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**Annex I Decisions adopted by the conference of the parties to the convention on biological diversity at its fifth meeting, Nairobi, 15-26 May 2000**

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## **1. Preface**

In this document an attempt is made to present the concept of the Ecosystem Approach to the management of human activities in the marine environment. Issues related to its future application to the Mediterranean Sea by the Mediterranean Action Plan are also discussed.

The on going process of establishing a “European Marine Strategy” (EMS) by the European Union, in which the Ecosystem Approach will play a crucial role, is also briefly presented. Regional Marine Conventions, such as the Barcelona Convention and MAP will be closely related to the EMS since they will be called upon to apply it in their respective geographical areas.

The application of the Ecosystem Approach in the Mediterranean will be a long process that will continuously develop and adjust itself on a time scale of at least ten years before it reaches its final stage. A suggestion on how to start the implementation, or in other words a tentative “road map” is also given.

## 2. Introduction

The concept of Ecosystem Approach is not new and goes back to the beginning of the 90's or even earlier. At those times though it was mainly viewed as a novel tool for the scientific study of various ecosystems. It included a large number of theoretical tools and elements of modern biology, physics and chemistry such as the ecosystem theory, the theory of chaos, non-linear systems theory, etc.

Very quickly, though, management issues were also discussed and included in the Ecosystem Approach. Today it is considered mainly as a *management tool* more than anything else. It relies, of course, on a sound scientific knowledge of the ecosystem itself but it has incorporated and developed a large number of concepts regarding the management of human activities that impact on the ecosystem.

The Ecosystem Approach concept 'officially' entered the global environmental community after its adoption (decision V/6) by the Conference of the Parties to the Convention on Biological Diversity held in Nairobi, in May 2000. Additionally, in the conclusions of the World Summit on Sustainable Development (WSSD, Johannesburg, 2002) and more specifically in the so-called Johannesburg Plan of Implementation (JPOI) it *encourages the application by 2010 of the ecosystem approach* in the marine environment.

Since its adoption in 2000, the ecosystem approach to the management of human activities is making its way through almost all regional environmental Conventions and Programs. A broad discussion though, on how to implement it, is still under way and is likely to be there for some time.

The ecosystem approach being a management tool should be applied in the framework of a marine strategy, which would set up a number of goals and objectives to be achieved. It is the main tool for the application of such a marine strategy at any level, including the regional one.

**This document attempts to introduce the whole concept of the Ecosystem Approach together with some elements of a marine strategy as well as some suggestions for its application in the Mediterranean Sea. It aims at opening a discussion within MAP for this important issue and should be only considered as a discussion paper.**

## 3. MAP and the EU Marine Strategy

A European Marine Strategy is being developed during the last two years by the European Commission. Up to now, no real strategy or management tool exists within the EU, which deals in detail with European marine waters (one exception to that, is the Water Framework Directive (WFD) which extends its geographical coverage up to 1 n.m. at sea). The preparation work for a European Marine Strategy has been carried out in various working groups coordinated by the European Commission.

Basic material on the basis of which the European Commission will finalise its proposal prepared by these working groups has been presented and discussed at the second Stakeholders Conference for the European Marine Strategy in Rotterdam (10-12 November 2004). The final proposal for the "Thematic Strategy for the Protection and Conservation of the European Marine Environment", is scheduled to be made by June 2005 in the form of a Communication to Council and the European Parliament. It is foreseen that this will be accompanied by a proposal for a Framework Directive for implementing the strategy within the EU. A detailed presentation of the EMS is beyond the scope of this document.

Because of the nature of the marine environment, it is obvious that success and benefits of the European marine strategy would be seriously curtailed if its application was restricted only to member states. Participants at the Rotterdam Stakeholder Conference concluded that **implementation through existing regional conventions would be essential**. This is even more clearly the case for the Mediterranean Sea because of its semi-enclosed geomorphology. There is therefore a need for a more 'regional' application of the marine strategy. Obviously any legal obligation deriving from the EMS would only apply to member states but non-member states will be invited to join their efforts and to participate in that context. **This is the point where Regional Marine Conventions such as the Barcelona Convention and MAP, OSPAR, HELCOM, and BSC enter the game**. All those regional marine conventions have been invited from the very beginning and have actively participated in the formulation of the EMS. The EMS will be implemented through and with the help of the regional marine conventions (see also below).

#### **4. The Ecosystem Approach**

##### 4.1. Definitions of the Ecosystem Approach

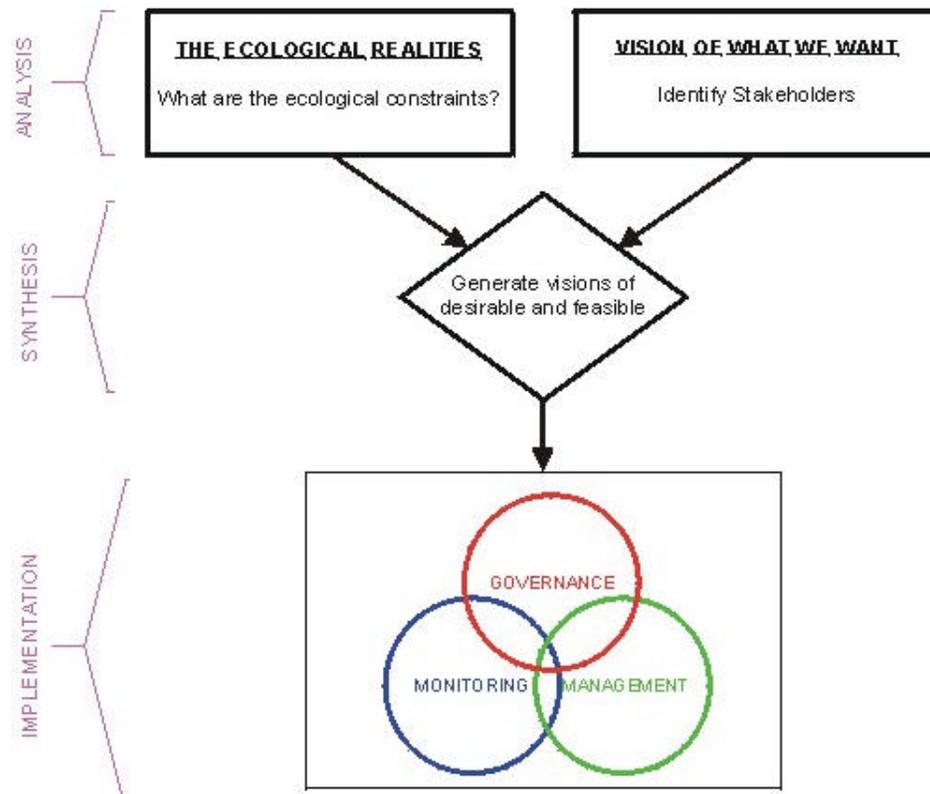
Likewise the complex concept of sustainable development, there is no unique definition of the Ecosystem Approach and one can find a number of such definitions in international literature. In general, the Ecosystem Approach is embedded in the concept of sustainable development, which requires that the needs of future generations are not compromised by the actions of people today. The Ecosystem Approach puts emphasis on a management regime that maintains the health of the ecosystem alongside appropriate human use of the marine environment, for the benefit of current and future generations.

Perhaps the most detailed and structured definition is the one mentioned above which defines the Ecosystem Approach as "a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way" and the ecosystem as "an interacting complex of living communities and the environment, functioning as a largely self-sustaining unit." (Humans are part of the ecosystem). It relies on twelve principles and five operational guidance statements (see Annex I).

The OSPAR Convention describes the Ecosystem Approach as 'a comprehensive integrated management of human activities based on best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.' This description clearly places humans as part of natural ecosystems, and stresses that human activities in these ecosystems must be managed so that they do not compromise ecosystem components that contribute to the structural and functional integrity of the ecosystem.

One can see similarities and some differences between those two definitions. An important thing to bear in mind is that in all definitions or descriptions of the Ecosystem Approach, humans are considered as being part of the ecosystem. This is one of the major novelties introduced by this concept.

In simple terms, the whole process of applying the ecosystem approach may be described by the schematic diagram below :



The various elements of this schematic will be further developed in the following chapters.

#### 4.2. Ecosystem Approach vs. Sustainable Use

To conclude this section of definitions, it is useful to mention another concept, namely that of the “Sustainable Use” of the ecosystem, previously developed in the context of the CBD and other fora. These two concepts have strong similarities but subtle differences as well. In brief, one may say that the ‘sustainable use’ concept is embedded within the concept of “ecosystem approach” which is more general. The latter puts the emphasis on keeping the ecosystem functioning and structure intact and maintaining the ecosystem resilience. In this view, the use of species (e.g. in fisheries) must not only be sustainable at the population or species level, (as it is the case of the Sustainable Use concept) but it must also not weaken the ecosystem in anyway. This might lead to additional constraints in sustainable use and reduce the amount of use that is allowed to take place. *(for a detailed discussion on that interesting issue, refer to IUCN Information Document “Comparing the Ecosystem Approach to Sustainable Use”, November 2003)*

### 5. The main elements of a Marine Strategy in the Mediterranean

As mentioned before, the ecosystem approach is a management tool, which should be used in the framework of an existing marine strategy in order to achieve the goals and objectives set up by the latter.

Many of the elements of such a strategy for the Mediterranean already exist within MAP, namely in the Strategic Action Program (SAPMED), in MEDPOL Phase III, as well as in the Convention itself (see also Annex II)

In general, a structured Marine Strategy could contain the following elements:<sup>1</sup>

- A vision
- Principles
- Strategic Goals and associated Objectives
- The benefits and environmental conditions sought through the implementation of the Ecosystem Approach to the management of human activities

Common principles will underpin the effective implementation of the Ecosystem Approach, and will apply to the planning and the management in all regions. There are many formulations of management principles within the Ecosystem Approach, and the points below, for instance, draw on the Malawi Principles. The proposed principles are:

1. Management should be based on a shared vision and requires stakeholder engagement and participation;
2. Planning and management should be integrated, strategic, adaptive and supported by unambiguous objectives and take a long-term perspective.
3. The geographic span of management should reflect ecological characteristics and should enable management of the natural resources of both the marine and terrestrial components of the coastal zone
4. The management objectives should be consistent with the requirement for sustainable development and reflect societal choices. They should address the desired quality status of the structure and dynamic functions of the ecosystem;
5. Management should be based upon the precautionary principle, the polluter-pays principle and the prevention principle. Best Available Technologies (BAT) and Best Environmental Practices (BEP) should be applied;
6. Management should be supported by co-ordinated programmes for monitoring, assessment, implementation and enforcement and by peer reviewed scientific research and advice and make the best use of existing scientific knowledge.

The Strategic Goals should be common across all areas, all uses and all sectors. The Strategic Goals that are under discussion are:

- A. To protect, allow recovery and, where practicable, restore the function and structure of marine biodiversity and ecosystems in order to achieve and maintain good ecological status of these ecosystems.
- B. To phase out pollution<sup>2</sup> in the marine environment so as to ensure that there are no significant impacts or risk to human and/or on ecosystem health and/or on uses of the sea.
- C. To contain the use of marine services and goods and other activities in marine areas to levels that are sustainable and that do not compromise uses and activities of future generations nor the capacity of marine ecosystem to respond to changes.
- D. To apply the principles of good governance, both within Europe and globally.

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<sup>1</sup> Thematic Strategy for the Protection and Conservation of the European Marine Environment

<sup>2</sup> In the context of this document, pollution is defined in accordance with United Nations Convention of the Law of the Sea as “the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.” This includes pollution by hazardous substances, nutrients, litter and radioactive substances.

The first and second Strategic Goals address directly the quality of the marine environment. This is the subject of the guidance provided in this document. Strategic Goal C addresses human uses of marine ecosystems, and will be pursued through setting and achieving social and economic objectives for these uses. Such objectives will have to be set at regional or national level and guidance on these inherently regional activities will not be provided in this document. Likewise, Strategic Goal D, on good governance will form a part of the institutional framework for the Ecosystem Approach, and therefore falls outside the scope of the guidance provided here. While guidance on setting Objectives for Strategic Goals C and D will not be provided here, it is stressed that all objectives need to be reconciled, so that they can be pursued and achieved together. This reconciliation will be important at every level, but will have particular importance at the regional scale where implementation and programme delivery will occur.

In various forms, Strategic Goals A and B have long been goals of management of most human activities, so moving to the Ecosystem Approach is an evolutionary step, not a revolutionary one. However, the Ecosystem Approach highlights the need to approach the Goals systematically and in a coordinated manner. Looked at this way, two deficiencies in the *status quo* are apparent.

- (1) First, the existing policy instruments operate largely independently. In moving to the Ecosystem Approach there is a clear need to address interactions and cumulative effects among:

- a) multiple uses of marine ecosystem components
- b) multiple impacts of most human activities
- c) multiple policy instruments used to manage the uses

Most sectoral policies address diverse uses, impacts, and major ecosystem components like fish, seabirds, water quality, and habitat features separately. One of the major challenges for the implementation of the Ecosystem Approach to human activities is to create the appropriate institutional framework to deliver the integration required to achieve the goals and objectives. The benefits that result from developing such a framework will be larger than the sum of the individual payoffs for each sector.

- (2) Second, the concept of a 'healthy' ecosystem needs to be reconciled across sectors and policy instruments. For example, a 'healthy' ecosystem from the perspective of chemical contamination might be an ecosystem with no contaminant loading (un-impacted), while a 'healthy' ecosystem from the perspective of fishery managers is one that is impacted until the fishery provides the maximum sustainable economic and social benefits to society. This highlights the need for a forum in which different societal sectors with different values can express their values and reach a common description of what they want management to achieve. While this document mainly provides guidance on the delivery of Strategic Goals 1 and 2 at a regional scale, there is a strong and direct relationship between the policy framework (visions, goals and objectives) and regional implementation.

Regional implementation will be supported by Ecological Objectives that are consistent with the Vision and Strategic Goals. The management measures needed to meet Ecological Objectives will be determined by Operational Objectives. Operational Objectives are specific and tractable objectives that can be achieved through the application of a management measure. For each Operational Objective, there will be associated indicators and reference points. This guidance document explains the process of setting Ecological Objectives and Operational Objectives, their ideal properties, how they interact, and how they support the Ecosystem Approach at any spatial scale.

## 6. The Ecosystem Approach in the marine environment

The application of the Ecosystem Approach in the marine environment must take into account the linkages between the terrestrial and marine environment and recognise that actions on land can affect the marine environment. Decisions on appropriate management actions will need to take into account environmental variation and natural change.

The Ecosystem Approach strives to ensure that those human activities and demands that have an actual or potential impact on the marine environment are managed effectively. The Ecosystem Approach does not require control of the natural processes of ecosystems; only that these must be considered in managing human activities. The Ecosystem Approach to management is based on a long-term perspective, and highlights the dependence of economic and social sustainability on ecological sustainability. Ecological sustainability will be achieved by setting and achieving Ecological Objectives that protect ecosystem structure and function from serious or irreversible harm. Economic and Social Objectives should be met without compromising Ecological Objectives. Achieving the appropriate balance between Ecological, Economic and Social Objectives requires that Ecological Objectives, and the associated Operational Objectives, should be set on geographical scales comparable with Economic and Social Objectives.

### 6.1. Management regions and Eco-Regions<sup>3</sup>

The Vision, the strategic goals and objectives, and the principles should apply to the marine environment as a whole. This means that the area in question should include all waters under national jurisdiction including coastal waters and will, in some sea areas, also include waters outside national jurisdictions.

The Marine Strategy will be implemented at many scales, ranging from local to pan-European. The application of the Ecosystem approach requires Ecological Objectives, Indicators, Targets and Limits that can be applied at all these scales. However, if there are activities taking place outside the area of implementation with impacts inside the area then these must be taken into account when defining actions to avoid or remediate impacts. Whereas some Ecological Objectives could be the same in all areas or at all geographical scales, such as the ambition to limit harmful substance to levels that do not threaten the health of the ecosystem including humans, other Ecological Objectives and associated Operational Objectives would apply at scales ranging from local to regional.

Since the Marine Strategy will be implanted at many scales, to achieve consistency it will be necessary to identify individual management regions for which Ecological and Operational Objectives will be defined. Ecosystem boundaries are typically based on biological and physical processes. The boundaries of the management regions should therefore be primarily based on biogeographic and oceanographic features. By doing so, management regions will be characterised by similarity in biogeographic and oceanographic characteristics among sites within the same management regions. This enhances the opportunities to pursue management objectives in consistent and orderly ways within each region. The process of identifying appropriate boundaries between regions should also take account of existing political, social, and economic and management divisions, since this is likely to reduce conflicts and inconsistencies in the management process and increase the probability of meeting Ecological Objectives. However, it is recognised that all boundary problems cannot totally be avoided given ongoing changes in patterns of human activity and the environment, as these are subjected to changes over time as well as variation in human.

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<sup>3</sup> Guidance on the application of the Ecosystem Approach to Management of Human Activities in the European Marine Environment

When selecting management regions, some of the biogeographic characteristics to consider will include the composition of faunal communities and patterns of primary production. Appropriate physical oceanographic characteristics to consider include depths, basin morphology, tidal and ocean currents, temperature or degree of seasonal stratification. Identification of management regions should also take account of the links between the marine and terrestrial environment, including patterns of land use and distribution and density of human populations. Appropriate human activities may be fisheries, mineral extraction, energy and shipping.

A working group has been established by the commission at ICES, with the participation of the regional conventions, to discuss the division of all European waters into eco-regions based on the criteria mentioned above. Eco-regions will form the basic *regional* management units for the application of the strategy and of the ecosystem approach. The Ecosystem approach will have to be implemented on all scales going from regional to national and local level, but Eco-regions are the smaller scale geographical areas where *regional* Ecological and Operational objectives will apply (see above).

MAP Secretariat has suggested to the ICES working group the subdivision of the Mediterranean Sea into four Eco-regions (see Annex III):

- The Western Mediterranean Sea
- The Adriatic Sea
- The Ionian Sea
- The Aegean-Levantine Sea

## 6.2. Objectives, Indicators, Limits and Targets<sup>3</sup>

### 6.2.1. Qualities of good Objectives

Unambiguous Ecological and Operational Objectives are needed to underpin the implementation of the Ecosystem Approach. Ecological and Operational Objectives will be required at all scales, from local to regional to ecosystems. At all scales, effective Ecological and Operational Objectives should be SMART:

- (1) Specific. Objectives should clearly specify the state to be achieved and be interpreted unambiguously by all Stakeholders
- (2) Measurable Good Objectives should relate to measurable properties of ecosystems and human societies, so that Indicators and Reference Points can be developed to measure progress towards the Objective.
- (3) Achievable. Good Objectives should not conflict. Within an effective management framework, it should be possible to achieve all Objectives. Good Objectives should describe a state of the ecosystem, including the position and activities of humans within it, which accurately reflects the values and desires of a majority of stakeholders.
- (4) Realistic. Good Objectives will be implementable using the resources (research, monitoring, and assessment and enforcement tools) available to managers and stakeholders. Good Objectives should reflect the aspirations of stakeholders, such that the majority of stakeholders will strive to achieve them and ensure sustainable development.
- (5) Time bound. There should be a clearly defined time scale for meeting Objectives

The process for identifying Objectives must be inclusive and consultative. Objectives will be set at many geographic scales, apply to many types of ecological, social, and economic properties and be used by many types of governance systems. The capacity to set and address Ecological and Operational Objectives will differ between different areas based on the differences in factors such as the available scientific knowledge, the human activities in the areas, and the threats present. Reconciliation of Economic and Social Objectives with Ecological Objectives will pose different challenges in different management regions. It is therefore appropriate to apply different Ecological and Operational Objectives in different circumstances.

To ensure that the groups of Objectives set in different management regions are compatible at all scales of governance, Objectives must relate upward (geographically and in terms of governance bodies) without conflicts and contradictions, and relate downward without gaps or inefficiencies.

### 6.2.2. Indicators, Limits and Targets

This section sets out a process for developing the Operational Objectives needed in order to support achievement of Ecological Objectives. Indicators are needed to monitor the progress being made towards meeting these Operational sub-Objectives and to guide the management decisions. Indicators may describe ecosystem state, activity-specific ecosystem properties, or impacts.

#### *Indicators*

Effective Indicators should have the following properties:

- (1) **Measurable** Effective Indicators should be measurable in practice and in theory. They should be measurable using existing instruments, monitoring programmes and analytical tools available in the regions, and on the time-scales needed to support management. They should have minimum or known bias (high level of QA), and signal should be distinguishable from noise.
- (2) **Cost effective** Indicators should be cost-effective because monitoring resources are limited. Monitoring should be allocated in ways that provide the greatest benefits to society and the fastest progress towards sustainable development.
- (3) **Concrete** Indicators which are directly observable and measurable rather than reflecting abstract properties which can only be estimated indirectly are desirable because concrete Indicators are more readily interpretable by the diverse stakeholder groups that contribute to management decision making.
- (4) **Interpretable** Indicators should reflect properties of concern to stakeholders and their meaning should be understood by as wide a range of stakeholders as possible. Public understanding of the Indicator should be consistent with its technical meaning.
- (5) **Grounded in theory** Indicators should reflect features of ecosystems and human impacts that (according to well-accepted peer-reviewed scientific theory) are relevant to the achievement of Objectives. They should not be based on theoretical links that are poorly defined or validated.
- (6) **Sensitive** Trends in the Indicator should be sensitive to changes in the ecosystem properties or impacts, which the Indicator is intended to measure.
- (7) **Responsive** Indicators should be responsive to effective management action and provide rapid and reliable feedback on the consequences of management actions.

- (8) **Specific** Indicators should respond to the properties they are intended to measure rather than to other factors and/ or it should be possible to disentangle the effects of other factors from the observed response.

**Few Indicators will have all these properties and thus several Indicators with complementary properties may be needed to provide strong and effective support for management decision-making. In selecting Indicators, it is important to ensure compatibility among Indicators so that they do not provide conflicting information for managers or provide the same information in several different ways and thus obscure overall patterns. This issue becomes even more important when an evaluation of the ecological state is based on the integration of several indicators—to derive a higher-level indicator.**

**The properties highlighted here refer primarily to indicators of ecosystem state. Various institutions have developed other types of indicators. It is not the purpose of this document to deal with these types of indicators even though the properties listed might apply to these indicators as well.**

#### *Limits and Targets*

For indicators to support decision-making, managers need to know the values associated with specific ecosystem states. These values are known as reference points. Reference points that might support ecosystem-based management include those for the unexploited ecosystem (or component), target reference points associated with the favoured state of the ecosystem (as a trade-off between environmental, social, and economic benefits), and limit reference points which, if exceeded, indicates that the ecosystem will be subject to serious or irreversible harm or that society has driven the ecosystem to a state where it does not want to go. As estimates of indicators contain measurement error, precautionary reference points may be used to guarantee a high (preferably specified) probability that the limit reference point is not exceeded. Indicators must be assessed regularly in relation to reference points, to identify changes in status of the system.

For contaminants, reference points may be set to zero, or to the lowest detectable concentration, reflecting a wish to remove harmful substances that provide no ecological, social, or economic benefits from the marine environment. Reference points that take account of the unexploited situation may be appropriate for assessing the overall impact of fishing, because it is important to avoid the “shifting baseline syndrome”, where baselines set with a short-term perspective represent an increasingly impacted state over time. However, this does not imply that the management objective is to perpetuate the unexploited state. Society often deems some impacts acceptable, given the social and economic benefits that fisheries can provide. Ultimately, setting a management objective is a societal issue, though science can provide commentary on the consequences of setting different objectives, and how to meet them.

## **7. Management**

Decision making for management relies on the assumption that we can predict the effects of management actions. Decision making should preferably be supported by scenario studies with quantitative predictions. This ability relies on how well we can quantify the effects of management actions and hence on the availability of proper data and a good understanding of the major processes controlling the ecosystem components affected by management action.

However, scientific knowledge is always incomplete, and the extent to which it is incomplete will vary among regions and for different ecosystem components. Therefore, managers will rarely be in a position to use formal rule-based management frameworks to implement the Ecosystem Approach.

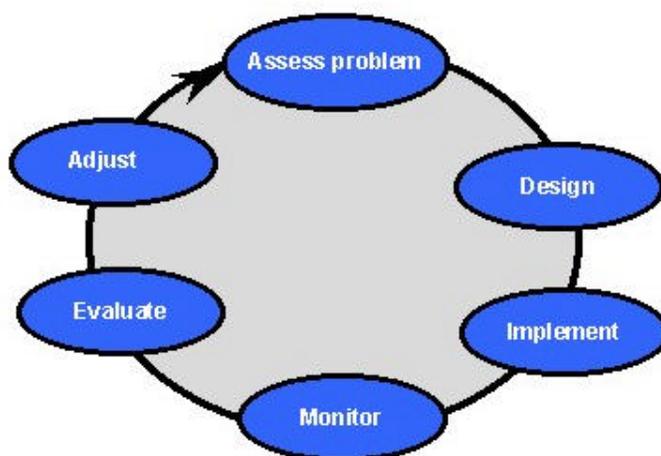
The Ecosystem Approach should also take account of the natural variability in marine ecosystems and management should recognise that ecosystems are dynamic. This implies that management frameworks will not be static, but continually reassessed and updated as circumstances change.

The alternative to rigid and inflexible management frameworks is *Adaptive Management*, and adaptive management is part of the Ecosystem Approach.

Adaptive management has been defined in various ways since its development in the early 1970s. One such definition stipulates:

*Adaptive Management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. Its most effective form—"active" adaptive management—employs management programs that are designed to experimentally compare selected policies or practices, by evaluating alternative hypotheses about the system being managed.*

The adaptive management process is often portrayed as a six-step cycle, and it is emphasized that, successful adaptive management requires managers to complete all six steps:



The Adaptive Management requires less stringent assumptions about scientific understanding of ecosystem processes but requires an ability to predict the trend and general magnitude of the effects of management actions. Managers would be guided towards the achievement of the Operational Objectives, and hence the Ecological Objectives and Strategic Goals, through a series of consecutive adjustments of the management measure in response to system reactions.

Adaptive management is a form of *learning by doing*, with structured feedback and decision-making. The adaptive approach uses the ecological indicators to support the Operational Objectives, and requires that monitoring and assessment are of sufficient accuracy, precision and frequency to ensure that the effects of management measures can be evaluated in a timely manner, and adjusted as necessary.

In order to make adaptive management efficient, the indicators should provide rapid and reliable feedback on activities and management measures. Limit or Target Points will often have to be set with limited knowledge and re-evaluated and revised regularly as learning-by-doing provides more and better information. In the longer term even the Ecological Objectives and Operational Objectives may need to be refined to reflect new knowledge of relationships and impacts.

## **8. Assessment, Monitoring and Scientific Research<sup>3</sup>**

Assessment, monitoring and scientific research will be required to support the Ecosystem Approach. They are required to provide a sound scientific basis for identifying Ecological Objectives and associated Operational Objectives, selecting Indicators, and identifying Reference Points. They are also required to provide regular evaluations of ecosystem status and to assess the values of Indicators in relation to Reference Points. The capacity for supporting science will vary regionally and the selection of Indicators, Limits and Targets to support the achievement of the Operational Objectives should be sensitive to regional capacity for support.

The science available will almost always be perceived as incomplete, particularly in the most sensitive or contested areas. The resources should focus on where risks are highest, and the science advice provided should be clear about sources and magnitudes of risks and uncertainties. Managers will have to make best use of incomplete advice and apply the precautionary principle when the advice is uncertain about consequences of human activities.

Policy-setters and managers should interact with scientists at an early stage in the process to form tractable questions and requests for advice, so the scientific community can address the questions asked and ensure that the answers will support management. In addition, managers implementing the Ecosystem Approach should liaise effectively with scientists involved in planning and coordinating monitoring or assessment programmes. Through this liaison, managers and scientists should identify opportunities for joint and more cost-effective monitoring activities from the same platforms, or multiple uses of existing monitoring programs.

Advice should be clear, direct, and relevant to the needs of the entire governance process. Advice should come from scientifically reliable sources, and be delivered by processes, which are open to external scrutiny. The advisory processes should also be uncompromising in their rigour and objectivity. Nonetheless, there is growing acknowledgement that there are many sources of sound information on status and trends of the properties being assessed and of hypotheses about the causes of trends in the assessments. Thus the scientific advisory process should be able to draw in and consider the ecological knowledge of resource users and those living close to the ecosystems being assessed, without compromising the objectivity, rigour or credibility of the ultimate advice.

## **9. Applying the Ecosystem Approach at a Regional scale**

A detailed discussion on how to proceed in applying the Ecosystem Approach at a regional scale is given in chapter 7 of the document *“Guidance on the application of the Ecosystem Approach to Management of Human Activities in the European Marine Environment”*

We present here the basic points related to this issue. The Ecosystem Approach can be applied by following a 7 -step process:

## 1. Scoping the Current Situation

Regional implementation requires description of the starting conditions for management within the Ecosystem Approach. This has four components:

- a) Evaluate Ecosystem Status
- b) Evaluate Relevant Ecosystem policies
- c) Compile inventory of Human Activities
- d) Evaluate Relevant Economic and Social Policies

## 2. Contrasting with the Vision

## 3. Identifying important Ecosystem Properties and Threats

## 4. Setting Ecological Objectives

## 5. Deriving Operational objectives with Indicators and Reference Points

## 6. Ongoing Management

## 7. Periodic Updates

The first four steps could be called the 'assessment' steps, while the last three would be the 'action' steps.

### 9.1 Measuring progress towards implementation

When the 7 -step process for applying the Ecosystem Approach at a regional scale is followed, then the extent of progress towards implementation can be measured using the following tests. The Ecosystem Approach would be considered as fully applied when all tests have been passed.

1. Have management regions with unambiguous boundaries been defined and have responsibilities for the management of all activities at all scales been identified?
2. Has the current status of the ecosystem been described and contrasted with the vision?
3. Have the properties of the ecosystem and the associated threats been fully documented and likely additive or synergistic threats identified?
4. Have Ecological Objectives and Operational Objectives with appropriate properties (SMART) been identified and agreed in all regions, based on an inclusive and consultative process?
5. Have all incompatibilities of Ecological Objectives, Operational Objectives and scales of management been identified and rectified?
6. Have indicators, limits and targets been established for each Operational Objective and are they inter-compatible?
7. Have sufficient management tools to support the Operational objectives been identified and put in place?
8. Will all proposed management tools be effective in supporting the Ecological Objectives and Operational Objectives of management and are the management methods co-ordinated and compatible?
9. Has a process for providing quality controlled supporting science been established, and is there a clear route by which the science is fed into the decision making process?
10. Is the science advice supported by adequate monitoring and assessment and are the monitoring and assessment procedures also quality controlled?
11. Has a process for management feedback and decision-making been established and will it ensure ongoing compatibility of management methods

## **10. Implications from the application of the Ecosystem Approach in the Mediterranean Sea.**

The application of the basic tool of the Ecosystem Approach in the Mediterranean will be a long process that will take at least ten years to be fully implemented. This process will be the responsibility of Mediterranean countries under the coordination and supervision of MAP.

How and where to start from in this long process? Can it be applied simultaneously and in its totality to the whole Mediterranean? Certainly, not! Since this process is novel to the area, it is suggested that a step-by-step approach is undertaken.

The first step would be to pick up the elements of a marine strategy for the Mediterranean Sea as described in chapter 5, which would form the framework for the application of the Ecosystem Approach. MAP Secretariat or an ad-hoc working group under its responsibility would have to prepare a list, which would include strategic goals and objectives. A very good basis for this work can be found in the document prepared by MAP Secretariat regarding the contribution of MAP and of the Barcelona Convention in implementing the EMS and more specifically the Strategic Goals A, B, C, and D, with valuable relative information (see Annex II).

The next step would be to define the management eco -regions for the Mediterranean Sea taking into account the criteria discussed in chapter 6.1. As already mentioned, such a division has already been suggested by MAP Secretariat (appendix III). It remains to be discussed and finalized.

Ecological and Operational Objectives will have to be specified as well. Again, most of those elements already exist in various MAP documents such as SAPMED, MEDPOL Phase II, etc. In preparing this part of the work the following should be taken into account:

- The regional implementation, will be supported by Ecological Objectives, that are consistent with the Vision and Strategic Goals.
- The management measures needed to meet Ecological Objectives, will be determined by Operational Objectives.
- Operational Objectives are specific and tractable objectives that can be achieved through the application of a management measure within a specific time frame.
- Ecological Objectives should in principle apply to the whole Mediterranean whereas Operational Objectives may differ from one eco-region to another. Operational Objectives may be also defined on scales smaller than that of an eco-region and up to the local scale.
- Because of differences in ecological status, available means, governance, etc., all Ecological and Operational Objectives cannot be met simultaneously in all regions. A priority list of which objectives to meet first and which at a later phase, should be prepared based on the factors mentioned above.
- For each Operational Objective, associated indicators and reference points will have to be developed.

Finally, an area would have to be chosen, which would serve as a *test case* for the implementation of the ecosystem approach. and in which the seven steps described above in

chapter 9, would be applied and implemented. This area should be one among the suggested Eco-regions for the Mediterranean since, as already mentioned, Eco-regions would form the basic *regional* management units for the application of the ecosystem approach. Any of the four suggested eco-regions of the Mediterranean could be selected for such an exercise.

A detailed discussion of the step by step approach to follow in the test area is discussed in the next chapter.

11. A tentative roadmap for the application of the Ecosystem Approach in a test case eco-region.

It is suggested that the Adriatic eco-region might be a good *test case*, since a preparatory work for this area already exists<sup>4</sup>, together with a large amount of marine data to support the exercise. The work could be divided in two phases. The first would concern the implementation of the four “assessment” steps and the second the implementation of the remaining three “action” steps.

For the first phase, an ad-hoc working group should be set up and coordinated by MAP Secretariat, which would have the task of implementing the following suggested steps.<sup>4</sup>:

## **PHASE 1.**

### **Step 1.1. SCOPING THE CURRENT SITUATION**

#### **(1) Evaluation of Ecosystem Status**

In order to evaluate current ecosystem status a short overview on the state of environment and pressures in the Adriatic Sea has been prepared on the basis of reports, prepared by the EEA, UNEP/MAP and national reports from states in Adriatic region (Annex IV).

1. *The working group will be invited to:*
  - a. *consider whether the level of detail in this evaluation would be sufficient for identification of ecosystem status of the Adriatic; and if not,*
  - b. *what kind of additional data and information would be required and how this could be made available.*

#### **(2) Evaluation of Relevant Ecosystem Policies**

2. Objectives have been set at various levels by a broad range of different international organisations covering geographical scales from global via European to regional. In addition, national authorities have established objectives for the protection, conservation and use of the marine environment.

3. An overview of existing ‘international’ objectives with regard to the protection and conservation of the marine environment at international, European and regional level is provided in Annex 2 of document ‘*Thematic Strategy for the Protection and Conservation of the European Marine Environment*’.

4. *The working group will be invited to consider:*
  - a. *whether the above-mentioned table could be a starting point for further work on the Adriatic;*
  - b. *whether a similar overview of national policies would need to be established.*

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<sup>4</sup> Working Document for Working Group III ‘Toward a Roadmap for Development of Ecological Objectives for the Adriatic and Ionian Seas’ by Ms Monika Peterlin (Slovenia).

**(3) Inventory of Human Activities**

5. The objectives of management of land, water and living resources are a matter of *societal choice*. The ecosystem approach should involve *all relevant sectors of society* and scientific disciplines.

6. The following stakeholders can be identified :

Fisheries	Industry
Aquaculture	Tourism, recreation
Agriculture	Transportation
Shipping, navigation, ports and harbours	Offshore installations
Extraction of materials	Local communities (spatial planning, waste and wastewater treatment, habitat protection)

7. *The working group will be invited to:*
- check whether this list of stakeholders is complete and whether these stakeholders are all relevant for the Adriatic and Ionian Sea; and*
  - provide advice how cooperation between stakeholders could be organised on national and regional level.*

**(4) Evaluation of Relevant Economic and Social Policies**

8. The analysis in the document *The Ecosystem Approach - Coherent actions for marine and coastal environments* identified 'seven areas of coherence' as framework for taking the ecosystem approach and its principles to a practical application.

9. Environmental, economic and social coherence reflect the three pillars of sustainability. Spatial and temporal coherence reflect the fact that ecosystems operate at different scales and change over time. Scientific coherence recognises the need to provide best available information to be used for management purposes. Institutional coherence reflects the need to work beyond the boundaries of how society traditionally organises itself. The seven areas are elaborated in Annex 2.

10. *The working group will be invited to:*
- indicate whether this framework is sufficient and whether it would enable a practical implementation of the ecosystem approach in the Adriatic;*
  - discuss how a balance between the environmental, the social and the economic components of sustainability in the area could be achieved.*

**Step 1.2. CONTRASTING WITH THE VISION**

11. From the evaluation of current ecosystem status of the Adriatic Sea at Annex 1, it can be concluded in general that the current situation in the area does not fulfil the Vision of the European Marine Strategy that *"we and future generations can enjoy and benefit from biologically diverse and dynamic oceans and seas that are safe, clean, healthy and productive"*.

12. *The working group will be invited to indicate in more detail how discrepancies between the current situation and the situation described by the vision can be identified.*

**Step 1.3. IDENTIFYING IMPORTANT ECOSYSTEM PROPERTIES AND THREATS**

13. The scoping of the current situation should identify ecosystem properties of particular importance in the area. Ecosystem components impacted by past or current human activities are identified when the properties that have been identified are contrasted with the vision.

14. Cross tabulation of the properties and components identified in steps 1 and 2 with the major human activities impacting on the marine ecosystem would allow the identification of threats to important components of ecosystem structure, function, or environmental quality.

The cross-tabulation also will highlight areas where additive or synergistic impacts of human activities might be expected.

15. *The working group will be invited to provide:*
- a. *advice on how to organise the identification of important ecosystem properties and threats in the Adriatic Sea and how to use experience from other regions in this process;*
  - b. *guidance on how to structure the cross tabulation of properties and components versus human activities.*

#### **Step 1.4. SETTING ECOLOGICAL OBJECTIVES**

16. Based on the analysis of ecosystem properties and threats, Ecological Objectives can be set. The complete set of Ecological Objectives should be reviewed to ensure that they provide adequate coverage of the valued ecosystem components and threats, while being tractably small in number. Gaps and redundancies should be identified and addressed at this stage. Likewise the suite should be reviewed in a science context to ensure that all the Ecological Objectives are inter-compatible, so they can be achieved together. Those setting the Social and Economic Objectives for uses of the regional seas should crosscheck their Objectives for compatibility with the Ecological Objectives at this stage as well. Iterative revisions may be necessary before full reconciliation of ecological, economic, and social objectives is achieved.

17. *The working group will be invited to provide advice on how to organise the process to identify and set ecological objectives for the Adriatic and how to use experience from other regions in this process.*

## **PHASE 2**

Based on the outcome of this first working group on the “assessment” steps, a second one should proceed with the next three “action” steps. Obviously this group should also include country representatives and experts since it will deal with management issues on sub-regional and country level.

### **STEP 2.1. Deriving Operational objectives with Indicators and Reference Points**

18. Based on the Ecological Objectives already defined, a set of Operational Objectives that will support the achievement of the Ecological Objectives will have to be set. The Operational Objectives are in fact concrete management actions with a specific target and time frame. Indicators are needed to monitor the progress being made towards meeting these operational objectives and to guide the management decisions. Indicators should be, to the maximum possible extent, concrete, measurable, cost effective and easily understood by a wide range of stakeholders. They should also be sensitive and responsive to management actions and provide rapid and reliable feedback on the consequences of actions taken.

19. *The working group will be invited to provide advice on setting up the Operational Objectives for the Adriatic. Based on the large existing work within MAP on Sustainable Development Indicators it will be invited to suggest the most suitable ones to monitor and quantify the progress made in meeting the operational objectives. If needed it might suggest the elaboration of new indicators.*

## **STEP 2.2. On going management**

20. Following the setting up of Operational Objectives and Indicators, concrete management measures and actions should follow. Concerted management actions should be taken in all countries in order to achieve each operational objective. Depending on the information provided by the relevant indicators for each such objective, the degree and “strength” of the management actions to be undertaken by each country might vary. In applying management measures, the goal of achieving common Ecological Objectives on a regional scale should be considered. The six-step cycle of Adaptive Management should be applied.

21. *The working group will be invited to provide advice to countries, through MAP, for the application of concrete management actions, based on adaptive management principles. It will at the same time monitor and evaluate the effectiveness of measures undertaken.*

## **STEP 2.3. Periodic Updates**

22. This step in reality can be considered as part of (actually the last part) of the six-step cycle of the Adaptive Management. Following the design, implementation, monitoring and evaluation steps, the “adjustment” step should follow. Periodic assessments of the effectiveness of measures taken should be done. These assessments should evaluate successes and failures of management measures undertaken under the “present” management cycle. Based on the outcome of these assessments, updates of the management measures should be considered and a new set of measures and actions, where and if needed, should be planned for the next cycle.

23. *The working group will be invited to periodically assess the degree of success or failure of management measures applied and to provide advice, where needed, for new management measures for each of the Operational Objectives separately. In doing so, it might suggest changes in priorities on which objective to achieve first or on the time scale for the achievement of a specific objective.*

## ANNEX I

UNEP/CBD/COP/5/23

### DECISIONS ADOPTED BY THE CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY AT ITS FIFTH MEETING

Nairobi, 15-26 May 2000

Decision V/6

#### ECOSYSTEM APPROACH

The Conference of the Parties,

1. Endorses the description of the ecosystem approach and operational guidance contained in sections A and C of the annex to the present decision, recommends the application of the principles contained in section B of the annex, as reflecting the present level of common understanding, and encourages further conceptual elaboration, and practical verification;
2. Calls upon Parties, other Governments, and international organisations to apply, as appropriate, the ecosystem approach, giving consideration to the principles and guidance contained in the annex to the present decision, and to develop practical expressions of the approach for national policies and legislation and for appropriate implementation activities, with adaptation to local, national, and, as appropriate, regional conditions, in particular in the context of activities developed within the thematic areas of the Convention;
3. Invites Parties, other Governments and relevant bodies to identify case-studies and implement pilot projects, and to organise, as appropriate, regional, national and local workshops, and consultations aiming to enhance awareness, share experiences, including through the clearing-house mechanism, and strengthen regional, national and local capacities on the ecosystem approach;
4. Requests the Executive Secretary to collect, analyse and compare the case-studies referred to in chapter 3 above, and prepare a synthesis of case-studies and lessons learned for presentation to the Subsidiary Body on Scientific, Technical and Technological Advice prior to the seventh meeting of the Conference of the Parties;
5. Requests the Subsidiary Body on Scientific, Technical and Technological Advice, at a meeting prior to the seventh meeting of the Conference of the Parties, to review the principles and guidelines of the ecosystem approach, to prepare guidelines for its implementation, on the basis of case-studies and lessons learned, and to review the incorporation of the ecosystem approach into various programmes of work of the Convention;
6. Recognises the need for support for capacity-building to implement the ecosystem approach, and invites Parties, Governments and relevant organisations to provide technical and financial support for this purpose;
7. Encourages Parties and Governments to promote regional co-operation, for example through the establishment of joint declarations or memoranda of understanding in applying the ecosystem approach across national borders.

A. Description of the ecosystem approach

1. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.
2. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organisation, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of many ecosystems.
3. This focus on structure, processes, functions and interactions is consistent with the definition of "ecosystem" provided in Article 2 of the Convention on Biological Diversity: "Ecosystem' means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit." This definition does not specify any particular spatial unit or scale, in contrast to the Convention definition of "habitat". Thus, the term "ecosystem" does not, necessarily, correspond to the terms "biome" or "ecological zone", but can refer to any functioning unit at any scale. Indeed, the scale of analysis and action should be determined by the problem being addressed. It could, for example, be a grain of soil, a pond, a forest, a biome or the entire biosphere.
4. The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. Ecosystem processes are often non-linear, and the outcome of such processes often shows time-lags. The result is discontinuities, leading to surprise and uncertainty. Management must be adaptive in order to be able to respond to such uncertainties and contain elements of "learning-by-doing" or research feedback. Measures may need to be taken even when some cause -and -effect relationships are not yet fully established scientifically.
5. The ecosystem approach does not preclude other management and conservation approaches, such as biosphere reserves, protected areas, and single-species conservation programmes, as well as other approaches carried out under existing national policy and legislative frameworks, but could, rather, integrate all these approaches and other methodologies to deal with complex situations. There is no single way to implement the ecosystem approach, as it depends on local, provincial, national, regional or global conditions. Indeed, there are many ways in which ecosystem approaches may be used as the framework for delivering the objectives of the Convention in practice.

#### B. Principles of the ecosystem approach

6. The following 12 principles are complementary and interlinked:

**Principle 1: The objectives of management of land, water and living resources are a matter of societal choice.**

Rationale: Different sectors of society view ecosystems in terms of their own economic, cultural and societal needs. Indigenous peoples and other local communities living on the land are important stakeholders and their rights and interests should be recognised. Both cultural and biological diversity are central components of the ecosystem approach, and management should take this into account. Societal choices should be expressed as clearly as possible.

Ecosystems should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way.

**Principle 2: Management should be decentralised to the lowest appropriate level.**

Rationale: Decentralised systems may lead to greater efficiency, effectiveness and equity. Management should involve all stakeholders and balance local interests with the wider public interest. The closer management is to the ecosystem, the greater the responsibility, ownership, accountability, participation, and use of local knowledge.

**Principle 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.**

Rationale: Management interventions in ecosystems often have unknown or unpredictable effects on other ecosystems; therefore, possible impacts need careful consideration and analysis. This may require new arrangements or ways of organisation for institutions involved in decision-making to make, if necessary, appropriate compromises.

**Principle 4: Recognising potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:**

- (a) Reduce those market distortions that adversely affect biological diversity;**
- (b) Align incentives to promote biodiversity conservation and sustainable use;**
- (c) Internalise costs and benefits in the given ecosystem to the extent feasible.**

Rationale: The greatest threat to biological diversity lies in its replacement by alternative systems of land use. This often arises through market distortions, which undervalue natural systems and populations and provide perverse incentives and subsidies to favour the conversion of land to less diverse systems.

Often those who benefit from conservation do not pay the costs associated with conservation and, similarly, those who generate environmental costs (e.g. pollution) escape responsibility. Alignment of incentives allows those who control the resource to benefit and ensures that those who generate environmental costs will pay

**Principle 5: Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.**

Rationale: Ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species.

**Principle 6: Ecosystems must be managed within the limits of their functioning.**

Rationale: In considering the likelihood or ease of attaining the management objectives, attention should be given to the environmental conditions that limit natural productivity, ecosystem structure, functioning and diversity. The limits to ecosystem functioning may be affected to different degrees by temporary, unpredictable or artificially maintained conditions and, accordingly, management should be appropriately cautious.

**Principle 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.**

Rationale: The approach should be bounded by spatial and temporal scales that are appropriate to the objectives. Boundaries for management will be defined operationally by users, managers, scientists and indigenous and local peoples. Connectivity between areas should be promoted where necessary. The ecosystem approach is based upon the hierarchical nature of biological diversity characterised by the interaction and integration of genes, species and ecosystems.

**Principle 8: Recognising the varying temporal scales and lag-effects that characterise ecosystem processes, objectives for ecosystem management should be set for the long term.**

Rationale: Ecosystem processes are characterised by varying temporal scales and lag-effects. This inherently conflicts with the tendency of humans to favour short-term gains and immediate benefits over future ones.

**Principle 9: Management must recognise that change is inevitable.**

Rationale: Ecosystems change, including species composition and population abundance. Hence, management should adapt to the changes. Apart from their inherent dynamics of change, ecosystems are beset by a complex of uncertainties and potential "surprises" in the human, biological and environmental realms. Traditional disturbance regimes may be important for ecosystem structure and functioning, and may need to be maintained or restored. The ecosystem approach must utilise adaptive management in order to anticipate and cater for such changes and events and should be cautious in making any decision that may foreclose options, but, at the same time, consider mitigating actions to cope with long-term changes such as climate change

**Principle 10: The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.**

Rationale: Biological diversity is critical both for its intrinsic value and because of the key role it plays in providing the ecosystem and other services upon which we all ultimately depend. There has been a tendency in the past to manage components of biological diversity either as protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in context and the full range of measures is applied in a continuum from strictly protected to human-made ecosystems.

**Principle 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.**

Rationale: Information from all sources is critical to arriving at effective ecosystem management strategies. A much better knowledge of ecosystem functions and the impact of human use is desirable. All relevant information from any concerned area should be shared with all stakeholders and actors, taking into account, inter alia, any decision to be taken under Article 8(j) of the Convention on Biological Diversity. Assumptions behind proposed management decisions should be made explicit and checked against available knowledge and views of stakeholders.

**Principle 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.**

Rationale: Most problems of biological-diversity management are complex, with many interactions, side-effects and implications, and therefore should involve the necessary expertise and stakeholders at the local, national, regional and international level, as appropriate.

C. Operational guidance for application of the ecosystem approach

7. In applying the 12 principles of the ecosystem approach, the following five points are proposed as operational guidance.

**1. Focus on the functional relationships and processes within ecosystems**

8. The many components of biodiversity control the stores and flows of energy, water and nutrients within ecosystems, and provide resistance to major perturbations. A much better knowledge of ecosystem functions and structure, and the roles of the components of biological diversity in ecosystems, is required, especially to understand: (i) ecosystem resilience and the effects of biodiversity loss (species and genetic levels) and habitat fragmentation; (ii) underlying causes of biodiversity loss; and (iii) determinants of local biological diversity in management decisions. Functional biodiversity in ecosystems provides many goods and services of economic and social importance. While there is a need to accelerate efforts to gain new knowledge about functional biodiversity, ecosystem management has to be carried out even in the absence of such knowledge. The ecosystem approach can facilitate practical management by ecosystem managers (whether local communities or national policy makers).

**2. Enhance benefit-sharing**

9. Benefits that flow from the array of functions provided by biological diversity at the ecosystem level provide the basis of human environmental security and sustainability. The ecosystem approach seeks that the benefits derived from these functions are maintained or restored. In particular, these functions should benefit the stakeholders responsible for their production and management. This requires, inter alia: capacity-building, especially at the level of local communities managing biological diversity in ecosystems; the proper valuation of ecosystem goods and services; the removal of perverse incentives that devalue ecosystem goods and services; and, consistent with the provisions of the Convention on Biological Diversity, where appropriate, their replacement with local incentives for good management practices.

**3. Use adaptive management practices**

10. Ecosystem processes and functions are complex and variable. Their level of uncertainty is increased by the interaction with social constructs, which need to be better understood. Therefore, ecosystem management must involve a learning process, which helps to adapt methodologies and practices to the ways in which these systems are being managed and monitored. Implementation programmes should be designed to adjust to the unexpected, rather than to act on the basis of a belief in certainties. Ecosystem management needs to recognise the diversity of social and cultural factors affecting natural-resource use. Similarly, there is a need for flexibility in policy-making and implementation. Long-term, inflexible decisions are likely to be inadequate or even destructive. Ecosystem management should be envisaged as a long-term experiment that builds on its results as it progresses. This "learning-by-doing" will also serve as an important source of information to gain knowledge of how best to monitor the results of management and evaluate whether established goals are being attained. In this respect, it would be desirable to establish or strengthen capacities of Parties for monitoring.

**4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate**

11. As noted in section A above, an ecosystem is a functioning unit that can operate at any scale, depending upon the problem or issue being addressed. This understanding should define the appropriate level for management decisions and actions. Often, this approach will imply decentralisation to the level of local communities. Effective decentralisation requires proper empowerment, which implies that the stakeholder both has the opportunity to assume responsibility and the capacity to carry out the appropriate action, and needs to be supported by enabling policy and legislative frameworks. Where common property resources are involved, the most appropriate scale for management decisions and actions would necessarily be large enough to encompass the effects of practices by all the relevant stakeholders. Appropriate institutions would be required for such decision-making and, where necessary, for conflict resolution. Some problems and issues may require action at still higher levels, through, for example, transboundary co-operation, or even co-operation at global levels.

#### **5. Ensure intersectoral co-operation**

12. As the primary framework of action to be taken under the Convention, the ecosystem approach should be fully taken into account in developing and reviewing national biodiversity strategies and action plans. There is also a need to integrate the ecosystem approach into agriculture, fisheries, forestry and other production systems that have an effect on biodiversity. Management of natural resources, according to the ecosystem approach, calls for increased intersectoral communication and co-operation at a range of levels (government ministries, management agencies, etc.). This might be promoted through, for example, the formation of inter-ministerial bodies within the Government or the creation of networks for sharing information and experience.

## ANNEX II

### MEDITERRANEAN ACTION PLAN AND BARCELONA CONVENTION FOR THE PROTECTION OF THE MARINE ENVIRONMENT AND THE COASTAL REGIONS OF THE MEDITERRANEAN AND ITS PROTOCOLS

#### MAP AND BARCELONA CONVENTION STOCKTAKING OF POSSIBLE CONTRIBUTIONS TO THE REGIONAL IMPLEMENTATION OF THE EUROPEAN MARINE STRATEGY

Prepared by the UNEP/MAP Secretariat

#### **Purpose**

This document describes the possible contribution that the Mediterranean Action Plan (MAP) and the Barcelona Convention for the Protection of the Marine Environment and Coastal Regions of the Mediterranean and its Protocols can provide to the implementation at the regional level of the strategic goals and objectives proposed for the European Marine Strategy.

**Strategic Goal A: To protect and, where practicable, restore the function and structure of marine ecosystems in order to achieve and maintain good ecological status of these ecosystems**

#### **Related Objectives:**

1. By 2010 to implement an ecosystem approach in accordance with the guidance prepared for its application.

1.1 Following the signature of the new LBS Protocol in 1996, a number of important steps have been made in the region to achieve the expected integration between the socio-economic and environmental aspects of the fight against land-based sources of pollution of the Mediterranean Sea.

1.2 Particular account is taken of the need to encourage the application by 2010 of the ecosystem approach for the sustainable development of the oceans agreed at the Johannesburg Summit.

The need to ensure consistency with those goals is recognized in the principles and objectives of the next phase of the environmental assessment component of MAP, MED POL Phase IV (2006-2013).

1.3 As a result, the Contracting Parties to the Barcelona Convention at their 13<sup>th</sup> meeting held in November 2003 adopted a decision for the implementation of the ecosystem approach as a management tool of human activities to protect the marine environment of the Mediterranean.

1.4 To this aim, the Parties requested the MED POL Programme to prepare in 2005 an assessment on the possible implications of this decision on their related national management system.

2. By 2010 to halt the decline of biodiversity.

2.1 Following the signature of the new Biodiversity Protocol, it became obvious that the complex threats to the Mediterranean marine and coastal biodiversity required a large range of responses, involving both the public and private sectors, carrying out national and regional actions, with the participation and commitment of all the countries and all the sectors and users of environmental resources.

2.2 To respond to this need, the Mediterranean States adopted in 2003, the Strategic Action Programme for the Conservation of Biological Diversity (SAP BIO) in the Mediterranean Region. The SAP BIO elaborates the principles, approaches, measures, targets, timetables and priorities for action to conserve biodiversity in the region. Relying on a participatory process that includes all the parties involved in the issue, this Programme seeks to integrate species and ecosystem conservation and protection measures into socio-economic development strategies, notably for fishing, tourism and maritime transport. It is evident therefore that the SAP BIO is intended to be implemented within the context of sustainable use.

2.3 One important obligation of the Mediterranean countries, as stated in the new SPA and Biodiversity Protocol of the Barcelona Convention, is the establishment of specially protected areas to protect, preserve and manage areas of particular natural or cultural value in a sustainable and environmentally sound manner.

2.4 Priority III of the SAP BIO, which is "Assessing and mitigating the impact of threats to biodiversity", has as a main objective to contribute to achieving the WSSD targets concerning the significant reduction by **2010** in the current rate of loss of biodiversity. A large number of SAP BIO priority actions have been foreseen to contribute to achieving this target.

2.5 In formulating the main requirements of the new phase of the environmental assessment component of MAP, MED POL Phase IV (2006-2013), particular consideration is also given to the general principle of contributing towards the WSSD target to achieve by **2010** a significant reduction in the current rate of loss of biological diversity.

3. By [2012] to establish an effective system of representative networks of marine and coastal protected areas covering also the high seas.

3.1 The 1995 Protocol concerning Specially Protected Areas and Biological Diversity, entered into force in 1999, promotes the establishment of specially protected areas in zones subject to the Contracting Parties' sovereignty and in zones partly or wholly on the high seas.

3.2 Priority II of the SAP BIO, which is "Conservation of sensitive habitats, species and sites", has the main objective to contribute to achieving the targets concerning the establishment of Marine Protected Areas consistent with international law and based on scientific information, as well as the establishment of representative protected area networks by **2012**. One of the priority actions under this section of the SAP BIO is the "Development of existing Marine and Coastal Protected Areas", under which are included the objectives to enhance the management of existing protected areas and to establish and support protected area networks.

4. To reduce the risk of accidental and to prevent intentional introduction of alien and invasive species.

4.1 Article 13 of the 1995 SPA and Biodiversity Protocol to the Barcelona Convention states that the Mediterranean countries “shall take all appropriate measures to regulate the intentional or accidental introduction of non-indigenous or genetically modified species to the wild and prohibit those that may have harmful impacts on the ecosystems, habitats or species” of the marine environment and coastal region of the Mediterranean.

4.2 Accordingly, one of the actions under Priority III of the SAP BIO, (Assessing and mitigating the impact of threats to biodiversity), is to control and mitigate the introduction and spread of alien and invasive species.

4.3 MAP is cooperating closely with the International Maritime Organization (IMO) in the exchange of information on the protection of the marine environment from aquatic organisms transferred in ships ballast.

**Strategic Goal B:** *To phase out pollution in the marine environment so as to ensure that there are no significant impacts or risk to human and/or on ecosystem health and/or on uses of the sea*

*Related Objectives:*

5. To progressively reduce discharges, emissions and losses of substances hazardous to the marine environment with the ultimate aim to reach concentrations of such substances in the marine environment near background values for naturally occurring substances and close to zero for man-made synthetic substances.

5.1 Article 4 of the Barcelona Convention defines the general obligation of the Mediterranean countries to “individually or jointly take all appropriate measures to prevent, abate, combat and to the fullest possible extent eliminate pollution of the Mediterranean Sea Area and to protect and enhance the marine environment in that Area so as to contribute towards its sustainable development”.

5.2 As stated in the Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources and Activities (Land-Based Sources Protocol, as amended in 1996) to the Barcelona Convention, in undertaking the commitment to take all appropriate measures to prevent, abate, combat and eliminate to the fullest possible extent pollution of the Mediterranean Sea caused by discharges from rivers, coastal establishments or outfalls or other land based sources and activities, priority is to be given by the Mediterranean countries to the phasing out of inputs of substances that are toxic, persistent and liable to bio-accumulate (TPBs) .

5.3 Accordingly, the Strategic Action Programme (SAP) to Address Pollution from Land-based Activities, in dealing with polluting substances resulting from industrial development, including TPBs, other heavy metals (Zn, Cu, Cr) and other organohalogen compounds, proposes a series of activities to be undertaken by the Mediterranean countries at regional and national level to progressively reduce and phase out the discharges, emissions and losses of these substances.

5.4 The target is to phase out the input of the 12 priority Persistent Organic Pollutants (POPs) by the year **2010**. The remaining TPBs (Hg, Cd, Pb, organometallic compounds and Polycyclic Aromatic Hydrocarbons, PAH) are to be phased out by the year **2025**. The input of

other heavy metals (Zn, Cu, Cr) and other organohalogen compounds is to be eliminated to the fullest possible extent by the year **2025**.

5.5 The Strategic Action Programme (SAP) to Address Pollution from Land-based Activities sets the target by the year **2025** to dispose all wastewater from industrial installations that are sources of BOD, nutrients and suspended solids in conformity with the provisions of the LBS Protocol.

5.6 Mediterranean Countries are actually preparing integrated National Action Plans (NAPs) for the reduction of their inputs of different pollutants into the Mediterranean Sea in the framework of the implementation of the SAP. NAPs are expected to be ready and fully operational by the end of 2005.

6. To prevent pollution from ionizing radiation through progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the ultimate aim to reach concentrations in the marine environment near background values for naturally occurring radioactive substances and close to zero for artificial radioactive substances.

6.1 The Strategic Action Programme (SAP) sets the target to eliminate the input of radioactive substances into the Mediterranean by the year **2025**.

7. *To put in place by [2010] measures to control all sources of nutrients required to reduce human induced eutrophication to acceptable levels. Where these measure address agriculture within the EU, they will be considered in the forthcoming review of the Common Agricultural Policy.*

7.1 By **2010** the Mediterranean countries are expected to develop and adopt environmental quality criteria and standards for point sources discharges of BOD, nutrients and suspended solids, as well as guidelines for wastewater treatment and waste disposal from industries that are sources of BOD, nutrients and suspended solids.

7.2 The SAP also sets the target by **2025** at the latest, to reduce inputs of nutrients from agriculture and aquaculture practices into areas where these inputs are likely to cause pollution. By **2025** at the latest the Mediterranean countries are expected to dispose all municipal wastewaters in compliance with the provisions of the LBS Protocol.

**7.3 On the basis of Article 6 of the LBS Protocol, the SAP requires that all point source discharges and releases be strictly subject to authorization or regulation by the competent authorities of the Parties.**

7.4 Furthermore, Article 6 specifies that the Contracting Parties are expected to provide for systems of inspection by the competent authorities to assess the compliance with authorizations and regulations.

7.5 In addition, Article 7 requires the Parties to prepare and progressively adopt common guidelines, environmental quality criteria and standards (for the categories of substances listed in Annex I, including compounds of nitrogen and phosphorus and other substances which may cause eutrophication), setting specific requirements concerning the quantities of the substances discharged, their concentration in effluents and methods of discharging them, as well as the quality of seawater used for specific purposes that is necessary for the protection of human health, living resources and ecosystems.

8. By [2010] at the latest to improve compliance with all existing discharge regulations for ships and with existing regulations on the protection of marine environment from pollution derived from shipping and maritime transport and to further reduce the environmental impact

of shipping, inter alia, by developing and applying the concept of the “Clean Ship” and further promote “safe shipping”.

8.1 The new Protocol to the Barcelona Convention concerning “Cooperation in Preventing Pollution from Ships and in Case of Emergency Combating Pollution of the Mediterranean Sea” adopted in 2002 and entered into force in 2004 deals with aspects of pollution prevention from operational activities of maritime transport and the environmental safety of maritime traffic in addition to the traditional provisions of the previous 1976 Emergency Protocol, dealing with preparedness and response to accidental marine pollution, which are now brought in line with some of the existing global agreements.

8.2 The Mediterranean Action Plan is in the process of preparing a regional strategy for the prevention of and response to marine pollution from ships, including precise commitments and deadlines, aiming at addressing the priorities that have arisen from the ERIKA and PRESTIGE accidents within the legal framework established at the global and regional levels for the protection of the marine environment.

9. To progressively reduce discharges, releases and losses of marine litter to the marine environment by improving enforcement of waste legislation and to developing a more effective waste management, including campaigns to increase public awareness about the environmental problem of litter and ship generated waste or cargo residues.

**9.1 The Strategic Action Programme (SAP) refers to the need for appropriate solid waste management and sets the target by the year 2025, at the latest, to base urban solid waste management on reduction at source, separate collection, recycling, composting and environmentally sound disposal.**

**9.2 According to the SAP a number of relevant activities are to be implemented in 2004-2005 on a national level, including the development of national plans for the reduction at source and the environmentally sound management of urban solid waste in cities of more than 100,000 inhabitants and the promotion of waste reduction and recycling, especially in relation to coastal litter.**

**9.3 To assist the countries and improve the conditions for the effective implementation of these national commitments, an assessment of the systems for the management of coastal litter in the Mediterranean was prepared in 2000-2001, followed by the preparation of specific guidelines in 2002-2003.**

**9.4 the Mediterranean Countries adopted in 2003 a regional plan for the reduction by 2010 of 20% of the generation of hazardous waste from industrial sources. It is expected that in 2005 they will adopt an implementation plan.**

**Strategic Goal C: To ensure, through appropriate management, that the uses of marine services and goods, and all other activities in marine areas, are contained at levels that are sustainable and do not compromise the full range of goods and services for future generations or the capacity of marine ecosystem to respond to changes.**

*Related Objectives:*

10. *To carry out environmental assessments of human activities, even in cases where the EC Directives regarding Environmental Impact Assessment or Strategic Environmental*

*Assessments do not apply. Such assessments should in particular take account of interactions between projects and plans or programmes and of long term cumulative effects thereof on the marine environment so as not to compromise Strategic Goals A, B and C.*

**10.1 Under Article 4 of the Barcelona Convention, one of the general obligations of the Mediterranean countries is to undertake environmental impact assessment for proposed activities that are likely to cause a significant adverse impact on the marine environment and are subject to an authorization by competent national authorities.**

**10.2 Article 17 of the SPA and Biodiversity Protocol to the Barcelona Convention specifies that in the planning process leading to decisions on industrial and other projects and activities that could significantly affect marine protected areas and species and their habitats, the Mediterranean countries shall carry out environmental impact assessments to evaluate and take into consideration the possible direct or indirect, immediate or long-term impact, including the cumulative impact of the projects and activities being contemplated.**

**10.3 Environmental Impact Assessment is an essential element in the process of implementation of the Strategic Action Programme (SAP). In accordance with the Barcelona Convention and accordingly with the SAP, the Mediterranean countries are obliged to undertake environmental impact assessment for proposed activities that are likely to cause a significant adverse impact on the marine environment and are subject to an authorization by competent national authorities. In the context of preparation of the SAP National Action Plans (NAPs), environmental impact assessments are to be undertaken according to the importance of the potential physical alterations and destruction of habitats of intended management projects.**

**10.4 The introduction of the application of Strategic Impact Assessment is currently being explored in view of the recent findings in relation to the investigation of the sustainability of the SAP. These findings include the need for regular risk assessments of serious or irreversible damage on the critical marine ecosystems factors for the Mediterranean Sea, as well as the need to carry out socio-economic appraisals of coastal development programmes targeted by the SAP national action plans to demonstrate that the total capital (man-made and natural) is conserved to the satisfaction of present generations and for the benefit of future generations.**

**10.5 During 1999/2000, the EU-sponsored project "Introduction of Strategic Environmental Assessment (SEA) in the Planning System of Mediterranean Countries" was carried out by the Priority Actions Programme Regional Activity Centre of MAP. The objective of the project was to investigate opportunities and issues associated with the introduction and application of SEA in Mediterranean countries, to evaluate the present experience in SEA implementation in the region and to prepare a programme of further activities on SEA in support of the overall Mediterranean Action Plan aims and activities.**

10.6 The component of MAP Phase II dealing with the Integration of Environment and Development considers that integrated coastal area management should gradually become the standard approach for tackling the problems affecting the Mediterranean coastal areas. To this end, at national and where relevant at sub-national level, relevant legislation should be enacted and institutional capacities created or strengthened. At regional level cooperation activities are to be organized in order to elaborate jointly the most appropriate planning methodologies, provide training, exchange of information and transfer of knowledge and promote and facilitate cooperation with international institutions likely to support coastal area management policies.

10.7 The MAP Strategic Action Programme for the Conservation of Marine and Coastal Biodiversity in the Mediterranean (SAP BIO) in dealing with Priority III, which is Assessing and Mitigating the Impact of Threats on Biodiversity, includes as a priority action to control

and mitigate the effects of changes in land use (including urbanization and construction of infrastructure) through the integration of land use planning into a wider integrated coastal area management plan.

11. With a view to achieving sustainable fisheries and reducing the impact on fishing activities on the marine environment to implement as soon as possible, the governing principles of the FAO Code of Conduct for Responsible Fisheries and its instruments, the International Plans of Actions (IPOA). In addition, to invite countries who did not yet do so to ratify the 1995 New York Agreement.

12. In accordance with the commitments taken at the 2002 World Summit on Sustainable Development, to reverse the decline in fished stocks by reducing fishing pressure to ensure sustainable fisheries and contribute to healthy ecosystems, both in EU and globally with the aim of restoring or maintaining stocks to levels that can produce maximum sustainable yields by 2015.

11.-12.1 The SAP BIO, in dealing with Priority III, which is Assessing and Mitigating the Impact of Threats on Biodiversity, sets as a specific target to maintain or restore fishery stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible no later than 2015. This target, among others of the SAP BIO Priority III, is intended to address the general objective of contributing to the achievement of the WSSD targets concerning the significant reduction by 2010 in the current rate of loss of biological diversity.

11.-12.2 The MAP Strategic Action Programme for the Conservation of Marine and Coastal Biodiversity in the Mediterranean (SAP BIO) in dealing with Priority III, which is assessing and Mitigating the Impact of Threats on Biodiversity, includes as a priority action the assessment, control and elaboration of strategies to prevent the impact of fishing activities on the biodiversity of the marine environment. Identifiable targets aiming at preventing this impact deal with improving fishing statistics, improving gear selectivity, minimizing habitat damage, limiting harmful fishing practices, developing "traditional" control measures, developing new management techniques, controlling recreational fishing, prosecuting illegal fishing and preserving traditional Mediterranean fishing knowledge.

11.-12.3 The component of MAP Phase II dealing with the Integration of Environment and Development has, as one of the main objectives, the sustainable management of living marine resources and to this end, among other activities, to ensure the implementation of the Code of Conduct for Responsible Fishing developed by the FAO, the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, as well as the decisions taken within the framework of the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks.

13. To reduce the environmental impact of the exploitation of non-renewable marine resources.

13.1 Under the Barcelona Convention's Protocol for the Protection of the Mediterranean Sea from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil, the Mediterranean countries are expected to take all appropriate measures to prevent, abate combat and control pollution resulting from activities concerning exploration and/or exploitation of the Mediterranean marine resources, by ensuring that the best available techniques, environmentally effective and economically appropriate, are used for this purpose. All relevant activities shall be subject to the prior written authorization for exploration or exploitation from the competent authority.

14. To promote the application and wider use of management tools such as adaptive management, ICZM, risk assessment and spatial planning to contribute to sustainable development and achieving the strategic goals.

14.1 In the follow-up to the RIO conference, a number of regional events were held with a view to identifying and bolstering Integrated Coastal Area Management (ICAM). The major shift in regional efforts for better coastal management occurred with the advent of the Mediterranean Commission on Sustainable Development (MCSD) in 1996. The MCSD identified sustainable coastal management as one of its priority issues.

14.2 MAP has since then concentrated its efforts on the following: promotion of a practical approach to ICAM, including the adaptation and simplification of tools and techniques to make them more accessible to all Mediterranean States, as well as the development of an approach to integrated coastal area and river basin management (ICARM); the preparation of a wide range of related publications; the development of Coastal Area Management Programmes (CAMPs) as a special contribution of MAP to the integrated management of coastal areas and finally the analysis in greater detail of specific coastal issues (urbanization, mass tourism, climate change and sea level rise, coastal erosion, increased demand for water resources, renewable energy sources, solid and liquid waste management, historic settlements, coastal legislation).

14.3 Affirming the urgent need to halt and reverse the continuing degradation of the Mediterranean coastal zone through a process of integrated management, the Secretariat of MAP has been asked by the Contracting Parties to start the process of preparing the **draft text of a regional protocol on integrated coastal area management**. The first draft text is expected to be presented to the Parties at their Meeting in 2005 with a view to the finalization and signature of the new Protocol in 2006.

15. With a view to promote the conservation and sustainable tourism activities in marine and coastal ecosystems and habitats, to implement the Guidelines on Biodiversity and Tourism Development as adopted by the 2004 Conference of the Convention on Biological Diversity.

15.1 To respond to this need, the Mediterranean States adopted in 2003, the Strategic Action Programme for the Conservation of Biological Diversity (SAP BIO) in the Mediterranean Region. The SAP BIO elaborates the principles, approaches, measures, targets, timetables and priorities for action to conserve biodiversity in the region. Relying on a participatory process that includes all the parties involved in the issue, this Programme seeks to integrate species and ecosystem conservation and protection measures into socio-economic development strategies, notably for fishing, tourism and maritime transport. It is evident therefore that the SAP BIO is intended to be implemented within the context of sustainable use.

**Strategic Goal D: To apply the principles of good governance both within Europe and globally**

**Related Objectives:**

16. To promote coherence of sectoral policies with the aim of reducing the impact of all human activities on the marine environment.
17. To promote compliance and enforcement of legislation dealing with the protection and conservation of the marine environment.
18. To promote more effective coordination and cooperation between different institutions and regional and global conventions and action plans working within their respective mandates.
19. To promote increased awareness and wide stakeholder participation.
20. To promote improved communication between research, management and other end-users.
21. To improve the knowledge base required to fully implement an ecosystem approach, especially promote development of risk-based and spatial management tools, economic and socio-economic evaluation methods.
22. To promote the development of coordinated and strategic research programmes with the view to support scientific advice at regional sea scale.

**16.-22.1 The Barcelona Convention recognizes fully the need for close cooperation between the States and the international organizations concerned in a coordinated and comprehensive regional approach for the protection and enhancement of the marine environment. In the implementation of MAP Phase II the MAP Coordinating Unit establishes and strengthens relations with other regional seas programmes, the secretariats of international conventions relevant to the region, the United Nations Commission on Sustainable Development and the international financing institutions related to environment and sustainable development in the Mediterranean.**

16.-22.2 The United Nations specialized agencies concerned, including UNEP, UNDP, WHO, FAO, WMO, IAEA, IOC, IMO, IUCN, UNESCO, the World Bank, are regularly involved in the formulation and implementation of the MAP Phase II programme of activities, as well as local, provincial and regional authorities, as appropriate. Non-governmental organizations involved in the protection of the environment and the promotion of sustainable development, as well as organizations representing economic activities are also associated in the MAP Phase II activities.

**16.-22.3 As the European Union is a major partner in the Mediterranean, the MAP Secretariat and all MAP components are closely following the developments taking place within the framework of the Euro-Mediterranean Partnership. A work programme to strengthen further the cooperation of MAP with the European Commission is being finalized, based on the following priorities:**

- **Strengthening the cooperation between MAP and the Euro-Mediterranean**
- **Partnership in conformity with the Athens Declaration, 2002**
- **Association of the European Commission with the implementation of the SAP and the SAP BIO**
- **Participation of the European Commission in the process of preparing the Mediterranean Strategy for Sustainable Development**
- **Involvement of MAP in the process of implementing the European Strategy for Integrated Coastal Zone Management**
- **Cooperation with the European Commission for the development of the strategy for the implementation of the Prevention and Emergency Protocol**

- **Involvement of MAP in the process of preparing and implementing the European Marine Strategy as confirmed in the Catania Declaration adopted at the 13<sup>th</sup> Meeting of the Contracting Parties to the Barcelona Convention, with a view to providing a holistic framework to deal with the protection and conservation of the marine environment.**

**16.-22.4 Considering the increasingly important role of the European Environment Agency (EEA) in data collection, information, analysis and reporting on environment and development in the Mediterranean, a detailed framework for joint activities with MAP has been agreed, to strengthen cooperation, avoid duplication and promote synergy. There is currently cooperation with the Blue Plan Regional Activity Centre of MAP on indicators and statistics and on the Environment and Development report, with MED POL on indicators and information, and with the Environment Remote Sensing, (ERS) Regional Activity Centre of MAP on remote sensing. A report on the “State and pressures of the marine and coastal Mediterranean environment” was jointly prepared with the MAP Coordinating Unit.**

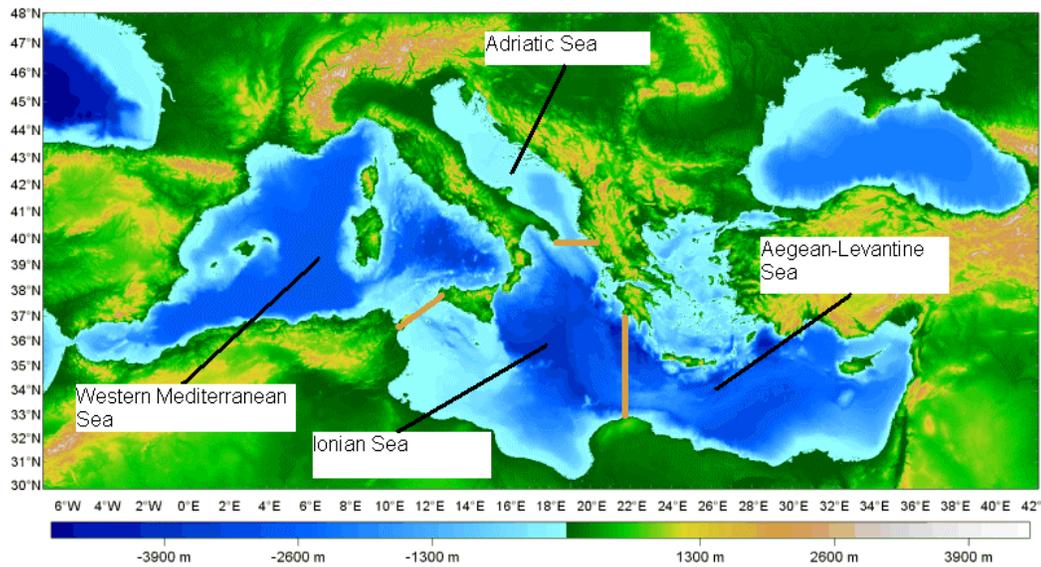
**16.-22.5 MAP is cooperating with the Global Environment Facility (GEF) on the Strategic Action Programme to address pollution from land-based activities and the preparation of the Strategic Action Plan for Biodiversity. The implementation of the SAP BIO has also resulted in increased cooperation with the Mediterranean Technical Assistance Programme (METAP) of the World Bank.**

**16.-22.6 Cooperation in the biodiversity sector has been strengthened through Memoranda of Understanding with the Secretariats of the Convention on Biological Diversity and the Ramsar Convention.**

### ANNEX III

Proposed subdivision of the Mediterranean Sea into Ecoregions made by MAP Secretariat :

- **Western Mediterranean Sea**
- **Adriatic Sea**
- **Ionian Sea**
- **Aegean-Levantine Sea**



## ANNEX IV

### OVERVIEW OF THE PRESSURES AND QUALITY STATUS OF ADRIATIC AND IONIAN SEA

#### 1. Introduction

1. The Adriatic and Ionian Region include marine and coastal waters of Albania, Bosnia and Herzegovina, Croatia, Greece, Italy, Slovenia and Serbia and Monte Negro. The Adriatic Sea is a dilution basin - river and land runoff exceed evaporation, the rest of Mediterranean as a whole is a concentration basin. The excess water from Adriatic is exported to the Ionian Sea through the Strait of Otranto.

2. The following is a short summary of the environmental pressures and quality status of the marine environment in these regions. This summary is based extensively on the reports of the regional marine convention, national reports and reports from the European Environment Agency<sup>5</sup>.

#### 2. Climate change

3. Major potential impacts of climate change identified in the UNEP/MAP studies are: increased flooding and high-water events; increased coastal erosion; retreat of dunes; damage to coastal infrastructure; salinisation of soils; alteration to seasonal water discharge regimes; reduced near-shore water mixing and primary production; increased bottom water anoxia; inundation of coastal lowlands; drowning of marshland; increased sea water stratification and bottom anoxia; decreased river runoff; decreased soil fertility; damage to coastal protective structures; extension of tourist season; increased soil erosion; groundwater and some of the lakes; accelerated deterioration of historic buildings; increase in domestic, industrial and agricultural water requirements; increased risk from forest fires; salinisation of coastal aquifers and estuaries; shortage of adequate quality of drinking water; extension of summer drought.

#### 3. Biodiversity and habitat protection

4. The Adriatic and Ionian marine ecosystems are high-diversity ecosystems, highly vulnerable to marine pollution, over-exploitation of marine resources, habitat erosion, climatic changes, introduction of non-indigenous species, phenomena of unusual intensity – mucilage events, anoxia, explosive appearance of various species, and other human activities leading to environmental degradation (like devastation of rocky shores due the illegal date-shell overfishing). There are insufficient data on marine populations of the Mediterranean fish stocks, but there is evidence that the demersal stocks are being over-exploited. Fishing activities occur in the coastal waters including the trawlers; fisheries resources are in a state of overexploitation driven by rising prices and demand in the past decades.

5. Concerns exist also over the potential impacts of aquaculture. The introduction and transfer of marine organisms create risks of transporting competitors, predators, parasites, pests, diseases and non-indigenous species introduction. Over the past years, a growing number of non-indigenous species have been transported into the Adriatic Sea. Some of the alien species have been intentionally introduced while others were brought by ship traffic.

6. Intensive tourism development and illegal construction in Eastern Adriatic region - in many areas without appropriate infrastructure - cause habitat loss, fragmentation and degradation of habitats and ecosystems. Habitats and associated ecological processes have

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<sup>3</sup> These reports include: a contribution made by AMAP, the “State and Pressures of the Marine and Coastal Mediterranean Environment” of the EEA and UNEP/MAP (published in 1999) and “Europe’s Environment: The Second Assessment”, published by the EEA in 1998. Adriatic and Ionian region are addressed specifically from national reports: “Albania - National diagnosis analysis report”, Tirana 2003; “Bosnia - National diagnosis analysis report”, 2003; “Croatia - National diagnosis analysis report”, Zagreb 2003; “Greece - National diagnosis analysis report”, Athens 2003; “Slovenia - national diagnostic analysis”, Ljubljana 2003, courtesy to UNEP/MAP.

been changed in all areas by coastal protection, land reclamation, recreational activities and development of industries, ports and harbours. Many of coastal areas are densely populated and tourism has been growing steadily. Many of the habitats and locations are jeopardised by the sheer number of visitors they attract, increased traffic and growing demands for accommodation and improved services.

#### **4. Eutrophication**

7. The area at highest risk of eutrophication and eutrophication-related phenomena is the north-western Adriatic Sea, which receives high nutrient and organic matter inputs from the Po River and other minor rivers. The high vulnerability of the Northern Adriatic to eutrophication and to the build up of pollutants is also due to the fact that it is a very shallow, semi-enclosed basin, with long residence times especially during the summer months

8. Eutrophication in the east Adriatic areas is limited mainly to urban and adjacent offshore areas and enclosed coastal bays that receive elevated nutrient loads from rivers, together with direct discharges of untreated domestic and industrial waste. Intensive tourism without appropriate infrastructure in some areas seasonally elevates pollutants input. Seasonal effects of eutrophication are intense phytoplankton blooms, extreme reduction of dissolved oxygen, benthic organisms and fish kills, local algal blooms related sporadically to hypoxic or anoxic conditions and rarely toxic algal blooms.

9. The trophic status in the Ionian Sea is very low. The eastern part of the sea is exposed to urbanisation and intensive agriculture, which locally contributes to high nutrients input and demands the change of agriculture practices and improvement of wastewater treatment.

#### **Toxic algal blooms**

10. The Northern Adriatic Sea appears as the most vulnerable area with respect to toxic algal blooms since blooms of potentially toxic species occur almost regularly in the area, although shellfish toxicity has been recorded only on a few occasions.

#### **5. Pollution**

##### **Hazardous substances**

11. Inputs of hazardous substances to the marine environment arise from a number of industrial processes and commercial and domestic uses and agriculture runoff. The emission of hazardous substances in the Adriatic Sea is due to industrial activities (50%), agricultural uses (e.g. pesticides) and urban developments (50%). However, impacts of these emissions on the marine environment seem to have a limited and spatially restricted effect in Adriatic and Ionian Seas, but the data about pollution from hazardous substances are fragmented and not completed. There is concern in all the Mediterranean area about the use of chemicals that interfere with endocrine systems (e.g. nonylphenols and tributyltin compounds).

##### **Oil pollution**

12. Marine life at basin scale has not been affected by oil pollution although localised incidents have sometimes had adverse effects on the benthic communities. Accidental releases from ships, oil refineries, oil load terminals, industrial plants and sewerage outfalls are major land based sources of hydrocarbon pollution.

##### **Marine litter**

13. Sources of marine litter are mainly related to waste generated by shipping (fishing and commercial), tourist and recreational activities. Information on quantities of marine litter in the area was not available. As tourism, urban development and industrial pressure for development in the coastal zone increase, the problem of litter may also increase.

14. In the eastern Adriatic waste management is not yet thoroughly organized and therefore the discharge of solid wastes in rivers and their transport in the sea also results in mass of plastic and metallic wastes in marine environment.

##### **Violations of existing regulations**

15. Due to the existence of high seas in the Adriatic basin, Coastal states have a limited jurisdiction over passing ships flagged by other states<sup>2</sup>.

#### **Accidents**

16. Accidental oil spills have caused localised damage to the Mediterranean marine and coastal environment so far. Major oil spill could occur at any time in any part of the area, particularly along the major sea routes on oil loading and unloading terminals, particularly as several ageing tankers are still operating in the area. The expected increase of maritime traffic carrying hazardous substances and other goods can be considered as an additional risk factor.

#### **Shipping and ship-source pollution<sup>4</sup>**

17. Beside illegal waste discharge and accidental pollution, caused by ships in distress, there are three types of ship operations polluting the sea: ballast water discharge and tank washings for tankers and engine room effluent discharges for all ships. The study (2) shows, that 1 228 km<sup>2</sup> of the Adriatic Sea and 3 697 km<sup>2</sup> of the Ionian Sea were exposed to oil spills of different magnitudes in the survey of 1999.

#### **Response to pollution**

18. National systems of response to pollution deriving from shipping accidents are in place. By implementing international agreements, a number of States are cooperating in order to establish co-ordinated means and procedures.

#### **Radionuclides**

19. Radioactive contamination is not considered to be a problem in the Adriatic and Ionian basin.

### **6. Health and environment**

#### **Microbiological pollution**

20. Microbial pollution is related to the discharge of untreated or inadequately treated urban wastewaters. The most important eutrophication hot spots sometimes coincide with coliform bacterial hot spots into the immediate coastal zone. Microbial pollution and its effects have been mitigated along the EU Mediterranean coast since the installation of urban wastewater treatment plants in most of the European urban areas. However, the problem remains in the eastern part of Adriatic.

#### **Bioaccumulation**

21. A recent study of the Italian National Institute of Health<sup>5</sup> evaluated the chemical contamination seafood from the Italian coastal area of the Adriatic Sea. 140 pollutants were analysed in the study: heavy metals, PAH, PCB, PCDD, PCDF, organochlorine pesticides and alkylphenols. All the pollutants were found in the seafood at levels below the limit risks for human health; there is a need to evaluate the risks due to the exposure to mixtures of pollutants. Particular concern is due to the detection of alkylphenols in all samples analysed. In general a slight gradient of contamination from the north through the south Adriatic Sea can be observed<sup>6</sup>.

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<sup>4</sup> 'On the Monitoring of Illicit Vessel discharges, A Reconnaissance Study in the Mediterranean Sea', DG Joint Research Centre, DG Environment, EC 2001.

<sup>5</sup> Istituto Superiore di Sanità

<sup>6</sup> Ferrara F. e Funari F., Rischio chimico associato alla qualità delle acque del mare Adriatico, Rapporto Istisan 04/4