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MED POL-Phase III (1996-2005)

**A PROGRAMME FOR THE ASSESSMENT AND CONTROL OF
POLLUTION IN THE MEDITERRANEAN REGION**

PROGRAMME DOCUMENT

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1. BACKGROUND

1.1 The MED POL programme, designed as the environmental assessment component of the Mediterranean Action Plan, has been fully operational since 1975. Its first phase (MED POL-Phase I) was implemented from 1975 until 1980 and it comprehended seven basic baseline studies covering the major marine pollution problems in the Mediterranean. In 1981 the Contracting Parties to the Barcelona Convention approved a new ten-year long-term programme (MED POL-Phase II, 1981-1990) which included two main components, monitoring and research. In 1991 the Contracting Parties decided to extend MED POL-Phase II until 1995 to allow the completion of the programme as well as the formulation of the next phase.

1.2 In fact, during the implementation of MED POL-Phase II the need was felt to bring the MED POL programme closer to the other components of the Mediterranean Action Plan, and in particular to the Protocol for Land-Based Sources of Pollution which entered into force in 1983 and the more recent Coastal Areas Management Programme (CAMP). As a result, preparations were made to refocus the MED POL Programme and therefore to prepare a new phase of the programme (MED POL-Phase III, 1996-2005). In addition, recent global events such as the Rio de Janeiro Summit and the Agenda 21, i.e. the new trends towards sustainable development, traced the lines for approaching the marine pollution control programmes in a different and more integrated dimension.

1.3 As early as 1989, a meeting of experts took place to evaluate the main pollution data gathered until then through MED POL (UNEP(OCA)/MED WG. 5/3). Four experts prepared specific reports on sources of pollution (UNEP(OCA)/MED WG.5/Inf.3), micro-organisms in coastal areas (UNEP(OCA)/MED WG.5/Inf.4), heavy metals in coastal and reference areas (UNEP(OCA)/MED WG.5/Inf.5) and petroleum and chlorinated hydrocarbons in coastal and reference areas (UNEP(OCA)/MED WG.5/Inf.6) which showed the existing gaps, presented the available data and made suggestions for their improved collection and use.

1.4 In addition, several meetings and consultations took place in and outside the Secretariat with the scientific community and the UN bodies involved in the programme; in particular, large *fora* such as the ICSEM/IOC/UNEP Workshops on pollution of the Mediterranean Sea were utilized to discuss with the scientific community the major achievements and shortcomings of the programme and propose new approaches. Two review papers, "Monitoring Strategies of Marine Pollution" and "Pollution Problems in the Mediterranean and Relevant Research Strategies", were presented and widely discussed during the X ICSEM/IOC/UNEP Workshop held in Perpignan (1990). The papers summarized and critically analyzed the work carried out in the framework of MED POL in the field of monitoring and research and proposed follow-up activities. During the XI ICSEM/IOC/UNEP Workshop on Pollution held in Trieste (1992) another review paper "The Data Quality Assurance Programme of MED POL" presented the new strategy of MED POL as to data quality assurance and the prospectives in the specific field.

1.5 Discussions also on the subject of the new phase of MED POL were held in the course of all Inter-Agency Advisory Committee Meetings of MED POL. Finally, in 1992, the Bureau of the Contracting Parties asked the Secretariat to organize the preparation of an in-depth evaluation of the MED POL Programme by scientists/experts external to the MAP office with a view of using this evaluation in the drafting of the Phase III of MED POL. Five consultants worked during 1993 and an evaluation was prepared and presented to the Eighth Ordinary Meeting of the Contracting Parties in October 1993 (UNEP(OCA)/MED IG.3/Inf.6). During the latter Meeting the Contracting Parties also formally agreed that a Phase III of MED POL should be prepared covering the period from 1996 to 2005 and, to this effect, they set a number of basic objectives and principles which should be used for its preparation (UNEP(OCA)/MED IG.3/5, Annex IV).

1.6 The present document is an outline of the programme elements of the MED POL-Phase III. The contents of the programme keep into due account the results and the conclusions of all the Meetings mentioned above as well as the new trends related to marine pollution control developed as a result of the Rio de Janeiro Summit.

2. INTRODUCTION

2.1 The organization of a programme for monitoring of the sources, levels and effects of pollutants, as well as the research related to this monitoring, was one of the cornerstones of the Mediterranean Action Plan (MAP)¹ adopted by the governments of the Mediterranean countries in February 1975. With the adoption, in 1976, of the Barcelona Convention by the same governments, and the subsequent adoption of the protocols to this Convention, the objectives and methodologies of the programme were gradually modified in order to respond to the expanding goals set by the governments².

2.2 The declared objectives of the first phase of the programme, MED POL-Phase I (1975-1980)³, were:

¹ The acronyms and abbreviations used in the present document are listed and explained in Appendix 1.

² *Mediterranean Action Plan and Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols*. UNEP/UN, 1992.

³ *Long-term programme for pollution monitoring and research in the Mediterranean (MED POL) - Phase II*. UNEP Regional Seas Reports and Studies No.28. Rev.1. UNEP, 1986.

- *to formulate and carry out a co-ordinated pollution monitoring and research programme taking into account the goals of the Mediterranean Action Plan and the capabilities of the Mediterranean research centres to participate in it⁴:*
- *to assist national research centres in developing their capabilities to participate in the programme;*
- *to analyze the sources, levels, pathways, trends and effects of pollutants relevant to the Mediterranean Sea;*
- *to provide the scientific/technical information needed by the Governments of the Mediterranean States and the EEC for the negotiation and implementation of the Convention and its related protocols; and*
- *to build up consistent time-series of data on the sources, pathways, levels and effects of pollutants in the Mediterranean Sea and thus contribute to the scientific knowledge of the Mediterranean Sea.*

2.3 While the first phase of the programme focused on strengthening the national capabilities in order to enable all countries to participate in the programme, and on the development of methodologies needed to implement it, the next phase of the programme (MED POL-Phase II, 1981-1995) had more general and broader objectives⁵ to provide the Parties to the Barcelona Convention with:

- *information required for the implementation of the Convention and the protocols;*
- *indicators and evaluation of the effectiveness of the pollution prevention measures taken under the Convention and the protocols;*
- *scientific information which may lead to eventual revisions and amendments of the relevant provisions of the Convention and the protocols, and for the formulation of additional protocols;*
- *information which could be used in formulating environmentally sound national, bilateral and multilateral management decisions essential for the continuous socio-economic development of the Mediterranean region on sustainable basis; and*

⁴ All titles of documents and quotes from documents are given in italics. In addition, quotes from recommendations of the Eighth Ordinary Meeting of the Contracting Parties (Appendix II to the present document), or references to these recommendations, are identified by relevant paragraph numbers in square brackets.

⁵ *Long-term programme for pollution monitoring and research in the Mediterranean (MED POL) - Phase II.* UNEP Regional Seas Reports and Studies No. 28. Rev.1. UNEP, 1986.

- *periodic assessment of the state of pollution of the Mediterranean Sea.*

2.4 During the second phase of MED POL:

- the gains of the first phase were consolidated by considerable strengthening of national institutional capabilities through: training; provision of equipment; development of suitable sampling and analytical techniques, quality assurance programmes including intercalibration exercises, equipment maintenance and other forms of assistance;
- the monitoring of the levels and effects of pollutants was intensified, and gradually focused on monitoring related to compliance with the pollution control measures adopted by the Contracting Parties, through agreements with governments involving about 80 national institutions in practically all Mediterranean countries;
- the research programme contributing to the improved understanding of the requirements for pollution control measures was considerably broadened, and implemented through more than 500 research contracts with national institutions in practically all Mediterranean countries;
- a detailed survey (inventory) of pollutants from land-based sources, as defined by the *Protocol for the protection of the Mediterranean Sea against pollution from land-based sources* (LBS protocol) is under way;
- consistent databases resulting from monitoring, research and survey activities, and other sources, were built-up and used in the preparation of studies, analyses and assessments of specific environment pollution problems;
- a regional assessment of the environmental state of the marine and coastal environment was prepared (1989);
- a regional assessment of the possible implications of expected climate changes was prepared (1992), and 11 detailed site-specific studies were carried out on the implications of these changes, with concrete recommendations for the possible mitigation of the negative effects;
- in-depth analyses ("assessment documents") of 13 specific problems related to the control of individual pollutants (or group of pollutants) covered by the LBS protocol were prepared and used as the basis for the formulation of control measures subsequently adopted by the Parties to the Convention; and

- significant input was made from all activities listed above into the coastal area management programme (CAMP) carried out in the framework of the Action Plan⁶.

2.5 Taking into account the ongoing refocusing of the MAP on integrated coastal area management, the eighth ordinary meeting of the Contracting Parties to the Barcelona Convention (Antalya, 12-15 October 1993), in reaffirming *the objective of the Mediterranean Action Plan (MAP) since its establishment to act as an instrument of regional cooperation covering the concerns both of the environment and of development*, approved a set of recommendations (UNEP(OCA)/MED IG.3/5, Annex IV) about the general strategy to be followed in MAP, as well as about actions to be taken under specific components of MAP in order to implement this strategy.

2.6 Recognizing that:

- *in line with UNCED and Agenda 21, further emphasis is to be given to those MAP activities contributing to the implementation of the sustainable development concept, and that*
- *MED POL, as the scientific and technical component of MAP, provides the scientific basis for decision making related to marine pollution in the region in the process of achieving sustainable development;*

recommendation 7.2 of the Antalya meeting asked for the development of MED POL-Phase III, and specified the fields in which it should assist the Contracting Parties, with the following overall objectives:

- (a) *organization of a Mediterranean coordinated marine pollution monitoring and research programme, concentrating on contaminants and pollutants affecting the quality of the marine and coastal environment, as well as the health of man and of the living resources in the Mediterranean and interpretation/assessment of the results of the programme as part of the scientific basis for decision making in the region [7.2.i];*
- (b) *generation of information on the sources, levels, amounts, trends (trend monitoring) and effects of marine pollution, develop capabilities for assessing the present and future state of the marine environment within the Mediterranean region as an additional component of the scientific basis upon which the formulation of proposals for preventive and remedial actions can be based [7.2.ii];*

⁶ Appendix III contains a selected list of the most important publications and internal documents giving detailed presentation of the results and activities of the first two phases of MED POL.

- (c) *formulation of proposals for technical, administrative and legal programmes and measures for the prevention and/or reduction of pollution [7.2.iii];*
- (d) *strengthening and, when necessary, development of the capabilities of the national institutions, in accordance with the circumstances and the country requesting it, so as to implement monitoring and research of pollution of the marine environment [7.2.iv]; and*
- (e) *assistance, as appropriate, to Contracting Parties for the implementation of the recommendations adopted with view to the assessment of their effectiveness; this assistance will allow the competent authorities to verify the recommendations adopted taking into account data of a satisfactory standard [7.2.v].*

3. GOALS AND PRINCIPLES FOR MED POL-Phase III (1996-2005)

3.1 The main goal of MED POL-Phase III (1996-2005) shall be to serve the Contracting Parties to the Barcelona Conventions as their long-term programme for the assessment, prevention, mitigation and control of pollution⁷ in the geographic area covered by the Convention and MAP. This goal shall be achieved by:

- (a) assessing all (point and diffuse) sources of pollution, the load of pollution reaching the Mediterranean Sea, and the magnitude of the problems caused by the impact of pollutants on living and non-living resources, including human health, as well as on amenities and uses of the marine and coastal regions;

⁷ In the context of this document, "pollution of the marine environment" is interpreted according to the definition adopted in the United Nations Convention on 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;

bearing in mind the somewhat more restrictive definition given in the Barcelona Convention:

introduction by man, directly or indirectly, of substances or energy into the marine environment resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of quality for use of sea water and reduction of amenities.

- (b) formulating and implementing measures for prevention and control of pollution, and measures for mitigation of impacts caused by pollution; measures for the restoration of systems already damaged by pollution should also be a high priority directly linked to sustainable development;
- (c) monitoring the effectiveness of the implementation of the pollution prevention, mitigation and control measures adopted; and
- (d) assessing the trends in the quality of the marine and coastal environment attributable to pollution in particular, and acting as an early warning system for potential environmental problems caused by pollution.

3.2 In view of the broad cross-sectoral mandate of MED POL with heavy emphasis on pollution control from all sources, in particular from land-based sources, and taking into account that the control of marine pollution is one of the central issues to be resolved in the framework of MAP in order to enable the sustainable development of the Mediterranean region, the new phase of MED POL will require an intensified interaction between MED POL and practically all other components of MAP, and with the coastal area management programme (CAMP) in particular. Therefore, in outlining the possible elements of MED POL's new phase, an attempt is made in the present document to link the specific objectives and activities recommended for MED POL-Phase III by the Antalya meeting with those recommended for the other components of MAP.

3.3 In addition to reflecting the organic links between MED POL-Phase III and the other components of MAP, the document was also prepared with due regard for the concepts and recommendations contained in Agenda 21 as they bear on activities relevant to MED POL, specifically those contained in Chapter 17 of the Agenda 21⁸.

3.4 The stated goals shall be achieved through the implementation of interdependent and organically linked (see Figures 1 and 2) activities grouped in 3 basic MED POL programme elements (assessment of pollution related problems; pollution control and management; and supporting measures), all contributing to the ultimate goal of MED POL and MAP. The rationale of these activities, their specific objectives and means of implementation are described in sections 4-6 of the present document.

3.5 The development of suitable measures for the prevention, mitigation and control of pollution from all sources, and a continuous monitoring of the effectiveness of their implementation, are the central goals of the new phase of MED POL. All other activities

⁸ Chapter 17 of the Agenda 21, adopted by the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), lists 33 objectives and more than 180 type of activities which are recommended under the heading *Protection of the oceans, all kind of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their resources.*

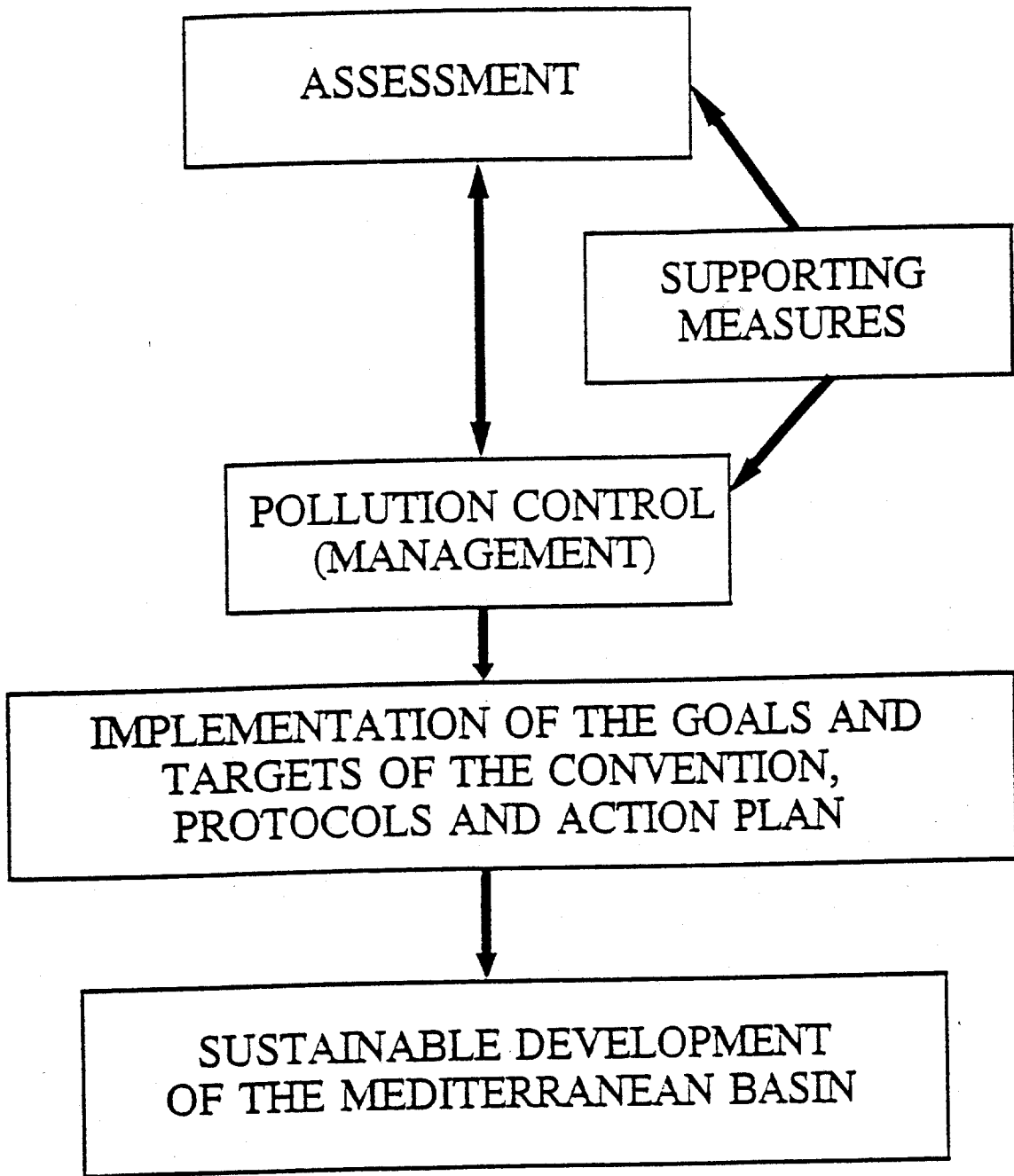


Figure 1: Relationship of MED POL-Phase III to the goals of the Mediterranean Action Plan emphasizing the feed-back relationship between assessment and pollution control.

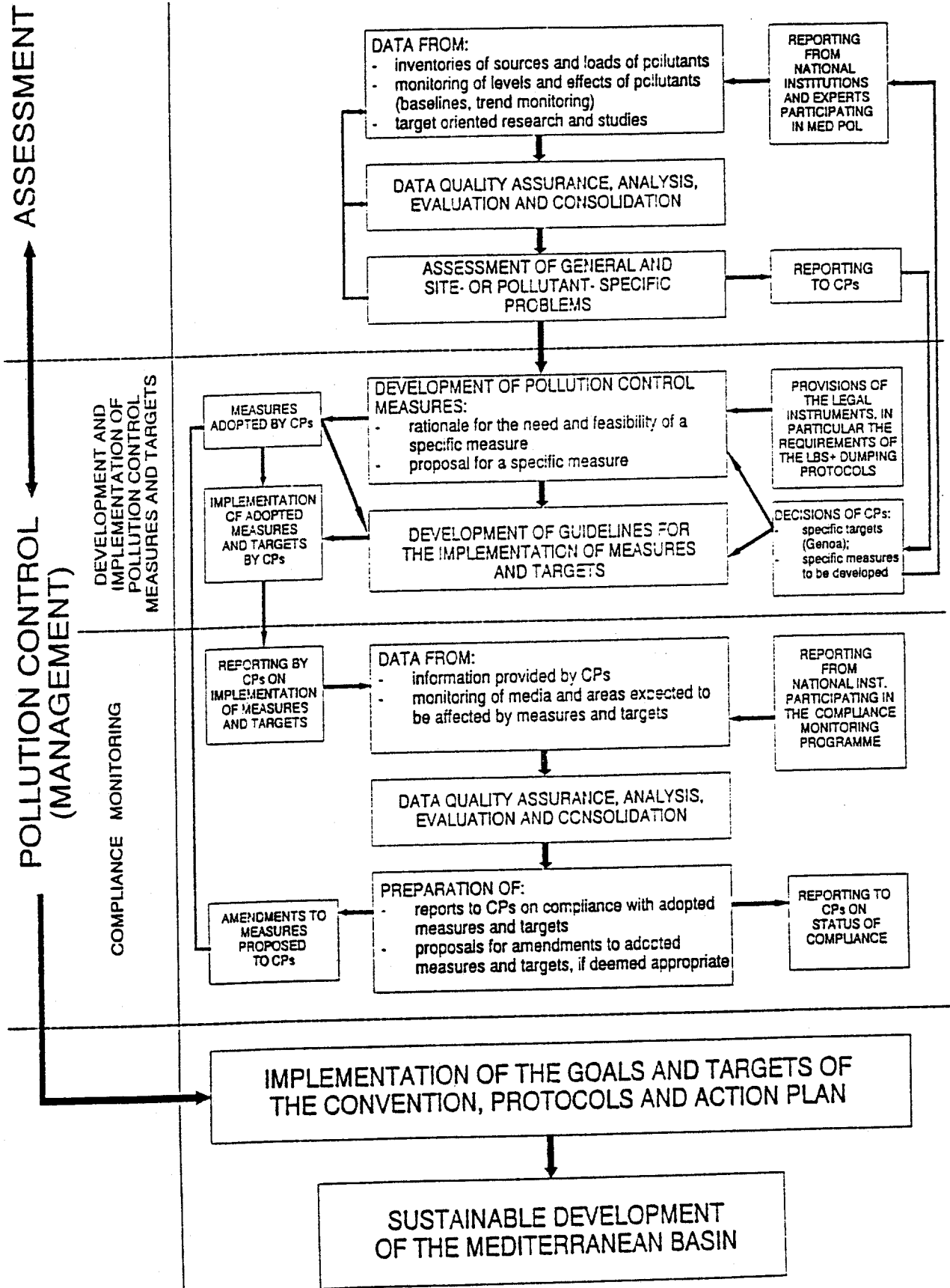


Figure 2: Simplified flow chart showing the more important links between the substantive activities of MED POL-Phase III.

are subsidiary to these goals and contribute to their more efficient achievement. By concentrating on these goals, MED POL- Phase III is expected to provide critically important inputs into practically all other components of MAP, notably in MAP's coastal area management programmes (CAMPs), and thus make a significant contribution to the development of the Mediterranean region in a sustainable manner.

4. ASSESSMENT OF POLLUTION-RELATED PROBLEMS

Basis for action

4.1 A scientific assessment of pollution related problems of the Mediterranean region is one of the basic prerequisites for development of a rational approach towards the sustainable development of the region. Such an assessment, together with information provided through the other components of MAP, is the sound foundation for the decisions and recommendations of the Contracting Parties to the Convention on pollution control measures suitable and applicable in the Mediterranean region⁹.

Objectives

4.2 The specific objectives of this programme element shall be:

- (a) to identify the sources, assess the present levels and keep under periodic review the trends in the load of pollutants reaching the Mediterranean Sea from marine and land-based sources including point and non-point sources and airborne pollutants. This will constitute an inventory of sources of pollution required as basic information for the implementation of the LBS and other protocols¹⁰;
- (b) to assess, in areas under direct influence of pollutants (e.g., coastal waters, estuaries), the levels of pollutants and their potentially harmful effects on marine life, fisheries, and human health¹⁰;
- (c) to assess, in areas not under direct influence of pollutants from identifiable primary or secondary source of pollution ("reference areas"), parameters which may serve as indicators for the general trend in the environmental quality of larger areas¹⁰;
- (d) to assess (on a sub-regional basis) the background level of substances needed to evaluate the anthropogenic loads of pollutants and to assess their potential harmful effects on the marine environment;

⁹ Articles 5, 6, 7 and 8 of the Barcelona Convention.

¹⁰ Paragraphs 3.2 (a), (b) and (c) and 17.13 and 17.35 (a) of Agenda 21.

- e) to identify and assess potential short- and long-term threats to the Mediterranean region, and in particular those associated with environmental pollution¹¹; and
- (f) to provide the Contracting Parties, and other interested groups and individuals, with information about the general and specific pollution related problems of the Mediterranean region¹².

Activities

4.3 The stated objectives shall be achieved through:

- (a) monitoring/studies/surveys, as appropriate, of levels, loads, pathways, and distribution on pollutants and their effects;
- (b) monitoring of trends in the levels and impacts (effects) of pollutants¹³;
- (c) target oriented research in support of monitoring activities¹⁴;
- (d) collection, analysis and evaluation of pollution related data from surveys, baseline studies and monitoring organized in the framework of MED POL, and from other sources;
- (e) preparation of reports on the assessment of specific pollution related problems of the Mediterranean region (e.g., on possible implication of the expected climate change¹⁵), including recommendations for action, if deemed appropriate¹⁶;
- (f) preparation of short and concise reports on the state of pollution of the Mediterranean environment for each meeting of the Contracting Parties,

specifically highlighting the changes and trends identified since the submission of the last report¹⁷; and

¹¹ Paragraphs 17.6 (e) and 17.97 of Agenda 21.

¹² Paragraph 17.35 (b) of Agenda 21.

¹³ Article 10 of the Barcelona Convention.

¹⁴ Article 11(3) of the Barcelona Convention.

¹⁵ Paragraphs 17.98 and 17.101 (a), (b) and (c) of Agenda 21.

¹⁶ The recommendations may lead to the development of proposals for concrete pollution control measures, as described in section 5A of the present document.

¹⁷ Paragraph 17.106 (d) of Agenda 21.

- (g) preparation, for the 1997 and 2003 meetings of the Contracting Parties, of consolidated reports on the state of the Mediterranean environment^{17 18}.

4.4 The monitoring shall concentrate on the assessment of trends in pollution related problems in order to provide a solid basis for the appraisal of the environmental health of the Mediterranean as a whole, and to serve as an early warning system for the problems which may be encountered in the future (see annex I). The preparation of inventories of point- and non-point sources of pollution, particularly the land-based sources, and the monitoring of the pollution loads reaching the Mediterranean from these sources, shall be considered as a high priority task¹⁹.

4.5 In some instances data from monitoring programmes alone will not be sufficient for the assessment of pollution related problems and their long-term implications. Therefore, in such cases, monitoring data will have to be supplemented by well defined target oriented research.

4.6 Although the overall assessment for the Mediterranean will be organized by the Secretariat, there is also a need for national assessments in order to prioritize national pollution control measures.

Means of implementation

4.7 The assessment of pollution related problems will require a high degree of coordination and close cooperation between the Secretariat of MAP²⁰, the National Coordinators for MED POL, the National MED POL Collaborating Institutions, and the specialized Agencies of the United Nations system supporting or participating in MED

POL²¹. The modalities of their cooperation are described in Annex II of the present document.

¹⁸ The last report of this nature was prepared in 1989 (MAP Technical Reports Series No.28).

¹⁹ Presently ongoing activity, using the *Guidelines for monitoring land-based sources of marine pollution* prepared in 1994 in the framework of MED POL Phase II.

²⁰ In the context of this document, *UNEP's Coordination Unit for the Mediterranean Action Plan in Athens* is identified as the *Secretariat of MAP*.

²¹

- Food and Agriculture Organization of the United Nations (FAO)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- World Health Organization (WHO)
- World Meteorological Organization (WMO)
- Intergovernmental Oceanographic Commission (IOC)
- International Atomic Energy Agency (IAEA)
- World Conservation Union (IUCN)
- GEF Black Sea Environmental Programme (BSEP)
- United Nations Environment Programme (UNEP)

4.8 Data and information from monitoring of trends in the levels and impacts (effects) of pollutants, including from the inventories of pollution sources and loads (paragraphs 4.3(a) and 4.4), will be generated and provided to the Secretariat by the National MED POL Coordinator, as described in Annex II and by the National MED POL Collaborating Institutions.

4.9 Target oriented research (paragraphs 4.3(b) and 4.5) will be based on research projects selected by the Secretariat in cooperation with the relative UN Specialized Agency participating in the Programme. For such projects, research contracts will be signed by the Secretariat or Agency and the National MED POL Collaborating Institutions, in consultation with the relevant National Coordinators for MED POL. The Collaborating Institutions may receive financial support from the Trust Fund to cover partial cost of the research carried out by them.

4.10 Assistance to developing countries will be needed in the form of training of their national experts and technical assistance (equipment, material, data quality assurance, instrument maintenance²²) to their national institutions, in order to enable their effective participation in the programme element²³.

5. POLLUTION CONTROL

5.1 A scientific assessment of pollution related problems of the Mediterranean region is only the first step towards action to prevent, mitigate and control the pollution and its effect. Therefore, the substantive focus of MED POL-Phase II was gradually shifting from the assessment of the problems related to pollution to the development of proposals for concrete pollution control measures. Taking into account the data and information obtained in the previous phases of MED POL, and relying on a permanent system for keeping the present assessment up to date through activities envisaged in section 4 of the present document, MED POL-Phase III shall further emphasize the development of proposals for pollution control measures, and the control of compliance with the measures adopted by the Contracting Parties, as its central activities.

²² See paragraph 6.7 and Annex I.

²³ Article 11(3) of the Barcelona Convention.

A. Development and implementation of pollution control measures²⁴

Basis for action

5.2 Pollution from land-based sources was recognized in the very early stages of the MAP as the major problem for the Mediterranean region. The adoption of the LBS protocol (1980) and its entering into force (1983) provided the legal basis for the introduction of concrete measures for the control of pollutants from land-based sources and activities listed in the annexes to the protocol.

5.3 Although the control of pollution from land-based sources remains a major objective of MAP, the control of pollutants from other sources and activities is not neglected, as exemplified by the adoption of protocols associated with the Barcelona Convention which deal with pollution from dumping and emergency situations, and by the preparations for the adoption of a protocol on control of pollution from offshore sea-bed activities²⁵.

Objectives

5.4 The specific objectives of this programme element shall be:

(a) to develop proposals for concrete pollution control measures required by the Barcelona Convention and its protocols²⁶, as well as the decisions and recommendations of the Contracting Parties²⁷; and

(b) to implement pollution control measures adopted by the Contracting Parties^{28 29}.

Activities

²⁴ In the context of this document, *pollution control measures* are broadly interpreted as a combination of technical (technological), economic (fiscal), legal and administrative policies, measures and practices contributing to the:

- prevention and mitigation of pollutants' impact on human health and on the quality of the marine and coastal environment, including their living and non-living resources, and amenities;
- general decrease of pollution load reaching the Mediterranean Sea; and
- restoration of marine and coastal environment damaged by present impact of pollution.

²⁵ *Protocol concerning cooperation in combating pollution of the Mediterranean Sea by oil and other harmful substances* (adopted in 1976, entered into force in 1978); *Protocol for the prevention of pollution of the Mediterranean Sea by dumping from ships and aircraft* (adopted in 1976, entered into force in 1978); *Protocol concerning pollution resulting from exploration and exploitation of the continental shelf, the sea-bed and its subsoils* (adoption expected in October 1994).

²⁶ Articles 5(2), 6(2) and 7(1) of the LBS protocol.

²⁷ Paragraphs 17.6 (n), 17.28 (h) and 17.30 (a) of Agenda 21.

²⁸ Paragraphs 17.6 (n), 17.22 (a), 17.24 and 17.28 (j) of Agenda 21.

²⁹ Articles 4(1), 5, 6, 7, 8 and 9 of the Barcelona Convention.

5.5 The stated objectives shall be achieved by:

- (a) formulation of a scientifically sound rationale for pollution control measures, by providing an assessment of the magnitude and intensity of the problem which is to be tackled by the measures ("assessment document");
- (b) formulation of proposals for pollution control measures, taking into account the best available assessment of the problem to be controlled and the feasibility of the measures' implementation in the context of the Mediterranean region;
- (c) formal adoption of the proposed measures, or of their amended versions, by the Contracting Parties;
- (d) development of technical guidelines for the implementation of adopted measures³⁰; and
- (e) implementation of the adopted measures by the Contracting Parties³¹.

Means of implementation

5.6 A high degree of cooperation and coordination will be required between the Secretariat, the Contracting Parties, the National Coordinators for MED POL, as well as the relevant Regional Activity Centres of MAP³², the Specialized Agencies of the United Nations system (see footnote 21) as well as the international and intergovernmental organizations to implement the activities listed above.

5.7 The priorities for the formulation of control measures, as well as the timetable for the development of proposals shall be determined by the Contracting Parties.

5.8 Based on the decisions of the Contracting Parties, the Secretariat will coordinate the preparation of the assessment documents, the formulation of proposals for control measures, and the technical guidelines for the implementation of the adopted measures.

³⁰ Article 7 of the Barcelona Convention.

³¹ Article 4 of the Barcelona Convention.

³² The following are the Regional Activity Centres of MAP:

- Regional Activity Centre for Priority Actions Programme (PAP/RAC) in Split;
- Regional Activity Centre for Blue Plan (BP/RAC) in Sophia Antipolis;
- Regional Marine Pollution Emergency Response Centre for the Mediterranean (REMPEC) in Malta;
- Regional Activity Centre for Specially Protected Areas (SPA/RAC) in Tunis;
- Regional Activity Centre for Environment Remote Sensing (ERS/RAC) in Palermo.

5.9 Consultants and *ad hoc* meetings of experts may be used by the Secretariat for the preparation of the assessment documents, the proposals for control measures, and the guidelines for their implementation.

5.10 The meetings of the Scientific and Technical Committee shall review, and revise as necessary, the drafts of the assessment documents, the proposals for control measures and the guidelines for implementation of the measures, before they are submitted for the consideration of the Contracting Parties.

5.11 The implementation of the adopted measures shall be the responsibility of the individual Contracting Parties³³.

5.12 Assistance shall be provided through the Secretariat to developing countries requesting training of their national experts, or advise (technical and legal) to their national institutions, in order to ensure timely and effective implementation of the adopted pollution control measures³⁴.

B. Compliance control

Basis for action

5.13 Compliance with the provisions of the Barcelona Convention and its protocols (in particular the LBS and Dumping protocols), and specifically with the decisions and recommendations adopted by the meetings of the Parties to the Convention, is the key to a successful environmental protection of the Mediterranean Sea. The most relevant decisions and recommendations pertinent to the mitigation, prevention and control of pollution are:

- (a) the targets, adopted by the Contracting Parties in 1985³⁵, *to be achieved as a matter of priority during the second decade of the Mediterranean Action Plan:*
- *establishment of reception facilities for dirty ballast waters and other oily residues received from tankers and ships in ports of the Mediterranean;*
 - *establishment as a matter of priority of sewage treatment plants in all cities around the Mediterranean with more than 100,000 inhabitants and appropriate*

³³ Regarding potential financial support for the implementation of the adopted measures, see paragraph 6.8.

³⁴ Article 11(3) of the Barcelona Convention, and Article 10 of the LBS protocol.

³⁵ Genoa Declaration. UNEP(OCA)/IG.56/5.

outfalls and/or appropriate treatment plants for all towns with more than 10,000 inhabitants³⁶;

- *applying environmental impact assessment as an important tool to ensure proper development activities³⁷;*
- *concrete measures to achieve substantial reduction in industrial pollution and disposal of solid waste; and*
- *substantial reduction in air pollution which adversely affects coastal areas and the marine environment with the potential danger of acid rains³⁸;*

(b) the 13 specific measures adopted by the Contracting Parties in the context of the implementation of the LBS protocol for:

- *interim environmental quality criteria for bathing waters (1985);*
- *interim environmental quality criteria for mercury in Mediterranean seafood (1985);*
- *measures to prevent mercury pollution from effluent discharges (1987);*
- *environmental quality criteria for shellfish waters (1987);*
- *measures for control of pollution by used lubricating oils (1989);*
- *measures for control of pollution by cadmium and cadmium compounds (1989);*
- *measures for control of pollution by organotin compounds (1989);*

³⁶ In order to assist the countries, *Guidelines for submarine outfall structures for Mediterranean small and medium-sized coastal communities* were prepared in 1994 in the framework of MED POL-Phase II.

³⁷ In the framework of MAP, in 1990 guidelines for the application of EIA were developed and tested in ten site-specific Mediterranean case studies ("An approach to Environmental Impact Assessment for projects affecting the coastal and marine environment", UNEP Regional Seas Reports and Studies No. 122)(see also Gray and Jensen, 1993, TREE 8:267-8).

³⁸ The listed five targets are directly related to the implementation of the provisions contained in the LBS protocol.

- *measures for control of pollution by organohalogen compounds (1989);*
 - *measures for control of pollution by organophosphorus compounds (1991);*
 - *measures for control of pollution by persistent synthetic materials in the Mediterranean sea (1991);*
 - *measures for control of radioactive pollution (1991);*
 - *measures for control of pollution by pathogenic micro-organisms (1991); and*
 - *control of pollution by carcinogenic, teratogenic and mutagenic substances (1993).*
- (c) the relevant recommendations approved in 1993 by the Antalya meeting of the Contracting Parties, specifically those identified in paragraphs 3.4-3.7, 6.1, 6.3, 7.1-7.2 (see Appendix II).

Objectives

5.14 The specific objectives of this programme element shall be:

- (a) to monitor, on a continuous basis, the implementation and the effectiveness of the implementation of pollution control measures adopted or recommended by the Contracting Parties³⁹;
- (b) to identify problems experienced by the Contracting Parties in the implementation of the measures, and formulate proposals which may assist to overcome those problems⁴⁰; and
- (c) to keep the Contracting Parties regularly informed about the status of the implementation of the adopted and recommended measures⁴¹.

Activities

5.15 The stated objectives shall be achieved through:

³⁹ Paragraphs 17.25 (b), 17.28 (a) and (c), 17.30 (a) and 17.35 (a) of Agenda 21.

⁴⁰ Paragraph 17.25 (b) of Agenda 21.

⁴¹ Paragraph 17.35 (b) of Agenda 21.

- (a) collection, analysis and evaluation of data and information received from the Contracting Parties on the status of implementation of the adopted or recommended pollution control measures⁴²;
- (b) compliance monitoring programmes⁴³ carried out by National MED POL Collaborating institutions (see Annex I and II);
- (c) collection, analysis and evaluation of data and information received through the National Coordinators for MED POL from national compliance monitoring programmes (see Annex II);
- (d) target oriented research in support of national compliance monitoring programmes⁴⁴; and
- (e) preparation of consolidated reports for the Contracting Parties on the status of the implementation of the measures, including recommendations on the ways and means to improve the efficiency of their implementation.

5.16 The type of data and information which will be expected from the Contracting Parties, may include, *inter alia*:

- (a) the status of the adopted or recommended measures (paragraphs 5.13(a) and (b) in relation to the relevant national legislation and national administrative procedures and practices⁴⁵;
- (b) information on the permits issued for dumping of waste⁴⁶;
- (c) the experience gained with the application of the pollution control measures and dumping permits;
- (d) the results of the time series of measurements and observations (see annex I) about the levels of pollutants, or the status of biological pollution indicators, in media directly affected by the measures (e.g., effluent waters, recipient waters);
- (e) the major marine and land-based sources of marine pollutants on the national territories, including coastal waters under national jurisdictions, and estimates of the amounts of pollutants reaching the marine environment from these sources; and

⁴² Article 20 of the Barcelona Convention; Articles 4, 5 and 6 of the Dumping protocol; and Article 13 of the LBS protocol.

⁴³ Article 10 of the Barcelona Convention, and Article 8 of the LBS protocol.

⁴⁴ Article 11(2) of the Barcelona Convention, and Article 9 of the LBS protocol.

⁴⁵ Article 13 of the LBS protocol.

⁴⁶ Article 7 of the Dumping protocol.

- (f) information relevant for monitoring the biological development of the Mediterranean environment, and on threats to specially protected areas which may come from sources of pollution outside their control⁴⁷.

Means of implementation

5.17 The Secretariat will centrally coordinate all activities envisaged under the programme element. Close co-operation with and among the Contracting Parties and their institutions designated to participate in the programme element is the basic prerequisite for its successful implementation.

5.18 Data and information on the status of the adopted or recommended measures, and on the experience gained with their application (paragraphs 5.16(a), (b) and (c)) will be provided to the Secretariat by the Parties to the Convention, or on their behalf by the designated National Coordinators for MED POL, without cost to the Trust Fund.

5.19 Data and information on the results of the time series of measurements and observations, and on the marine and land-based sources of pollution (paragraphs 5.16(d) and (e)) will be provided to the Secretariat by the Contracting Parties through the National Coordinators for MED POL. The costs involved are expected to be shared between the Trust Fund and the relevant national institutions on the basis of agreements between the Secretariat and the relevant national authorities (see Annex II).

5.20 Target oriented research (paragraph 5.15(d)) will be based on research projects selected by the Secretariat in cooperation with the relative UN Specialized Agency participating in the Programme. For such projects, research contracts will be signed by the Secretariat or Agency and the National MED POL Collaborating Institutions, in consultation with the relevant National Coordinators for MED POL. The Collaborating Institutions may receive financial support from the Trust Fund to cover the partial cost of the research carried out by them.

5.21 Assistance shall be provided through the Secretariat to developing countries⁴⁸ requesting training of their national experts, or technical advice or assistance (equipment, consumables and data quality assurance⁴⁹) to their national institutions participating in monitoring the effectiveness of the implementation of pollution control measures (paragraph 5.15(b)) and reporting on national compliance with these measures (paragraph 5.15(a)).

⁴⁷ Article 14(1) of the SPA protocol.

⁴⁸ Article 11(3) of the Barcelona Convention, and Article 10 of the LBS protocol.

⁴⁹ See paragraph 6.7 and Annex I.

6. SUPPORTING MEASURES

6.1 References have been made in sections 4 and 5 of the present document to some of the measures supporting the substantive MED POL activities, but in view of their importance for the MAP as a whole, they are described in these sections of the document in a more comprehensive way.

A. Assistance (capacity strengthening)

Basis for action

6.2 MED POL-Phase III can not be implemented in a meaningful way without a strong national institutional basis supported with adequate financial resources, equipment and experts. While the situation in developed countries of the Mediterranean region seems adequate to deal with the implementation of the MED POL programme, the capacity of the developing countries will need further strengthening.

Objectives

6.3 The objective of the programme element is:

- to facilitate the full participation of all Contracting Parties in MED POL, including the implementation of the pollution control measures and recommendations adopted by the Contracting Parties⁵⁰.

Activities⁵¹

6.4 The stated objective shall be achieved by providing countries requesting assistance with:

- (a) technical advice on the most suitable institutional arrangements which may be needed for the implementation of the MED POL programme;
- (b) advice and technical assistance in all aspects of design and implementation of national MED POL programmes;

⁵⁰ Paragraphs 17.6 (k), 17.9, 17.14, 17.17, 17.23, 17.35 (f), 17.38 (f), 17.40 and 17.104 of Agenda 21.

⁵¹ References to the legislative authority for specific assistance measures are given in the relevant paragraphs of Sections 4 and 5 of the present document.

- (c) advice on legal⁵², technical⁵³ and fiscal⁵⁴ policies, strategies, and practices which may contribute to the implementation of the pollution control measures and targets adopted by the Contracting Parties⁵⁵;
- (d) individual and group training (e.g., seminars, workshops) of national experts (administrators, technicians, scientists) in all subjects related to the MED POL programme⁵⁶;
- (e) equipment and material donated to the National MED POL Collaborating Institutions⁵⁷;
- (f) guidelines, manuals, documents and reference publications relevant to the implementation of the MED POL programme; and
- (g) maintenance services for analytical equipment used in national pollution monitoring programmes.

Means of implementation

6.5 The provision of the assistance shall be coordinated by the Secretariat, involving as necessary the relevant RACs of MAP (see footnote 32), the Specialized Agencies of the United Nations system (see footnote 21) as well as other international and intergovernmental organizations and programmes ready to offer or provide such assistance. The cost of the assistance will be normally at the expense of the Trust Fund, but the Secretariat will also solicit direct bilateral assistance (without cost to the Trust Fund) from countries and financial institutions ready to provide such assistance.

6.6 Assistance may also be provided by the Secretariat to the MED POL National Coordinators needed to fulfil their role as defined in Annex II.

6.7 Activities related to Data Quality Assurance (DQA) will continue to be provided to MED POL Collaborating Institutions through the appropriate UN Specialized Agencies. The DQA programme will include all the elements necessary to achieve good quality data. Such elements cover all aspects of the monitoring programme ranging from

⁵² E.g., review of the adequacy of existing national legislation, proposals for adjustments in national legislation, proposals for new legislation.

⁵³ E.g., clean production technologies, minimization of waste.

⁵⁴ E.g., user fees, charges for violating pollution control measures, pricing policies and practices, fiscal incentives, possible loans and grants from international financial institutions.

⁵⁵ Paragraphs 17.6 (m) and 17.22 (a) of Agenda 21.

⁵⁶ Paragraph 17.38 (a) of Agenda 21.

⁵⁷ Paragraph 17.37 (c) of Agenda 21.

sampling to data interpretation. The DQA programme should be mandatory and form an integral part of each national monitoring programme (see Annex I).

6.8 The implementation of MED POL may be eligible for financial support (loans or grants) from international or regional financial institutions and mechanisms on a regional or country basis. The Secretariat will explore the possibilities for such support, and will assist interested and potentially eligible countries to formulate project proposals aimed at accessing these resources⁵⁸.

B. Data and information managements⁵⁹

Basis for action

6.9 The nature and quality of data and information provided through MED POL is of crucial importance for the soundness of the scientific and technical rationale underlying the decisions of the Contracting Parties. Therefore a great emphasis should be placed on appropriate data and information management procedures and techniques.

Objectives

- 6.10 The MED POL data and information management shall have a twofold objective:
- (a) to provide the Contracting Parties, on a continuous basis, with reliable data and information required for the development and effective implementation of pollution control measures⁶⁰; and
 - (b) to assist all components of MAP, and the coastal area management programmes (CAMPs) in particular, with data and information on the sources, levels (concentrations), trends and effects of pollutants in the Mediterranean region.

⁵⁸ The Global Environment Facility (GEF) and the World Bank's Mediterranean Environment Programme are the two most promising mechanisms which may support MED POL-related activities.

⁵⁹ Data and information management in the context of this document is understood as involving acquisition, quality control, analysis, evaluation, storage, retrieval and exchange (dissemination) of data and information.

⁶⁰ Paragraphs 17.8, 17.35 (d) and (e) and 17.37 (f) of Agenda 21.

Activities

6.11 The stated objectives shall be achieved through the following activities⁶¹ of the Secretariat:

- (a) collection of data and information resulting from MED POL activities;
- (b) quality control (validation) of collected data and information;
- (c) storage of validated data and information in appropriate databases maintained by the Secretariat;
- (d) analysis and reduction, if appropriate, of the validated data;
- (e) preparation of synthesis reports (evaluations) on general and specific MED POL related issues; and
- (f) distribution (exchange) of data, information and synthesis reports to the Contracting Parties and their subsidiary bodies (Bureau, Scientific and Technical Committee), RACs, National Coordinators for MED POL, National MED POL Collaborating Institutions, meetings organized in the framework of MAP, and other individuals and organizations, as appropriate and in accordance with the policy which will be adopted by the Contracting Parties (see paragraph 6.14).

Means of implementation

6.12 The National Coordinators for MED POL and the National MED POL Collaborating Institutions, shall be the primary source of data and information supporting the development and implementation of MED POL.

6.13 The collection, quality control, analysis and evaluation of the data and information will be carried out by the Secretariat (with the help of the relevant organizations of the United Nations system, outside experts, and *ad hoc* meetings of experts, as necessary), on the basis of agreed and fully documented data assessment procedure.

6.14 The Secretariat's databank will be the central repository of all data and information. The Secretariat, with the assistance of relevant experts, will develop a proposal for data and information distribution policy which will be submitted for adoption to the Contracting Parties. The guiding principle of that policy should be that access to the data and information received by the Secretariat will be normally free for the parties involved in MED POL.

6.15 The reports of the Secretariat to the Contracting Parties will be transmitted through the subsidiary bodies of the Contracting Parties.

⁶¹References to these activities, and to the means of their implementation, have been made in sections 4 and 5 (paragraphs 4.2(e), 4.3(c)-(f), 4.7, 5.4(a), 5.5(a), 5.8, 5.15(a), 5.15(c), 5.15(e), 5.16, 5.19 and 15.20), Annex I (paragraphs 3, 5 and 10) and Annex II (paragraphs 3.(c) and (d), 4. and 5.(b)-(f)) to the present document.

C. Coordination and cooperation

Basis for action

6.16 MED POL, as one of the central and most complex MAP activity, organically linked with virtually all other MAP activities, requires a well coordinated approach in order to ensure the harmonious cooperation and interaction of, and inputs from, the various actors contributing to its implementation.

Objectives

6.17 The objective to be achieved through the coordination of MED POL activities is:

- to ensure the full implementation of Contracting Parties' decisions relevant to MED POL through the highest degree of efficient cooperation between the Secretariat, national structures, international organizations, and individuals participating in the implementation of MED POL⁶².

Activities

6.18 The stated objective shall be achieved by:

- guidance provided directly or indirectly by the Secretariat to all parties involved in MED POL; and
- close cooperation among all parties involved in MED POL.

Means of implementation

6.19 The Secretariat shall play a central role in coordinating all MED POL activities, in close cooperation with National Coordinators for MED POL⁶³, the national MED POL Collaborating Institutions, the Specialized Agencies of the United Nations systems as well as other international and intergovernmental organizations ready to offer or provide support.

6.20 The Scientific and Technical Committee, as the subsidiary body of the Contracting Parties, will continue to review periodically the progress of MED POL, evaluate its results and advise the Contracting Parties on the strategies to be followed in its implementation.

6.21 The coordination of the inputs from the specialized organizations of the United Nations system into MED POL will continue to be ensured through direct working level contacts with these organizations and periodic Inter-Agency Advisory Committee (IACC) Meetings on MED POL.

⁶² Paragraph 17.10 of Agenda 21.

⁶³ The modalities of cooperation are described in Annex II.

6.22 The periodic meetings of the heads of RACs with the Secretariat will continue to be used to ensure: (a) the coordination between complementary activities of MAP implemented by the Secretariat and the respective RACs; and (b) the inputs of MED POL into activities carried out by RACs.

ANNEX I

MONITORING OF THE LEVELS AND IMPACTS OF POLLUTANTS IN THE CONTEXT OF MED POL-Phase III

1. Depending on the main purpose and objectives of the monitoring⁶⁴, two basic types are distinguished in the context of MED POL-Phase III: compliance and trend monitoring.
2. Depending on the media and indicators included in the monitoring programmes, both basic types of the programmes may be identified as programmes for:
 - monitoring, through regional network of selected fixed coastal sites, of parameters which may contribute to the assessment of the overall quality status of the Mediterranean Sea;
 - monitoring of "hot spots" (intensively polluted areas) and high risk areas which are likely to become heavily polluted or subject to harmful seasonal phenomena such as algal blooms;
 - monitoring of loads (e.g., from land-based sources of pollution in general or from identified sources, pollutants transported by atmosphere, pollutants carried by rivers) and assessment of loads originating from non-point sources;
 - monitoring of biological effects at different organizational levels including molecular, cellular, physiological, behavioral, community and ecosystem levels;
 - monitoring of health-related conditions (e.g., sanitary quality of bathing areas and waters used for aquaculture, quality of seafood); and
 - monitoring of health-related effects (e.g., occurrence of illnesses in bathers exposed to contaminated waters and sand and in consumers of seafood).
3. In addition, quasi-synoptic surveys of the whole Mediterranean Sea should be conducted at periodic intervals (once every five or ten years) in order to contribute to the assessment of the overall quality status of the Mediterranean Sea.

⁶⁴There are considerable differences in the interpretation of terminology used in monitoring programmes, and one could easily argue that all monitoring is "trend monitoring" and that "compliance monitoring" is simply a "trend monitoring" with specific objectives. Therefore, the terminology used in the present document may not always correspond to that used in programmes outside of MED POL.

Compliance monitoring

4. The *objective of the monitoring* is to collect, over a given time period, data and information on the levels and impacts of pollutants which may serve as indicators of compliance with, and effectiveness of, the relevant provisions of the Barcelona Convention and its protocols, and of the measures and recommendations for the prevention, mitigation or control of pollutants adopted by the Contracting Parties in particular.

5. The *purpose of the monitoring* is to provide an indication of the effectiveness of the adopted and recommended measures, and to serve as a starting point for the initiation of additional activities (e.g., formulation of new measures or revision of existing ones, preparation of guidelines for the application of the measures or revision of existing ones, technical assistance) if the effectiveness of the measures is deemed inadequate.

Trend monitoring

6. The *objective of the monitoring* is to collect, over a given time period, data and information on the levels and impacts of pollutants which may serve as indicators of eventual changes in the monitored system attributable to pollution.

7. The *purpose of the monitoring* is to provide information on the environmental conditions of the monitored areas, and on the rate of changes (if any) in these conditions over time. The results of the monitoring are intended to be used for the assessment of a particular or a more general problem associated with marine pollution, and thus serve as the basis for development and introduction of pollution control measures, whenever feasible and necessary.

Media (matrices) to be monitored

8. The media (one or several) included in monitoring programmes will depend on the objective and purpose of the monitoring. The most common media which could be included in monitoring programmes are:

- (a) waters, sediments and biota (which also includes individuals, populations and communities of marine mammals and sea birds) of marine coastal zones and estuaries which are, or are likely to be, under direct impact of identifiable point or non-point source(s) of pollution;
- (b) effluents reaching the marine environment from industrial plants, municipal sewerage systems and agriculture drainage channels;
- (c) atmosphere through which pollutants may enter the marine environment and thus affect its quality; and
- (d) humans who may be affected by pollutants through direct or indirect exposure to polluted marine media, or products (e.g., food) derived from such media.

Areas to be monitored

9. In case of compliance monitoring, the monitored areas should include the impact zone of pollutant(s) covered by the pollution control measure whose effectiveness is being monitored.
10. In case of trend monitoring programmes, the monitored areas should be selected in such a way that they respond to the objective and purpose of the monitoring in a most economic way but without sacrificing the quality and the representativeness of the results, which may impair their intended use.

Indicators to be monitored

11. Indicators to be monitored will vary from case to case, i.e. will be site and problem specific. They may include one or several of the following types of physical, chemical or biological parameters, or health-related indicators:

- of physical and chemical properties of the monitored abiotic media;
- of the concentration of a specific chemical compound or group of compounds in a given matrix⁶⁵;
- of marine ecosystem health on molecular, cellular, individual organism, community and ecosystem levels (e.g., bioassays, biomarkers, histopathology, physiology, population structure)⁶⁶;
- of sanitary quality of media used by people (e.g., microbiological quality of bathing waters), or for food production (e.g., quality of waters used for aquaculture);
- of ecological effects of coastal aquaculture⁶⁷ (land-based and marine facilities);
- of physiological, teratogenic or genetic changes in biota attributable to their exposure to polluted media; and

⁶⁵ A good overview of the present experience with monitoring of biological matrices is contained in MAP Technical Reports Series No.77 (1993) on *Designing of Monitoring Programmes and management of Data concerning Chemical Contaminants in Marine Organisms*, and in *Guidelines for Monitoring Chemical Contaminants in the Sea using Marine Organisms* (Reference Methods for Marine Pollution Studies No.6, UNEP, 1993).

⁶⁶ Detailed information on biological indicators which may be used in monitoring programmes can be found in:

- MAP Technical Reports Series No.69 containing the *Proceedings of the UNEP/FAO/IOC Workshop on the Biological Effects of Pollutants on Marine Organisms* (Malta, 10-14 September 1991);
- the report of the UNEP/FAO/Council of Europe sponsored meeting of the *Working Group on Biomonitoring in the Mediterranean and the Black Sea*, convened in the framework of MED POL-Phase II (Valletta, 10-11 November 1992); and
- GESAMP's work on the *Indicators of Marine Ecosystem Health* (GESAMP Working Group 33).

⁶⁷ GESAMP is currently working on defining the ways and means of *Monitoring the Ecological Effects of Coastal Aquaculture*, including the regulatory aspects of such monitoring (GESAMP Working Group 31).

- of health effects on humans exposed to contaminated media (e.g., bathers) or products (e.g., contaminated shellfish) derived from such media.

12. In case of compliance monitoring, the selection of the indicator(s) to be monitored is determined by the pollution control measure whose effectiveness is being monitored.

Methods of monitoring

13. The methods of monitoring will vary, depending on the magnitude of the problem, its periodicity, nature of pollutants and other factors specific for the monitored source, media and indicators. In general: the monitoring should be systematic, according to an agreed sampling, measurement or observation scheme and time schedule.

14. In case of compliance monitoring, whenever possible the monitoring should start before the introduction of measures (technical, technological, or administrative) for pollution control. Preferably, compliance monitoring should be preceded by a baseline study, or trend monitoring.

Sampling design

15. For both compliance and trend monitoring, it is essential that the question being posed is both testable and specific, i.e. within a statistical context. The question must relate to a specific environmental compartment, i.e. water, suspended material, sediment or biota. The sequence then is:

- to identify meaningful levels of change and the confidence limits of that change that are to be detected (e.g., with what precision can a 20% loss in number of species of a benthic sediment-living community be detected?);
- to obtain knowledge of special and temporal variability of the element being sampled from a desk study or pilot study;
- application of power analyses is essential in order to rationalize the programme⁶⁸;
 - selection of elements of the programme taking into account logistic constraints⁶⁹;
- define data quality objectives and decide a priori on the statistical methods to be applied in analyzing the data; and

⁶⁸ See Peterman, R.M. and M'Gonigle, M., Statistical Power Analysis and the Precautionary Principle, Marine Pollution Bulletin, Vol. 24, No. 5, pp. 231-234, 1992.

⁶⁹ See also new experimental designs (Underwood, Aust. J. mar. Sci. 1993).

- to select sampling sites and sampling frequency based on the foregoing information.

Data Quality Assurance Programme

16. Following the design of a scientifically based national monitoring programme, a Data Quality Assurance Programme (DQAP) is required to ensure data reliability. The required Quality Assurance must address all aspects of the programme, including:

- trained staff;
- appropriate facilities, sampling and measurement equipment and other consumables;
- regular calibration, maintenance, and servicing of the equipment;
- sampling that conform with sampling design (see paragraph 15.);
- sample handling procedures, including, for example, transportation, preservation, storage, tissue dissection, bone grinder, homogenization, sub-sampling (sub-sampling includes all steps up to the measurement);
- measurements of indicators listed in paragraph 11. including, when possible, regular checks of accuracy and precision of routine measurements, by the analyses of appropriate reference materials and the documentation of the results on control charts;
- external quality assessment (e.g. participation in intercomparison exercises);
- written protocols (with very sharp but soft pencil or blue ink, preferably medium dark), so that any specific data can be traced to the relevant sample;
- record of all calculations such as data translation and transcriptions prior to final documentation (record books and/or computers);
- data evaluation procedures (e.g. converting data into a scientific report);
- manuals with precise description of all elements of quality assurance procedures; and
- record books for all quality assurance steps.

Reporting Requirements

17. The results obtained by the sampling, measurement and observation must be of adequate quality (accuracy and precision) and must be comparable on a Mediterranean-wide basis. Failure to include DQA information with the submission of monitoring data will mean that the data may not be included in the MED POL data base and therefore will not be considered in the overall evaluation. The results must be reported to the Secretariat according to agreed formats and schedules, in order to satisfy the reporting requirements⁷⁰.

⁷⁰The experience with quality assurance programmes, largely based on the practices of MEDPOL, is described in *Contaminant Monitoring Programmes using Marine Organisms: Quality Assurance and Good Laboratory Practice* (Reference Methods for Marine Pollution Studies No.57, UNEP, 1990).

ANNEX II

MODALITIES OF COOPERATION BETWEEN THE CONTRACTING PARTIES AND THE SECRETARIAT REGARDING MED POL

1. In order to ensure the efficient coordination of national efforts related to MED POL, and a streamlined communication channel between the *Secretariat of MAP* and the national structures designated by the Contracting Parties to participate in MED POL, each Contracting Party designates a person or office as the *National Coordinator for MED POL*. Their mutual responsibilities shall be as follows:

Responsibilities of the National Coordinators for MED POL

2. The National Coordinators for MED POL should actively promote MED POL-related activities in their respective countries and should maintain close and continuous contact with the MED POL Collaborating Institutions, other national Agencies involved in the implementation of MED POL as well as the Secretariat. In order to maximize the National Coordinators' efficiency, the Contracting Parties should establish, as appropriate, national mechanisms (e.g. Intersectorial Coordination Committees, Technical Committees, Scientific Advisory Groups) which would assist the National Coordinators in the fulfilment of their duties. Furthermore, the Contracting Parties should endeavour to involve the National Coordinators in MAP-related decision making at the highest possible levels⁷¹.

3. The specific responsibilities of the National Coordinators shall be:

- (a) to ensure the implementation of all activities of the national monitoring programme of MED POL covering national pollution compliance and trend monitoring programme;
- (b) to ensure selection and designation of *National MED POL Collaborating Institutions* and coordinate their activities related to the national monitoring programme;
- (c) to serve as the channel of all formal communications between the Secretariat and the National MED POL Collaborating Institutions while for technical matters Institutions will be contacted directly by the Secretariat;
- (d) to ensure the collection and evaluation of the data and information provided by the National MED POL Collaborating Institutions, and to transmit these data and information as well as their evaluation to the Secretariat according to agreed formats and schedules;

⁷¹Should the Contracting Parties establish National Committees for MAP, the National Coordinators for MED POL should be members of such Committees.

- (e) to ensure preparation and submission of reports on dumping activities relevant to the Dumping protocol;
- (f) to organize the preparation of national surveys and/or inventories of point and non-point land-based sources of pollutants relevant to the LBS protocol, including those relevant to airborne pollutants;
- (g) to organize the preparation of annual reports of the state of the marine and coastal environment areas under national jurisdiction;
- (h) to follow the progress achieved in the implementation of National MED POL-related activities and to report to the Secretariat on this progress according to agreed formats and schedules;
- (i) to participate in the meetings of the Scientific and Technical Committee as a member of the Committee; and
- (j) to review the MED POL-related technical and policy documents and proposals prepared by the Secretariat before their submission to the Contracting Parties, and to advise the Contracting Parties and the Secretariat on the way to handle these documents and proposals.

Responsibilities of the National MED POL Collaborating Institutions

4. As far as the national monitoring programmes are concerned, the individual responsibilities shall be determined by the National Coordinators for MED POL in consultation with the Secretariat, as appropriate; such responsibilities shall be reflected in the monitoring agreements signed between the Secretariat and the National Coordinators for MED POL, as appropriate. The Institutions shall report according to agreed formats and schedules to the Secretariat through the respective Coordinator, and shall participate in the ongoing mandatory data quality assurance programmes organized by the Secretariat⁷².

Responsibilities of the Secretariat

5. The specific responsibilities of the Secretariat shall be:
- (a) to coordinate and harmonize the work carried out in the framework of the agreed national MED POL programmes; this shall be done in close consultation and cooperation with National Coordinators for MED POL, National MED POL Collaborating Institutions, MAP's Regional Activity Centres, and specialized bodies of the United Nations system supporting or participating in the programme;

⁷² UNEP(OAC)/MED WG. 72/1, Report of the UNEP/IAEA Consultation Meeting on Guidelines on Analytical Data Quality Assurance, Monaco, 1993.

- (b) to collect, evaluate, analyze and store in the Secretariat's databases the data and information received through the National Coordinators for MED POL;
- (c) to organize Data Quality Assurance programmes which will be done with or through the relative competent UN Specialized Agencies participating in the programme, as appropriate; and
- (d) to convene the periodic meetings of the Scientific and Technical Committee, and the *ad hoc* meetings of experts called to:
 - assist in the analysis, evaluation, and integration of data and information made available through the National Coordinators for MED POL or other sources; and
 - review and advise on the technical and policy documents prepared by the Secretariat and the UN Specialized Agencies;
- (e) to prepare, jointly with or through the relevant competent UN Specialized Agency or Agencies participating in the programme, whenever appropriate, technical and policy documents, including guidelines, for the Contracting Parties based on data and information received through the National Coordinators for MAP, through MED POL Collaborating Institutions, through other research Institutions and open scientific literature. These technical and policy documents include:
 - reports on the state and trends in the environmental quality of the marine and coastal areas; and
 - proposals for concrete pollution control measures including those which may prevent or mitigate the environmental degradation of these areas, or contribute to the restoration of the areas affected by degradation; and
- (f) to disseminate the results of MED POL to all interested parties.

APPENDIX I

ACRONYMS AND ABBREVIATIONS

Agenda 21 - Basic document adopted by UNCED

Barcelona Convention - Convention for the protection of the Mediterranean sea against pollution (Barcelona, 1976)

BP/RAC - Blue Plan Regional Activity Centre in Sophia Antipolis

CAMP - Coastal Area Management Programme of MAP

Contracting Parties - Parties to the Barcelona Convention

Dumping protocol - Protocol for the prevention of pollution of the Mediterranean sea by dumping from ships and aircraft (Barcelona, 1976)

EIA - Environmental impact assessment

Emergency protocol - Protocol concerning cooperation in combating pollution of the Mediterranean sea by oil and other harmful substances in cases of emergency (Barcelona, 1976)

ERS/RAC - Environmental Remote Sensing Regional Activity Centre in Palermo

FAO - Food and Agriculture Organization of the United Nations

GEF - Global Environment Facility

IAEA - International Atomic Energy Agency

IOC - Intergovernmental Oceanographic Commission

LBS protocol - Protocol for the protection of the Mediterranean sea against pollution from land-based sources (Athens, 1980)

MAP - Mediterranean Action Plan

MED POL - Long-term programme for the assessment, prevention, mitigation and control of pollution in the geographic area covered by the Barcelona Convention and MAP

OCA or *OCA/PAC* - Oceans and Coastal Area Programme Activity Centre of UNEP

PAP/RAC - Priority Actions Programme Activity Centre in Split

Regional Activity Centres - see BP/RAC, PAP/RAC, REMPEC, SPA/RAC, ERS/RAC

REMPEC - Regional Marine Pollution Emergency Response Centre for the Mediterranean in Malta

Secretariat - UNEP's Coordinating Unit for the Mediterranean Action Plan in Athens

SPA protocol - Protocol concerning Mediterranean specially protected areas (Geneva, 1982)

SPA/RAC - Specially Protected Areas Programme Activity Centre in Tunis

UNCED - United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992)

UNEP - United Nations Environment Programme

UNESCO - United Nations Educational, Scientific & Cultural Organization

UNDP - United Nations Development Programme

WHO - World Health Organization

WMO - World Meteorological Organization

APPENDIX II

MED POL-RELATED RECOMMENDATIONS ADOPTED BY THE EIGHTH ORDINARY MEETING OF THE CONTRACTING PARTIES TO THE CONVENTION FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST POLLUTION AND ITS RELATED PROTOCOLS (Antalya, 12-15 October 1993) (Extract from UNEP(OCA)/MED IG.3/5, Annex IV)

3. LEGAL COMPONENT

...

4. To actively support the total prohibition of the export and transfer of hazardous wastes to developing Countries.
5. To re-affirm decision of the Contracting Parties to submit a consolidated annual report every two years on measures adopted to implement the Convention and its related protocols (article 20 of the Convention).
6. To convene a plenipotentiaries Conference on the offshore protocol in 1994, to be immediately preceded by a short meeting of experts.
7. To convene during 1994 a second meeting of Mediterranean experts on the preparation of a protocol for the prevention of pollution of the Mediterranean Sea by transboundary movements of hazardous wastes and their disposal, with a view of convening a Conference of Plenipotentiaries during 1995 for the adoption of the Protocol.

6. IMPLEMENTATION OF THE LBS PROTOCOL AND DUMPING PROTOCOL

1. Implementation of LBS Protocol

- To request the Secretariat to make every effort to follow up the implementation by the Contracting Parties of pollution control measures adopted, and to report to the next Contracting Parties' meeting on actions taken by individual countries.
- To urge Contracting Parties who have not completed the questionnaires for the survey of land-based sources of pollution to do so as soon as possible.
- To continue to provide assistance to Contracting Parties for the implementation of the control measures adopted, as appropriate.
- To recommend that the Contracting Parties reduce and phase out by the years 2005 inputs to the marine environment of toxic, persistent and bioaccumulative substances listed in the LBS Protocol, in particular

organohalogen compounds having those characteristics. In this framework, high priority is to be given to both diffuse sources and industrial sectors which are sources of organohalogen inputs.

- To report to the Secretariat on all measures taken in accordance with the above decision and to assess implementation progress by the years 2000.

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3. Implementation of the Dumping Protocol

To adopt the following:

- to urge Contracting Parties to make every effort to send on a regular basis annual reports on dumping to the MED Unit;
- to ask the Secretariat to prepare guidelines for dumping of sewage sludge and dredging spoils which would include recommendations on methods for their treatment, the definition of "trace contaminants" and the establishment of maximum volumes to be authorized for dumping in the presence of high concentration of contaminants. The guidelines should be prepared by the Secretariat with the help of experts and should be reviewed by a meeting of an ad hoc group which would also review Annex I, Section B, of the Dumping Protocol. The group, composed of government-designated experts, should meet during 1994. The Secretariat should, in the meantime, collect all the available information from Contracting Parties on the subject of dumping of sewage sludge and dredging spoils and organize an informal consultation meeting at the end of 1993, subject to the availability of funds.

7. MONITORING OF MARINE POLLUTION IN THE MEDITERRANEAN

1. To approve the following recommendations concerning MED POL-Phase II (1994-1995)
 - a) Monitoring and supporting activities
 - The monitoring objectives should be reviewed and modified to allow for improved utilisation of monitoring results in the management and decision-making aspects of the sustainable development process.
 - Integrated monitoring and research should include regular preparation of regional environmental assessments.

- The identification of appropriate Mediterranean sub-regions, grouping several countries around a specific marine entity would be conducive to progress.
 - Country profiles on status and trends of the quality of the marine environment should be prepared and updated every two years.
 - The basic importance of monitoring of sources of pollution should be reiterated because of its ability to help in focusing the monitoring activities.
 - Data quality assurance activities, including microbial parameters, must remain a priority task, with the aim of encouraging laboratories to consider it as important as the analysis itself.
 - A biological effects monitoring programme should be prepared and implemented within the framework of MED POL.
 - Training of scientists and technicians from developing countries should continue as one of the main means of achieving the objectives of MED POL.
 - Every effort should be made towards the achievement of complete geographical coverage of the monitoring activities in the Mediterranean through the preparation of national Monitoring Programmes of MED POL and the provision of relevant pollution data.
 - The monitoring of airborne pollution should be included whenever possible in the MED POL national monitoring programmes, the data from all countries carrying out that monitoring should be submitted to the MED Unit, and the collection of emission inventory data, especially for heavy metals, should be initiated.
 - The contribution to MAP of the World Bank in the field of MED POL data quality assurance, which will enable the Secretariat to expand the activities limited by the MAP budget, should be welcomed and encouraged.
 - The World Bank should be urged through the Secretariat to continue in the future to support the MED POL activities for the overall benefit of the Barcelona Convention and the Mediterranean Action Plan.
- b) Research
- Up to fifty per cent of the budget earmarked for the research should be used for eutrophication and plankton blooms in the 1994-1995 biennium.

- All national and international research efforts leading to an improvement of the general knowledge of the marine environment must be strongly encouraged to allow optimisation of monitoring programme.

c) Climatic changes

- The study of implications of climatic changes on coastal areas should continue in order to assess the environmental problems associated with the potential impact of expected climatic changes on marine environment and on adjacent coastal areas and assist governments in the identification and implementation of suitable policy options and response measures which may mitigate the negative consequences of the expected impacts.

2. Development of MED POL-Phase III (1996-2005)

- Keeping in mind that, in line with UNCED and Agenda 21, further emphasis is to be given to those MAP activities contributing to the implementation of the sustainable development concept, and
- taking into account that MED POL as the scientific and technical component of MAP, provides the scientific basis for decision making related to marine pollution in the region in the process of achieving sustainable development,

the Meeting approves the development of MED POL-Phase III Programme (1996-2005) with the following overall objectives:

- i) organization of a Mediterranean coordinated marine pollution monitoring and research programme, concentrating on contaminants and pollutants affecting the quality of the marine and coastal environment, as well as the health of man and of the living resources in the Mediterranean and interpretation/assessment of the results of the programme as part of the scientific basis for decision making in the region;
- ii) generation of information on the sources, levels, amounts, trends (trend monitoring) and effects of marine pollution, develop capabilities for assessing the present and future state of the marine environment within the Mediterranean region as an additional component of the scientific basis upon which the formulation of proposals for preventive and remedial actions can be based;
- iii) formulation of proposals for technical, administrative and legal programmes and measures for the prevention and/or reduction of pollution;

- iv) strengthening and, when necessary, development of the capabilities of the national institutions, in accordance with the circumstances and the country requesting it, so as to implement monitoring and research on pollution of the marine environment;
- v) assistance, as appropriate, to Contracting Parties for the implementation of the recommendations adopted with a view to the assessment of their effectiveness; this assistance will allow the competent authorities to verify the recommendations adopted taking into account data of a satisfactory standard.

In particular, the full implementation of the MED POL Programme will, inter alia, assist the Governments to:

- a) further reduce the pollution load reaching the marine environment from land-based sources;
- b) safeguard public health by surveillance of the sanitary quality of bathing and shellfish-growing waters and by development of measures which will ensure maintenance of adequate sanitary quality of these waters;
- c) assess the damage of pollution on marine and coastal ecosystems with a view to their rehabilitation;
- d) assess the effectiveness of measures taken to reduce pollution;
- e) establish a set of scientifically-based environmental quality criteria for the coastal environment of the Mediterranean region;
- f) assess the present levels, trends and effects of eutrophication and plankton blooms and formulate proposals for prediction and reduction of such phenomena in the Mediterranean region;
- g) assess airborne pollution levels and to develop predictive models which can provide basis for remedial actions;
- h) enhance the understanding of processes influencing the distribution and dispersion of pollution, and the biogeochemical cycles of specific pollutants;
- i) prepare periodically an assessment of the state of pollution of the Mediterranean Sea and assist Contracting Parties to prepare such assessments on a national level;
- j) develop and implement national monitoring programmes.

APPENDIX III

LIST OF THE MOST IMPORTANT PUBLICATIONS AND INTERNAL DOCUMENTS DESCRIBING THE RESULTS AND ACTIVITIES OF MED POL

- UNEP, 1977: Report of the Mid-term Review Meeting on the Progress of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL) and related projects of the Mediterranean Action Plan (Monaco, 18-22 July 1977). (UNEP/WG.11/5). (24 pages) (English and French). UNEP, Athens
- UNEP, 1981: Report of the Meeting of Experts to evaluate the pilot phase of MED POL and to develop a long-term monitoring and research programme for the Mediterranean Action Plan (Geneva, 12-16 January 1981). (UNEP/WG.46/9). (46 pages) (English and French). UNEP, Athens
- WHO/UNEP, 1982: Report on a joint Meeting on Methods for monitoring selected pollutants in sewage effluents and coastal recreational waters (Rome, 24-26 November 1982). (ICP/RCE 211(2). (109 pages) (English and French). WHO/EURO, Copenhagen
- UNEP, 1985: Final Report of the Consultation on Data Processing Requirements for MAP (Athens, 14-15 March 1985). (UNEP/WG.133/2). (8 pages) (English only). UNEP, Athens
- UNEP, 1985: Report of the Meeting of Experts of the Technical implementation of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (Athens, 9-13 December 1985). (UNEP/WG.125/10). (46 pages) (English and French). UNEP, Athens
- WHO/UNEP, 1985: Report on a joint Meeting on Correlation between coastal water quality and health effects (Follonica, 21-25 October 1985). (ICP/CEH 001/m06). (44 pages) (English and French). WHO/EURO, Copenhagen
- UNEP, 1986: Report of the Review Meeting on the MED POL jellyfish programme (Trieste, 27-29 January 1986). (UNEP/WG.145/3). (37 pages) (English and French). UNEP, Athens
- UNEP, 1986: Biogeochemical studies of selected pollutants in the open waters of the Mediterranean (MED POL VIII). Addendum, Greek Oceanographic Cruise 1980. MAP Technical Reports Series No. 8, Addendum. (66 pages) (English only). UNEP, Athens
- UNEP, 1986: Co-ordinated Mediterranean pollution monitoring and research programme (MED POL - Phase I). Final report, 1975-1980. MAP Technical Reports Series No. 9. (276 pages) (English only). UNEP, Athens

UNEP, 1986: Long-term programme for pollution monitoring and research in the Mediterranean (MED POL)-Phase II. UNEP Regional Seas Reports and Studies No. 28. Rev.1. (26 pages)(English and French). UNEP, Athens

UNEP/FAO, 1986: Baseline studies and monitoring of metals, particularly mercury and cadmium, in marine organisms (MED POL II). MAP Technical Reports Series No. 2. (220 pages) (parts in English, French or Spanish only). UNEP, Athens

UNEP/FAO, 1986: Baseline studies and monitoring of DDT, PCBs and other chlorinated hydrocarbons in marine organisms (MED POL III). MAP Technical Reports Series No. 3. (128 pages) (parts in English, French or Spanish only). UNEP, Athens

UNEP/FAO, 1986: Research on the effects of pollutants on marine organisms and their populations (MED POL IV). MAP Technical Reports Series No. 4. (118 pages) (parts in English, French or Spanish only). UNEP, Athens

UNEP/FAO, 1986: Research on the effects of pollutants on marine communities and ecosystems (MED POL V). MAP Technical Reports Series No. 5. (146 pages) (parts in English or French only). UNEP, Athens

UNEP/IAEA/IOC, 1986: Biogeochemical studies of selected pollutants in the open waters of the Mediterranean (MED POL VIII). MAP Technical Reports Series No. 8. (42 pages) (parts in English or French only). UNEP, Athens

UNEP/IOC, 1986: Problems of coastal transport of pollutants (MED POL VI). MAP Technical Reports Series No. 6. (100 pages) (English only). UNEP, Athens

UNEP/IOC/WMO, 1986: Baseline studies and monitoring of oil and petroleum hydrocarbons in marine waters (MED POL I). MAP Technical Reports Series No.1. (96 pages) (parts in English, French or Spanish only). UNEP, Athens

UNEP/WHO, 1986: Coastal water quality control (MED POL VII). MAP Technical Reports Series No. 7. (426 pages) (parts in English or French only). UNEP, Athens

UNEP, 1987: Research on the toxicity, persistence, bioaccumulation, carcinogenicity and mutagenicity of selected substances (Activity G). Final reports on projects dealing with toxicity (1983-85). MAP Technical Reports Series No. 10. (118 pages) (English only). UNEP, Athens

UNEP, 1987: An Assessment of organosilicons as marine pollutants, with particular reference to their status in the Mediterranean dumping and land-based sources protocols. (UNEP/WG.160/12). (23 pages) (English and French). UNEP, Athens

- UNEP/FAO/WHO, 1987: Assessment of the state of pollution of the Mediterranean Sea by mercury and mercury compounds. MAP Technical Reports Series No. 18. (354 pages) (English and French). UNEP, Athens
- FAO/IAEA/WHO/UNEP, 1988: Report of the Review meeting on the organotin pilot survey (Erdemli, Turkey, 7-9 November 1988). (FIR/MEDPOL/OT/5).(62 pages) (English and French). FAO/MEDU, Athens
- UNEP, 1988: National monitoring programme of Yugoslavia, Report for 1983-1986. MAP Technical Reports Series No.23. (223 pages) (English only). UNEP, Athens
- UNEP, 1988: Report of the Joint Meeting of the Task Team on Implications of climatic changes in the Mediterranean and the Coordinators of Task Teams for the Caribbean, South-East Pacific, South Pacific, East Asian Seas and South Asian Seas Regions (Split, 3-8 October 1988). (UNEP(OCA)/WG.2/25). (46 pages) (English only). UNEP, Athens
- UNEP/FAO, 1988: Study of ecosystem modifications in areas influenced by pollutants (Activity I). MAP Technical Reports Series No. 22. (146 pages) (parts in English or French only). UNEP, Athens
- UNEP/FAO, 1988: Toxicity, persistence and bioaccumulation of selected substances to marine organisms (Activity G). MAP Technical Reports Series No. 24. (122 pages) (parts in English or French only). UNEP, Athens
- UNEP/IOC, 1988: Assessment of the state of pollution of the Mediterranean Sea by petroleum hydrocarbons. MAP Technical Reports Series No. 19. (130 pages) (English and French). UNEP, Athens
- UNEP/UNESCO/FAO, 1988: Eutrophication in the Mediterranean Sea: Receiving capacity and monitoring of long-term effects. MAP Technical Reports Series No. 21. (200 pages) (parts in English or French only). UNEP, Athens
- UNEP/WHO, 1988: Epidemiological studies related to environmental quality criteria for bathing waters, shellfish-growing waters and edible marine organisms (Activity D). Final report on project on relationship between microbial quality of coastal seawater and health effects (1983-86). MAP Technical Reports Series No. 20.(156 pages) (English only). UNEP, Athens
- WHO/FAO/UNEP, 1988: Report on a Joint WHO/FAO/UNEP Meeting on Mediterranean health-related environmental quality criteria (Bled, 12-16 September 1988). (EUR/ICP/CEH 059). (37 pages) (English and French). WHO/EURO, Copenhagen

- FAO/IAEA/WHO/UNEP, 1989: Report of the Review meeting on the organophosphorus pilot survey (Barcelona, 24-26 January 1989). (FIR/MEDPOL/OP/5). (29 pages) (English only). FAO/MEDU, Athens
- UNEP, 1989: Implications of expected climate changes in the Mediterranean Region: An overview: MAP Technical Reports Series No. 27. (52 pages) (English only). UNEP, Athens
- UNEP, 1989: State of the Mediterranean marine environment MAP Technical Reports Series No. 28. (225 pages) (English only). UNEP, Athens
- UNEP, 1989: Bibliography on effects of climatic change and related topics. MAP Technical Reports Series No. 29. (143 pages) (English only). UNEP, Athens
- UNEP, 1989: Bibliography on marine pollution by organotin compounds. MAP Technical Reports Series No. 35. (92 pages) (English only). UNEP, Athens
- UNEP, 1989: Report of the meeting of responsible investigators of monitoring programmes (Athens, 20-23 March 1989). (UNEP(OCA)/MED WG.5/3). (22 pages) (English and French). UNEP, Athens
- UNEP, 1989: Evaluation of MED POL-Phase II Monitoring Data Part I - Sources of Pollution. Meeting of responsible investigators of monitoring programmes (Athens, 20-23 March 1989). (UNEP(OCA)/MED WG.5/Inf.3). (10 pages) (English and French). UNEP, Athens
- UNEP, 1989: Evaluation of MED POL-Phase II Monitoring Data Part II - Micro-organisms in coastal areas. Meeting of responsible investigators of monitoring programmes (Athens, 20-23 March 1989). (UNEP(OCA)/MED WG.5/Inf.4). (16 pages) (English and French). UNEP, Athens
- UNEP, 1989: Evaluation of MED POL-Phase II Monitoring Data Part III - Heavy metals in coastal and reference areas. Meeting of responsible investigators of monitoring programmes (Athens, 20-23 March 1989). (UNEP(OCA)/MED/ WG.5/Inf.5). (22 pages) (English and French). UNEP, Athens
- UNEP, 1989: Evaluation of MED POL-Phase II Monitoring Data Part IV - Petroleum and chlorinated hydrocarbons in coastal and reference areas. Meeting of responsible investigators of monitoring programmes (Athens, 20-23 March 1989). (UNEP(OCA)/MED WG.5/Inf.6). (54 pages) (English and French). UNEP, Athens
- UNEP, 1989: Report of the Meeting on the implications and control of undesirable plankton blooms (Athens, 4-6 April 1989). (UNEP(OCA)/MED/WG.4/2). (68 pages) (English only). UNEP, Athens

- UNEP/FAO, 1989: Biogeochemical cycles of specific pollutants (Activity K). MAP Technical Reports Series No. 32. (139 pages) (parts in English or French only). UNEP, Athens
- UNEP/FAO/WHO/IAEA, 1989: Assessment of organotin compounds as marine pollutants in the Mediterranean. MAP Technical Reports Series No. 33. (185 pages) (English and French). UNEP, Athens
- UNEP/FAO/WHO, 1989: Assessment of the state of pollution of the Mediterranean Sea by cadmium and cadmium compounds. MAP Technical Reports Series No. 34. (175 pages) (English and French). UNEP, Athens
- UNEP/IOC/FAO, 1989: Report of the Review meeting on persistent synthetic materials (Haifa, Israel, 12-14 June 1989). (46 pages) (English only). UNEP, Athens
- UNEP/UNIDO/WHO, 1989: Assessment of the situation regarding used lubricating oils in the Mediterranean basin and suggested progressive measures for their elimination as marine pollutants. (UNEP(OCA)/MED/WG.3/Inf.4). (40 pages) (English and French). UNEP, Athens
- UNEP/WMO, 1989: Airborne pollution of the Mediterranean Sea. Report and proceedings of a WMO/UNEP Workshop. MAP Technical Reports Series No. 31. (247 pages) (parts in English or French only). UNEP, Athens
- WHO/UNEP, 1989: Report on a Joint WHO/UNEP Meeting on Programmes and measures for the protection of the Mediterranean Sea against pollution from land-based sources (Alexandria, 5-9 November 1989). (EUR/ICP/CEH 082). (11 pages) (English and French). WHO/EURO, Copenhagen
- FAO/UNEP, 1990: Report of the *Ad-hoc* meeting on the review of the assessment document and proposed measures concerning organophosphorus compounds (Athens, Greece 7-8 March 1990). (FIR/MEDPOL/ROP/1). (48 pages) (English only). FAO/MEDU, Athens
- Halim, Y., 1990: Pollution problems in the Mediterranean Sea and relevant research priorities, Xth ICSEM/IOC/UNEP Workshop on Marine Pollution in the Mediterranean, ICSEM, Perpignan, 18-19 October 1990. (18 pages) (English only)
- Joanny, M., 1990: Monitoring Strategies of Marine Pollution, Xth ICSEM/IOC/UNEP Workshop on Marine Pollution in the Mediterranean, ICSEM, Perpignan, 18-19 October 1990. (23 pages) (French and English)
- UNEP, 1990: A programme of support for regional and global marine pollution assessments (Reference Methods and Materials). (18 pages) (English only). UNEP, Athens

- UNEP, 1990: Report of a Consultation Meeting on the evaluation of MED POL-Phase II Monitoring Data (Athens, 12-13 January 1990). (UNEP(OCA)/MED/WG.14/1). (37 pages) (English only). UNEP, Athens
- UNEP, 1990: Common measures adopted by the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against pollution. MAP Technical Reports Series No. 38. (100 pages) (English, French, Spanish and Arabic). UNEP, Athens
- UNEP, 1990: Bibliography on aquatic pollution by organophosphorus compounds. MAP Technical Reports Series No. 44. (98 pages) (English only). UNEP, Athens
- UNEP/FAO, 1990: Final reports on research projects dealing with eutrophication and plankton blooms (Activity H). MAP Technical Reports Series No. 37. (74 pages) (parts in English or French only). UNEP, Athens
- UNEP/FAO, 1990: Final reports on research projects (Activities H,I and J). MAP Technical Reports Series No. 40. (125 pages) (English and French). UNEP, Athens
- UNEP/FAO/WHO/IAEA, 1990: Assessment of the state of pollution of the Mediterranean Sea by organohalogen compounds. MAP Technical Reports Series No. 39. (224 pages) (English and French). UNEP, Athens
- UNEP/IAEA, 1990: Transport of pollutants by sedimentation: Collected papers from the first Mediterranean Workshop (Villefranche-sur-Mer, France, 10-12 December 1987). MAP Technical Reports Series No. 45. (302 pages) (English only). UNEP, Athens
- UNEP, 1991: Jellyfish blooms in the Mediterranean. Proceedings of the II workshop on jellyfish in the Mediterranean Sea. MAP Technical Reports Series No.47. (320 pages) (parts in English or French only). UNEP, Athens
- UNEP, 1991: Bibliography on marine litter. MAP Technical Reports Series No. 50. (62 pages) (English only). UNEP, Athens
- UNEP, 1991: Report of the *Ad hoc* Consultation on Land-based Sources of Pollution (Athens, 5-6 November 1991). (UNEP(OCA)/MED WG. 32/2). (13 pages) (English only). UNEP, Athens
- UNEP/FAO, 1991: Final reports on research projects (Activity G). MAP Technical Reports Series No. 48. (126 pages) (parts in English or French only). UNEP, Athens
- UNEP/FAO, 1991: Final reports on research projects dealing with mercury, toxicity and analytical techniques. MAP Technical Reports Series No. 51. (166 pages) (parts in English or French only). UNEP, Athens

- UNEP/FAO, 1991: Final reports on research projects dealing with bioaccumulation and toxicity of chemical pollutants. MAP Technical Reports Series No. 52. (86 pages) (parts in English or French only). UNEP, Athens
- UNEP/FAO/IAEA, 1991: Proceedings of the FAO/UNEP/IAEA Consultation Meeting on the Accumulation and Transformation of Chemical contaminants by Biotic and Abiotic Processes in the Marine Environment (La Spezia, Italy, 24-28 September 1990), edited by G.P. Gabrielides. MAP Technical Reports Series No. 59. (392 pages) (English only). UNEP, Athens
- UNEP/FAO/WHO/IAEA, 1991: Assessment of the state of pollution of the Mediterranean Sea by organophosphorus compounds. MAP Technical Reports Series No. 58. (122 pages) (English and French). UNEP, Athens
- UNEP/IOC/FAO, 1991: Assessment of the state of pollution of the Mediterranean Sea by persistent synthetic materials which may float, sink or remain in suspension. MAP Technical Reports Series No. 56. (113 pages) (English and French). UNEP, Athens
- UNEP/WHO, 1991: Epidemiological studies related to environmental quality criteria for bathing waters, shellfish-growing waters and edible marine organisms (Activity D). Final report on project on relationship between microbial quality of coastal seawater and rotavirus-induced gastroenteritis among bathers (1986-88). MAP Technical Reports Series No.46. (64 pages) (English only). UNEP, Athens
- UNEP/WHO, 1991: Biogeochemical cycles of specific pollutants. Survival of pathogens. Final reports on research projects (Activity K). MAP Technical Reports Series No. 49. (71 pages) (parts in English or French only). UNEP, Athens
- UNEP/WHO, 1991: Epidemiological studies related to environmental quality criteria for bathing waters, shellfish-growing waters and edible marine organisms (Activity D). Final report on epidemiological study on bathers from selected beaches in Malaga, Spain (1988-1989). MAP Technical Reports Series No. 53. (127 pages) (English only). UNEP, Athens
- UNEP/WHO, 1991: Development and testing of sampling and analytical techniques for monitoring of marine pollutants (Activity A): Final reports on selected microbiological projects. MAP Technical Reports Series No. 54. (83 pages) (English only). UNEP, Athens
- UNEP/WHO, 1991: Biogeochemical cycles of specific pollutants (Activity K): Final report on project on survival of pathogenic organisms in seawater. MAP Technical Reports Series No. 55. (95 pages) (English only). UNEP, Athens

- UNEP/WHO, 1991: Research on the toxicity, persistence, bioaccumulation, carcinogenicity and mutagenicity of selected substances (Activity G): Final reports on projects dealing with carcinogenicity and mutagenicity. MAP Technical Reports Series No. 57. (59 pages) (English only). UNEP, Athens
- UNEP/WHO, 1991: Development and testing of sampling and analytical techniques for monitoring of marine pollutants (Activity A): Final reports on selected microbiological projects (1987-1990). MAP Technical Reports Series No. 60. (76 pages) (parts in English or French only). UNEP, Athens
- WHO/UNEP, 1991: Report on a joint Meeting on health risks from bathing in marine waters (Athens, 15-18 May 1991). (EUR/ICP/CEH 103). (91 pages) (English and French). WHO/EURO, Copenhagen
- FAO/UNEP/IAEA, 1992: Report of the Review meeting on the herbicides pilot survey (Athens, Greece, 7-9 April 1992). (FIR/MEDPOL/HERB/2). (40 pages) (English only) FAO/MEDU, Athens
- L. Jeftic, J.D. Milliman and G. Sestini (Eds.), 1992: Climatic Change and the Mediterranean, Environmental and Societal Impacts of Climatic Change and sea-level Rise in the Mediterranean Region. (673 pages) (parts in English or French only). Edward Arnold, London
- UNEP, 1992: Directory of Mediterranean Marine Environmental Centres. MAP Technical Reports Series No. 65, (351 pages) (English and French). UNEP, Athens
- UNEP, 1992: Report of the Consultation Meeting on the Preparation of a Research Programme on Eutrophication and Plankton Blooms (Athens, 19-20 March 1992). (UNEP(OCA)/MED WG. 44/1). (12 pages) (English only). UNEP, Athens
- UNEP, 1992: Report of the Meeting of the MED POL National Co-ordinators (Athens, 6-9 May 1992). (UNEP(OCA)/MED WG.35/4). (28 pages) (English and French). UNEP, Athens
- UNEP, 1992: Report of the meeting on implications of expected climatic changes on Mediterranean coastal areas (island of Rhodes, Kastela Bay, Syrian, Malta and Cres/Losinj islands) (Valletta, 15-19 September 1992). (UNEP(OCA)/MED/WG.55/7). (40 pages) (English only). UNEP, Athens
- UNEP, 1992: Report of the Consultation meeting on the evaluation of the Israeli Monitoring Programme (Haifa, 21-22 December 1992). (UNEP(OCA)/MED WG.59/2). (18 pages) (English only). UNEP, Athens
- UNEP/CRU, 1992: Regional Changes in Climate in the Mediterranean Basin Due to Global Greenhouse Gas Warming. MAP Technical Reports Series No.66, (172 pages) (English only). UNEP, Athens

- UNEP/FAO/IOC, 1992: Evaluation of the Training Workshops on the Statistical Treatment and Interpretation of Marine Community Data. MAP Technical Reports Series No. 68. (221 pages) (English only). UNEP, Athens
- UNEP/FAO/IOC, 1992: Proceedings of the FAO/UNEP/IOC Workshop on the Biological Effects of Pollutants on Marine Organisms (Malta, 10-14 September 1991), edited by G.P. Gabrielides. MAP Technical Reports Series No. 69. (287 pages) (English only). UNEP, Athens
- UNEP/IAEA, 1992: Assessment of the State of Pollution of the Mediterranean Sea by Radioactive Substances. MAP Technical Reports Series No. 62, (133 pages) (English and French). UNEP, Athens
- UNEP/IAEA/IOC/FAO, 1992: Organohalogen Compounds in the Marine Environment: A Review. MAP Technical Reports Series No. 70. (49 pages) (English only). UNEP, Athens
- UNEP/WHO, 1992: Biogeochemical cycles of specific pollutants (Activity K) - Survival of Pathogens - Final reports on Research Projects (1989-1991). MAP Technical Reports Series No. 63, (86 pages) (French only). UNEP, Athens
- UNEP/WMO, 1992: Airborne Pollution of the Mediterranean Sea. Report and Proceedings of the Second WMO/UNEP Workshop. MAP Technical Reports Series No. 64, (246 pages) (English only). UNEP, Athens
- UNEP, 1993: Costs and Benefits of Measures for the Reduction of Degradation of the Environment from Land-based Sources of Pollution in Coastal Areas. A - Case Study of the Bay of Izmir. B - Case Study of the Island of Rhodes. MAP Technical Reports Series No. 72. (64 pages) (English only). UNEP, Athens
- UNEP, 1993: Report of the Joint Meeting of the Scientific and Technical Committee and the Socio-Economic Committee (Athens, 3-7 May 1993). (UNEP(OCA)/MED/WG.66/8. (102 pages) (English and French). UNEP, Athens
- UNEP, 1993: Evaluation Report of the MED POL Programme. (UNEP(OCA)/MED/IG.3/Inf.6). (62 pages) (English and French). UNEP, Athens
- UNEP/FAO, 1993: Final Reports on Research Projects Dealing with the Effects of Pollutants on Marine Communities and Organisms. MAP Technical Reports Series No. 73. (186 pages) (English and French). UNEP, Athens
- UNEP/FAO/IAEA, 1993: Designing of monitoring programmes and management of data concerning chemical contaminants in marine organisms. MAP Technical Report Series No. 77. (236 pages) (English only). UNEP, Athens

UNEP/FAO/IOC, 1993: Selected techniques for monitoring biological effects of pollutants in marine organisms. MAP Technical Reports Series No. 71. (189 pages) (English only). UNEP, Athens

UNEP/FAO/WHO, 1993: Preliminary assessment of the state of pollution of the Mediterranean Sea by zinc, copper and their compounds and proposed measures. (UNEP(OCA)/MED/WG.66/Inf.3). (121 pages) (English and French). UNEP, Athens

UNEP/WHO, 1993: Development and Testing of Sampling and Analytical Techniques for Monitoring of Marine Pollutants (Activity A). MAP Technical Reports Series No. 75. (90 pages) (English only). UNEP, Athens

UNEP/WHO, 1993: Biogeochemical Cycles of Specific Pollutants (Activity K): Survival of Pathogens. MAP Technical Reports Series No. 76. (68 pages) (English and French). UNEP, Athens

WHO/UNEP, 1993: Report on a joint WHO/UNEP Meeting on Microbiological quality of coastal recreational waters (Athens, 9-12 June 1993). (EUR/ICP/CEH 039(1)). 108 pages) (English and French). WHO/EURO, Copenhagen

UNEP, 1994: Implications of expected climatic changes on the island of Rhodes (Valletta, 15-19 September 1992). (UNEP(OCA)/MED WG.55/2 (Revised)). (105 pages) (English only). UNEP, Athens

UNEP, 1994: Implications of expected climatic changes on Malta (Valletta, 15-19 September 1992). (UNEP(OCA)/MED WG.55/3(Revised)). (165 pages) (English only). UNEP, Athens

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