Decision IG.20/4

Implementing MAP ecosystem approach roadmap: Mediterranean Ecological and Operational Objectives, Indicators and Timetable for implementing the ecosystem approach roadmap

The 17th Meeting of the Contracting Parties,

Recalling the objective of the Barcelona Convention to prevent, abate, combat and to the fullest possible extent eliminate pollution of the Mediterranean Sea and its coastal areas; to protect and preserve biological diversity, rare or fragile ecosystems, as well as species of wild fauna and flora which are rare, depleted, threatened or endangered and their habitats and to protect and enhance the marine environment so as to contribute towards its sustainable development;

Recalling the vision and the goals for the implementation of the ecosystem approach to the management of human activities adopted in decision IG. 17/6 of its 15th meeting held in Almeria, Spain (2008) providing for *"A healthy Mediterranean with marine and coastal ecosystems that are productive and biologically diverse for the benefit of present and future generations"* and the seven step road-map for implementing the ecosystem approach by Mediterranean Action Plan also adopted during that meeting;

Recalling also the decisions taken by the Conference of the Parties to the Convention on Biological Diversity (CBD) regarding the ecosystem approach and the Aichi targets of the Strategic Plan for Biodiversity 2011-2020 adopted at the COP 10 of the CBD (Nagoya, 2010);

Considering the initiatives undertaken within the framework of the General Fisheries Commission for the Mediterranean (GFCM) to develop principles for and implement the Ecosystem Approach to Fisheries (EAF);

Recalling also the four objectives of the Mediterranean Strategy for Sustainable Development and the UNEP/MAP Five Year Strategic Programme of Work adopted in Marrakech in 2009 that highlighted the ecosystem approach as the Programme's overarching principle and several decisions of the Contracting Parties to ensure the necessary synergies and harmonization to the extent possible in terms of common understanding, tools used, reporting and timetable with the implementation of the EU Marine Strategy Directive;

Acknowledging the need for synergy to the extent possible with relevant global and regional processes, such as those under the UN regular Process for Global reporting and assessment of the state of the marine environment and the UNEP Regional seas programmes;

Recognizing the special importance of MAP work related to ecosystem approach for those Contracting Parties that are EU members states in view of implementing the EU Marine Strategy Framework Directive (MSFD) that provides for building on relevant existing programmes and activities developed in the framework of structures stemming from international agreements such as Regional Sea Conventions;

Acknowledging with satisfaction the progress achieved and work carried out in the Mediterranean with respect to the implementation of the ecosystem approach roadmap by the Government-designated Experts Group (GDE) supported by the Secretariat during the biennium 2010-2011;

Thanking the Secretariat including MEDPOL, SPA/RAC and BP/RAC for the successful preparation of the integrated assessment report of the status of the Mediterranean Sea using ecosystem approach and ecosystem services analysis;

Appreciating the conclusions and recommendations of the Government-designated Experts' Meeting held in Durres, Albania in June 2011;

Recognizing the necessity for the Contracting Parties to fully support the implementation of the ecosystem approach roadmap and the need for substantive financial resources to support the process at regional and national levels;

Recognizing the need to focus the PoW on ECAP amongst other priorities.

Recognizing also, the importance of moving forward towards establishing InfoMAP following the principles of a Shared Environmental Information System (SEIS) for the purposes of the implementation of future phases of the ecosystems approach in the Mediterranean thus ensuring synergy and harmonization with national efforts by contracting parties with regards to the establishment of environmental information systems that support decision-making and enhance public information as well as recent global and regional developments in this field;

Considering the need to establish an effective governance of the knowledge and information generated through an appropriate data sharing policy which takes fully into account the GEOSS Data Sharing Action Plan for the implementation of the GEOSS Data Sharing Principles which was adopted by the GEO-VII Plenary of 3-4 November 2010 and which have been ratified by nearly all Contracting Parties to the Barcelona Convention;

Decides:

To re-affirm *the* commitment of the Contracting Parties to continue to apply the ecosystem-based approach to the management of human activities while enabling a sustainable use of marine goods and services with the view to achieving or maintaining good environmental status of the Mediterranean sea and its coastal region; their protection and preservation, as well as preventing their subsequent deterioration as an integrated operational approach for the successful implementation of the Barcelona Convention and its protocols while enhancing sustainable development in the region;

To endorse the Summary for decision-makers (attached as Annex I to this decision) that provides the main findings and priorities highlighted in the Initial Integrated Assessment Report (UNEP(DEPI)/MED WG.363/Inf.21) prepared by the Secretariat based on the available knowledge and information and with the precious contribution of the Contracting Parties, partners, as well as with the expertise of MEDPOL, SPA/RAC and Blue Plan and which has been peer reviewed by GESAMP;

To adopt based on Article 18 of the Barcelona Convention the Mediterranean Ecological Objectives associated with Operational Objectives and Indicators presented in Annex II to the present decision;

To adopt the timeline and projected outputs of the Ecosystem Approach roadmap implementation presented in Annex III to this decision for the next two years and on an indicative basis until 2017, as well as to update it on biannual basis to take into account progress achieved as need be;

To adopt the establishment of a review cycle for the integrated assessment of ecosystem approach roadmap implementation on a 6 year basis;

To establish an ECAP Coordination Group consisting of MAP focal points, the Coordinating Unit, the MAP components and MAP partners to oversee the implementation of the ecosystem approach, identifying progress gaps in the implementation of the road map and find feasible solutions for the advancement of the ECAP agenda. This Coordination Group will inform the Bureau about the results and the MAP components on the action they need to take;

To request the Secretariat to:

1. Prepare an integrated monitoring programme based on the agreed ecosystem approach indicators with the participation of and contribution from all MAP components and with a leadership role by MED POL and in cooperation with other regional competent organisations such as the Secretariats of GFCM, ICAT and ACCOBAMS;.

2. Work on the determination of Mediterranean Good Environmental Status (GES) and targets during the next biennium through a participatory process involving MAP components, contracting parties and scientific community, with the leadership role by the Coordinating Unit with the view of submitting the proposed Mediterranean GES and targets by the meeting of the Contracting Parties in 2013;

3. Prepare in cooperation with Contracting Parties, MAP components and competent partner organizations and with a leadership role by Blue Plan an in-depth socio-economic analysis developed through a common methodology for the consideration of the Contracting Parties meeting at its 18th meeting;

4. Develop a MAP-Barcelona Convention policy on assessments in the framework of the implementation of the ECAP

5. Work in 2012-2013, with SPA/RAC, with the national authorities and the relevant organisations to (i) evaluate the progress made so far in the implementation of the Strategic Action Programme for the conservation of Biodiversity in the Mediterranean (SAPBIO) adopted by the 13th Meeting of the Contracting Parties (Catania, 2003); (ii) to define the orientations of SAPBIO at national and regional levels for the coming years, in accordance with the Mediterranean Ecological Objectives and the Aichi targets; and, (iii) to investigate options for ensuring appropriate financial support for the implementation of SAPBIO at national and regional levels;

6. Establish and make operational, through INFO/RAC, by 2013, at the latest, an information system to support the implementation of ecosystem approach and MAP integrated monitoring system;

7. Develop with the participation of and contribution from all MAP components and with a leadership role by INFO/RAC a MAP/Barcelona Convention data sharing policy taking into account the SEIS data sharing principles and with due consideration of access rights and confidentiality for the consideration of MAP Focal Points and 18th Contracting Parties meeting;

8. Ensure the implementation of this decision through the operational activities of MAP/Barcelona Convention and its integration in the next Strategic and 2-year Programme of work;

9. Ensure that MAP/Barcelona Convention regional policies become coherent with the ecosystem approach progress and outcome and in particular to consider systematically the ECAP indicators when coordinating work of the various MAP components, or evaluating efficiency of MAP actions;

10. Consider the work carried out for the implementation of the Ecosystem Approach by all MAP components where appropriate;

11. Undertake under the guidance of the Bureau of the Contracting Parties the necessary analysis to enhance MAP/Barcelona Convention governance structure with the view to implementing the ecosystem approach for the consideration of the 18th meeting of the Contracting Parties;

12. Continue supporting the Contracting Parties in their efforts to implement the other steps of the road map according to the agreed timeline and enhance cooperation with partners and stakeholders and other global and regional process in particular with the EU common MSFD implementation strategy;

13. Mobilize resources for supporting financially the application of ecosystem approach by MAP as a means to effectively achieve the objectives of the MAP/Barcelona Convention.

Annex I

Summary for Decision-Makers

of the Initial Integrated Assessment of the Mediterranean Sea and Coastal Areas Carried out as part of Step 3 of the road map for the application of the Ecosystem Approach

The commitment by the Contracting Parties of the Barcelona Convention for the Protection of the Mediterranean Sea to an Ecosystem Approach signals recognition of the immense value of the region's seas and coasts, and the singular importance of promoting management that allows for sustainable use.

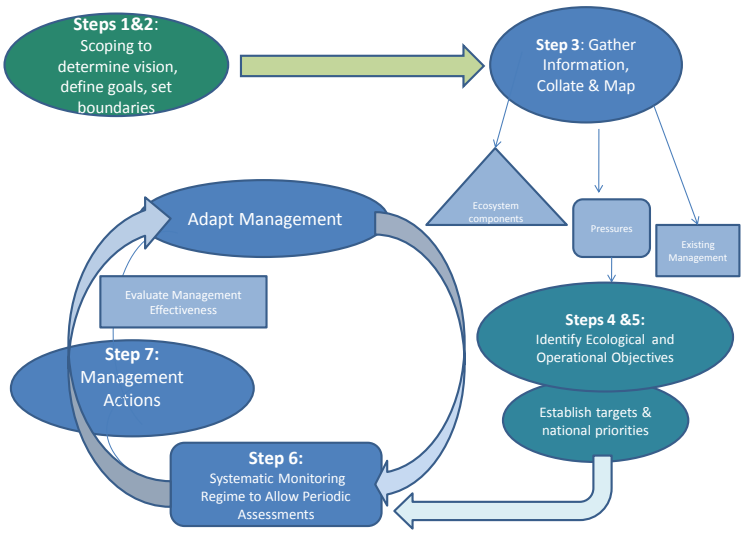
Mediterranean marine and coastal systems are at risk, and as a result, so too are the communities and countries that border the Basin. However, the Mediterranean Action Plan / Barcelona Convention and its 7 associated protocols offer an excellent foundation for coordinated and effective management of the Mediterranean Sea and its coastal areas. Contracting Parties have committed to the progressive application of the Ecosystem Approach (EA) to the management of human activities, and have moved forward to lay the groundwork for policy formulation that addresses priority threats and improves understanding of management needs.

The seven step EA process to which they have agreed is rational and strategic, and comprises: 1) establishing the vision for an ecosystem approach throughout the Mediterranean; 2) elaborating three strategic goals to achieve this vision; 3) undertaking an initial assessment to determine priority issues, information availability as well as gaps that need to be filled; 4) deciding on ecological objectives; 5) determining operational objectives and associated indicators and identifying targets or thresholds for those indicators; 6) developing a monitoring strategy; and 7) elaborating specific management plans and actions that will ensure that ecological objectives and strategic goals are met, moving the Mediterranean countries effectively towards their vision for marine and coastal management.

This Ecosystem Approach goes beyond examining single issues, species, or ecosystem functions in isolation. Instead it recognizes ecological systems for what they are: a rich mix of elements that interact with each other in important ways. This is particularly important for coasts and oceans. A commercially valuable fish species may depend on a range of widely separated habitats over its life, depending on whether it is young or adult, feeding, spawning or migrating – this being one example of how human well-being and economies are inextricably linked to intact natural habitats. The connection between human welfare and the health of the environment can be described as "ecosystem services" whereby marine and coastal systems provide a wide range of valuable resources and functions to human communities. To ensure the health and economic vitality of communities in the region, therefore, ocean functions must be sustained and protected. This means managing them in a way that acknowledges the complexity of marine ecosystems, the connections among them, and their links with land and freshwater as well.

However, before countries collectively adopt an Ecosystem Approach, it is necessary to take stock of environmental conditions and trends. Assessing the information available on coastal and marine ecosystems and their services in the Mediterranean Basin is thus a crucial step (see EA planning diagram below). The Initial Integrated Assessment (IIA) completed during 2010-2011 represents step 3 in the EA process: collating information on the overall nature of ecosystems in the Mediterranean, including physical and ecological characteristics, drivers and pressures that affect the state of the marine environment, conditions or state of the coastal and marine ecosystems, and expected response of ecosystems if trends continue,

where feasible. The goals of the IIA are to define the major basin-wide priority issues to be addressed by the EA and to determine where information that is being gathered within MAP/Barcelona Convention system, combined with published studies, could eventually suffice to elucidate management priorities. The converse of this goal is also important: determining where gaps exist, in order to improve scientific research and monitoring being undertaken by Mediterranean countries so as to provide an adequate foundation for effective and efficient ecosystem-based management going forward.



For the purposes of the IIA, the Contracting Parties provided information, in snapshot as well as longer-term time series, on the physical, chemical, and biological features of the Mediterranean Sea. This information was combined with information from international bodies on uses, pressures, and impacts, to first develop four sub-regional and thematically-oriented assessments, and subsequently an over-arching assessment that attempts to synthesize information from the four subregions. The focus of information gathering and analysis was on status and trends in pressures already identified as important, and reflected in the foci of the Convention's protocols, with the aim of harnessing this information to further an ecosystem approach to coastal and marine management throughout the Mediterranean.

The four subregions of the Mediterranean (see below), as defined by the Contracting Parties for practical reasons and the unique purpose of the initial assessment, present a conglomerate of linked coastal and marine ecosystems, with many shared resources, species and common approaches to both environmental monitoring and management. Each of the major pressures or classes of threat identified by national monitoring, the research undertaken by scientific institutions, and the analysis of multilateral agencies and programs such as MAP, occur across all four subregions – but the priority issues are different in each. This is partly based on the underlying physical and biological characteristics of each subregion, and the degree to which various impacts are being felt by the marine ecosystems within them. The characteristics of each subregion are described briefly below.

The four subregions of the Mediterranean, as defined for practical reasons and for the unique purpose of the initial assessment.

The Western Mediterranean subregion has a high level of industrialization and coastal development-related habitat loss and alteration in this region – especially on the north coasts. Tourism drives much of the coastal development and pressure on resources, and tourism is behind much of the degradation of coasts and nearshore waters. In addition to the physical alteration of the environment and the degradation caused by pollution and loss of key habitats, growth in tourism and urbanization drive increasing pressure on resources, including freshwater (limiting availability in wetlands and estuaries and increasing the need for desalination, with its attendant pollution impacts) and fisheries. In the southern portion of this subregion, population growth along the coast has led to degradation from sewage inputs and run-off. Maritime industries, including shipping, energy development, and aquaculture also degrade the environment and impact biodiversity, causing localized pollution as well as broader impacts on the delivery of ecosystem services due to trade-offs.

The Central Mediterranean and Ionian subregion experiences some of the same pressures and drivers, though the major impacts are somewhat different from the western Mediterranean, in part because of the differing physical characteristics of this subregion. There is no direct exchange with waters of the Atlantic, and in contrast to the wide open basin of the western subregion, the central subregion has complex bottom topography and numerous straits through which water masses and species pass. Coastlines are generally not as highly developed as in the Western Mediterranean, though urbanization is a factor in some localized areas. Fishing is a major pressure on species and ecosystems, both due to over-exploitation and incidental catch or by-catch, and due to the use of destructive fishing methods, including dynamite fishing, bottom trawling, and destructive removal of deep corals. Shipping pressures are concentrated in the straits between the African continent and the southern Sicilian coast, and nutrient over-enrichment from sewage and run-off puts the southeastern portion of this subregion at risk of hypoxia.

The Adriatic Sea is a semi-enclosed sea within a semi-enclosed sea; given its limited water exchange, agricultural inputs and urbanization along its western flank, and its relative shallowness, eutrophication is a major issue. Although point source pollution by toxic contaminants has been largely controlled and toxic pollution is confined to a few localized industrial areas, run off and inadequately treated sewage continues to upset the nutrient

balances of the narrow sea, leading to algal blooms, mucilages, and spreading hypoxia. Climate changes may be exacerbating the impacts of these pressures, as well as compounding the effects of invasive species in the subregion. Fisheries over-exploitation is also identified as a pressure, especially in the northern reaches of the central Adriatic. Yet despite the pressures, the Adriatic Sea is remarkably diverse and productive, with a variety of ecosystems providing valuable ecosystem services. Tourism is important to the region, as are fisheries. The Adriatic is also noteworthy in that several of the countries within this subregion have been exploring ways to coordinate research and management, setting the stage for a facilitated movement towards an ecosystem approach.

The Eastern Mediterranean subregion is perhaps the least known of the four subregions delineated for the initial assessment. This subregion is also very diverse in large-scale biodiversity: extensive archipelagos exist in the north, while a wide shelf with alluvial sediments is found around the Nile Delta to the south. The coastline and bottom topography is highly varied, as are the human uses of coasts and seas. While all the pressures that exist throughout the Mediterranean are found within this subregion as well, invasive species and climate change are the top issues of concern. Spreading hypoxia and lowered water quality result from untreated sewage inputs, desalination effluents, and urban run-off. The trends in water quality, invasive species spread, and tropicalization from climate change have not yet devalued this subregion. The northern portion remains one of the primary coastal tourist destinations in the world, and coastal communities throughout the region continue to depend on marine resources.

To the extent this information synthesis provides a common approach to assessment, it has begun to highlight how different threats or pressures have differing levels of importance in each region. Thus pressure-state-impact-response varies, and this initial assessment can only begin to tease out why these responses may be different in different areas. Nonetheless, while the subdivision of the Mediterranean into four regions facilitated the initial assessment, there is great value in synthesizing the information across regions at a Mediterranean-wide level in order to guide the ecosystem approach.

The region is now on track to lead to strategic activities across the Mediterranean at three different levels: 1) at the basin level, where having standardized Ecological Objectives, Operational Objectives, and Indicators will put everyone on the same page and allow future assessments to tell states what they need to know; 2) at the national level, with countries being guided through a standardized process for determining priorities and developing in-country management actions; and 3) at the site level, where management tools such as protected areas, regional fisheries measures, cooperation to study or protect areas within Areas Beyond National Jurisdiction (ABNJ), and bilateral (transboundary) agreements to reduce pollution loading, could take place.
An overview of all four subregions, taken together with a review of literature on Mediterranean ecology overall, suggests that commonalities may be more pervasive than are differences between subregions. Common to all regions is the recognition that certain coastal and marine habitats deliver extremely valuable ecosystem services that benefit all Mediterranean inhabitants. These multiple services are provided by a wide range of natural habitats, and include not only fisheries resources and tourism values (things for which economic values can be ascertained relatively easily), but also waste assimilation, medium for transport, ability to buffer land from storms, and maintaining ecological balances that make life on Earth possible.

In an attempt to prepare a preliminary analysis of the known economic value of some of these services, the UNEP/MAP Blue Plan Regional Activity Center produced an initial Mediterranean marine ecosystem services valuation report. The study concludes that across the Mediterranean region, ecosystem service benefits may exceed 26 billion euros annually. The bulk of these estimated economic benefits (more than two thirds) come from tourism and

the value of nature supporting such tourism. Other valuable services supported by the studied habitats include provisioning of seafood, waste assimilation, coastal stabilization and erosion prevention, and carbon sequestration, which contribute to the total value with amounts within the same order of magnitude. While the findings of the study are under review, the magnitude of the value estimates for the different ecosystem services studied suggest the relative importance of certain types of habitats and resources in supporting human well-being throughout the basin. As countries discuss how to move forward together toward a more ecosystem-based approach to marine management, priorities may center on those habitats that provide the bulk of these economically, ecologically, and culturally valuable services.

Despite increasing bodies of knowledge due in part to the emerging science of valuation highlighting the value of Mediterranean coastal and marine environments, degradation continues due to direct uses and indirect impacts on ecosystems. The pressures and impacts that are common to all four subregions include:

- **coastal development and sprawl,** driven by urbanization and tourism development, leading to habitat loss and degradation, and erosion/ shoreline destabilization

- **overfishing**, and incidental or by-catch, affecting community structure, ecological processes, and delivery of ecosystem services

- **destructive fishing, including bottom trawling and fishing methods resulting in benthic disturbance**

- **contamination of sediments and biota caused by pollution, primarily from urbanization and industry, but also from anti-foulants and atmospheric inputs of hazardous compounds**

- **nutrient over-enrichment, leading sometimes to eutrophication and hypoxia, more regularly leading to ecological imbalances (reduced water quality and growth of algae)**

- **disturbance and pollution caused by maritime industries, including shipping, energy, aquaculture, and desalination (operational as well as disaster-related)**

- **invasive species spread, in many cases mediated by climate changes**

- **degradation of transitional or estuarine areas, which serve as critical nursery areas for commercial fisheries and also support unique assemblages of species**

Additionally, the initial assessment provides some information on ecologically important, biologically diverse, or vulnerable areas, and the potential biodiversity loss (inferred but not yet quantified) that emerges as a priority issue across the whole of the Basin. However, there may be other drivers of change to ecosystems and attendant delivery of ecosystem services that have not been highlighted as basin-wide in the assessment, due to lack of information available across the whole of the Basin. This includes anthropogenic impacts from changing hydrodynamics and sediment delivery (through dams, freshwater diversion, etc.) from watersheds, as well as coastal constructions, which both contribute to changes to shoreline stability and potentially exacerbate sea level-induced erosion.

Since the 2006 UNEP/MAP - EEA report on Priority issues in the Mediterranean environment, some changes in condition are apparent. Improvements in water quality are

discernable in many places, thanks to strategic efforts to reduce pollutant loading. Quantities of hazardous substances such as DDT and heavy metals are declining in most areas. New issues, however, are emerging which warrant attention. Desalination and its effects, particularly with respect to brine release, should be better investigated. The increasing uses of coastal and ocean space for aquaculture, including the grow out operations for bluefin tuna, bring with them the threat of increased pollution, eutrophication, invasive species and pathogen releases, and increased conflicts over reduced access and availability of space for other uses. And impacts on ecology and economy caused by invasive species continue to grow in the region, warranting more serious attempts to prevent new invasions and to control, where possible, impacts caused by these species.

It should be emphasized that the IIA is not a compilation of all scientific information on the Mediterranean Sea and its uses. Care was taken to balance the assessment across the significant variability that exists in availability of information, and across sometimes incompatible datasets. Furthermore, because knowledge was derived from information already being collected for other purposes (for instance to meet obligations under the Convention's protocols), and not from the sort of comprehensive and systematic monitoring program for integrated management that will eventually be adopted under EA, the initial assessment is important not just for summarizing the state of the art, but also for highlighting gaps in data and information. As such, the assessment guides the crucial regionally coordinated approach to monitoring that will emerge from the Ecosystem Approach process in the future.

One key information gap concerns the ability to uniformly assess pressures and states, in order to formulate responses. With the exception of localized pollutants and nutrient and organic matter enrichment, data for some countries is limited, whereas for others it is more extensive. Some countries have begun to assess climate change impacts and have research oriented towards emerging issues such as noise pollution and cumulative impacts assessments, whereas other countries with more limited human and financial resources are focusing at the national level on their obligations under the various Barcelona Convention protocols. It is expected that the rationalized monitoring program that will flow from the ecological and operational objectives will overcome these barriers to understanding pressure-state-impact-response across a wide span of inter-related impacts from human activity. A further gap that the assessment points to is the strong bias towards understanding the ecology and human impacts on shallow water environments, particularly rocky bottoms and intertidal areas, as well as seagrass meadows. While some descriptions of biodiversity and the ecosystem services that flow from other habitats is available, systematic information on pressures and state have not been compiled – with the exception of special transitional and marine areas (such as within protected areas, in Natura 2000 sites in EU countries, etc.). A rationalized system of monitoring using key indicators will overcome these discrepancies in focus.

In line with the Ecosystem Approach, every attempt was made to focus on ecosystem services in coastal and marine areas that are of value to the Mediterranean countries. However, because the study of ecosystem services is still in its infancy everywhere in the world, the assessment has utility in pointing to gaps in information about how communities and nations depend on and value these ecosystems – gaps which if filled could steer Mediterranean countries towards an effective, efficient, coordinated response to the growing pressures being exerted on Mediterranean coasts and marine ecosystems. The conclusions arising from the assessment also have implications for how to raise awareness about the value of Mediterranean ecosystems and their services, with the eventual outcome of improved management.

The Initial Integrated Assessment process has thus helped to highlight commonalities, and possible priorities that should serve as foci for subsequent steps in the Ecosystem Approach.

It has also been extremely useful in highlighting information gaps serving as the foundation to support the next steps in the EA process. These steps include the determination of ecological objectives that reflect common issues for marine management at the regional scale, the determination of operational objectives, indicators, and targets, which will help steer future monitoring and guide decision-making; and the development of management plans at sub-regional, national, or local levels, based on the robust information that will flow from an integrated monitoring regime in the future.

Annex II

Proposed Ecological Objectives

1 Biodiversity

Ecological Objective	Operational Objectives	Indicators
Biological diversity is maintained or enhanced. The quality and occurrence of coastal[1] and marine habitats[2] and the distribution and abundance of coastal[3] and marine species[4] are in line with prevailing physiographic, hydrographic, geographic and climatic conditions.	**1.1 Species distribution is maintained**	1.1.1 Distributional range
		1.1.2 Area covered by the species (for sessile/benthic species)
	1.2 Population size of selected species is maintained	1.2.1 Population abundance
		1.2.2 Population density
	1.3 Population condition of selected species is maintained	1.3.1 Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/ mortality rates)
	1.4 Key coastal and marine habitats are not being lost	1.4.1 Potential / observed distributional range of certain coastal and marine habitats listed under SPA protocol
		1.4.2 Distributional pattern of certain coastal and marine habitats listed under SPA protocol
		1.4.3 Condition of the habitat-defining species and communities

[1] By coastal it is understood both the emerged and submerged areas of the coastal zone as considered in the SPA/BD Protocol as well as in the definition of coastal zone in accordance with Article 2e and the geographical coverage of Article 3 of the ICZM Protocol

[2] Regarding benthic habitats currently, sufficient information exists to make a prioritization amongst those mentioned in the UNEP/MAP - RAC/SPA list of 27 benthic habitats and the priority habitats in areas beyond national jurisdiction following CBD decisions VIII/24 and VIII/21 paragraph 1 . These could include from shallow to deep: biocoenosis of infralittoral algae (facies with vermetids or trottoir), hard beds associated with photophilic algae, meadows of the sea grass Posidonia oceanica, hard beds associated with Coralligenous biocenosis and semi dark caves, biocoenosis of shelf-edge detritic bottoms (facies with Leptometra phalangium), biocoenosis of deep-sea corals, cold seeps and biocoenosis of bathyal muds (facies with Isidella elongata). Amongst pelagic habitats upwelling areas, fronts and gyres need special attention and focus.

[3] By coastal it is understood both the emerged and submerged areas of the coastal zone as considered in the SPA/BD Protocol as well as in the definition of coastal zone in accordance with Article 2e and the geographical coverage of Article 3 of the ICZM Protocol

[4] On the basis of Annex II and III of the SPA and Biodiversity Protocol of the Barcelona Convention

2 Non-indigenous species

Ecological Objective	Operational Objectives	Indicators
Non-indigenous[5] species[6] introduced by human activities are at levels that do not adversely alter the ecosystem	**2.1 Invasive non-indigenous species introductions are minimized**	2.1.1. Spatial distribution, origin and population status (established vs. vagrant) of non-indigenous species
		2.1.2 Trends in the abundance of introduced species, notably in risk areas
	2.2. The impact of non-indigenous particularly invasive species on ecosystems is limited	2.2.1 Ecosystem impacts of particularly invasive species
		2.2.2 Ratio between non-indigenous invasive species and native species in some well studied taxonomic groups

[5] The term non-indigenous refers to an organism that may survive and subsequently reproduce, outside of its known or consensual range. Non-indigenous may be further characterized as un-established or vagrant, established, invasive and noxious or particularly invasive. Occhipinti-Ambrogi and Galil (2004). Marine Pollution Bulletin 49 (2004) 688–694. doi:10.1016/j.marpolbul.2004.08.011

[6] The list of priority (indicator) species introduced by human activities will be derived by consensus, based on information from the CIESM Atlas of Exotic Species in the Mediterranean and the DAISIE project (European Invasive Alien Species Gateway) a database tracking alien terrestrial and marine species in Europe

3 Harvest of commercially exploited fish and shellfish

Ecological Objective	Operational Objectives	Indicators
Populations of selected commercially exploited fish and shellfish[7] are within biologically safe limits, exhibiting a population age and size distribution that is indicative of a healthy stock	**3.1 Level of exploitation by commercial fisheries is within biologically safe limits**	3.1.1 Total catch by operational unit[8]
		3.1.2 Total effort by operational unit
		3.1.3 Catch per unit effort (CPUE) by operational unit
		3.1.4 Ratio between catch and biomass index (hereinafter catch/biomass ratio).
		3.1.5 Fishing mortality
	3.2 The reproductive capacity of stocks is maintained	3.2.1 Age structure determination (where feasible)
		3.2.2 Spawning Stock Biomass (SSB)

[7] The choice of indicator species for collecting information for Ecological Objective 3 should be derived from fisheries targeting species listed in Annex III of Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (species whose exploitation is regulated) and the species in the GFCM Priority Species list (http://www.gfcm.org/gfcm/topic/166221/en). Choice of indicators should cover all trophic levels, and if possible, functional groups, using the species listed in Annex III of SPA and/or, as appropriate the stocks covered under regulation (EC) No 199/2008 of 25 February 2008 concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy

[8] Operational unit is “the group of fishing vessels which are engaged in the same type of fishing operation within the same Geographical Sub-Area, targeting the same species or group of species and belonging to the same economic segment”

4 Marine food webs

Ecological Objective	Operational Objectives	Indicators
Alterations to components of marine food webs caused by resource extraction or human-induced environmental changes do not have long-term adverse effects on food web dynamics and related viability	**4.1 Ecosystem dynamics across all trophic levels are maintained at levels capable of ensuring long - term abundance of the species and the retention of their full reproductive capacity**	4.1.1 Production per unit biomass estimates for selected trophic groups and key species, for use in models predicting energy flows in food webs
	4.2 Normal proportion and abundances of selected species at all trophic levels of the food web are maintained	4.2.1 Proportion of top predators by weight in the food webs
		4.2.2 Trends in proportion or abundance of habitat-defining groups
		4.2.3 Trends in proportion or abundance of taxa with fast turnover rates

5 Eutrophication

Ecological Objective	Operational Objectives	Indicators
Human-induced eutrophication is prevented, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters.	**5.1 Human introduction of nutrients in the marine environment is not conducive to eutrophication**	5.1.1 Concentration of key nutrients in the water column
		5.1.2 Nutrient ratios (silica, nitrogen and phosphorus), where appropriate
	5.2 Direct effects of nutrient over-enrichment are prevented	5.2.1 Chlorophyll-a concentration in the water column
		5.2.2 Water transparency where relevant
		5.2.3 Number and location of major events of nuisance/toxic algal blooms caused by human activities[9]
	5.3 Indirect effects of nutrient over- enrichment are prevented	5.3.1 Dissolved oxygen near the bottom, i.e. changes due to increased organic matter decomposition, and size of the area concerned*[10]

6 Sea-floor integrity

Ecological Objective	Operational Objectives	Indicators
Sea-floor integrity is maintained, especially in priority benthic habitats[11]	**6.1 Extent of physical alteration to the substrate is minimized**	6.1.1 Distribution of bottom impacting activities[12]
		6.1.2 Area of the substrate affected by physical alteration due to the different activities[12]
	6.2 Impact of benthic disturbance in priority benthic habitats is minimized	6.2.1 Impact of bottom impacting activities[12] in priority benthic habitats
		6.2.2 Change in distribution and abundance of indicator species in priority habitats[13]

[9]The connection between eutrophication and toxic algal blooms is subject of devoted research at the moment. The connection between the two is not clearly established as not all the ecosystems react in the same way. In fact recent surveys in UK/Ireland in the framework of OSPAR have allowed concluding on the lack of relation between the them and therefore the number and location of major events of nuisance/toxic algal blooms should always be regarded cautiously as an indicator of a direct effect of nutrient over-enrichment.

[10]Monitoring to be carried out where appropriate

[11] e.g. coastal lagoons and marshes, intertidal areas, seagrass meadows, coralligenous communities, sea mounts, submarine canyons and slopes, deep-water coral and hydrothermal vents

[12] e.g bottom fishing, dredging activities ,sediment disposal, seabed mining, drilling, marine installations, dumping and anchoring, land reclamation, sand and gravel extraction

[13]Indicator species to be used to assess the ecosystem effects of physical damage to the benthos could refer to disturbance-sensitive and/or disturbance-tolerant species, as appropriate to the circumstances, in line with methodologies developed to assess the magnitude and duration of ecological effects of benthic disturbance.

7 Hydrography

Ecological Objective	Operational Objectives	Indicators
Alteration of hydrographic conditions does not adversely affect coastal and marine ecosystems.	**7.1 Impacts to the marine and coastal ecosystem induced by climate variability and/or climate change are minimized**	7.1.1 Large scale changes in circulation patterns, temperature, pH, and salinity distribution
		7.1.2 Long term changes in sea level
	7.2 Alterations due to permanent constructions on the coast and watersheds, marine installations and seafloor anchored structures are minimized	7.2.1. Impact on the circulation caused by the presence of structures
		7.2.2 Location and extent of the habitats impacted directly by the alterations and/or the circulation changes induced by them: footprints of impacting structures
		7.2.3 Trends in sediment delivery, especially in major deltaic systems
		7.2.4 Extent of area affected by coastal erosion due to sediment supply alterations
	7.3 Impacts of alterations due to changes in freshwater flow from watersheds, seawater inundation and coastal freatic intrusion, brine input from desalination plants and seawater intake and outlet are minimized	7.3.1. Trends in fresh water/sea water volume delivered to salt marshes, lagoons, estuaries, and deltas; desalination brines in the coastal zone
		7.3.2. Location and extent of the habitats impacted by changes in the circulation and the salinity induced by the alterations
		7.3.3 Changes in key species distribution due to the effects of seawater intake and outlet

8 Coastal ecosystems and landscapes

Ecological Objective	Operational Objectives	Indicators
The natural dynamics of coastal areas are maintained and coastal ecosystems and landscapes are preserved	**8.1 The natural dynamic nature of coastlines is respected and coastal areas are in good condition**	8.1.1. Areal extent of coastal erosion and coastline instability
		8.1.2 Changes in sediment dynamics along the coastline
		8.1.3 Areal extent of sandy areas subject to physical disturbance[14]
		8.1.4 Length of coastline subject to physical disturbance due to the influence of manmade structures
	8.2 Integrity and diversity of coastal ecosystems, landscapes and their geomorphology are preserved	8.2.1 Change of land-use[15]
		8.2.2 Change of landscape types
		8.2.3 Share of non-fragmented coastal habitats

[14] Physical disturbance includes beach cleaning by mechanical means, sand mining, beach sand noursihment
[15] Land-use classess according to the classification by Eurostat-OCDE, 1998: http://unstats.un.org/unsd/environment/q2004land.pdf

9 Pollution

Ecological Objective	Operational Objectives	Indicators
Contaminants cause no significant impact on coastal and marine ecosystems and human health	**9.1 Concentration of priority[16] contaminants is kept within acceptable limits and does not increase**	9.1.1 Concentration of key harmful contaminants in biota, sediment or water
	9.2 Effects of released contaminants are minimized	9.2.1 Level of pollution effects of key contaminants where a cause and effect relationship has been established
	9.3 Acute pollution events are prevented and their impacts are minimized	9.3.1 Occurrence, origin (where possible), extent of significant acute pollution events (e.g. slicks from oil, oil products and hazardous substances) and their impact on biota affected by this pollution
	9.4 Levels of known harmful contaminants in major types of seafood do not exceed established standards	9.4.1 Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood[17]
		9.4.2 Frequency that regulatory levels of contaminants are exceeded
	9.5 Water quality in bathing waters and other recreational areas does not undermine human health	9.5.1 Percentage of intestinal enterococci concentration measurements within established standards
		9.5.2 Occurrence of Harmful Algal Blooms within bathing and recreational areas

[16] Priority contaminants as listed under the Barcelona Convention and LBS Protocol
[17] Traceability of the origin of seafood sampled should be ensured

10 Marine litter

Ecological Objective	Operational Objectives	Indicators
Marine and coastal litter do not adversely affect coastal and marine environment[18]	**10.1 The impacts related to properties and quantities of marine litter in the marine and coastal environment are minimized**	10.1.1 Trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and, where possible, source
		10.1.2 Trends in amounts of litter in the water column, including microplastics, and on the seafloor
	10.2 Impacts of litter on marine life are controlled to the maximum extent practicable	10.2.1 Trends in the amount of litter ingested by or entangling marine organisms, especially mammals, marine birds and turtles[19]

11 Energy including underwater noise

Ecological Objective	Operational Objectives	Indicators
Noise from human activities cause no significant impact on marine and coastal ecosystems	**11.1 Energy inputs into the marine environment, especially noise from human activities is minimized**	11.1.1 Proportion of days and geographical distribution where loud, low and mid-frequency impulsive sounds exceed levels that are likely to entail significant impact on marine animals
		11.1.2 Trends in continuous low frequency sounds with the use of models as appropriate

[18] A policy document on marine litter strategy, taking fully into account the activities envisaged for the implementation of the EA roadmap, is being prepared by MEDPOL and will be submitted to the MAP Focal Point for approval. The approved document will be used as the basis for the formulation of an action plan for the reduction of marine litter.
[19] Marine mammals, marine birds and turtles included in the regional action plans of the SPA/BD Protocol.

UNEP/MAP Ecosystem Approach

roadmap projected outputs

Annex III - Ecosystem Approach Initial

- Preparing IA report for four sub regions and on Mediterranean wide commonalities
- Preparing a Mediterranean regional study on ecosystem services
- State of Environment Report (SOER 2011) based on Initial Assessment

Ecological Objectives, Operational Objectives and Indicators

- Development of Ecological Objectives, Operational Objectives and Indicators for Mediterranean wide GES
- Testing the Ecological Objectives, Operational Objectives and Indicators

COP Decision

Determination of Good Ecological Status (GES) and Targets

- Formulation of ToRs and follow-up of socioeconomic and ecosystem services analysis to support target definition
- Definition of the process and methodological approach for the establishment of GES and Targets (2011)
- Pilot Study finalized to support definition of the process and method for the establishment of GES and Targets
- Establishment of GES relative to each Indicator (subject to data availability)
- Establish coordinated Targets per Indicator (subject to data availability)

Development of MAP assessment policy

- Develop MAP assessment policy to address multiple needs for thematic and integrated assessment in the EA framework
- Update/revise a set of effectiveness indicators of the implementation of the Convention and its protocols including the EA

Integrated Monitoring Programme

- Preparing the regional integrated monitoring programme (by mid 2013 if possible)
- Information and GIS system established

UNEP/MAP policies under development to incorporate EA application progress

- Integrate the EA objectives/indicators in the ICZM Protocol Action Plan
- Updating SAP BIO as appropriate.
- Preparing Action plan to implement the Offshore Protocol
- Preparing Action Plan on marine litter
- Review of the management plans of 1-2 SPAMIs

COP Decision

UNEP/MAP Programatic work (ongoing during the whole EA cycle)

- Integrate the activities related to the Ecosystem Approach throught UNEP/MAP policy and action including the 2012-13 and the five year programme of work

Public awareness raising on the Ecoystem Approach

2010												2011												2012												2013											
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12

- Legal transposition of Directive
- Designation of competent authorities
- Communication of subdivision (Art.4)
- List of competent authorities
- For public consultation: draft initial assessment, draft set of characteristics for GES and draft comprehensive set of environmental targets and associated indicators
- Finalised initial assessment, set of characteristics for GES and comprehensive set of environmental targets and associated indicators
- For public consultation: draft monitoring programme

EU MSFD
National implementation

Development of IA, GES, ET+ I → **Public consultation**

Development of mon. programme → **Consultation** → **Dev. of measures**

- Establishment of criteria and methodological standards for GES
- Establishment of guidance on social and economic analysis
- Establishment of reporting formats for data and information in initial assessment
- Assessment report on the contribution of the MSFD to other international obligations, etc.
- Assessment reports on GES, environmental targets and indicators

EU
Common Implementation Strategy

Integrated Monitoring Programme

- Updating national monitoring programme on
- Assessment of needs for implementing the updated national monitoring programmes

Review and development of Action Plans and Programmes of measures to take into account the EA application progress

- New regional plans on LBS protocol identified and developed as appropriate
- Regional plans on endangered species, updated or new ones developed as appropriate
- Regional strategy to combat pollution from ships updated
- Update as appropriate NAPs (LBS) and SAPs (BIO) to reflect the targets and commitments under the regional plans
- Management plans of selected SPA and SPAMIs, adjusted to reflect the EA application progress and other requirements under the Barcelona convention and its protocols as well as commitment under the regional plans
- Establishment of new protected areas, as appropriate and development and implementation of their management plans in order to address priority issues identified by the Initial Assessment as well as EA progress
- National ICZM strategies and coastal plans to take into account EA application progress

COP Decision

Public awareness raising on the Ecoystem Approach

Integrated of Monitoring Programme

- Implementing national monitoring programme in line with the integrated regional one with coordinated support from the Secretariat, where appropriate
- Reporting monitoring data and information on the implementation of the Convention and its Protocols

- SoE report finalised in the form of quality status report and submitted to the CPs meeting

Review and development of Action Plans and Programmes of measures to take into account the EA application progress

- New regional plans on LBS protocol identified and developed as appropriate
- Regional plans on endangered species, updated or new ones developed as appropriate
- Update as appropriate NAPs (LBS) and SAPs (BIO) to reflect the targets and commitments under the regional plans
- Management plans of selected SPA and SPAMIs, adjusted to reflect the EA application progress and other requirements under the Barcelona convention and its protocols as well as commitment under the regional plans
- Establishment of new protected areas, as appropriate and development and implementation of their management plans in order to address priority issues identified by the Initial Assessment as well as EA progress
- National ICZM strategies and coastal plans to take into account EA application progress

COP Decision

Review process and implementation of its outcome

- Coordinated review of national and regional/subregional assessment
- Review progress achieved towards EO, OO, Indicators and Targets
- Evaluation of implementation of regional plans, legally binding measures
- COP decisions to suggest policy/adjustment and revision of monitoring programmes as appropriate and other regional policy instruments

Public awareness raising on the Ecoystem Approach

2014												2015												2016												2017											
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12

EU MSFD
National implementation

- Monitoring programme finalised for implementation
- For public consultation: draft programme of measures
- Programme of measures established
- Entry into operation of programme of measures
- For public consultation: draft review of initial assessment, set of characteristics for GES and comprehensive set of environmental targets and associated

EU
Common Implementation Strategy

Dev. progr. of measures → **Public consultation** →

- Assessment report on programmes of
- Progress report on the establishment of marine protected areas
- Assessment report on monitoring programmes

Development of first review IA, GES, ET+I → **Public consultation** →

- First evaluation report of the implementation of the MSFD (by 2019 at the latest)

Integrated Monitoring Programmes

- Implementing national monitoring programme in line with the integrated regional one with coordinated support from the Secretariat, where appropriate
- Reporting monitoring data and information on the implementation of the Convention and its Protocols

Development and implementation of Action Plans and Programmes of measures to take into account the EA application progress

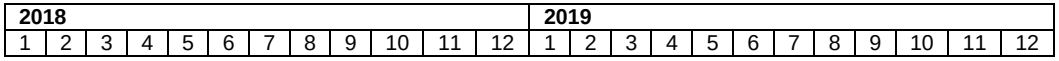
- New regional plans based on LBS protocol identified and developed as appropriate
- Regional plans on endangered species, updated or new ones developed as appropriate
- Updating as appropriate and implement their NAPs (LBS) and SAPs (BIO) to reflect the targets and commitments under the regional plans
- Management plans of selected SPA and SPAMIs, adjusted to reflect the EA application progress and other requirements under the Barcelona convention and its protocols as well as commitment under the regional plans
- Establishment of new protected areas, as appropriate and development and implementation of their management plans in order to address priority issues identified by the EA
- National ICZM strategies and coastal plans to take into account EA application progress

Review process and implementation of its outcome

- Suggest the necessary policy adjustment as appropriate to the meeting of the Contracting Parties in 2019 with regard to, EO, OO, Indicators, Targets and monitoring programme
- Implementation of 2017 COP decisions related to the adjustment as appropriate of the regional policies, legally binding measures and monitoring programme.
- COP 2019 decision to approve the necessary updates and revisions of regional policies and targets, legally binding measures and regional plans.

COP Decision

Public awareness raising on the Ecosystem Approach



EU MSFD
National implementation

Review established of initial assessment, set of characteristics for GES and comprehensive set of environmental targets and associated indicators

For public consultation: draft review of monitoring programme

Development of first review of monitoring programme
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EU
Common Implementation Strategy