category was ranked based on the level of oil discharges. Particular sub criteria on tourism and aquaculture and fisheries have been introduced in proposed updated methodology in line with WB methodology.

(d) Trans-boundary effects

With regards to transboundary effects the methodology considers location of the pollution area, the nature of pollutants as well as the distance from the border.

Based on the above criteria, the following multipliers per category are presented in the following table.

Table 2. Categories, multipliers and scores.

Category	Multiplier	Score
Public health		
1) Population	4	1-4
2) Wastewater treatment	4	1-4
3) Drinking water quality	4	1-4
4) Bathing water quality	4	1-4
SCORE	<i>16-64</i>	
Environmental Status and Pressures		
5) Organic matter	3	1-4
6) Nutrients and biological status	3	1-4
7) Contaminants	3	1-4
8) Marine litter	3	1-4

Category	Multiplier	Score
<i>SCORE</i>	<i>12-48</i>	
Economics		
9) Economic activities and ecosystem services underpinning them	4	1-4
<i>SCORE</i>	<i>4-16</i>	
10) Transboundary effects	1	1-4
<i>SCORE</i>	<i>1-4</i>	

Each potential hot spot is expressed within the following categories: A, B, C or D according to the range where the calculated total score falls:

Category	Weighted Total
Priority hot spot (A)	132 – 107
Hot spot (B)	106 – 82
Potential hot spot / Sensitive area (C)	81 – 58
No hotspot (D)	57 - 33

The following sections explain the criteria for ranking the effects/risks in each category:

2.2.2.1. Criteria on “PUBLIC HEALTH”

- Criteria on **population** affected by the potential hot spot have been based on the size and distance. Only one of the alternatives (a) or (b) needs to be met for assigning the related score. If different alternatives and different scores are possible, the precautionary principle should be applied and the worst scenario chosen:

Table 3. Ranking criteria for population category.

POPULATION¹	
severe effects (4)	(a) Population size within a radius of 10 km is > 100,000 inhabitants.
moderate effects (3)	(a) Population size within a radius of 10 km is between 10,000 -100,000 inhabitants and/or
	(b) Population size is > 100,000 inhabitants within a radius of 20 km.
slight effects (2)	(a) Population size within a radius of 10 km is between 2,000 -10,000 inhabitants and/or
	(b) Population size is between 10,000 -100,000 inhabitants within a

¹ It is recommended to also consider population during tourist seasons.

POPULATION¹	
	radius of 20 km.
negligible effects (1)	(a) Population size within a radius of 10 km is < 2,000 inhabitants and/or (b) Population size is between 2,000 -10,000 inhabitants within a radius of 20 km.

2) Criteria on **wastewater treatment** have been based on the following definitions extracted from the Regional Plan on the reduction of BOD₅ from urban waste water in the framework of the implementation of Article 15 of the LBS Protocol (Decision IG 19/7):

- **Urban wastewater** means wastewater of the mixture of domestic waste water with industrial waste water pre-treated or not and/or run-off rain water;
- **Domestic wastewater** means wastewater from residential settlements and services which originates predominantly from the human metabolism and from household activities;
- **Collecting system** means a system of conduits which collects and conducts urban waste water;
- **Wastewater Treatment Plant WWTP** means systems used to treat urban wastewater using physical, chemical and /or biological techniques;
- **Agglomeration** means an area where the population of more than 2.000 inhabitants and/or economic activities are sufficiently concentrated for urban waste water to be collected and conducted to an urban waste water treatment plant or to a final discharge point;
- **Population-equivalent (p.e.)** means the organic biodegradable load having a five-day biochemical demand (BOD₅) of 60 g of oxygen per day;
- **Primary treatment** means treatment of urban waste water by a physical and/or chemical process involving settlement of suspended solids, or other processes in which the BOD₅ of the incoming waste water is reduced by at least 20% before discharge and the total suspended solids of the incoming waste water are reduced by at least 50%;
- **Secondary treatment** means treatment of urban wastewater by a process generally involving biological treatment with a secondary settlement or other process so that the treatment results in a minimum reduction of the initial load of 70-90% of BOD₅.

In addition, according to the World Bank Group², **tertiary treatment** is considered as any additional treatment beyond secondary. Tertiary treatment can remove more than 99 percent of all the impurities from sewage, producing an effluent of almost drinking-water quality. Disinfection, typically with chlorine, can be the final step before discharge of the effluent. However, there is some concern about chlorine residuals in the effluent.

The following tables describes the criteria for ranking the category, only one of the alternatives (a), (b) or (c) needs to be met for assigning the related score. If different alternatives and different scores are possible, the precautionary principle should be applied and the worst scenario chosen:

Table 4. Ranking criteria for wastewater collection and treatment category.

² <http://water.worldbank.org/shw-resource-guide/infrastructure/menu-technical-options/wastewater-treatment>

WASTEWATER COLLECTION AND TREATMENT	
The effects of wastewater collection and treatment on public health have:	
severe effects (4)	(a) Urban wastewater (agglomeration more than 10,000 PE) no collected or treated ³ or primary treated only. (b) Significant loads of industrial hazardous substances are discharged to municipal collecting system without treatment.
moderate effects (3)	(a) Urban wastewater (agglomerations more than 2,000 PE) no collected or treated ³ or primary treated only. The sewer network has big leakages and the wastewater treatment plant overflows frequently and/or. (b) Industrial loads of hazardous substances are discharged to municipal collecting system without treatment.
slight effects (2)	(a) Urban wastewater (agglomerations less than 2,000 PE) no collected or treated ³ or primary treated only. (b) Urban wastewater is collected and treated: I. biological (secondary) treatment for collected wastewater and/or II. the sewer network has small leakages and the wastewater treatment plant hardly overflows and/or (c) Insignificant industrial loads of hazardous substances are discharged to the WWTP.
negligible effects (1)	(a) >99% of population connected to sewerage and/or (b) Advanced (tertiary) treatment or any additional treatment beyond secondary, e.g. disinfection for collected wastewater.

- 3) Qualitative criteria on the potential risk for land based industrial or urban solid waste disposal, industrial or urban wastewater discharge or other land based sources (e.g. run off from agriculture, farms or spills) to contaminate water sources (either groundwater or surface waters such as rivers and reservoirs) for **drinking water** have been defined:

Table 5. Ranking criteria for drinking water quality category.

DRINKING WATER QUALITY	
The quality of drinking water has effects on public health:	
severe effects (4)	Any industrial or urban wastewater, or solid waste or agricultural run off reaching a drinking water source without treatment.
moderate effects (3)	Any industrial or urban wastewater, or solid waste or agricultural run off reaching drinking water sources which are filtered but not disinfected before storage and distribution.
slight effects (2)	Any industrial or urban wastewater, or solid waste or agricultural run off reaching drinking water sources which are properly filtered and disinfected before storage and distribution.

³ According to Decision IG 19/7, the Parties shall ensure that all agglomerations (>2,000 PE) collect and treat their urban waste waters before discharging them into the environment. The conditions are set in Annex I.

DRINKING WATER QUALITY	
The quality of drinking water has effects on public health:	
negligible effects (1)	No discharges/run offs affecting the water sources.

4) Categories on **bathing water quality** have been based on Decision IG.20/9 regarding Criteria and Standards for bathing waters quality in the framework of the implementation of Article 7 of the LBS Protocol, however, this category is also covered by other categories, e.g. contaminants. The following requirements should be met for sampling and analysis:

- Minimum sampling frequency: at least one per month and not less than four in a bathing period including an initial one prior to the start of the bathing period.
- For classification purposes at least 12 sample results are needed spread over 3-4 bathing seasons
- Reference method of analysis: ISO 7899-2 based on membrane filtration technique or any other approved technique

Table 6. Ranking criteria for bathing water quality category.

BATHING WATER QUALITY⁴	
The quality of bathing water is:	
Poor (4)	(a) Percentage of intestinal enterococci concentration measurements (90th percentile intestinal enterococci/100 ml) is above 185 cfu/100 mL and/or (b) No monitoring data.
Sufficient (3)	(a) Percentage of intestinal enterococci concentration measurements (90th percentile intestinal enterococci/100 ml) is less than or equal to 185 cfu/100 mL
Good (2)	(a) Percentage of intestinal enterococci concentration measurements (95th percentile intestinal enterococci/100 ml) is between 101-200 cfu/100 mL
Excellent (1)	(a) Percentage of intestinal enterococci concentration measurements (95th percentile intestinal enterococci/100 ml) is below 100 cfu/100 mL

2.2.2.2. Criteria on “ENVIRONMENTAL STATUS and PRESSURES”

5) For the evaluation of the **organic matter**, releases of BOD₅ into the Mediterranean Sea (in kg/year) need to be calculated or estimated.

The following table describes the criteria for ranking the effects/risks, only one of the alternatives (a), (b) or (c) needs to be met for assigning the related score. If different alternatives and different

⁴ The values presented in Table 6 be checked by the experts

scores are possible, the precautionary principle should be applied and the worst scenario chosen. If no data are available, the category will be ranked as moderate effects (3).

Table 7. Ranking criteria for Organic Matter category.

ORGANIC MATTER Human introduction of BOD ₅ in the marine environment has:	
Severe effects (4)	(a) Significant increase of inputs of BOD ₅ into seawater from previous year(s) and/or significant deviation from the RP/national ELV for point sources and/or (b) Significant deviation from GES target and/or national/regional/sub-regional thresholds/EQS.
Moderate effects (3)	(a) Increase of inputs of BOD ₅ into seawater from previous year(s) and/or deviation from ELV from point sources and/or (b) Deviation from GES target and/or national/regional/sub-regional thresholds/EQS and/or (c) No data available.
Slight effects (2)	(a) Increased inputs of BOD ₅ into seawater and/or deviation from RP/national ELV but meeting GES targets and/or national/regional/sub-regional thresholds.
Negligible effects (1)	(a) Decrease of inputs of BOD ₅ into seawater and meeting GES targets and/or national/regional/sub-regional thresholds.

- 6) For the evaluation of the **nutrients enrichment and biological status**, either releases of Total P and/or Total N into the hot spot area (in kg/year) or their concentration in water column (mg/l) need to be calculated or estimated.

The following table describes the criteria for ranking the effects/risks, only one of the alternatives (a), (b), (c) or (d) needs to be met for assigning the related score. If different alternatives and different scores are possible, the precautionary principle should be applied and the worst scenario chosen. If no data are available, the category will be ranked as moderate effects (3).

Table 8. Ranking criteria for nutrients and biological status category.

NUTRIENTS and BIOLOGICAL STATUS Human introduction of nutrients in the marine environment has:	
Severe effects (4)	(a) Significant increase of inputs of Total N and/or Total P into seawater from previous year(s) and/or (b) Significant decrease of dissolved oxygen and/or increase of chlorophyll concentrations in water column and/or (c) Significant deviation from GES target ⁵ and/or national/ regional/sub-regional thresholds/EQS and, where appropriate, biological status

⁵ Reference nutrients concentrations according to the local hydrological, chemical and morphological characteristics of the un-impacted marine region.

<i>NUTRIENTS and BIOLOGICAL STATUS</i> Human introduction of nutrients in the marine environment has:	
Moderate effects (3)	(a) Increase of inputs of Total N and/or Total P into seawater from previous year(s) and/or (b) Decrease of dissolved oxygen and/or increase of chlorophyll concentrations in water column and/or (c) Deviation from GES target5 and/or national/ regional/sub-regional thresholds/EQS and/or (d) No data available, including biological status.
Slight effects (2)	(a) Increased inputs of Total N and/or Total P into seawater but meeting GES targets5 and/or national/ regional/sub-regional thresholds/EQS and/or (b) Decreased concentrations of dissolved oxygen and/or increased concentration of chlorophyll in water column but meeting GES targets5 and/or national/ regional/sub-regional thresholds/EQS and/or good biological status.
Negligible effects (1)	(a) Decrease of inputs of Total N and/or Total P into seawater and meeting GES targets5 and/or national/ regional/sub-regional thresholds/EQS and/or (b) Increased concentrations of dissolved oxygen and/or decreased concentrations of chlorophyll in water column and meeting GES targets5 and/or national/ regional/sub-regional thresholds/EQS and/or good biological status.

7) For the evaluation of **contaminants** (including pollution from industries), either releases of hazardous substances into the hot spot area (in kg/year) or their concentration in water, biota or sediment need to be calculated or estimated.

The contaminants to be evaluated should consider SAP substances, pollutants covered by NBB 2008/2013 as well as the priority hazardous substances agreed by MEDPOL Focal points at their meeting held in Aix en Provence, France in November 2009 and listed in Annex II of Decision IG.21/3. A minimum common list of substances is the following:

- Metals and related compounds:
 - Chromium
 - Cadmium
 - Lead
 - Mercury
 - Organic tin compounds
 - Organic mercury compounds
 - Organic lead compounds
- Organohalogen compounds:
 - Polychlorinated Biphenyls (PCBs)
 - Polychlorinated dibenzodioxins (PCDDs)
 - Polychlorinated dibenzofurans (PCDFs)

- Organohalogenated pesticides/biocides:
 - Endosulphan
 - Hexachlorocyclohexane
 - Hexachlorobenzene

- Other organic compounds:
 - Diethylhexylphthalate (DEHP)
 - Phenolic compounds
 - Brominated flame retardants
 - Petroleum hydrocarbons, oils & greases
 - Polycyclic aromatic hydrocarbons
 - Short Chain Chlorinated Parafins

While considering this list for the purpose of assessing the inputs to marine environment as appropriate, with regards to monitoring, the Contracting Parties should include as a minimum only substances which are part of the integrated and coordinated monitoring programme either at national or regional level.

Each potential hot spot or sensitive area should be assessed regarding the most representative priority substance/s.

The following table describes the criteria for ranking the effects/risks, only one of the alternatives (a), (b), (c) or (d) needs to be met for assigning the related score. If different alternatives and different scores regarding the considered contaminants are possible, the precautionary principle should be applied and the worst scenario chosen. If no data are available, the category will be ranked as moderate effects (3).

Table 9. Ranking criteria for Contaminants category.

CONTAMINANTS	
Contaminants are introduced or were previously introduced at levels giving rise to:	
Severe effects (4)	(a) Significant increase of inputs of contaminants into marine environment compared to previous year(s) and/or in the occurrences of acute pollution events and/or (b) Significant increase of contaminants concentrations in sediment and biota and/or in frequency of cases of seafood samples above regulatory limits for contaminants and/or (c) Significant deviation from GES target and/or national/ regional/sub-regional thresholds/EQS (e.g. regional ELV on Hg ⁶).
Moderate effects (3)	(a) Increase of inputs of contaminants into marine environment compared to previous year(s) and/or (b) Increase of contaminants concentrations in sediment and biota and/or in frequency of cases of seafood samples above regulatory limits for contaminants and/or (c) Deviation from GES target and/or national/ regional/sub-regional thresholds/EQS (e.g. regional ELV on Hg) and/or

⁶ 50 µg/l by 2015 and 5 µg/l by 2019 (Decision IG 20/8.1).

CONTAMINANTS	
Contaminants are introduced or were previously introduced at levels giving rise to:	
	(d) No data available.
Slight effects (2)	(a) Increased inputs of contaminants into marine environment but meeting GES targets and/or national/ regional/sub-regional thresholds/EQS (e.g. regional ELV on Hg) and/or (b) Increased concentrations of contaminants in sediment and biota but meeting GES targets and/or national/ regional/sub-regional thresholds/EQS (e.g. regional ELV on Hg).
Negligible effects (1)	(a) Decrease of inputs of hazardous substances into marine environment and meeting GES targets and/or national/ regional/sub-regional thresholds/EQS (e.g. regional ELV on Hg) and/or (b) Decreased concentrations of contaminants in sediment and biota and meeting GES targets and/or national/ regional/sub-regional thresholds/EQS (e.g. regional ELV on Hg).

- 8) **Marine litter** category addresses the effects of any solid materials discarded, disposed of or abandoned in the marine and coastal environment; solid waste from industrial sources is not addressed under this category.

The area to which this category applies is the area defined both in the Regional Plan on marine litter (Decision IG.21/7) and in Art. 3 of the LBS Protocol paragraphs (a), (c), and (d)⁷.

The following table describes the criteria for ranking the effects/risks, only one of the alternatives (a), (b) or (c) needs to be met for assigning the related score. If different scores are possible, the precautionary principle should be applied and the worst scenario chosen.

Table 10. Ranking criteria for Marine Litter category.

MARINE LITTER	
Properties and quantities of marine litter affect the coastal and marine environment:	
Severe effects (4)	(a) Significant increase of number of areas with accumulated marine litter at sea and in the land part of the coastal zone up to 1 km close to the river mouth or run-off drainage system and/or (b) Significant increase of the amount of litter washed ashore and/or deposited on coastlines and/or (c) Illegal dump sites and/or non-sanitary landfills located in the coastal area or river basin area.

⁷ Article 3 of the LBS Protocol: (a) The Mediterranean Sea Area as defined in article 1 of the Convention; (c) Waters on the landward side of the baselines from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the freshwater limit; (d) Brackish waters, coastal salt waters including marshes and coastal lagoons, and ground waters communicating with the Mediterranean Sea.

MARINE LITTER	
Properties and quantities of marine litter affect the coastal and marine environment:	
Moderate effects (3)	(a) Increase of number of areas with accumulated marine litter at sea and in the land part of the coastal zone up to 1 km close to the river mouth or run-off drainage system and/or (b) Increase of the amount of litter washed ashore and/or deposited on coastlines and/or (c) Illegal dump sites and/or non-sanitary landfills in the river basin area.
Slight effects (2)	(a) Maintained number of areas with accumulated marine litter at sea and in the land part of the coastal zone up to 1 km close to the river mouth or run-off drainage system and/or (b) Maintained trends in the amounts of litter washed ashore and/or deposited on coastlines and/or
Negligible effects (1)	(a) Decreased trends in number of areas with accumulated marine litter at sea and in the land part of the coastal zone up to 1 km close to the river mouth or run-off drainage system and/or (b) Decreased trends in the amounts of litter washed ashore and/or deposited on coastlines and/or (c) No illegal dump sites and/or non-sanitary landfills.

2.2.2.3. Criteria on “ECONOMICS”⁸

9) The following table describes the criteria for ranking the effects/risks on **economic activities** (and **ecosystem services** underpinning them), only one of the alternatives (a), (b) or (c) needs to be met for assigning the related score. If different alternatives and different scores are possible, the precautionary principle should be applied and the worst scenario chosen.

Table 11. Ranking criteria for recreation and ecosystem services category.

ECONOMIC ACTIVITIES AND UNDERPINNING ECOSYSTEM SERVICES	
severe effects (4)	(a) Area with a significant decrease in tourism and other recreational activities and/or it is a very important tourist area (>200,000 tourists annually) and/or (b) Severe effects on aquaculture or fisheries and/or close to a very important aquaculture and fisheries area (including spawning sites) and/or (c) Severe effects on provision of ecosystem services.
moderate effects (3)	(a) Area with a decrease in tourism and other recreational activities and/or it is an important tourist area (100,000 - 200,000 tourists annually) and/or (b) Moderate effects on aquaculture or fisheries and/or close to an important aquaculture and fisheries area and/or (c) Moderate effects on provision of ecosystem services.
slight effects (2)	(a) Tourism and other recreational activities are maintained and/or it is a

⁸ Further work is ongoing in the framework of ECAP regarding ecosystem services.

	<p>tourist area between 10,000 – 100,000 tourists annually and/or</p> <p>(b) Slight effects on aquaculture or fisheries and/or relatively far from an aquaculture and fisheries area and/or</p> <p>(c) Slight effects on provision of ecosystem services.</p>
negligible effects (1)	<p>(a) Tourism and other recreational activities are increasing and/or it is a tourist area below 10,000 tourists annually and/or</p> <p>(b) Negligible effects on aquaculture or fisheries or no aquaculture and fisheries activities nearby and/or</p> <p>(c) Negligible effects on provision of ecosystem services.</p>

Once the hot spots are categorised it is recommended to collect the necessary information regarding the investment and related costs required for their elimination.

2.2.2.4. Criteria on “TRANSBOUNDARY EFFECTS”

10) The following table describes the criteria for ranking the effects/risks on **transboundary effects**.

Table 12. Ranking criteria for transboundary effects category.

TRANSBOUNDARY EFFECTS	
severe effects (4)	Downstream area close to the borders ⁹ discharging to the Mediterranean sea significant amounts of substances which are toxic, persistent and liable to bioaccumulate and/or marine litter.
moderate effects (3)	Downstream area close to the borders discharging to the Mediterranean sea <p>(a) Moderate amounts of substances which are toxic, persistent and liable to bioaccumulate and/or marine litter.</p> <p>(b) Significant amounts of nutrients and/or organic matter.</p>
slight effects (2)	Area close to the borders discharging to the Mediterranean sea <p>(a) Negligible amounts of substances which are toxic, persistent and liable to bioaccumulate and/or marine litter.</p> <p>(b) Moderate amounts of nutrients and/or organic matter.</p>
negligible effects (1)	Area far from the border with no direct/indirect effect.

⁹ Secretariat to clarify further

3. Guidance on the implementation of evaluation criteria and test example

3.1. Screening/compilation of a list of potential hot spots

For the initial list of potential sites, nation-wide data should be gathered from the following sources:

- a) PRTR (Pollutant Release and Transfer Register) data.
- b) Seawater, sediment and aquatic life monitoring data.
- c) Factory or industry emission permits.
- d) Information from local authorities (amounts of marine litter, bathing water quality, local emission sources, etc.).

3.2. Assigning the category scores for each site

Determining the score for each category is notably dependent on local quality standards and on expert judgement. The evaluation can be performed according to the following principles:

(a) Population

This category refers to the size of the affected population and its distance from the potential hotspot. A geographic analysis has to be made to determine the nature of the secondary effects, the dispersion of polluting substances and the density of the population in terms of both permanent and temporary residents.

If different alternatives and different scores are possible, the precautionary principle should be applied and the worst scenario chosen.

(b) Wastewater Treatment

The following data can be used to aid the assessment of the wastewater treatment criteria:

- (a) Evidence of marine discharge of raw sewage, or minimally treated wastewater.
- (b) The frequency of overflows and leaks in the last years and the amount of wastewater discharged in these events will be evaluated in order to decide on the significance of the impact.
- (c) Examination of the pollution load from industrial sources obtained and untreated in WWTP (such as heavy metals). Will be determined by the concentration multi-year trends of pollutants leaving the WWTP.

(c) Drinking Water

The purpose of this category is to further prioritize sites that also pollute drinking water sources beside the Mediterranean seawater. For this category, local standards will be reviewed along with the general quality of the polluted water body to assess the impact of the potential hot spot.

(d) Bathing Water Quality

This category refers to frequent health risk in the bathing water and not one-time events. The number of events or instances of high pathogens in the water has to be assessed to determine the final score. For example – “severe effect” for beaches with constant high health risk, “moderate effect” for repeated to isolated events, and “slight effects” for occasional events of high pollution.

The following requirements should be met for sampling and analysis:

- (b) Minimum sampling frequency: at least one per month and not less than four in a bathing period including an initial one prior to the start of the bathing period.
- (c) For classification purposes at least 12 sample results are needed spread over 3-4 bathing seasons.
- (d) Reference method of analysis: ISO 7899-2 based on membrane filtration technique or any other approved technique.

(e) Organic Matter

Organic matter emission is first compared to GES standards, either local or regional. When these are no available standards, the emission can be rated according to comparable orders of magnitude.

(f) Nutrients and biological status

Nutrients emission and seawater concentrations are first compared to available GES standards, either local or regional. When no specific values or other targets are available, the emission can be assessed by referring to all available data to determine the severity of the pollution.

Nutrients concentration are also affected by the characteristics of the location of discharge – for example, nutrients discharged in a partially enclosed bay are more prone to accumulate and spur eutrophication than nutrients discharged in open waters. For the final ranking, both local and regional chlorophyll concentration have to be considered, along with the magnitude of emission and its location and the distribution exists in the estuary.

The biological status can also be considered based on national standards, practices and monitoring data.

(g) Contaminants

Contaminants concentrations and emissions should be considered in the context of the types of emission sources in and around the potential hot-spots. When no knowledge of current concentration and loads is available, the evaluation will be based on a worst-scenario basis.

(h) Marine Litter

Marine litter category is based on local accounts. And refers to frequent and concentration of marine litter in the water and not one-time events. The number of events or instances of high concentration of marine litter has to be assessed to determine the final score. For example – “severe effect” for beaches with constant high marine litter problem or close to emission source of waste,

“moderate effect” for repeated to isolated events, and “slight effects” for occasional events of high pollution.

(i) **Economic activities and Underpinning Ecosystem Services**

The severity of the damage to local and regional economic activities (and ecosystem services underpinning them) can be assessed by relating to either recent trends in activity level or to nearby coastal area with similar characteristics.

(j) **Transboundary effect**

The factors to be considered in assessing transboundary effects are related to the distance from the border of the pollution area including downstream or upstream location, as well as the nature and discharge loads of the pollutants. It has to be noted that different categories of pollutants should be examined such as heavy metals, organic pollutants, nutrients and marine litter.

4. References

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APPENDIX D. Issues/impacts matrix for scoring issues associated with impacts on human health and marine environment*

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Table 1. Issues/impacts matrix for scoring issues associated with impacts on human health and marine environment..... 2

* The table included in this Appendix is taken from the NAP Guidelines approved in 2004. The Secretariat is reviewing the list of contaminants and will present proposed changes to this table, as appropriate, at the next MED POL FP meeting in June 2015.

Table 1: Issues/impacts matrix for scoring issues associated with impacts on human health and marine environment.

Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
Trace Metals	<ul style="list-style-type: none"> - No evidence of production or product contamination - No evidence of air emissions - No evidence of emissions from solid residues - No evidence of chemical stockpiled - No evidence of chemical being contaminant in production of other chemicals - No evidence of use of the chemical - No evidence of release from liquid effluent 	<ul style="list-style-type: none"> - Evidence of limited production - Presence of small sources with possible emissions (e.g. small incineration plants) - Some limited evidence of releases but on a small scale invoking local concerns - Some use of the chemical in small areas - Some limited evidence of releases according to national standards 	<ul style="list-style-type: none"> - Historical production evident and production for local use ongoing - Present as contaminant in other chemical production - Presence of major combustion related sources e.g. large municipal or industrial incinerators - Evidence of stockpiles of the chemical - Use of chemical in agriculture or industry sub-regionally 	<ul style="list-style-type: none"> - Major production of chemical for local and export use - Chemical evident as contaminant in large scale production of other chemicals - Known emission of chemical from large scale - Evidence of leakage from major stockpiles of the chemical poorly packaged - Large-scale use of the chemical throughout the region
	<ul style="list-style-type: none"> - No known or historical levels of chemical contaminant in the environment except background levels of naturally occurring substances - No available data to quantify evidence of the chemical found in fish, wildlife animal or human tissue 	<ul style="list-style-type: none"> - Chemical contaminants are detectable in the environment but below threshold limits defined for the country or region - Chemical contaminants are detectable from fish, wildlife, foodstuff or human samples but below threshold limits established for the country or region 	<ul style="list-style-type: none"> - Chemical contaminants are found in the environment marginally above threshold limits defined for the country or region - Limited data available to support chemical existing within fish, wildlife, foodstuff or human tissue at marginal levels above threshold standards for the country or region 	<ul style="list-style-type: none"> - Chemical contaminant is analysed repeatedly well above threshold limits in the environment defined for the country or region - Known contamination of fish, wildlife, foodstuff or humans at levels far exceeding the threshold established for the country or region

Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
Organohalogenes	<ul style="list-style-type: none"> - No evidence of production or product contamination - No evidence of air emissions - No evidence of emissions from solid residues - No evidence of chemical stockpiled - No evidence of chemical being contaminant in production of other chemicals - No evidence of use of the chemical - No evidence of release from liquid effluent 	<ul style="list-style-type: none"> - Evidence of limited production - Presence of small sources with possible emissions (e.g. small incineration plants or bleached kraft/pulp mills using chlorine) - Some limited evidence of releases but on a small scale invoking local concerns - Some use of the chemical in small areas - Some limited evidence of releases in compliance with national standards 	<ul style="list-style-type: none"> - Historical production evident and production for local use ongoing. - Present as contaminant in other chemical production - Presence of major combustion related sources e.g. large municipal or industrial incinerators or large bleached kraft pulp mills - Evidence of stockpiles of the chemical - Use of chemical in agriculture or industry 	<ul style="list-style-type: none"> - Major production of chemical for local and export use - Chemical evident as contaminant in large scale production of other chemicals - Known emission of chemical from large scale incinerators or chlorine bleaching of pulp or other related combustion facilities - Evidence of leakage from major stockpiles of the chemical poorly packaged - Large-scale use of the chemical throughout the Region
	<ul style="list-style-type: none"> - No known or historical levels of chemical contaminant in the environment except background levels of naturally occurring substances - No available data to quantify evidence of the chemical found in fish, wildlife animal or human tissue 	<ul style="list-style-type: none"> - Chemical contaminants are detectable in the environment but below threshold limits defined for the country or region - Chemical contaminants are detectable from fish, wildlife, foodstuff or human samples but below threshold limits established for the country or region 	<ul style="list-style-type: none"> - Chemical contaminants are found in the environment marginally above threshold limits defined for the country or region - Limited data available to support chemical existing within fish, wildlife, foodstuff or human tissue at marginal levels above threshold standards for the country or region 	<ul style="list-style-type: none"> - Chemical contaminant is analysed repeatedly well above threshold limits in the environment defined for the country or region - Known contamination of fish, wildlife, foodstuff or humans at levels far exceeding the threshold established for the country or region

Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
BOD from industrial sources	<ul style="list-style-type: none"> - No evidence of releases from solid residues - Evidence of BOD levels in Rivers in compliance with national standards - Evidence of releases of all liquid industrial effluents in compliance with the national standards 	<ul style="list-style-type: none"> - Presence of small sources from small size industries - Some limited evidence of releases but on a small scale invoking local concerns 	<ul style="list-style-type: none"> - Historical releases of BOD from medium size industry - Evidence of periodical high BOD levels in coastal rivers 	<ul style="list-style-type: none"> - BOD releases are evident as contaminant in large scale industries - Known releases of BOD from large scale industries - Evidence of leakage from major municipal solid waste landfills - Evidence of leakage from major industrial solid waste landfills
	<ul style="list-style-type: none"> - No known or historical levels of BOD in water bodies except background levels of naturally occurring substances - No evidence of any eutrophication cases 	<ul style="list-style-type: none"> - BOD levels are detectable in water bodies but below threshold limits defined for the country or region 	<ul style="list-style-type: none"> - BOD levels are found in water bodies marginally above threshold limits defined for the country or region - Historical few harmful effects for marine and rivers wildlife associated with high BOD Levels 	<ul style="list-style-type: none"> - BOD levels are analysed repeatedly well above threshold limits in water bodies - Evidence of repeated harmful effects for marine and rivers wildlife associated with high BOD levels
Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
PCBs	<ul style="list-style-type: none"> - No evidence of production or product contamination - No evidence of air emissions - No evidence of emissions from solid residues - No evidence of chemical stockpiled 	<ul style="list-style-type: none"> - Evidence of limited production - Presence of small sources with possible emissions (e.g. small incineration plants or bleached kraft/pulp mills using chlorine); - Some limited evidence of releases but on a small scale invoking 	<ul style="list-style-type: none"> - Historical production evident and production for local use ongoing. Present as contaminant in other chemical production - Presence of major combustion related sources 	<ul style="list-style-type: none"> - Major production of chemical for local and export use - Chemical evident as contaminant in large scale production of other chemicals

	<ul style="list-style-type: none"> - No evidence of chemical being contaminant in production of other chemicals - No evidence of use of the chemical - No evidence of release from liquid effluent 	<ul style="list-style-type: none"> local concerns - Some use of the chemical in small areas - Some limited evidence of releases associated with liquid effluents 	<ul style="list-style-type: none"> e.g. large municipal or industrial incinerators or large bleached kraft pulp mills - Evidence of stockpiles of the chemical - Use of chemical in agriculture or industry 	<ul style="list-style-type: none"> - Known emission of chemical from large scale incinerators or chlorine bleaching of pulp or other related combustion facilities - Evidence of leakage from major stockpiles of the chemical poorly packaged - Large-scale use of the chemicals in the region
	<ul style="list-style-type: none"> - No known or historical levels of chemical contaminant in the environment except background levels of naturally occurring substances - No available data to quantify evidence of the chemical found in fish, wildlife animal or human tissue 	<ul style="list-style-type: none"> - Chemical contaminants are detectable in the environment but below threshold limits defined for the country or region - Chemical contaminants are detectable from fish, wildlife, foodstuff or human samples but below threshold limits established for the country or region 	<ul style="list-style-type: none"> - Chemical contaminants are found in the environment marginally above threshold limits defined for the country or region - Limited data available to support chemical existing within fish, wildlife, foodstuff or human tissue at marginal levels above threshold standards for the country or region 	<ul style="list-style-type: none"> - Chemical contaminant is analysed repeatedly well above threshold limits in the environment defined for the country or region - Known contamination of fish, wildlife, foodstuff or humans at levels far exceeding the threshold established for the country or region
Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
Solid waste	<ul style="list-style-type: none"> - Evidence of convenient solid waste management system in the region - No noticeable interference with the recreational use of beaches due to litter - No reported entanglement of 	<ul style="list-style-type: none"> - Evidence of temporary failure of the solid waste management system - Some evidence of marine derived litter on beaches - Occasional recovery of solid waste through trawling activities 	<ul style="list-style-type: none"> - No evidence of solid waste landfill - Widespread litter on beaches giving rise to public concern regarding recreational use of beaches - High frequency of benthic 	<ul style="list-style-type: none"> - No evidence of solid waste management system - Incidence of litter on beaches sufficient to deter the public from recreational activities

	aquatic organisms with debris		litter recovery and interference with trawling activities – Frequent report of entanglement or suffocation of species by litter	– Trawling activities untenable because of benthic litter and gear entanglement – Widespread entanglement and/or suffocation of aquatic species by litter
Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
Batteries and chemicals associated to its manufacturing	<ul style="list-style-type: none"> – No evidence of production – No evidence of air emissions – No evidence of emissions from solid residues – No evidence of batteries stockpiled – No evidence of release from liquid effluent – Evidence of extensive recycling (100%) of Batteries 	<ul style="list-style-type: none"> – Evidence of limited production – Presence of small sources with possible emissions (e.g. small incineration plants and landfills) – Some limited evidence of releases but on a small scale invoking local concerns – Presence of small stockpiles – Evidence of medium scale recycling (80%) 	<ul style="list-style-type: none"> – Historical production evident and production for local use ongoing – Presence of major combustion related sources e.g. large municipal or industrial incinerators – Evidence of stockpiles of batteries – Evidence of small scale recycling (50%) of batteries 	<ul style="list-style-type: none"> – Major production of batteries for local & export use – Chemicals from Batteries production are evident as contaminant in large scale production – Evidence of leakage from major stockpiles – Large-scale use of batteries throughout the region – Evidence of no recycling of batteries
	<ul style="list-style-type: none"> – No known or historical levels of chemical contaminant in the environment except background levels of naturally occurring substances – No available data to quantify evidence of the chemical found in fish, wildlife animal or human tissue 	<ul style="list-style-type: none"> – Chemical contaminants are detectable in the environment but below threshold limits defined for the country or region – Chemical contaminants are detectable from fish, wildlife, foodstuff or human samples but below threshold limits established for the country or region 	<ul style="list-style-type: none"> – Chemical contaminants are found in the environment marginally above threshold limits defined for the country or region – Limited data available to support chemical existing within fish, wildlife, foodstuff or human tissue at 	<ul style="list-style-type: none"> – Chemical contaminant is analysed repeatedly well above threshold limits in the environment country or region – Known contamination of fish, wildlife, foodstuff or humans at levels far exceeding the threshold

Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
Lub Oil	<ul style="list-style-type: none"> - No evidence of production - No evidence of air emissions - No evidence of emissions from solid residues - No evidence of lub oil stockpiled - No evidence of release from liquid effluent - Evidence of full recycling of lub oil 	<ul style="list-style-type: none"> - Evidence of limited production - Presence of small sources with possible emissions (e.g. small incineration plants and landfills) - Some limited evidence of releases but on a small scale invoking local concerns - Presence of small stockpiles - Evidence of medium scale recycling of lub oil 	<ul style="list-style-type: none"> - Historical production evident and production for local use ongoing - Presence of major combustion related sources e.g. large municipal or industrial incinerators - Evidence of stockpiles of lub oil - Evidence of limited recycling of lub oil 	<ul style="list-style-type: none"> - Major production of lub oil for local and export use - Chemicals from Batteries production are evident as contaminant in large scale production - Evidence of leakage from major stockpiles of the chemical poorly packaged - Large-scale use of lub oil throughout the region - Evidence of no recycling of lub oil
	<ul style="list-style-type: none"> - No known or historical levels of chemical contaminants from lub oil in the except background levels of naturally occurring substances - No available data to quantify evidence of the chemicals originated from lub oil found in fish, wildlife animal or human tissue 	<ul style="list-style-type: none"> - Chemical contaminants from lub oil are detectable in the environment threshold limits defined for the country or region - Chemical contaminants originated from lub oil are detectable from fish, wildlife, foodstuff or human samples but below threshold limits established for the country or region 	<ul style="list-style-type: none"> - Chemical contaminants from lub oil are found in the environment marginally above threshold limits defined for the country or region - Limited data available to support chemicals originated from lub oil existing within fish, wildlife, foodstuff or human tissue at marginal levels above threshold standards for the country 	<ul style="list-style-type: none"> - Chemical contaminants from lub oil are analysed repeatedly well above threshold limits in the environment defined for the country or region - Known contamination of fish, wildlife, foodstuff or humans by chemical originated from lub oil at levels far exceeding the threshold established for the country

Issue	Score 0 = No concern	Score 1 = Slight concern	Score 2 = moderate concern	Score 3 = major concern
All issues	<ul style="list-style-type: none"> - No evidence of violation of Bilateral environmental agreements - No evidence of violation of regional and global environmental agreement - No evidence of transboundary impacts 	<ul style="list-style-type: none"> - Potential transboundary impacts 	<ul style="list-style-type: none"> - Increase of GHG emissions 	<ul style="list-style-type: none"> - Evidence of violation of regional and global environmental agreements - Potential bilateral conflict

APPENDIX E. List of indicators to assess the LBS, Dumping, Hazardous waste Protocols, NAP and Regional Plans implementation

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1. Introduction

The UNEP/MAP programme of work 2014-2015 adopted by the eighteenth meeting of the Contracting parties (COP 18), 3-6 December 2013, Istanbul, Turkey, mandated the Secretariat to update the MAP reporting system with the view to make it more user friendly, further strengthen its indicator-based dimension as well as complete it with the reporting requirements of the Regional Plans adopted under Article 15 of the LBS Protocol.

COP 18 also requested the contracting parties to update their National Action Plans (NAPs) that were endorsed by COP 14, Portoroz, Slovenia, 2005, in accordance with Article 5 of the LBS Protocol of the Barcelona Convention.

With the view to deliver the above tasks, the Secretariat developed the draft Guidelines for updating the NAPs, including an annex on “NAP follow-up and reporting indicators”. The Annex provided a comprehensive list of indicators of relevance for the follow-up of NAPs implementation. The listed indicators were indicators already in use and/or in process of negotiation within and/or outside MAP system, consistent with regional and international reporting requirements relevant to MAP. This document was presented at the MED POL Focal Points (FP) meeting on 26-28 March 2014 in Athens, Greece.

The MED POL FP asked the Secretariat to:

- a) continue its work and conduct an in-depth analysis of the reporting requirements of the LBS, Dumping and Hazardous waste Protocols as well as of the Regional Plans adopted in the framework of the LBS Protocol and recommend a list of ranked indicators for assessing their implementation.
- b) streamline the Protocols and Regional Plans indicators with the NAP follow up and reporting indicators.

With the view to propose the list of potential ranked indicators that fit the reporting requirements of the LBS, Dumping and HW protocols, the Regional Plans and the NAPs the Secretariat carried out a two-step analysis:

The first step included a prioritization exercise of the list of indicators presented at the March 2014 MED POL FP meeting, based on UNEP/MAP Plan Bleu and EEA experience with indicators and presented in section three of this Appendix. In addition, the Secretariat used the opportunity of the workshop on PRTR held in the framework of SEIS Project, in Ankara, Turkey, in June 2014 to review again and carry out a second scoring exercise with participation and contribution of several country experts.

In the second step, **indicators receiving more than 50% of the total scores were** further analyzed and complemented by the Secretariat with other potential indicators based on the in-depth and concrete legal and policy analysis of the relevant provisions of the Barcelona Convention and Protocols. This list was submitted at the MED POL FP meeting held on 18 – 19 December 2014 in Barcelona for its consideration. After a careful review the meeting agreed on the list presented in section 2 of this Annex IV, Appendix E while pointing out the importance of identifying this list of common indicators for the Mediterranean and requesting the Secretariat to work further on assessing the level of maturity for each indicator, for consideration at the forthcoming meetings of the MED POL Focal Points, and as appropriate by other MAP bodies.

2. Indicators to assess the implementation of the LBS, Dumping and Hazardous Waste Protocols, LBS Regional Plans and NAPs

In case of LBS&Regional Plans&NAPs implementation, the indicators should respond to questions related to pollution reduction and prevention trends in the Mediterranean region and the improvement of marine and coastal environment (to achieve the relevant ECAP GES targets) through the implementation of the LBS Protocol, its Regional Plans, Dumping as well as the Hazardous Waste Protocols of the Barcelona Convention as well as the NAPs.

The indicators are organized according to the following structure:

- SAP MED/NAP sectors (based on Annex I of the LBS Protocol).
- Relevant legal and policy questions (from the Protocols and Regional Plans).
- Title of the candidate indicators per each sector and the related codes.
- Units.
- Link to other initiatives and policy/legal frameworks (to be further completed).
- Type.
- Indicator description.
- Information on data sets and sources (to be further completed).
- Reference to the mandatory related obligations under the Barcelona Convention and related Protocols as well as the Regional Plans.
- Total scoring per each candidate indicator (from both steps of the prioritization analysis).

For ease of reference, the legal and policy questions raised per each NAP/SAP sector are presented below together with the title of the candidate indicators as well as related ECAP indicator.

I. Urban development

a) WASTEWATER (NAP/LBS and RP on BOD from WWTP)

Are the agglomerations (areas with a population of more than 2.000 inhabitants and/or economic activities sufficiently concentrated) collecting and treating their urban waste waters before discharging them directly or indirectly into the Mediterranean Sea?

- WW01. Share of population with access to an improved sanitation system (total, urban, rural).
- WW02. Wastewater collected (in population equivalent).
- WW03. Wastewater treated (in population equivalent).

Do collecting systems consider the best technical knowledge notably regarding: (a) the volume and characteristics of urban waste water; (b) the maintenance of piping system for the prevention of leaks; (c) the maintenance of pumping and boosting equipment; and (d) the separation of storm water pipes from collection pipes of WWTP, when applicable?

- WW04. Share of the treated wastewater according to the type of treatment (primary, secondary, tertiary) and, where relevant, share of wastewater reused after treatment.

- WW05. Total loads of BOD5, Total nitrogen, Total phosphorus discharged to the Mediterranean Sea from urban wastewater treatment.

Are the coastal and marine environment and health protected from the adverse effects of the urban waste water direct and or indirect discharges, in particular regarding adverse effects on the oxygen content of the coastal and marine environment and eutrophication phenomena?

ECAP common indicator 7/[WW06]. Concentration of key nutrients in the water column.

ECAP common indicator 8/[WW07]. Chlorophyll A concentration in the water column.

b) BATHING WATER QUALITY (Decision IG 20/9)

Is the quality of bathing waters in the Mediterranean countries being improved?

- BW01. Share of bathing water categories: A (Excellent quality), B (Good quality), C (Sufficient) and D (Poor quality) with respect to total number of assessed bathing waters.
- **ECAP Common Indicator 15/[IND04]** “Percentage of intestinal enterococci concentration measurements within established standards”)

c) MUNICIPAL SOLID WASTE AND MARINE LITTER (NAP/LBS and RP on Marine Litter management)

Is marine litter pollution in the Mediterranean being prevented and reduced to the minimum?

ECAP Common Indicator 16/[MW01] Trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and, where possible, source.

[ECAP Common Indicator 17/[MW02] Trends in the amount of litter in the water column including microplastics and on the seafloor.

[ECAP Common Indicator 18/[MW03]. Trends in the amount of litter ingested by or entangling marine organisms focusing on selected mammals, marine birds and turtles.] (trial basis)

Is the municipal solid waste management based on the waste hierarchy (prevention, preparing for re-use, recycling, other recovery, e.g. energy recovery and environmentally sound disposal) as a priority order in waste prevention and management legislation and policy?

- MW04. Municipal waste generation per capita.

- MW05. Share of recycled, composted, incinerated, treated in waste-to-energy facilities or landfilled municipal waste with respect to collected amount.
- MW06. Share of generated municipal waste per waste composition category: paper/paperboard, textiles, plastics, glass, metals, other inorganic material, organic material.
- MW07. Number of illegal dumpsites at coastal area that have been closed/remediated over the past 10 years.

Are prevention measures related to: (a) Extended Producer Responsibility, (b) Sustainable Procurement Policies, (c) Voluntary agreements with retailers and supermarkets, (d) Fiscal and economic instruments, (e) Deposits, Return and Restoration System and, (f) Procedures and manufacturing methodologies with plastic industry, being explored and implemented to the extent possible in order to reduce the fraction of plastic packaging waste that goes to landfill or incineration without energy recovery?

- [MW0X. Share of (supermarkets) applying deposit, return and restoration system for plastic beverage bottles.]¹
- MW08. Annual consumption of plastic bags at national level per capita.
- MW09. Share of producers, manufacturer brand owners and first importers responsible for the entire life-cycle of the product with measures prioritizing the eco-design of the product and the hierarchy of waste management.

d) Urban AIR POLLUTION (NAP/LBS Protocol Annex III)

Is air quality in coastal Mediterranean cities being improved in the Mediterranean?

Indicators already agreed under other relevant multilateral international agreements and EEA as appropriate and relevant assessment described in a concise manner

II. INDUSTRIAL DEVELOPMENT (Barcelona Convention Article 8, LBS Articles 1 and 5, Annex III, Regional Plans (Mercury, POPs, BOD from food sector, NAPs, Dumping Protocol and Hazardous Waste Protocol)

a) INDUSTRIAL POLLUTION

Are the emissions/pollution inputs from industrial land based sources and activities being eliminated, or phased out in the hydrological basin of the Mediterranean?

- **ECAP Common Indicator 11/[IND01]** Concentration of key harmful contaminants measured in the relevant matrix (biota, sediment, seawater).
- **ECAP Common Indicator 12/[IND02]** Level of pollution effects of key contaminants where a cause and effect relationship has been established.²

¹ Indicator to be considered in the future

² It is recommended to consider streamlining of these two indicators (IND01 and IND 02) in the future.

- **ECAP Common Indicator 14**/[IND03] Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood.
- IND004. National loads of pollutants from point sources:
 - (a) SO₂, NO_x, NH₃, VOC, hydrocarbons, CO, CH₄, TPS, PM10, PM2.5, POPs, heavy metals;
 - (b) PAH, VOC, PCDD/PCDF, Hexachlorobenzene, Cadmium, Chromium, Lead and Mercury which are directly or indirectly discharged to the Mediterranean Sea;
 - (c) Total loads of BOD₅, Total nitrogen, Total phosphorus discharged to the Mediterranean Sea.
- IND05. Number of substances covered by national standards (ELV) for point source discharges into water or air.
- IND06. Share of contaminated sites with toxic, persistent and liable to accumulate substances in the coastal area which have been closed/remediated including spills from industrial accidents.
- IND07. Share of companies within Annex I of the LBS Protocol applying cleaner production, BAT and/or BEP.

b) HOT SPOTS

Is the state of the national hot spots in the Mediterranean periodically monitored and hot spots eliminated?

- HS01. Share of hot spots and sensitive areas covered by monitoring, projects/ investments and/or eliminated.

c) DUMPING

Are the quantities of the materials dumped in the sea and their impact monitored and reported to the Secretariat in accordance with Articles 10, 11 and 12 of the Dumping Protocol?

- D01. Annual quantities of materials dumped per category.
- D02. Share of number of permits issued by national competent authorities providing for strict monitoring programmes of marine environment from dumping activities.
- [D03.Number of permits for industrial waste]..

d) HAZARDOUS WASTE

Is the amount of HW generated being reduced and disposed in an environmental sound manner in the Mediterranean?

- [HW01. Amount of hazardous waste generated by Y categories.
- HW02. Amount of hazardous waste environmentally soundly managed or exported by Y categories and by disposal/recovery operation (D - disposal, R- recovery, as well as treated in waste to energy facilities).
- HW03. Number of illegal HW trafficking cases]³.

Note on the Regional Plans on the POPs

With regards to POPs Regional Plan and Stockholm Convention provisions, since the timeframe for the reporting period have already passed, related information and indicators will correspond to the reports periodically submitted by the Mediterranean countries to the Secretariat of the SC

3. Selection and prioritization methodology of indicators presented in NAP update draft Guidelines

The list of indicators included in Annex E of NAP update guidelines (Document UNEP (DEPI)MED WG.394/4) is built based on the relevant:

- a) MAP effectiveness indicators adopted in COP 16
- b) MAP reporting system indicators adopted by COP 15
- c) MSSD indicators, 2005
- d) Indicators with regards to other relevant policy frameworks, mainly Horizon 2020 Initiative and IWRM (Integrated Water Resources Management)
- e) Indicators agreed in the framework of relevant MEA.

In general, official indicators are selected based on a thematic approach as it facilitates the connection with the target and legal and political processes, while providing a clear message to policy makers.

The above mentioned indicator list consisted of a spreadsheet with all the potential indicators with fields for Indicator code, Indicator title, Units, SAP/NBB sector, Link to ECAP/Regional plans targets, Link to other policy frameworks, Type of indicator (D = Driving force, P = Pressure, S = State, I = Impact, R = Response), Description, Data source, Criteria and Total.

The selection criteria used for the Sustainable Development Indicators of the United Nations Commission on Sustainable Development (UN-CSD) are:

- Conceptually well founded.
- Understandable (clear, simple and unambiguous).
- Based on data that is readily available or available at a reasonable cost, adequately documented, of good quality and updated at regular intervals.
- Within the capacities of the governments to implement, given logistics, time, technical and other constraints.

The Secretariat used the methodology developed by UNEP/MAP Plan Bleu-RAC consisting of the following criteria:

³ Pending study reservation to ensure that are fully in line with Basel Convention.

- a. Mandatory nature of the indicator within MAP framework.
- b. Relevance
- c. Measurability
- d. Cost effectiveness
- e. Understandable

The scoring used for each criteria is described below:

1. Mandatory nature: Non Mandatory=0; Overall objective (Mandatory but not legally binding)=1; Legally binding=2

- Legally binding indicators can be those related to requirements or measures established by the Barcelona Convention, Protocols, Regional plans adopted in the framework of Article 15 of the LBS Protocol.
- Overall objective: those indicators that track the achievement of a related objective/target, e.g. from non legally binding regional plans or SAP MED, ECAP indicators or MAP effectiveness indicators that have been adopted or approved by COP but are not strictly legally binding by themselves.
- Non mandatory indicators but smart and useful for assessment purposes.

2. Relevance: It is disaggregated into the following five single criterions:

a) Meaningful: it measures the degree to which the indicators meet its intended purpose in coverage, content and detail.

Not meaningful=0; More or less meaningful=1; Highly meaningful=2

- Highly meaningful: the indicator seems intuitively reasonable and it adequately reflects the objectives/targets or phenomenon which are intended to measure and is appropriate to the needs of the user or purpose.
- Partially meaningful: the indicator is related with objectives/targets or phenomenon which is intended to measure but it does not fully reflect them.
- Not meaningful: the indicators not related with the objectives/targets or it is not appropriate to the needs of the user or purpose.

b) Applicable to different scales: it measures the ability to be disaggregated/broken down into areas of particular interest, such as regional areas.

Applicable to a single scale=0; Applicable only to some scales=1; Applicable to different scales.

- Applicable to different scales: primarily national in scope but able to be disaggregated/broken down into areas of interest, e.g. regional areas. Allow international comparison as it is consistent with those used in international indicators programmes.
- Applicable only to some scales: limited ability to be disaggregated/broken down into areas of interest, e.g. regional areas.
- Applicable to a single scale: only able to be expressed in a single scale.

c) Conceptually sound: it measures the degree to which the information precisely describes the objective/target or phenomena it was designed to measure. The indicator should be specific, aligned

with the objectives/targets or phenomenon of interest and not with other non-related objective/target or phenomenon.

Not conceptually sound=0; More or less conceptually sound=1; Highly conceptually sound=2

- Highly conceptually sound: the indicator measurement is methodologically sound and fits conceptually for the purpose to which it is being applied. It is specific and fully aligned with the objectives/targets and not with other non-related objective/target or phenomenon.
- More or less conceptually sound: the indicator measurement is more or less methodologically sound and partially fits for the purpose to which it is being applied. It is moderately specific and partially aligned with the objectives/targets, it can be aligned with other non-related objective/target or phenomenon.
- Not conceptually sound: the indicator measurement is not methodologically sound and does not fit conceptually for the purpose to which it is being applied. It is unspecific and not aligned with the objectives/targets.

d) Responsive to change/sensitivity: it relates to how significantly an indicator varies according to changes in the objectives/targets or phenomenon.

Not responsive to change=0; More or less responsive to change=1; Highly responsive to change=2

- Highly responsive to change: the indicators respond relatively quickly and noticeably to changes, but not show false movements.
- More or less responsive to change: the indicators respond moderately slowly and noticeably to changes, and can show false movements sometimes.
- Not responsive to change: the indicators respond slowly to changes and show false movements frequently.

e) Useful to decision makers: the usefulness of indicators to decision makers is related directly to the ability to track trends over time with regards the objectives/targets or phenomenon which is intended to measure.

- Highly useful to decision makers: the indicator is related directly to the ability to track trends over time with regards the objectives/targets or phenomenon which are intended to measure.
- More or less useful to decision makers: the indicator is more or less related to the ability to track trends over time with regards the objectives/targets or phenomenon which are intended to measure.
- Not useful to decision makers: the indicator is not able to track trends over time with regards the objectives/targets or phenomenon which is intended to measure.

c) Measurable. It is disaggregated into the following two criteria:

- a) Based on data readily available: it relates to the degree to which data produced are up to date, published frequently and delivered to schedule.
- b) Data needs to be collected and reported regularly and frequently. There should also be minimal time lag between the collection and reporting of data, to ensure that indicators are reporting current rather than historical information.

Not available=0; Potentially available=1; Fully available=2

- Fully available: data is directly collected and reported regularly and frequently. There is a minimal time lag between the collection and reporting of data.
- Potentially available: data is not directly collected or reported regularly and frequently. Changes in regular surveys; arrangements with data 'owner'; improved handling of raw data; or shorter release time are needed.
- Not available: data is not available.

d) Cost-effective: it measures whether data are routinely collected either by national statistical services or through international processes.

Not available=0; Potentially available=1; Fully available=2

- Fully cost-effective: data are already collected routinely either by national statistical services or through international processes.
- Potentially cost-effective: data are not routinely collected but minor efforts need to be made for data collection and reporting.
- Not cost-effective: data are not routinely collected and costly efforts need to be made for data collection and reporting.

d) Understandable: it measures whether the indicator is intelligible and easily interpreted. Indicators should be sufficiently simple to be interpreted in practice and be intuitive in the sense that it is obvious what the indicator is measuring.

Not understandable=0; More or less understandable=1; Fully understandable=2

- Fully understandable: the indicator is intelligible and easily interpreted.
- More or less understandable: the indicator is more or less intelligible and interpreted with difficulties.
- Not understandable: the indicator is unintelligible and hardly interpreted.

For each indicator, a total score was deducted from 0 to 18, with a score of 18 meaning that the indicator perfectly meets all the criteria.

APPENDIX F. Information for Developing and Drafting the NAP

Example illustrating the process for developing pollution prevention and control measures regarding marine litter starting from defining quantifiable objectives and elaboration of midterm baseline conditions, to identification of gaps, ending with the selection of required measures to be included in the NAP

Requirement	Example
<i>SAP Requirement for solid waste</i>	By the year 2025 at latest, to base urban solid waste management on reduction at source, separate collection, recycling, composting and environmentally sound disposal
<i>Requirement of the Marine Litter Regional Plan</i>	Reduction of fraction of plastic packaging waste that goes to landfill or incineration without energy recovery by 2019
<i>Relevant ECAP state targets adopted in Decision 21.3</i>	Decreasing trend in the number of/amount of marine litter (items) deposited on the coast.
	Decreasing trend in the number/amount of marine litter items in the water surface and the seafloor
	Decreasing trend in the cases of entanglement or/and a decreasing trend in the stomach content of the sentinel species.
<i>Potential quantifiable objectives and operational targets</i>	(a) To reduce 20% fraction of plastic packaging waste that goes to landfills or incinerators without energy recovery by 2019. (b) To ensure that the fraction of plastic packaging waste that goes to landfill or incinerators without energy recovering decreases at a yearly rate of 5% till 2019.
<i>NAP Mid term Baseline conditions</i>	<ul style="list-style-type: none"> - No existing quantifiable target - Plans for the construction and management of landfills and incinerators in coastal areas - Policies that hold industries' liable to damages caused to the marine environment by plastic packaging missing - Policies that promote reduction of the amount of plastic used in packaging products or in the service sector do not address required aspects - Policies that promote the development of management schemes for plastic packaging waste not yet developed - Existing reports publicizing data and information on trends of marine litter in coastal areas and coastal waters
<i>Gaps/Issues</i>	<ul style="list-style-type: none"> - Lack of national/regional laws that address measures for reducing marine litter along the coastline - Lack of investment measures for the construction and management of landfills and incinerators in coastal areas - Lack of policies that hold industries' liable to damages caused to the marine environment by plastic packaging - Weak policies that promote reduction of the amount of plastic used in packaging products or in the service industry - Lack of funding and competencies to carry out monitoring activities for generation and disposal of plastic waste - Ineffective public awareness campaigns that address the risk

	<p>caused to human health and the environment as a result of marine litter entanglement or/and the stomach content of the sentinel species</p> <p>– Restricted public access to existing reports publicizing data and information on trends of marine litter in coastal areas and coastal waters</p>
<p><i>Potential measures for consideration in the NAPs to meet SAP/RP and GES targets</i></p>	<p>(a) Legal measures</p> <ul style="list-style-type: none"> ▪ Update industrial solid waste management law to integrate marine litter and plastic recycling ▪ Develop regulation regarding monitoring system for marine litter ▪ Enforce public access to data and information on pollutants discharges to the environment including marine litter ▪ Enforce the implementation of management schemes for plastic packaging waste <p>(b) Technical measures</p> <ul style="list-style-type: none"> ▪ Construct and operate two landfills for coastal waste disposal ▪ Establish municipal solid waste collection and segregation centre <p>(c) Policy-driven measures</p> <ul style="list-style-type: none"> ▪ Sign voluntary agreements with the Plastic industry to implement EPR ▪ Sign a voluntary agreement with supermarkets to reduce single use bags by 50% ▪ Support three public awareness campaigns every year to address the risk caused to human health and the marine environment by marine litter with special emphasis on the role of plastics and microplastics

Detailed outline and guidance information for drafting the updated NAP.

Following is a proposed table of contents for the updated NAP document with additional explanation on what each section should focus on:

- i) Preface
- ii) Executive summary
- iii) Introduction
 - Background on the national SAP-MED/NAP process.
 - Overview of achievements made in the 2004 NAP and challenges facing implementation of the updated NAP.
- iv) NAP updating process
 - Institutional arrangements.
 - Work methodology.
 - Involved stakeholders and public consultation.
- v) Development of the midterm implementation benchmark
 - Data and information on the baseline situation for each of the following sectors, categorized into policy framework, legal requirements and pollution prevention and control measures:
 - Municipal wastewater
 - Municipal solid waste and marine litter
 - Urban air pollution
 - Industrial aqueous effluents
 - Industrial air pollution
 - Hazardous wastes
 - Agricultural activities
 - Legal and institutional aspects of monitoring, enforcement, reporting, capacity building and public participation
- vi) Defining quantifiable objectives
 - List of the adopted quantifiable objectives or targets based on the requirements derived from the SAP-MED, the Regional Plans and the ECAP targets (Annex A). The list of quantifiable objectives is presented in line with the following SAP- MED priority sectors and substances:
 - Urban municipal wastewater
 - Urban Solid waste
 - Air pollution in urban areas
 - Persistent organic pollutants (POPs)
 - Heavy metals and organo-metallic compounds (Hg, Cd, Pb, Zn, Cu, Cr)
 - Organohalogen compounds (halogenated aliphatic and aromatic hydrocarbons, Chlorinated phenolic compounds and organo-halogenated pesticides)
 - Radioactive substances
 - Nutrients and suspended solids from industrial development
 - Hazardous wastes (obsolete chemicals, lubeoil and batteries)
 - Monitoring
 - Capacity building
 - Public participation
 - Reporting
- vii) Gaps analysis and identification of issues
 - Results of the gap analysis between the midterm baseline and the proposed targets or quantifiable objectives. Gaps to be presented as a list of issues, whereby each is categorized in line with the SAP- MED priority sectors and substances included in section (vi).

- viii) Prioritization of issues and identification of potential measures
 - Prioritized list of identified issues on a regional level in accordance with the methodology of assessment from the issue/impacts matrix (Annex C). The list is produced for each of the SAP- MED priority sectors and substances included in section (vi).
- ix) Selection of programme of pollution prevention and control measures
 - Selected options to address each of the identified issues for the management of land-based sources of pollution contributing to the pollution of the Mediterranean Sea. Actions/measures to be categorized according to policy and legal measures and technical measures, with emphasis on these requiring significant investments for implementation.
- x) Preparation of a Prioritized List of Investment Projects
 - Top 10 to 12 priority actions/measures which require significant investments are approached as priority national projects. For each of these projects, investments portfolios (IP) and project fiches are prepared.
- xi) Monitoring plan for NAP implementation
 - Information on the institutional arrangements, resources and competencies that the Country will employ to undertake the process for monitoring NAP implementation in order to fulfill the unified list of 21 MED POL indicators included in Annex E.
- xii) Capacity building plan for NAP implementation
 - Formulation of a plan that assigns responsibilities, resources and budgets required for training and capacity-building needs for the tasks to be undertaken for implementation of the NAP.
- xiii) Arrangements for public information, awareness raising and education
 - Arrangements to be introduced to ensure that information is disseminated to the public and to explain how awareness raising and educational campaigns will be organized and implemented.

Appendix G. Guidance on cost-effectiveness and cost-benefit analysis

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Introduction

Following the commitment of the Contracting Parties to the Barcelona Convention to update the National Action Plans (NAPs) adopted under Article 5 of the LBS Protocol of the Convention and endorsement of the NAP update Guidelines¹ (main body) at the MED POL Focal Points meeting held in Athens in March 2014, the Secretariat proceeded with the work on finalization of the technical annexes to the Guidelines including a first draft of the guidance on the use of cost-effectiveness and cost-benefit analysis for selection of the programme of pollution prevention and reduction measures. The draft guidance on cost-effectiveness was reviewed by the by the MED POL FO meeting held on 18 – 19 December 2014 in Barcelona, and the changes recommended by the meeting are integrated in this Annex 4, Appendix G.

The principal objective of the NAP update is to identify and prioritize national programme of measures to achieve Good Environmental Status (GES) with regard to pollution-related ecological objectives under the ecosystem approach (ECAP) in the framework of the LBS Protocol and the Regional Plans adopted in line with Article 15 of the LBS Protocol.

In preparing this first draft of the proposed guidance document, the work of the Secretariat was based in particular on the large number of reports and extensive experience gained in this field in the framework of the EU Marine Strategy Framework Directive (EU MSFD) implementation. Moreover, the draft guidance document is strongly rooted in the previous work carried out under the UNEP/MAP system. This especially refers to the Plan Bleu's technical reports on economic and social analysis of the uses of coastal and marine waters in the Mediterranean and on application of different tools and approaches (e.g. cost-benefit analysis, cost of degradation) to economic analysis, as well as to the UNEP/MAP Background paper on Marine Litter Regional Plan. A number of publications discussing methodological issues and practical application of different economic analysis tools that might be particularly useful to NAP update teams are provided in chapter 4 of this document.

The overall goal of the guidance document is to assist the NAP update thematic groups, stakeholders and experts to perform cost-effectiveness (CEA) and/ or cost-benefit (CBA) assessments (or, alternatively, multi-criteria analysis) in prioritizing and selecting the NAP measures/ programmes of measures to achieve GES for pollution related ecological objectives and meet Regional Plans targets. More specifically, the document aims to contribute to:

- sound analysis to underpin the NAP update process and facilitate decision making by providing attainable levels of information (quantitative and/ or qualitative) on effectiveness, costs and benefits of proposed NAP measures;
- overcoming of data gaps and other constraints;
- consistency in the approaches and outcomes of the NAP update in different Contracting Parties (by e.g. providing definitions, advices and guidance on various aspects and components of CEA and CBA) while allowing for specificities in different countries to be taken into account;
- dissemination of knowledge acquired and lessons learnt through the application of these (CEA and CBA) methodologies in related process, in particular through the work of the UNEP/ MAP Plan Bleu and in the EU MSFD implementation;

¹ *Guidelines for Updating National Action Plans for the Implementation of the LBS Protocol and its Regional Plans in the Framework of the SAP-MED to Achieve Good Environmental Status for Pollution-Related ECAP Ecological Objectives*

- capacity building in the NAP update countries.

The guidance document has three main sections. Section one proposes a number of definitions of terms related to socio-economic analysis. Section two describes at which stages of the NAP update process it is needed to compile, organise and analyse different socio-economic data. Finally, section three provides details on the possible ways of assessing cost-effectiveness, costs and benefits of NAP measures/ programme of measures, discussing particularly important and challenging aspects of the analysis, choices that need to be made and ways to address expected data gaps.

1 Section I: Definitions of the key terms and concepts

For the purpose of this guidance document and the NAP update economic analysis, the following definitions/ terms are used²:

Use of marine waters: Any human activity using or influencing the marine space and/ or ecosystem goods and services provided by marine waters.

Ecosystem services: Goods and services – benefits – that the ecosystem provides to human beings.

Degradation: Reduction in the provision of ecosystem services compared to another state.

Cost of degradation/ socio-economic losses: Foregone welfare, reflecting the reduction in the value of the ecosystem services provided compared to another state.

Socio-economic analysis: A socio-economic analysis aims to identify the impact on human welfare of a given policy. This includes economic as well as social aspects, and may include consideration of the distribution of these impacts across stakeholders. In light of this definition, an explicit distinction between „economic“ and „social“ analysis is not necessary³.

Drivers: Factors (economic sectors and policy instruments) inducing the pressures (e.g. agriculture, fishing, subsidies, regulation).

Pressures: Forces that generate changes in the state of the ecosystem and thereby the provision of its services (e.g. nutrient load, salinity, fishing effort, oil spills, invasive species).

Impacts: Impacts are the consequences for human welfare caused by the drivers and pressures affecting the state of the marine environment.

DPSIR framework: a theoretical framework used for systematically analysing environmental problems on the one hand and identifying measures on the other hand. The DPSIR framework starts with a description of the Driving forces that cause environmental Pressures. These Pressures cause a change in

² Based on WG ESA Guidance document (2010), UNEP/MAP Plan Bleu's reports on economic and social analysis in the Mediterranean, costs of degradation, and methods and tools for socio-economic assessment of forest ecosystem goods and services (2014a, 2014b, 2014 c), Arcadis report (2014) and EC Impact Assessment Guidelines (2009).

³ The NAP update process primarily uses the term 'economic' analysis, however the intention was not to exclude social aspects but rather to simplify the process and used terminology (whereas it is understood that social issues are a constituent part of the analysis).

the State of the environment. This may have Impacts on human wellbeing. If these Impacts are unwanted, policy-makers will Respond by taking actions aimed at the Driving forces to reduce their Pressures.

The Driving forces are the activities, and the social factors driving these activities, that use the marine waters, either directly or indirectly, and consequently impact the marine environment. The use of marine waters puts Pressure on the marine environment in various ways. The pressures degrade the State of the environment, which Impact upon human health and the value of ecosystem goods and services. Society can decide to Respond by acting on the Driving forces, Pressures, State as well as the Impact of the problem by implementing measures and incentives (i.e. policy instruments).

Specific examples of what is in general understood under each element in the DPSIR sequence are provided below.

Driving forces	Pressures	State (of marine waters and ecosystems)	Impacts	Responses
Socio-economic activities (uses of marine waters) i.e. economic sectors such as tourism, industries, shipping, fisheries	Emissions/pollution loads, extractions, disturbances	E.g. deteriorating bathing water quality, raised concentrations of contaminants, declining fish stocks, etc.	E.g. loss of recreation value, negative impacts on human health, reduced revenues from fishing etc.	Policies and measures aiming to reduce pressures and impacts (e.g. pollution standards, fishing quotas) and to reach set objectives (such as GES)

Use value: The use value captures the direct link between ecosystem services and human welfare.

- Direct use value includes the profits from direct use of marine environment (“economic” value) and wider benefits that are more difficult to measure, since they are not captured by market interactions, for example recreational activities such as swimming, fishing, scuba diving etc., as well as the importance to local coastal communities of maintaining their marine heritage (“social” value).
- Indirect use value includes the benefits we derive from the environment’s provision of ecosystem services such as waste decomposition or carbon sequestration.

Non-use value: The non-use value describes, for example, the importance people attach to knowing that a healthy sea surrounds them and that this resource may be passed on to future generations.

Valuation: A set of steps/ methods performed in order to determine Total Economic Value (use and non-use values) of ecosystem goods and services that do not have a market price. Valuation can be applied to assess the overall value of ecosystem services or to assess economic value of changes in ecosystem services.

Costs: Costs of measures differ depending on their type⁴. In case of technical measures, additional costs of introducing new measures mainly consist of direct investment and operational costs. The costs associated with the policy instruments and their implementation are indirect costs and they include:

⁴ Definitions of the different types of measures are provided in the main body of the Guidelines.

- *Administrative costs* for the regulator: research, information and meeting costs, enactment and lobbying costs, design and implementation costs and administration, monitoring and prosecution costs. Most of these costs are costs of labour time for researchers, court staff, legislators, government staff etc.
- *Compliance costs* for the regulated: investment in abatement equipment or additional costs related to changed behaviour, administrative costs e.g. costs of applying for permits, monitoring costs;
- *External costs*: environmental and resource costs.

Benefits: The benefits from measures can be described by identifying use and non-use values. The use values can be separated into direct use values such as fishery production and recreation and indirect use values such as values of environmental functions or the effects on living conditions. Non-use values capture the less tangible values derived from the implementation of the measures (for example the values of preserving certain ecosystems for future generations).

Once identified, expected benefits (both environmental and socio-economic ones) associated with implementation of measures can be either fully monetised or (in cases large uncertainties are involved) given for illustrative purposes only. The monetization and/ or description of benefits normally requires to carry out a literature review of available studies in the area of the proposed policy and verify whether economic estimates can be adopted in that context. There are areas where economic benefits are easier to ascertain (for example financial savings associated with the proposal or recreational and tourism benefits) whereas for others it might be more challenging due to many scientific and economic uncertainties (e.g. ecosystem services valuation, health effects, etc.). It is good practice to explain at minimum in qualitative term what are the benefits associated with the measure in question.

Cost-effectiveness analysis (CEA): A decision support method which relates the costs of alternative ways of producing the same or similar outcomes to a measure of those resulting outcomes.

Cost-benefit analysis (CBA): A decision support method which aims to compare all relevant benefits and costs (in monetary terms) of an alternative (project, policy or programme), including impacts on environmental goods and services.

Multi-criteria analysis (MCA): A decision support method that can be used to evaluate and compare different alternatives according to their performance with regard to a selected set of evaluation criteria.

2 Section II: How does the economic analysis fit in the NAP update process?

The steps in the NAP update process have been recommended in the main body of the *Guidelines* (UNEP(DEPI)MED WG.393/10). Economic analysis, that is the compilation of data necessary to perform them and the very application of cost-effectiveness and cost-benefit assessments, will need to be carried out throughout the entire process, whereas the following NAP phases are particularly important:

- Step 1: assessment of the NAP midterm implementation benchmark;
- Step 4: prioritizing issues and identifying potential measures (based on *inter alia* socio-economic losses);
- Step 5: selection of the programme of pollution reduction measures (based on criteria that will include costs and benefits from their implementation, among others).

The role of the economic analysis and specific tasks that will need to be undertaken in each NAP update step are described below. The steps for which economic assessments are of major significance are paid special attention and elaborated in more detail. The economic analysis should be undertaken by the appropriate specialists in the NAP update teams and tightly linked to the other analytical segments, drawing from them, supporting them and/ or serving as a basis for their development.

The Contracting Parties may build on other policy processes where similar economic analysis methods and approaches have been used to support their NAP update processes to ensure coherence and effectiveness.

2.1 Tasks under the specific NAP steps

Step 1: Assessment of the NAP midterm implementation benchmark

Within the first step in the NAP update, measures implemented since the first NAP was adopted need to be described and the current baseline established. Following the establishment of midterm implementation benchmark, future trends in pressures and impacts also need to be described assuming the existing policies and measures.

In conducting this part of the analysis, the NAP update teams should also compile information on economic sectors and activities affecting marine environment and analyse them in a way as to establish what are the main uses of marine environment having in mind their significance in socio-economic and in terms of their environmental impacts. Two important tasks at this phase of the economic analysis are to: 1) identify and describe different uses of marine environment with related pressures and impacts; and 2) assess direct and indirect benefits from different uses. For both, description of current conditions and projection of trends is needed.

1. Identifying and describing different uses of marine environment; identifying and describing pressures from these uses and related impacts. The key questions that need to be answered are: what are the different human activities and their impacts on the coastal and marine environment? To the extent possible, all information should be quantified. Data on pressures and impacts should be acquired from thematic experts and consultants working on the analysis of policies, NBB preparation and other pollution related aspects of the assessment of NAP midterm implementation benchmark. Additional sources (such as national and regional statistics, analytical reports and studies) will be needed to compile information on specific socio-economic topics.

At this stage the following information is recommended to be taken over from the baseline description, amended as appropriate and organised in order to enable further steps in economic analysis:

- *number and size of settlements,*
- *quantities of treated and untreated municipal wastewater discharged into the sea/tributaries; municipal waste and principal disposal methods;*
- *number, size and type of industries having an impact on marine environment,*
- *quantities and type of industrial waste and wastewater generated (the disposal of which affects marine environment);*
- *extent of agricultural activities in the coastal area,*
- *fishing (e.g. size of the fishing fleet, total catches etc.) and aquaculture activities (areas used for aquaculture, production, etc.);*

- *tourism data accompanied with pressures and impacts from tourism;*
- *number and type of ports and related pressures;*
- *use of marine waters for energy generation, if any; etc.*

In addition to the description of existing conditions, a projection of pressures and impacts under the assumed continuation of existing policies and measures need to be made. The role of the economic analysis will be to provide a projection of expected changes in the uses of marine environment to allow for estimation of pressures and impacts. UNEP/ MAP Plan Bleu's report on economic and social analysis of the uses of marine waters in the Mediterranean (2014a) can be used as a good example of how to structure and organize socio-economic data. The report is also relevant for the assessment of benefits (described in the following paragraphs).

2. Making an inventory of, and to the extent possible assessing direct and indirect benefits of different uses of marine environment. This entails collection of data on e.g. revenues, turnover, gross value added, employment, direct and indirect contribution to GDP, etc. from different economic activities⁵. In cases when adequately disaggregated (e.g. gross value added from coastal industries; employment in coastal agriculture etc.) and quantified data will not be readily available, the NAP update teams/ consultants should make an effort to come up with closest possible approximations and/ or qualitative description of benefits with the overall aim to have a clear picture of the magnitude and significance of different economic sectors.

In addition to standard economic measures of benefits (such as figures on employment, revenues, etc.), it will be also necessary to consider less conventional measures of benefits provided by marine environment (such as goods and services provided by ecosystems). Since these do not necessarily have market value, there will be a need to carry out their valuation using some of the established techniques (discussed in more detail in section III of this document) or to rely on valuation studies, if existent, that have already assessed benefits provided by respective marine ecosystems. A growing number of such studies is available in different countries and they can serve as a valuable source to overcome data gaps and/ or avoid time and resource demanding assessments being carried within NAP update. In this phase of NAP update assessment, it will be necessary to identify and describe direct and indirect benefits and compile existing information from various sources, while as the valuation itself, when necessary and opted for, will be carried out at later stages of the analysis (e.g. for estimation of socio-economic losses and selection of measures under steps 4 and 5 of the NAP update).

In carrying out the two tasks (describing the human activities affecting the marine environment and the benefits deriving from it), it is recommended that the economic expert/s in NAP update teams follow the approach to determination of geographic scope⁶ applied in the NBB preparation and use the related data

⁵ The indicators that are most commonly used to assess socio-economic benefits/ use values from different sectors are value added, production value, income and employment.

⁶ The available guidance on MSFD implementation (e.g. WG ESA, 2010) highlights the importance of adequate definition of spatial, sectoral and temporal aspects. First of all, there is a need to define the size of the ecosystem, that is, to define the relevant borders of the ecosystem subject to the analysis. In the analysis one must also determine what economic sectors should be included in order to address the consequences of the problem as well as the policy responses. To include all sectors impacting on or being affected by the marine ecosystem services or all sectors affected by measures /policy instruments might not be practically possible or even justified. For practical reasons, focus might have to be restricted to capture the main sectors connected to the problem either as drivers or as those economic sectors affected by the impacts. The temporal aspect means addressing the following two questions: i) what are the dynamics of the system? and ii) how do drivers, pressures, and states change over time? The temporal

from identification and classification of pollution sources (with related emissions). Due to the complexity of marine environment and expected lack of (disaggregated) data, the teams performing the analysis are likely to face difficulties particularly in their efforts to link certain impacts to relevant pressures and sources. Useful advices on the challenging task of establishing causal relationship between the state of ecosystems and economic activities can be found, amongst others, in the UNEP/MAP Plan Blue's report on setting the scope for assessment of costs of degradation.

Discussion of future trends in pressures and impacts, as well as discussion of effects these may have on the benefits from different uses of marine environment, in the first step of the NAP analysis will need to include information such as what pollution loads are expected over time if there is no change in current policies and measures and what will be the related impacts. Examples of the questions that need to be answered through integration of the economic and other segments of the analysis (if possible in a quantified manner) include:

- will the existing industries (as well as tourism, population, agriculture, etc.) grow or decline and to what extent/ at what pace;
- what will it mean in terms of quantities of the main pollutants reaching marine waters, direct or indirect uses of marine ecosystems;
- what impacts will it have on the state of marine ecosystems; and
- what will be the resulting impacts (gains or losses) for human wellbeing.

These projections will not be an exclusive or even predominant responsibility of the economic expert/s in the NAP update teams, however it is very important that close cooperation and coordination with experts working on pollution reduction is ensured and that all available data and knowledge are mobilized to arrive at the best possible projection of trends.

This is pivotal for determination of gaps (difference between baseline and set objectives), which make a starting point for identification of potential (new) measures that are needed to bridge the gaps. Omissions and mistakes in one phase of the analysis are likely to be carried over into the next one, thus affecting (in a negative way) accuracy and usefulness of the overall assessment. When quantification of future pressures and impacts (as well as of expected changes in benefits) will not be possible, qualitative assessments should be made to give as detailed as possible picture of the likely developments in human activities affecting marine environment over time.

Step 2: Definition of quantifiable objectives and operational targets

The definition of objectives and targets will primarily rely on the commitments stemming from the ECAP-GES and Regional Plans in the framework of SAP-MED as well as on the national priorities. Nevertheless, it is important to consider socio-economic conditions and have in mind possible specific concerns when setting up the environmental targets. A good baseline description of economic sectors (uses of marine waters) and related benefits, with projection of trends (resulting from the 2 economic analysis tasks performed in the NAP update step 1) will be of a great use for objectives and targets setting.

scale of the socio-economic and environmental impacts of concern can be addressed through scenarios analysis. Understanding the dynamics of the ecosystem is vital in order to make scenarios as well as identify the appropriate policy responses.

Step 3: Identification of gaps/ issues

Identification of gaps between midterm baseline and set objectives/ targets and assessment of the ability of existing measures to bridge the gap will also entail analysis of economic factors (including financial and/ or fiscal ones) and issues that prevent achievement of desired objectives. For example, barriers relating to wastewater management that are found in many countries are low levels of water tariffs, which slows down development of wastewater collection and treatment systems. Similarly, uptake of cleaner technologies in coastal industries is frequently hindered by the fact that there are no instruments (such as tax alleviations, pollution charges) to incentivise or dis-incentivise their introduction.

Step 4: Prioritization of issues and identification of potential measures

Prioritisation of issues and identification of measures is another step in the NAP update process where economic analysis will play a very important role, as one of the envisaged criteria for prioritisation of issues are socio-economic losses that will ensue if the set objectives are not met and if there is deterioration in the state of marine environment. The role of economic analysis at this stage of the NAP update is to provide as precise as possible data on the extent of losses that can be expected if appropriate measures are not introduced to close the gap between baseline and GES targets.

The main task under this step is to describe in qualitative and, if possible, in quantitative terms the costs that are expected to occur if the status of marine waters and ecosystems deteriorates. According to the UNEP/ MAP Plan Blue's report (2014 b), to cost of degradation corresponds to a loss of welfare and can be assessed in different ways, e.g. through a foregone benefit, a loss of profits, the increase in production costs or rise of mitigation costs. The main challenges highlighted in the report include definition of the reference against which the degradation will be assessed, establishment of causal relationships and assigning a monetary value on impacts that result from environmental change.

Various approaches – ecosystem, thematic and cost-based approach – to estimating the costs of degradation have been developed and used, mainly in the context of the EU MSFD implementation (the main elements of the three approaches are presented in table 2-1). Experiences are also gained in non-EU countries, for example as a part of the Regional Governance and Knowledge Generation (ReGoKo) project⁷, and should be utilised to the greatest possible extent in the NAP update process.

Each of these approaches employs different valuation methods including qualitative, quantitative and monetary valuation. The assessments can be qualitative and quantitative in the sense that they can provide evidence of the types of ecosystem services that might be lost and the extent of that loss, without monetisation (e.g. assessment of a decline in fish stocks without assigning a value to the change).

Monetary valuation is a way of capturing people's valuation of the ecosystem services and is applied for services that are not traded and priced in any market. To be able to compute the economic value of environmental change influencing non-market ecosystem services, special valuation methods have been developed. Valuation methods fall broadly into two main categories: economic and non-economic. Each valuation technique has its advantages and disadvantages. Market data, cost-based data (including use of abatement costs) and the "production function approach" can elicit monetary values that have a strong foundation in robust data, but these methods cannot derive values that are not traded in any market.

⁷ Under the project, UNEP/MAP Plan Bleu supports activities on strengthening the knowledge base on the socio-economic importance of maritime activities in the Mediterranean basin and on the cost of degradation of the marine environment at national level. This initiative includes the development of socio-economic assessments of key maritime activities and of ecosystem service losses for selected Mediterranean countries.

Choice modelling and contingent valuation can capture more of the total economic value of an ecosystem service (particularly non-use values), but the theoretical foundation for these analyses has been questioned. A summary table of the *pros* and *cons* of various valuation techniques is provided in the section III, preceded with a more detailed explanation of different valuation methods.

Step 5: Selection of a programme of pollution reduction measures

Selection of a programme of pollution reduction measures is a crucial step in the NAP update where NAP teams will propose a set of the most needed and effective measures from the list of prioritised potential measures. The criteria of selection will include priority rank, ability to integrate with other measures, impact on marine environment, technical feasibility, implementation timetable as well as costs of implementation and cost-effectiveness/ cost-benefit ratios (or net present values). This is therefore the NAP update stage where CEA/ CBA will be used (to the applicable/ practicable extent). More details on why, how and when to apply CEA/ CBA (or use alternative tolls) are provided in Section III of this document.

Step 6: Development of NAP follow-up and reporting plan

A set of indicators that will be included in the NAP and the plan on how to follow-up and report on NAP implementation will also need to include data/ indicators from the economic analysis the countries will deem appropriate for monitoring and eventual updating of programme of measures. It is suggested that the NAP follow up plan includes recommendations on the main research needs and adjustments in the information and statistical systems to allow for better assessment of the effectiveness and sustainability of NAP measures.

Step 7: Drafting the NAP

The final step in the NAP update includes evaluation of the overall sustainability of the programme of measures and consultations, thus offering an opportunity to check rigorousness and consistency of the economic analysis once again. In the consultation phase in particular, principles and methods used in the economic analysis should be explained and results checked with a wide range of stakeholders. Any comments and suggestions regarding the estimation of costs and benefits (how realistic are they, have any significant omissions been made etc.) should be considered and integrated to the greatest possible extent in the final version of the NAP in a concise manner. The results of the economic analysis will help decision makers to include in the final NAP an effective and sustainable set of measures to achieve ECAP GES and Regional Plans targets in the framework of SAP-MED.

2-1: Approaches to estimating the cost of degradation, UNEP/ MAP Plan Bleu (2014b)

Key issues	The ecosystem services approach	The thematic approach	The cost-based approach
<i>Ways of addressing the costs</i>	The cost of degradation is defined as the difference in values of ecosystem services provided in two different situations: the Good Environmental Status (GES) and a “Business as Usual” (BAU) Scenario.	The cost of degradation is analysed through costs, expenses and losses of benefits incurred by degradation themes arising from current environmental situation compared to a reference status characterized by GES achievement.	The cost of degradation is analysed through current quantified spending for preventing further degradation in comparison to the current situation.
<i>Objective</i>	Communicate at an early stage on the potential lost benefits if an environmental policy is not implemented. Benefits of implementing the policy could also later on be compared with the costs of implementing it.	Assess current cost of degradation and compare them with a GES situation (extra-costs). Get an overview of current socio-economic impacts of environmental degradation. Provide a knowledge base to assess costs and benefits of future measures.	Get a quantified overview of current socio-economic impacts of environmental degradation. Inform on the financing structure for more appropriate decisions regarding who should bear future costs.
<i>Main steps (as defined by WG ESA)</i>	<ol style="list-style-type: none"> 1. Define GES using the qualitative descriptors listed in the MSFD. 2. Assess the environmental status in a Business As Usual (BAU) scenario. 3. Describe in qualitative and, if possible, quantitative terms the difference between the GES and the environmental status in the BAU scenario, i.e. the degradation of the marine environment. 4. Describe the consequences to human well-being of degradation of the marine environment, either qualitatively, quantitatively or in monetary terms. 	<ol style="list-style-type: none"> 1. Define degradation themes, e.g. marine litter, chemical compounds etc.; 2. Define a reference condition, for example a condition where targets for good environmental status are achieved; 3. Describe in qualitative and, if possible, quantitative terms the difference between the reference condition and the present environmental status, i.e. the degradation of the marine environment, for all the degradation themes; 4. Describe the consequences to human well-being of degradation of the marine environment, either qualitatively, quantitatively or in monetary terms. 	<ol style="list-style-type: none"> 1. Identify all current legislation that is intended to improve the marine environment; 2. Assess the costs of this legislation to the public and private sectors; 3. Assess the proportion of this legislation that can be justified on the basis of its effect on the marine environment (as opposed to health or on-shore environmental effects); 4. Add together costs that are attributable to protecting the marine environment from all the different legislation you have assessed.
<i>Example of costs considered</i>	If more fish were available in the sea, fishing quotas could be increased and fishermen could make X € more profits. Non-use values could also be increased.	Today X € are spent to mitigate the negative effects of water pollution on aquaculture.	Today X € are spent for less environmentally damaging anti-fouling materials and other technical measures built into ships to comply with the International Oil Pollution Compensation (IOPC) Fund

3 Section III: Cost-effectiveness and cost-benefit analysis of measures/ programmes of measures

The aim of this section is to:

- provide brief explanation of the tools and outline their possible uses;
- recommend practical steps in potential application of the CEA/ CBA in the NAP update process and suggest alternative approaches in case full scale economic assessments will not be doable; and
- provide more information on methodologies and particularly challenging aspects of conducting the CEA/ CBA and point out possible ways for overcoming the challenges.

More detailed formation on the CEA and CBA (with references to different sources) can be found in chapter 6 of this document.

3.1 Cost-effectiveness analysis

The cost-effectiveness analysis has been widely applied in evaluating different policy options and specific measures/ projects and an extensive literature on both the theoretical underpinnings of the concept and on the practical experiences and *pros* and *cons* of its applications is available.

CEA is an analysis of the costs of alternative individual and/ or sets or programmes of measures designed to meet a well specified/ quantified objective. It is often interpreted as a tool that helps find the least-cost solution for meeting a prescribed target (for example, how to attain a set level of nitrogen in coastal waters at least costs). The cost-effectiveness is calculated by dividing the annualised costs of the assessed measures/ sets of measures by a quantified physical effect. Marginal costs of different assessed options can, for example, be defined as the increase in total abatement costs when pollution loads are decreased by 1 ton or 1 kilogram per year. As long as marginal costs are not equal, it is possible to obtain the same level of pollution reduction at lower costs by shifting emission reduction from high cost to lower cost measures. CEA is normally used when it is difficult or impossible to express benefits from different measures in monetary terms.

In the steps 1 – 4 of the NAP update process, baseline will be defined, specific environmental objectives/ operational targets (e.g. reduction in nutrient inputs, bringing concentrations of contaminants below the levels giving rise to pollution effects, etc.) will be determined and potential measures to bridge the gaps between the baseline and target situations identified. Provided that the data is available and the national NAP teams deem it appropriate (within the step 5 of the NAP update), it is recommended to conduct a CEA for specific measures/ sets of measures by carrying out the following tasks:

1. Assess the effectiveness of these measures in reaching the environmental objective;
2. Assess the costs of these measures;
3. Rank measures in terms of increasing unit costs;
4. Assess the least cost way to reach the environmental objective/ target.

In case sufficient data will not be available for monetary expression of costs of all measures, the experiences with the implementation of the EU MSFD show that the use of qualitative and semi-

quantitative approaches is also possible and can give valuable results. Examples of several possible approaches are summarised in points a) to d) below.

- a) Collecting opinion of experts, civil servants and scientists (through workshop and interviews) on the contribution of each measure to the GES indicators. This approach is useful in situations when physical effects of potential measures can be identified but not quantified. An illustration referring to marine litter is presented below.

Measures	Effect
Additional fishing for litter	Negative effect: decreased seafloor integrity
Additional beach cleaning on non-bathing beaches (once a year)	Less litter on the beach
Adding individually recognisable markers to fishing nets and wires	Reduce illegal or improper spill of nets (the first source of litter on the beach)

- b) A scoring system can be applied to classify:

- expected reduction of different pressures for each measure, and
- the relation (and importance) of each pressure for each individual target (and indicator)

as low, moderate, high or very high, based on the set of pre-determined criteria. Multiplying the expected reduction in pressure with the importance of a pressure for a certain target gives the on-site effect for a certain measure (displayed on a scale 1 to 5). The pressures are then scored according to their geographic dimension using the same classes (low to very high). Multiplying the on-site effect and scale of the effect gives the overall effectiveness of the measure. The effectiveness scores are then compared with costs scores in a matrix form to allow for conclusion on the overall cost-effectiveness of measures. This approach is particularly useful to overcome the knowledge gaps regarding driver-effect-pressure relations.

- c) Environmental effectiveness of measures can be evaluated and classified (as strong, potentially strong, or uncertain) and compared with categories of implementation costs (low, moderate and high). Based on such an analysis, four levels of cost-effectiveness can be defined:
- cost-effective measures,
 - moderate cost-effective measures,
 - low cost-effective measures, and
 - non cost-effective measure.
- d) A 'scale' („+++” to „---”) system can be used to assess costs and effectiveness (and possibly other criteria including benefits, feasibility, etc.) of NAP measures when monetized assessments will not be possible.

It is recommended that NAP update teams consider using the approach of evaluating and comparing effectiveness and costs (example c) to categorise measures in terms of their overall cost-effectiveness. The advantage of the approach is its simplicity. On the other hand, its application leaves a large room for arbitrary assessments and efforts should be made in the NAP update process to reduce subjectivity (by e.g. conducting the assessment in a workshop setting and reaching an agreement of various stakeholders on the assigned categories, or by defining detailed criteria on how to evaluate effectiveness).

3.2 Cost-benefit analysis

CBA is a method for comparing policy measures against the baseline situation in terms of their advantages (benefits) and disadvantages (costs). This essentially involves estimating all of the negative and positive economic, social and environmental impacts. CBA can be done at various levels, depending on data availability. It can be either a full CBA when the most significant part of both costs and benefits can be monetised, or a partial CBA in cases when quantification/ monetisation will only be possible for a part of the costs and benefits. The results of this analysis can be interpreted as a benefit to cost (B-C) ratio (total benefits divided by total costs) where a ratio larger than one indicates that the policy measure is beneficial, or as a net present value (NPV - the present value of the net benefits) where a positive NPV indicates a welfare improvement.

When conducting a full CBA in the NAP update process will be deemed appropriate, the following steps are recommended (adapted from Turner et al, 2010):

1. Definition of the details of each measure/ set of measures subject to the analysis, including the 'do nothing' option (i.e. projection of trends in pressures and impacts without analysed intervention/s).
2. Determining the spatial and temporal scales of the analysis (i.e. over what population is it appropriate to sum the costs and benefits and over what time period do the costs and benefits arise?).
3. Identification of the costs and benefits and their monetary values. Monetary value may be based on the market value of a good or service or on its replacement cost (if that can be calculated), or, in the case of some environmental goods and services, by use of various valuation techniques. To enable valid comparisons, all monetary values must refer to a common point in time – the base year – to give 'present' values. A standard discount rate is applied so that costs and benefits of measures with varying time scales can be compared (some considerations to support the choice of discount rate are provided in sub-section 3.3.3).
4. Compare the economic efficiency of various options through comparison of their benefit-cost ratios or net present values.

If the resources would permit it, it is also recommended to carry out a sensitivity analysis to assess the impact (on the benefit cost ratio and/ or net present value) of changes in the values of central parameters, e.g. the value of costs and benefits or the discount rate. By examining the impact that increasing costs (or reduced benefits) may have on the net present value, the breakeven point can be determined whereby the assessed option would be no longer justifiable.

It is preferred that the costs and benefits are expressed in monetary terms, but this is not a requirement to call an analysis a cost-benefit analysis. In cases full monetisation will not be possible, a qualitative description of costs and benefits could be performed instead to meet the needs of the NAP update and aid the decision making process.

Specific examples of the application of cost-benefit analyses are available from the UNEP/MAP Plan Bleu's (2014c) and Arcadis (2014) reports. The Plan Bleu's report is particularly valuable as it describes in detail concrete steps and methods that need to be applied at each CBA stage with an illustration for a project-level analysis (example of CBA for an afforestation project is provided). A limited number of examples from applying CBA in the framework of the EU MSFD implementation is also available.

3.3 Assessment of costs, valuation and temporal aspects in CEA and CBA

Three very important and challenging aspects in conducting CEA and/or CBA are related to techniques and approaches used to assess the costs of measures, include values for non-market goods and services and to allow for comparison of costs and benefits that occur at different times. The following sub-sections provide more information and the main guidance points for each of these.

3.3.1 Costing of measures

The main question to be answered in costing of potential NAP measures (as an input for CEA/ CBA or criteria for prioritisation of measures) is how much the implementation of the given measure costs the society (in terms of public and private costs). To answer this question, nature of the given measure needs to be determined and its breakdown into basic components and/ or inputs needed for implementation provided. Different types of measures require different types of input to be implemented, and these inputs are fundamental for costing i.e. for estimation of costs.

- Technical measures: some benchmarks or indicators usually exist for concrete interventions with tangible results (covering investment and operational costs). For example, feasibility studies may have been carried out for WWTP in a given region of the country and unit costs per population equivalent can be derived and used for similar projects/ measures. Alternatively, some international costing methods could be applied⁸, while for example using Purchasing Power Parities to adjust the costs to national circumstances. Waste management strategies can be also a useful source of information for the assessment of costs as they may include information on e.g. number of improper waste disposal sites in the coastal region the remediation of which is needed and a number of landfills to be constructed with estimation of costs. Other national plans may be a useful source of information on costs and contain e.g. information on number of industries in which technological changes are needed to address contaminants, scale of investments needed and similar. UNEP MAP Background document on marine litter regional plan (2013) and indicative costs provided therein on e.g. clean-up costs (per km of coast cleaned, per person to control litter, costs associated with fishing gear retrieval etc.) could be used for the assessment of costs of marine litter management measures.
- Legislative measures – the time needed to draft the laws and administer them are the main cost elements for this type of measures. Private costs (i.e. costs to entities to which the regulation applies) can be assessed by translating legal provisions into specific requirements needed to comply with the law and by estimating their costs.
- Policy instruments – tax breaks to stimulate introduction of cleaner technologies will have a clear cost for the national (regional and/ or local) budgets in terms of public revenues forgone. In addition to that, some indirect costs will incur relating to additional work of civil servants needed to administer the scheme. Introduction of economic instruments (e.g. pollution taxes and/ or charges, deposit-refund systems and similar) will also have a distinct cost linked to administration and enforcement (work of relevant tax and other public services, perhaps environmental funds, to collect the revenues, costs of monitoring the discharges, work of inspectorates to enforce the regulation etc.).

⁸ UfM report *Update priority investment projects for protecting the Mediterranean Sea from pollution: evaluation of NAP investment portfolio – regional analysis*, for example, assessed investment costs of priority wastewater projects by using cost functions developed by COWI under FEASIBLE model whereas an adjustment (reduction) of 80% was applied for Southern Mediterranean countries.

- Capacity building and awareness raising measures can be costed by e.g. determining how many people need to undergo training courses, take part in study visits and similar. Public campaigns costs can be assessed by breaking down the measures into type of communication materials, media time, work of specialized consultants etc.

A more difficult part of the analysis will be estimation of costs/ losses that would be incurred to the economy and society if the degradation is allowed (due to continuation of current measures and policies or under 'no measures' assumption) since these estimates include both use (direct and indirect) and non-use values.

As regards the benefits, the main questions are: How to quantify benefits? Is it always possible? How to provide for monetary expression of certain benefits that are expected to be generated by identified measures⁹? How do we value achievement of good ecological status yet make sure the estimates are not arbitrary? Answers to some of these questions can be found through the use of techniques and approaches that are not always straightforward, are somewhat sensitive and frequently disputed (such as valuation of non-market goods and services and discounting – briefly discussed in the following sub-sections).

3.3.2 Valuation of non-market goods and services

Costs of positive and negative changes in an ecosystem as well as benefits from implementing certain measures can be captured through valuation of ecosystem services and products. The UNEP/ MAP Plan Bleu report (2014c) is a useful source of information on valuation as it presents the basic concepts and describes selected valuation methods (market price, cost based, hedonic pricing, travel cost as well as stated preferences and other methods).

In order to understand the value of an ecosystem it is necessary to characterise and quantify the relationships between ecosystems and the provision of ecosystem services, and to identify the ways in which these impact on human welfare. Contributions to human welfare i.e. benefits from ecosystem services can be translated into economic value using economic valuation techniques. To arrive at economic value of changes in ecosystem services, the following steps are recommended (based on Defra, 2007):

1. Establish the environmental baseline;
2. Identify and provide qualitative assessment of the potential impacts of measures on ecosystem services;
3. Quantify the impacts of measures on specific ecosystem services;
4. Assess the effects on human welfare;
5. Value the changes in ecosystem services.

Valuation is the last stage of an often detailed assessment of the impacts on ecosystem services arising from a given measure/ set of measures or policies. As already mentioned, there are two types of valuation methods: economic, which is consistent with use in a cost-benefit analysis context, and non-economic (deliberative and participatory methods). The concept of total economic value (TEV) consisting from use and non-use values with different sub-categories is presented in figure 3-1 as it is important for understanding and comparing different valuation methods.

⁹ For example, how much will BOD₅ emissions be reduced if certain measure is implemented and what benefit will it generate for the marine ecosystems and society.

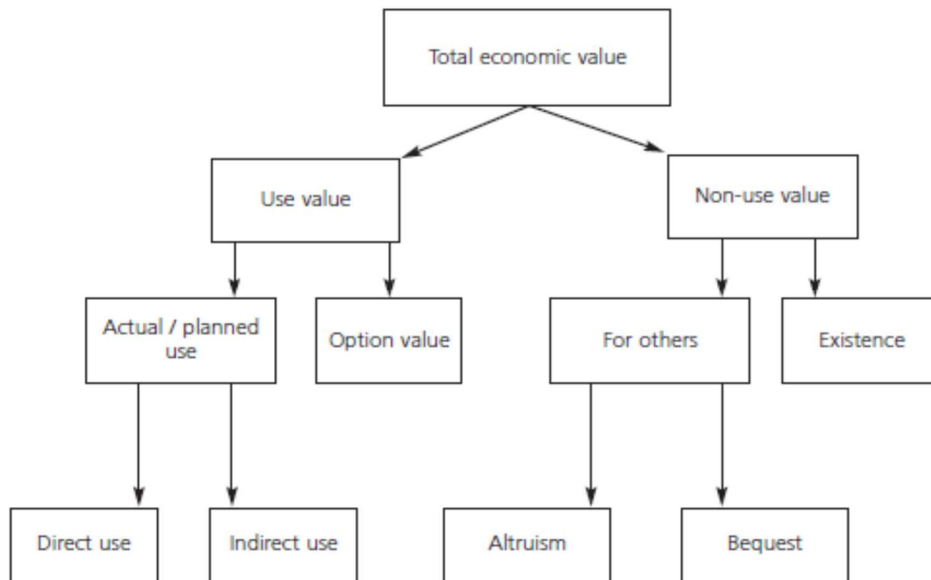


Figure 3-1: Total economic value framework, Defra, 2007

Economic valuation methods attempt to elicit public preferences for changes in the state of the environment in monetary terms. The main types of economic valuation methods available are Revealed Preference and Stated Preference methods.

Revealed Preference (RP) methods rely on data regarding individuals' preferences for a marketable good which includes environmental attributes. These techniques rely on actual markets. Specific techniques falling into this group are: market prices, averting behaviour, hedonic pricing, travel cost method, and random utility modelling. Market prices and averting behaviour can also be classified under pricing techniques¹⁰.

Stated Preference (SP) methods use carefully structured questionnaires to elicit individuals' preferences for a given change in a natural resource or environmental attribute. In principle, SP methods can be applied in a wide range of contexts and are the only methods that can estimate non-use values which can be a significant component of overall TEV for some natural resources. Contingent valuation and choice modelling are the main SP techniques used.

An indicative applicability of these methods in the context of specific categories of ecosystem services is presented in the table 3-1 which at the same time provides information on benefits and limitations of different approaches.

¹⁰ Pricing approaches use observed market prices either as direct measures of economic value of an ecosystem service (e.g. market prices, avertive expenditure, damage costs avoided) or as a proxy for the value (referred to as cost-based approaches). Cost-based approaches to valuing environmental goods and services consider the costs that arise in relation to the provision of environmental goods and services, which may be directly observed from markets such as: opportunity cost; cost of alternatives, and replacement costs. However, as these methods are based on costs, they do not strictly measure utility (and are therefore not included under the TEV framework), that is, they are non-demand curve methods and need to be used with care.

Table 3-1: Choice of valuation methods, Defra, 2007

Valuation method	Element of TEV captured	Ecosystem service(s) valued	Benefits of approach	Limitations of approach
Market prices	Direct and indirect use	Those that contribute to marketed products e.g. timber, fish, genetic information	Market data readily available and robust	Limited to those ecosystem services for which a market exists
Cost-based approaches	Direct and indirect use	Depends on the existence of relevant markets for the ecosystem service in question. Examples include man-made defences being used as proxy for wetlands storm protection; expenditure on water filtration as proxy for value of water pollution damages	Market data readily available and robust	Can potentially overestimate actual value
Production function approach	Indirect use	Environmental services that serve as input to market products e.g. effects of air or water quality on agricultural production and forestry output	Market data readily available and robust	Data-intensive and data on changes in services and the impact on production often missing
Hedonic pricing	Direct and indirect use	Ecosystem services that contribute to air quality, visual amenity, landscape, quiet i.e. attributes that can be appreciated by potential buyers	Based on market data, so relatively robust figures	Very data-intensive and limited mainly to services related to property
Travel cost	Direct and indirect use	All ecosystems services that contribute to recreational activities	Based on observed behaviour	Generally limited to recreational benefits. Difficulties arise when trips are made to multiple destinations.
Random utility	Direct and indirect use	All ecosystems services that contribute to recreational activities	Based on observed behaviour	Limited to use values
Contingent valuation	Use and non-use	All ecosystem services	Able to capture use and non-use values	Bias in responses, resource-intensive method, hypothetical nature of the market
Choice modelling	Use and non-use	All ecosystem services	Able to capture use and non-use values	Similar to contingent valuation above

Non-economic valuation – deliberative or participatory – approaches¹¹ tend to explore how opinions are formed or preferences expressed in units other than money. The decision on the choice of valuation methods does not need to be eliminatory (economic or non-economic). Instead (depending on the context) a combination of the two can be applied.

¹¹ Include qualitative semi-structured surveys, group deliberative discussions (such as focus groups or deliberative forums), citizens' juries, health-based approaches (such as quality-adjusted life years or health-year equivalents) and others.

3.3.3 Discounting

Discounting is a method used to value at the same date economic flows and stocks which have originated in different points in time. Discount rate is the rate used for discounting future values to the present. In cost-benefit analysis, there is a distinction between a private and a social rate of discount. A private rate of discount reflects the time preference of private consumers; a social rate is based on the government's view, which can be more long-sighted as it attempts, in most cases, to take into account the welfare of future generations (WATECO, 2003).

The discount rate used may have a significant impact on the outcome of the analysis, as it affects the value of future costs and benefits. Since benefits usually occur quite some time after measures are taken the temporal weight of these, given by the discount rate, will have a significant effect on the benefit side in a cost-benefit analysis. Since present values of future benefits becomes less the further ahead in the future they occur, assuming a positive discount rate, a hyperbolic discount rate is used in some cases. A hyperbolic discount rate implies a discount rate that is decreasing between different time periods (an example used by WG ESA in their 2010 Guidance document is provided in the table below).

Time horizon	Discount rate
0-10 years	3 %
10-30 years	2 %
30-75 years	1 %
> 75 years	0.5%

By using a hyperbolic discount rate the benefits occurring far into the future are given a relatively larger weight, than if a constant discount rate had been used. This might be justified by the fact that uncertainty increases as the impacts of projects occur further into the future.

Since any level of discount rate used will be questioned, a sensitivity analysis with regard to the discount is recommended to be applied in any assessment. It is also recommended to provide an explanation on the motivation behind the specific choice of discount rate.

3.4 CEA, CBA or alternative tools?

When evaluating different policy options, measures or projects, the economic analysis normally looks at two questions: i) is a given objective worth achieving, and ii) if yes, what is the most cost-effective way of achieving it. Cost-benefit analysis is used to address the first question while the second one can be answered by applying the cost-effectiveness analysis.

Another way of making the choice of using the CEA or CBA is to look at the nature of the question that is being analysed. If the task is meeting some environmental standard, complying with a law or achieving a target, then CEA is the appropriate course of action. If the question is one of choosing between a number of different possible policy or project options which do not involve compliance with standards or targets, then CBA is the most appropriate assessment tool.

Further questions to be considered in determining whether to undertake a CEA are:

- Have functional relationships between measures, pressures and impacts been described?
- Is the socio-economic data collected in the first step of the NAP update sufficient to allow a cost-effectiveness assessment?
- What are the gaps in information and what actions are needed to fill the gap?

While as CEA can help to prioritise measures, its limitation is that the estimation of costs for the application of this tool does not consider the full socio-economic and environmental impacts. The effectiveness assessment is based on the contribution of a measure to a specific target and not the full range of benefits. Another important limitation of CEA is to do with the assessment of the effectiveness of combination of measures.

CBA can provide a very useful and reliable input into the decision-making system, provided that it is carried out fully and impartially. However, translating all the costs and benefits of a project, policy or management scenario into monetary terms can be impractical or it may not give useful results. It should be remembered that CBA only provides an aid to decision making and that the option providing highest benefit per unit cost may not be the most appropriate on other grounds. In these situations multi-criteria analysis (MCA) can provide an alternative as it permits the inclusion of non-monetary criteria into the assessment and explicitly allows for stakeholder deliberations and dialogue.

Multi-criteria analysis (MCA) is a decision support method that can be used to evaluate different alternatives (e.g. different policy options) according to their performance against a selected set of evaluation criteria. These performances are presented in a so called performance matrix, or consequence table. MCA applies cost-benefit thinking to cases where it is necessary to deal with impacts that are a mixture of qualitative, quantitative and monetary data and where are varying degrees of certainty.

The main steps of MCA, as recommended in the UNEP/MAP Plan Bleu's report (2014 c), are:

Step 1: Establish the aims of the MCA, the decision makers and other stakeholders

Before starting the MCA, it is crucial to clearly define the objective of the MCA (why it is done) and to define who should be involved in the MCA process (e.g. decision makers and other stakeholders).

Step 2: Identify alternatives

After the objectives and the stakeholders are identified, the alternatives (e.g. alternative management approaches, measures or similar) to be evaluated should be listed.

Step 3: Define the criteria (and the corresponding objectives) that reflect the relevant consequences of each option

Defining the criteria is a crucial part of the MCA. The selected criteria should reflect all the important characteristics of the evaluated alternatives.

Step 4: Describe the performance of each alternative against the criteria in the performance matrix and determine the score matrix (scoring)

Before the scoring can be performed, all evaluated alternatives should be described, with regards to the selected criteria. These descriptions should be done in a neutral and objective way, not to influence the evaluation process.

Step 5: Assign weights to each of the criteria to reflect their relative importance (weighting).

This step introduces the relative importance of the criteria, and thus adds another dimension to the evaluation process. The users involved in a MCA may not only differ in their judgment of the performance on criteria, but also in the relative importance they attach to different criteria).

Step 6: Combine the weights and scores for each of the options to derive overall values.

Step 7: Analyse the results

Based on the obtained results, recommendations can be made regarding which alternative would be the best (overall) or which performs best on a single criterion.

The following strengths and weaknesses of multi-criteria analysis have been identified:

Strengths	Weaknesses
<ul style="list-style-type: none"> • Enables taking into account impacts that are not easily given monetary values. • Facilitates stakeholder involvement. • Makes the appraisal and decision-making process more transparent. 	<ul style="list-style-type: none"> • No built-in standard value, as it applies values (criteria and weights) specific to the evaluated option. • Comparisons between studies with different valuation criteria and weights are very limited. • Requires well developed participation processes and strongly depends on stakeholder willingness to participate.

In case the countries will choose to apply MCA to support selection of the programme of measures, the analysis itself will be conducted in the step 5 of the NAP update. Some elements of the MCA will however need to be determined in earlier NAP phases (e.g. alternatives to be assessed will in fact be determined in the NAP step 4 when potential measures will be identified).

3.5 Data limitations, complexities and uncertainties

Complexities of marine environment¹² pose numerous difficulties for assessing the cause-effect relationships between pressures, impacts, state and related socio-economic losses or gains. This in turn makes the assessment of effectiveness and benefits of different measures more complicated. In a cost-effectiveness analysis, for example, effectiveness can be either assessed by looking at a pressure (tons of emissions reduced) or an impact (avoided damage or improvements in environmental quality). Which of the two is applicable depends on how the objectives (which the assessed measures are set to achieve) are defined. In practice, most assessments tend to focus on pressures, since they are less challenging to measure and since the causality between measures and effects is easier to establish.

Lack of data and uncertainties due to complexity of marine environment, insufficient monitoring and information systems in many of the countries that will perform NAP update as well as other factors are expected to affect significantly economic analysis and possible application of CEA and CBA. Nevertheless, these limitations should not be used as a justification not to conduct the analysis and every effort should be made to apply the logic and elements of cost-effectiveness and cost-benefit assessments in determining programmes of pollution reduction measures and to utilise to the greatest possible extent potential of these tools.

Available studies and reviews show that carrying out full scale CBA and monetising all the costs and benefits is a significant challenge but at the same they provide examples of good practices in overcoming such challenges. These can provide ideas and point out to useful practices for the development of the NAP economic analysis.

¹² Including for example the following facts: the seas are an open access resource; there are transboundary effects and mixing/ accumulation of pollutants and impacts; there are gaps in scientific knowledge on the dynamics of marine ecosystems and their reaction to external stresses; and similar.

To address data gaps, the NAP update teams need to make sure that all the useful sources of information are identified in the beginning of the process including in particular any information on non-economic uses of marine waters, non-use values, correlations between drivers, pressures and state/ impacts. Available data should be used in the best possible way and a pragmatic approach should be employed, while setting the basis for more comprehensive analyses in the future. Usage of a mix of quantitative and qualitative data and expert judgments is strongly encouraged in all the cases when full quantification will not be possible.

The following simple recommendations drawn from the existing experiences with similar types of the analysis can be useful:

- Start preparations early;
- Identify all relevant national sources and studies; identify comparable regional/ international sources and examples;
- Know (agree upon) what role will the economic analysis have in the decision making process;
- Assess available data and decide on appropriate tools to be used;
- Organise data in the manner that will allow consequent steps in the analysis (e.g. develop a database of measures with uniform data on costs and effects of measures)
- Identify any areas where new assessments/ data collection is necessary having in mind time and resource limitations;
- Try to keep the analysis simple, focusing on the main pressures and impacts;
- When quantification is not possible, use qualitative approaches;
- Identify research needs and adjustments in the monitoring and statistical systems for the future.

It is also strongly recommended to the NAP update teams to note down any gaps in knowledge, lack of data, and uncertainties that will be faced in the process, to explain clearly assumptions and approximations made, and to discuss possible effects all of these may have on the deployed methodologies and obtained results.

4 Useful reports

European Commission DG ENV (2010). WG ESA: Economic and social analysis for the Initial assessment for the marine strategy framework directive: a guidance document [*Provides a comprehensive overview of issues relevant for the EU MSFD Implementation most of which are highly significant for the NAP update too. The most relevant topics covered include economic and social analysis of the use of marine waters; cost of degradation; and valuation methods*]

Plan Bleu (2014a), Economic and social analysis of the uses of the coastal and marine waters in the Mediterranean, Characterization and impacts of the Fisheries, Aquaculture, Tourism and recreational activities, Maritime transport and Offshore extraction of oil and gas sectors, Technical Report, Plan Bleu, Valbonne, available from: www.planbleu.org [*Report prepared in the context of implementation of the MAP Ecosystem Approach Initiative EcAp; it analyzes fisheries, aquaculture, tourism and recreational activities, maritime transport and offshore exploitation of oil and gas at the scale of the Mediterranean basin as well as at a sub-regional level. Production and socioeconomic indicators are presented for each sector*]

Plan Bleu, ACTeon (2014b), Scoping study for the assessment of the costs of degradation of the Mediterranean marine ecosystems, Technical Report, Plan Bleu, Valbonne [*Discusses the relevance of different assessment methods that can be applied for assessing the costs imposed on society by the current state of degradation of the Mediterranean marine & coastal ecosystems*]

Plan Blue, EFIMED and CTFC (2014c) Methods and tools for socio-economic assessment of goods and services provided by Mediterranean forest ecosystems, Technical Report, Plan Bleu, Valbonne [*Provides useful information on the theory behind valuation methods, cost-benefit and multi criteria analysis together with concrete examples on the application of these tools and methodologies*]

Arcadis (2014), Background document summarising experiences with respect to economic analysis to support member states with the development of their programme of measures for the Marine Strategy Framework Directive [*Prepared in the framework of WG ESA activities, contains discussion of the concepts and practices from different Member States (including ongoing work) on the role and approach of economic analysis in the EU MSFD PoM development*]

European Commission (2003). WATECO Guidance document n.o. 1. Economics and the environment [*Contains information on the methodological tools for undertaking the economic analysis and on preparations for conducting the cost-effectiveness analysis*]

5 List of references

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4. European Commission (2009). Impact assessment guidelines. Available online: http://ec.europa.eu/smart-regulation/impact/commission_guidelines/commission_guidelines_en.htm
5. European Commission (2014). Programmes of measures under MSFD; Recommendations for establishment / implementation and related reporting, Draft, 27 May 2014
6. European Commission DG ENV (2010). Working group on economic and social assessment (WG ESA): Economic and social analysis for the Initial assessment for the marine strategy framework directive: a guidance document
7. Goerlach, B. Interwies, E and Newcombe, J. (2006). How are we performing? The Role of ex-post Cost-Effectiveness-Analyses in European Environmental Policies. Paper presented at the 2006 Berlin Conference on the Human Dimensions of Global Environmental Change
8. Joint Research Centre of the European Commission (2013). *Research needs with regard to the socio-economic analysis under the Marine Strategy Framework Directive*; Report from the workshop held in October 2013 under STAGES (Science and Technology Advancing Governance of Good Environmental Status) project
9. Plan Bleu (2014a). Economic and social analysis of the uses of the coastal and marine waters in the Mediterranean, Characterization and impacts of the Fisheries, Aquaculture, Tourism and recreational activities, Maritime transport and Offshore extraction of oil and gas sectors, Technical Report, Plan Bleu, Valbonne
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6 Further information on cost-effectiveness and cost-benefit analysis

Cost-effectiveness

Elaboration of the concept and possible application	Source
<p>CEA is used to establish the “least cost solution” to achieve a certain predetermined output. A CEA is an analysis of the costs of alternative individual and/ or sets or programmes of measures designed to meet well specified objective (quantified in physical terms). It can be used to identify the highest level of a physical benefit given available resources (e.g. delivering the maximum reduction in risk exposure subject to a budget constraint), as well as the least-cost method of reaching a prescribed target (e.g. a given concentration level of nitrogen in coastal waters at least costs).</p> <p>CEA is used when measurement of benefits in monetary terms is difficult, or in any other case when any attempt to make a precise monetary measurement of benefits would be redundant due lack of scientific evidence and/ or open to considerable dispute, or where associated uncertainties are high. In the case of multiple objectives a more sophisticated weighted CEA is required, which gives weights to objectives to measure their priority scale.</p> <p>In a CEA, the focus lies in first instance on the direct costs¹³ i.e. the cost of investment and operation associated with the implementation of measures. However if the measure is a policy instrument, an estimation would be necessary of the indirect costs as well. Typically a CEA mainly looks into the financial compliance costs; sometimes a rough estimation of (part of) the administrative costs is made but external costs are rarely known and usually not used.</p>	Arcadis report, 2014
<p>The purpose of a cost-effectiveness analysis is to find out how predetermined targets, e.g. threshold values for nutrients or other pollutant loads in a catchment/ coastal waters can be achieved at least cost. Theoretically speaking, the least cost allocation of pollution abatement strategies is found if the marginal costs of the proposed measures are equal. The marginal costs of these abatement measures can for example be defined as the increase in total abatement costs when pollution loads are decreased by 1 ton or 1 kilogram per year. As long as marginal costs are not equal, it is theoretically possible to obtain the same level of pollution reduction at lower costs by shifting emission reduction from high cost measures to lower cost measures.</p>	Turner et al, 2010
<p>A cost-effectiveness analysis seeks to find the best alternative activity, process, or intervention that minimises resource use to achieve a desired result. An <i>ex-ante</i> CEA is performed when the objectives of the public policy have been identified and an analyst or an agency has to find the least cost-option of achieving these objectives. The cost-effectiveness of a policy option is calculated by dividing the annualised costs of the option by a quantified measure of the physical effect, such as animal or plant species recovered,</p>	Goerlach et al, 2006

¹³The direct cost is the cost of investment and operation associated with the implementation of measures. Indirect costs are costs associated with the policy instruments and their implementation and the policy’s impact on other environmental targets and on other sectors in the economy.

<p>tons of emissions of a given pollutant reduced, kilometres of river length restored, and so on. In this context, the effects of a policy can be both reduced pressures (for example, the least-cost option to reduce CO₂ emissions), or avoided impacts (for example, the cheapest way to keep global warming below 2°), where the latter is usually more difficult to assess. Different options that achieve/ have achieved the same effect are then compared based on their cost. CEA, therefore, does not ask, nor attempts to answer, the question whether the policy is justified, in the sense that its benefits to society will exceed its costs to society. CEA is sometimes used as a second-best option when a full-blown CBA would be desirable, but many effects cannot be captured in monetary form.</p>	
<p>An analysis of the costs of alternative programmes designed to meet a single objective. The programme which costs less will be the most effective.</p>	<p>WATECO, 2003</p>

Cost-benefit analysis

Elaboration of the concept and possible application	Source
<p>CBA is a method for comparing policy measures against the baseline situation in terms of their advantages (benefits) and disadvantages (costs). This essentially involves estimating all of the negative and positive economic, social and environmental impacts, including items for which the market does not provide an observable measure of value, accruing to all affected societal parties. According to the EC Impact Assessment Guidelines, a CBA can be done at various levels, depending on data availability. It can be either a full CBA when the most significant part of both costs and benefits can be monetised utilising economic values derived through various economic techniques (e.g. market, revealed and stated preference-based methods); or a partial CBA in cases where only a part of the costs and benefits can be quantified and/or monetised.</p>	<p>Arcadis report, 2014</p>
<p>CBA is a means of project or policy appraisal. It involves identifying and measuring, in monetary terms, as many of the costs and benefits as possible that relate to a particular project or course of action. This helps to determine whether the project or policy will produce a net gain or loss in economic welfare for society as a whole. As a rule, a project (or policy option) is deemed to be efficient if total benefits exceed total costs.</p> <p>A CBA compares the costs and benefits in monetary terms. The results of this analysis can be interpreted as a benefit to cost (B-C) ratio, i.e. total benefits divided by total costs, where a ratio larger than one indicates that the policy measure is economically beneficial, or as a net present value (NPV), that is the present value of the net benefits where a positive NPV indicates a welfare improvement. Strictly speaking, only those costs and benefits are included in a CBA that can be quantified in monetary terms. However, it will hardly ever be possible to monetise all impacts all the time: those impacts that cannot be monetised are often left out of the analysis. Non-monetised impacts, if considered relevant, can nonetheless be included in a qualitative discussion accompanying the discussion of the CBA results.</p>	<p>Turner et al, 2010</p>
<p>Cost-benefit analysis (CBA) is a technique for the assessment of the relative desirability of competing alternatives (events, project, management or policy measures). The assessment involves the comparison of the current (<i>base case</i>) situation to one or more <i>alternatives</i> considering the differences between the base case and the alternatives. For example, to evaluate the impact of the application of thinning on the output of forest goods and services in a particular forest, the base case (without thinning) would be compared to the</p>	<p>UNEP/MAP Plan Bleu, 2014c</p>

<p>alternative scenario (with thinning). The analysis would focus on the differences in costs and benefits, in the situations with and without the management measure. The CBA compares the costs and benefits measured in monetary terms.</p> <p>The cost-benefit analysis can be conducted from different perspectives. <i>Private CBA</i> considers only those costs and benefits from the analysed alternative, which are imposed onto or accrue to a private agent (e.g. individual or firm). Thus, it also considers transfer payments (e.g., subsidies, taxes), which the private agent receives or pays to the administration. This type of CBA is also often called financial appraisal. <i>Social CBA</i> in turn attempts to assess the overall impact of an alternative on the welfare of the society as a whole.</p>	
<p>CBA is carried out in order to compare the economic efficiency implications of alternative actions. The benefits from an action are contrasted with the associated costs (including the opportunity costs) within a common analytical framework. To allow comparison of these costs and benefits measured in widely differing units, a common denominator is used: money. This is where most problems usually start since some resources, especially environmental resources, are difficult to evaluate in monetary terms. Many of the goods and services provided by ecosystems, such as amenity, clean air, biodiversity sustenance, are not traded on a market, hence, no market price is available which reflects their economic value. Such prices need to be estimated instead through the use of valuation studies, for example eliciting people's willingness to pay for a particular environmental good. By comparing costs and benefits in monetary terms, a CBA provides an assessment of whether a policy option (or a project) is worth implementing (that is whether the benefits outweigh the costs).</p>	<p>Goerlach et al, 2006</p>
<p>The evaluation of an investment project with a long-term perspective from the viewpoint of the economy as a whole by comparing the effects of undertaking the project with not doing so.</p>	<p>WATECO, 2003</p>

APPENDIX H. Reference information on technical guidelines produced by UNEP/MAP for selecting management options for pollution prevention and control

- UNEP/MAP/MED POL/WHO: **Municipal wastewater treatment plants in Mediterranean coastal cities – Inventory of treatment plants in cities of between 2,000 and 10,000 inhabitants.** MAP Technical Reports Series No. 169, UNEP/MAP, Athens, 2008.
- UNEP/MAP/CP RAC: **State of the art of sustainable production in the Mediterranean.** MAP Technical Reports Series No. 165, UNEP/MAP, Athens, 2006. (English, French, Spanish).
- UNEP/MAP/MED POL/WHO: **Municipal wastewater treatment plants in Mediterranean coastal cities (II)** UNEP/MAP: Athens, 2004. (English, French).
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