



UNITED NATIONS ENVIRONMENT PROGRAMME

*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

PREFACE

Fourteen years ago the United Nations Conference on the Human Environment (Stockholm, 5-16 June 1972) adopted the Action Plan for the Human Environment, including the General Principles for Assessment and Control of Marine Pollution. In the light of the results of the Stockholm Conference, the United Nations General Assembly decided to establish the United Nations Environment Programme (UNEP) to "serve as a focal point for environmental action and co-ordination within the United Nations system" (General Assembly resolution (XXVII) of 15 December 1972). The organizations of the United Nations system were invited "to adopt the measures that may be required to undertake concerted and co-ordinated programmes with regard to international environmental problems", and the "intergovernmental and non-governmental organizations that have an interest in the field of the environment" were also invited "to lend their full support and collaboration to the United Nations with a view to achieving the largest possible degree of co-operation and co-ordination". Subsequently, the Governing Council of UNEP chose "Oceans" as one of the priority areas in which it would focus efforts to fulfil its catalytic and co-ordinating role.

The Regional Seas Programme was initiated by UNEP in 1974. Since then the Governing Council of UNEP has repeatedly endorsed a regional approach to the control of marine pollution and the management of marine and coastal resources and has requested the development of regional action plans.

The Regional Seas Programme at present includes ten regions^{1/} and has over 120 coastal States participating in it. It is conceived as an action-oriented programme having concern not only for the consequences but also for the causes of environmental degradation and encompassing a comprehensive approach to combating environmental problems through the management of marine and coastal areas. Each regional action plan is formulated according to the needs of the region as perceived by the Governments concerned. It is designed to link assessment of the quality of the marine environment and the causes of its deterioration with activities for the management and development of the marine and coastal environment. The action plans promote the parallel development of regional legal agreements and of action-oriented programme activities^{2/}.

The Mediterranean Action Plan was the first one developed in the framework of the Regional Seas Programme. It was adopted in early 1975 in Barcelona^{3/} and since then has shown a remarkable progress.

The 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 Action Plan. During the first phase of the

^{1/} Mediterranean, Kuwait Action Plan Region, West and Central Africa, Wider Caribbean, East Asian Seas, South-East Pacific, South Pacific, Red Sea and Gulf of Aden, East Africa and South Asian Seas.

^{2/} UNEP: Achievements and planned development of UNEP's Regional Seas Programme and comparable programmes sponsored by other bodies. UNEP Regional Seas Reports and Studies No. 1. UNEP, 1982.

^{3/} UNEP: Action Plan for the protection of the Mediterranean. UNEP Regional Seas Reports and Studies No. 34. UNEP, 1983.

monitoring and research programme, known as MED POL, in which 83 national marine research centres participated from 16 Mediterranean States, several pilot projects were formulated and carried out with assistance of eight United Nations organizations 4/.

The Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution 5/, which provides the legal framework for the Action Plan, decided, in 1981, to terminate the pilot phase of MED POL and approved a long-term (10 years) programme for pollution monitoring and research (MED POL - Phase II).

The overall objective of the long-term programme is to promote the achievement of the goals of the Convention and its related protocol. When approving the long-term programme, which is reproduced in this document, the Contracting Parties recommended (UNEP/IG.23/11, Annex VIII, section 5) that they "should contribute to co-operation in the Mediterranean, without thereby increasing the general administration costs, by:

- Jointly developing programmes of interest to the Mediterranean;
- Increasing the part played by the mobilization of national efforts in the common endeavour, by providing studies, the results of pilot experiments, training, etc; and
- Identifying their own efforts and annually notifying thereof the other Mediterranean coastal States and the international organizations concerned, such identification relating in particular to the institutes, laboratories and research workers taking part in national, regional and subregional programmes, and indicating, as far as possible, the nature and purpose of their work together with any relevant bibliographic data available, with a view to their dissemination and the facilitation of fruitful co-operation."

4/ FAO/UNESCO/IOC/WHO/WMO/IAEA/UNEP: Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL) - Phase I: Programme Description. UNEP Regional Seas Reports and Studies No. 23. UNEP, 1983.

5/ UNEP: Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols. UNEP, 1982.

CONTENTS

	<u>Page</u>
BACKGROUND	1
OBJECTIVES	2
PRINCIPLES	2
MONITORING	4
A. Monitoring of sources of pollution to provide information on the type and amount of pollutants reaching the marine environment from coastal sources	4
B. Monitoring of the coastal waters, including estuaries, within the limits defined by article 1 of the Barcelona Convention and by article 3 of the Land-Based Sources Protocol, under the direct influence of pollutants from identifiable primary (e.g. outfalls, discharge or coastal dumping points) or secondary (rivers and other water courses) sources	5
C. Monitoring of reference areas, as defined by article 1 of the Convention, which are not under direct influence of pollutants from identifiable primary or secondary sources	7
D. Monitoring of the transport of pollutants to the Mediterranean Sea through the atmosphere	7
E. Sampling and analytical techniques	8
F. Data analysis and dissemination	8
RESEARCH AND STUDY TOPICS	9
ASSISTANCE COMPONENT	10
CO-ORDINATION	11
BUDGETARY CONSIDERATIONS	11
Appendix: Articles of the Convention for the Protection of the Mediterranean Sea Against Pollution and its related Protocols relevant to MED POL - Phase II	13

BACKGROUND

1. The pilot phase of the Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL - PHASE I) was initiated in 1974 and formally approved by the Intergovernmental Meeting on the Protection of the Mediterranean (Barcelona, 28 January - 4 February 1975) as the scientific/technical component of the Mediterranean Action Plan.

2. Initially it consisted of seven pilot projects (MED POL I - VII), which were later expanded by an additional six pilot projects (MED POL VIII - XIII), some of which remain in a conceptual stage only. It was based on the work of 83 national research centres designated by 16 Mediterranean States and the EEC as participants in co-operative networks and on the input of 8 United Nations organizations (ECE, UNIDO, FAO, UNESCO, IOC of UNESCO, WHO, WMO, IAEA), IUCN and ICSEM. The overall co-ordination and guidance for MED POL - PHASE I was provided by UNEP, acting as the secretariat of the Mediterranean Action Plan.

3. The general objectives of the MED POL - PHASE I, evolved through a series of expert and intergovernmental meetings, were:

- 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 it;
- to assist national research centres in developing their capabilities to participate in the programme;
- to analyse the sources, amounts, 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 for the Protection of the Mediterranean Sea against Pollution and its related protocols;
- to build up consistent time-series of data on the sources, pathways, levels and effects of pollutants in the Mediterranean Sea and thus to contribute to the scientific knowledge of the Mediterranean Sea.

4. The results of, and experience gained through, MED POL - PHASE I are reflected in numerous documents issued by UNEP and the specialized agencies which participated in the Programme.

5. The Intergovernmental Review Meeting of Mediterranean Coastal States and First Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution, and its related protocols (Geneva, 5-10 February 1979), having examined the status of MED POL - PHASE I, recommended that during the 1979/1980 biennium a long-term pollution monitoring and research programme should be formulated and the present document is a response to this request.

6. The legal obligations of the Contracting Parties to the:

- Convention for the Protection of the Mediterranean Sea Against Pollution; adopted in Barcelona, 16 February 1976; entered into force on 12 February 1978;
- Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft; adopted in Barcelona, 16 February 1975; entered into force on 12 February 1978;
- Protocol Concerning Co-operation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency; adopted in Barcelona, 16 February 1976; entered into force on 12 February 1978; and

- Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources; adopted in Athens, 17 May 1980;

are the legal basis for MED POL - Phase II.

7. Based on the recommendations made at various expert and intergovernmental meetings, the draft long-term (10 years) programme for pollution monitoring and research (MED POL - PHASE II) was formulated by the secretariat of the Convention (UNEP) in co-operation with the organizations which supported the MED POL - PHASE I. Subsequently, it was formally approved by the Second Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against pollution and its related protocols and Intergovernmental Review Meeting of Mediterranean Coastal States on the Action Plan held in Cannes, 2-7 March 1981.

OBJECTIVES

8. The general long-term objective of MED POL - PHASE II is to further the goals of the Barcelona Convention by assisting the Parties to prevent, abate and combat pollution of the Mediterranean Sea Area and to protect and enhance the marine environment of the Area. The specific objectives are designed to provide, on a continuous basis, the Parties to the Barcelona Convention and its related protocols 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 a sustainable basis;
- periodic assessment of the state of pollution of the Mediterranean Sea.

9. These objectives will be achieved through the evaluation of the information on the sources, amounts, levels, trends, pathways and effects of pollutants in the Mediterranean which will be collected, analysed and reported on a systematic basis using commonly agreed methods, and taking into account data available from other sources.

PRINCIPLES

10. The basic principles used in the development of MED POL - PHASE II are listed below:

(a) Mechanisms which will be used for MED POL - PHASE II related to policy making:

- periodic meetings of Contracting Parties to decide on the programme, approve its budget, review its progress and evaluate its results;

- periodic meetings of the Working Group for Scientific and Technical Co-operation which will consist of national MED POL co-ordinators designated by the relevant national authorities to assist the Contracting Parties in reviewing the progress of the programme and in evaluating the results thereof, and to prepare relevant recommendations for submission, through UNEP, as the secretariat of the Convention, to the meetings of the Contracting Parties.
- (b) The monitoring of, and research on, pollutants affecting the Mediterranean marine environment will reflect primarily the immediate and long-term requirements of the Barcelona Convention and its protocols (including those protocols which are in their formative stage) but will also take into account factors needed for the understanding of the relationship between the socio-economic development of the region and the pollution of the Mediterranean Sea.
- (c) The strategy of the programme will be such as to provide information on pollution trends within the Mediterranean recognizing that the dynamics of the system are such that pollution in one area can cause detrimental effects in other areas.
- (d) For this purpose, monitoring will be organized on several levels:
 - monitoring of sources of pollution providing information on the type and amount of pollutants released directly into the environment;
 - monitoring of nearshore areas, including estuaries, under the direct influence of pollutants from identifiable primary (outfalls, discharge and coastal dumping points) or secondary (rivers) sources;
 - monitoring of offshore areas (reference areas) providing information on the general trends in the level of pollution in the Mediterranean;
 - monitoring of the transport of pollutants to the Mediterranean through the atmosphere, providing additional information on the pollution load reaching the Mediterranean Sea.
- (e) Studies and research undertaken in the framework of the programme will be directly relevant to the achievement of the objectives of the programme.
- (f) PHASE II will be based primarily on the experience and results obtained during PHASE I, but will also take into account the experience gained through other large-scale national, bilateral or multilateral research and monitoring programmes carried out in the Mediterranean and in other regions of the world.
- (g) The work will be carried out by national research centres, which will not necessarily have to carry out all the aspects of the programme, in particular those which actively participated in PHASE I, taking into account the need for adequate geographic coverage. These centres will be designated by the relevant national authorities and will be named "collaborating UNEP MED POL centres" after demonstrating their relevant technical competence. Participation of national institutions in the work will be formalized through contracts based on proposals submitted to the Mediterranean Action Plan Co-ordinating Unit in response to requests.
- (h) The results of PHASE II will be collated, processed and disseminated by the unit co-ordinating the Mediterranean Action Plan in co-operation with the relevant specialized organizations of the United Nations system. The International Computing Centre (ICC) in Geneva will be used for data processing according to agreed standard practices, making full use of existing mechanisms for data exchange.
- (i) Data generated in PHASE II will be comparable, to the largest extent feasible, with those obtained during PHASE I and with those generated through UNEP-sponsored regional seas programmes in other regions, thus contributing to the Global Environment Monitoring System

(GEMS), and furthering the concept of integrated monitoring of the environment. The inter-regional comparability of data will be assured through UNEP's Regional Seas Programme Activity Centre.

- (j) The overall co-ordination of MED POL - PHASE II will be vested in the Mediterranean Action Plan Co-ordinating Unit, acting on behalf of UNEP (the secretariat of the Barcelona Convention).
- (k) The day-to-day co-ordination of the work carried out by national institutions participating in MED POL - PHASE II will be achieved through the relevant international organizations, under the responsibility of the Co-ordinating Unit.
- (l) Mechanisms which will be used, as appropriate, for the analysis of data and their initial evaluation are:
 - the unit co-ordinating the Mediterranean Action Plan in co-operation with the international organizations;
 - the Working Group for Scientific and Technical Co-operation;
 - experts, selected by the Co-ordinating Unit in consultation with the international organizations. These experts will act in their personal capacity;
 - periodic meetings of scientists participating in the programme to discuss the progress made in the projects and the future programme.
- (m) Financial resources for the implementation of PHASE II are:
 - (i) cash from:
 - Mediterranean Trust Fund;
 - UNEP's Fund;
 - voluntary contributions.
 - (ii) contributions in kind, services and activities related to the Mediterranean Action Plan from:
 - collaborating national centres;
 - Governments of the Mediterranean States and the EEC;
 - specialized organizations participating in the programme.

MONITORING

11. Several types of monitoring will be undertaken, all contributing to the fulfillment of the principles contained in paragraph 10.

A. Monitoring of sources of pollution to provide information on the type and amount of pollutants reaching the marine environment from coastal sources

12. The purpose of this monitoring is to establish the pollution load reaching the Mediterranean Sea and to contribute to the understanding of biogeochemical cycles of pollutants relevant to the Mediterranean Sea. It will cover the:

- (a) Survey of the type and amount of pollutants discharged directly into the coastal waters from land-based (coastal) sources;
- (b) Survey of the type and amount of pollutants dumped directly into the sea;
- (c) Survey of the type and amount of pollutants dumped in emergency or released accidentally into the sea;
- (d) Assessment of the type and amount of selected substances reaching the sea directly through natural (weathering, hydrothermal, etc.) processes from land-based (coastal) or maritime sources.

13. Pollutants to be monitored include:

- (a) Pollutants listed in annexes I and II of the Land-Based Sources Protocol (paragraph 12 (a));
- (b) Pollutants listed in annexes I and II of the Dumping Protocol (paragraph 12(b));
- (c) Pollutants referred to in Article 8 and Article 9 of the Dumping Protocol (paragraph 12(c));
- (d) Pollutants referred to in Article 8 of the Emergency Protocol (paragraph 12(c));
- (e) Substances which may contribute significantly to the overall level (concentration) of pollutants in the sea (paragraph 12(d)).

14. The monitoring will be based on:

- (a) Reports to be submitted by the Contracting Parties according to Article 7, Article 8 and Article 9 of the Dumping Protocol;
- (b) Reports to be submitted by the Contracting Parties according to Article 8 and Article 9 of the Emergency Protocol;
- (c) Reports to be submitted by the Contracting Parties according to Article 6 and Article 13 of the Land-Based Sources Protocol;
- (d) Reports to be submitted by the Contracting Parties on monitoring of sources for substances which may contribute substantially to the overall level (concentration) of pollutants in the sea (paragraphs 12(d) and 13(c)). Data will be generated by national research centres designated by their governments to participate in the programme.

B. Monitoring of the coastal waters, including estuaries, within the limits defined by Article 1 of the Barcelona Convention and by Article 3 of the Land-Based Sources Protocol, under the direct influence of pollutants from identifiable primary (e.g. outfalls, discharge or coastal dumping points) or secondary (rivers and other water courses) sources

15. The purpose of this monitoring is to establish the effects of measures taken by Contracting Parties under Land-Based Sources Protocol (Article 8(b)).

16. The monitoring will be carried out by governmentally selected national research centres to monitor areas within their national jurisdiction for the following parameters (indicators) selected on the basis of:

- (a) scientific and economic feasibility;

(b) specific needs of the Mediterranean, i.e. relevance to the annexes I and II of the Land-Based Sources Protocol;

(c) identifiable cause-effect relationship.

17. For general monitoring purposes of coastal waters (i.e. not in the heavily polluted areas in the vicinity of point sources) the following priority parameters (indicators) will be taken into account initially:

- total mercury in organisms and sediments;
- cadmium in organisms;
- high-molecular weight halogenated hydrocarbons in organisms and sediments;
- petroleum hydrocarbons in water, sediments and oil residues (tar-balls) on sea-shores;
- faecal coliforms in recreational waters and edible bivalves;
- basic oceanographic and meteorological conditions.

In addition, standard physical and chemical parameters (salinity, oxygen, temperature, etc.) which may contribute to the interpretation of the results, will be monitored.

18. It is envisaged that after 3 years the following additional parameters (indicators) for monitoring of coastal waters will be added to the list:

- cadmium in sediments;
- organic mercury in organisms and sediments;
- total arsenic in organisms;
- selenium in organisms;
- lead in organisms;
- polynuclear aromatic hydrocarbons in organisms;
- additional organics (such as carcinogenic compounds) in organisms;
- radionuclides in organisms;
- faecal coliforms in sediments;
- pathogens in waters, sediments and bivalves;
- ecological parameters, such as productivity and community structure.

19. Taking into account the specificity of estuaries, the parameters (indicators) to be monitored will initially include:

- total mercury in water and suspended matter;
- cadmium in water and suspended matter;
- high-molecular weight halogenated hydrocarbons in water and suspended matter;

- faecal coliforms in water and suspended matter;
- phosphorus in water and suspended matter;
- nitrogen in water and suspended matter;
- BOD₅ in water;
- COD in water.

20. It is envisaged that after 3 years, the following additional parameters (indicators) for monitoring of estuaries will be added to the list:

- total arsenic in water and suspended matter;
- organic mercury in water and suspended matter;
- selenium in water and suspended matter;
- lead in water and suspended matter;
- polynuclear aromatic hydrocarbons in water and suspended matter;
- radionuclides in water and suspended matter;
- oil residues in water and suspended matter;
- pathogens in water;
- phenols in water.

C. Monitoring of reference areas, as defined by Article I of the Convention, which are not under direct influence of pollutants from identifiable primary or secondary sources

21. The purpose of this monitoring is to provide information on the general trends in the level (concentration) of pollutants in the Mediterranean Sea.

22. The monitoring will be based on the work of governmentally selected national research centres which will monitor areas falling within their jurisdiction. Monitoring of areas outside of national jurisdiction will be agreed jointly by governments concerned.

23. The selection of reference areas will take into account the present knowledge of the prevailing conditions and other relevant regional programmes in the Mediterranean Sea.

24. Parameters (indicators) recommended to be monitored in the reference areas are primarily those listed in paragraph 17, with the exception of micro-organisms.

D. Monitoring of the transport of pollutants to the Mediterranean Sea through the atmosphere

25. The purpose of this monitoring is to establish the input (flux) of pollutants into the Mediterranean Sea through the atmosphere and thus to provide additional information on the pollution load reaching the Mediterranean Sea.

26. The monitoring will be based on the work of national research centres designated by their governments.

27. The monitoring areas will include (i) areas directly influenced by identifiable sources of air pollution and (ii) reference areas not directly influenced by identifiable sources of air pollution.

28. Monitoring of areas outside of national jurisdiction, or under shared jurisdiction by two states, will be agreed jointly by the governments concerned.

29. Parameters (indicators) to be monitored will be selected on the basis of their relevance to the annex I and annex II of the Land-Based Sources Protocol and of a feasibility study and research which will be carried out.

E. Sampling and analytical techniques

30. Sampling and analytical techniques used in the monitoring will be based on mandatory reference methods. Other methods could also be used, including remote sensing, subject to a satisfactory intercomparison.

31. Reference methods developed and tested during MED POL - PHASE I include:

- (a) Determination of total mercury in edible tissue of fish by flameless atomic absorption spectrophotometry after liquid pressure decomposition of the organic material;
- (b) Determination of total mercury in edible tissue of mussels by flameless atomic absorption spectrophotometry after liquid pressure decomposition of the organic material;
- (c) Determination of DDTs in edible tissues of shrimps and fish by gas-liquid chromatography;
- (d) Determination of DDTs in edible tissue of mussels by gas-liquid chromatography;
- (e) Determination of total coliforms in sea-water by the membrane filtration culture method;
- (f) Determination of faecal coliforms in sea-water by the membrane filtration culture method;
- (g) Determination of faecal streptococci in sea-water by the membrane filtration culture method;
- (h) Determination of faecal coliforms in shellfish (bivalves) by the multiple-test-tube method (MPN).

32. Additional reference methods will be developed and tested during MED POL - PHASE II (see paragraph 42(a)).

33. Sampling frequency will depend on the purpose of monitoring.

34. All national research centres will participate in the continuing intercalibration of sampling and analytical techniques or in data quality control programmes.

F. Data analysis and dissemination

35. Data will be subjected to a preliminary quality control and analysis by the national research centres or other organizations collecting them.

36. Depending on their nature, the data will be reported through the national MED POL co-ordinators, (or directly, if so decided by the latter) in an agreed format and according to an agreed schedule, to UNEP's Mediterranean Action Plan Co-ordinating Unit, or through the Regional Oil Combating Centre or through the relevant international organizations. On this level, using

the computer facilities of the International Computing Center in Geneva, the second analysis of data will be carried out, including the control of their quality, (data validation), and the first integration of data will be achieved on a Mediterranean scale.

37. The Co-ordinating Unit, in consultation with the specialized organizations, may convene groups of experts, either periodically or on an ad hoc basis, to assist in the analysis, integration and interpretation of data, after consideration is given to the possibility of convening meetings of the Working Group for Scientific and Technical Co-operation.

38. Before submitting the data and the reports prepared by UNEP on the basis of these data to the Contracting Parties and other users they will be reviewed by the Working Group for Scientific and Technical Co-operation.

39. The type of regular reports to be submitted to the Contracting Parties in connection with MED POL - PHASE II are:

(a) Type and amount of pollutants directly entering the Mediterranean Sea from land-based sources. The report will be based on the analysis and evaluation of data reported according to the provisions contained in paragraph 14 of this document. It will be submitted to the regular (biennial) meetings of the Contracting Parties.

(b) Quality of the marine environment in the areas monitored under MED POL - PHASE II. The report will consist of:

- collated reports on the quality of the areas monitored according to paragraphs 15-29 of this document, as submitted to the Co-ordinating Unit of the Mediterranean Action Plan from the national MED POL focal points in a commonly agreed format;
- analysis, evaluation and interpretation of the results contained in the reports on the areas monitored according to paragraphs 15-29 of this document.

The report will be submitted to the regular (biennial) meetings of the Contracting Parties.

(c) Results of selected research and study topics as defined in paragraph 42 of this document.

(d) Periodically updated report on the state of pollution of the Mediterranean Sea, indicating the major environmental problems, general trends in the pollution of the Mediterranean as well as the environmental problems which may face the Mediterranean basin in the future.

RESEARCH AND STUDY TOPICS

40. Only research and studies directly relevant to the achievement of the objectives of MED POL - PHASE II are envisaged.

41. Research and studies will be carried out by Mediterranean research centres and organizations primarily on a direct contractual basis or as a contribution from centres and organizations offered by the Contracting Parties.

42. Research and study topics included initially in the MED POL - PHASE II (sequence does not imply order of priority):

- (a) Development of sampling and analytical techniques for monitoring the sources and levels of pollutants. Testing and harmonization of these methods at the Mediterranean scale and their formulation as reference methods. Substances listed in Dumping and Land-Based Sources Protocol priorities.
- (b) Development of reporting formats required according to the Dumping, Emergency and Land-Based Sources Protocols.
- (c) Formulation of the scientific rationale for the environmental quality criteria to be used in the development of emission standards, standards of use or guidelines for substances listed in annexes I and II of the Land-Based Sources Protocol in accordance with Articles 5, 6 and 7 of that Protocol.
- (d) Epidemiological studies related to the confirmation (or eventual revision) of the proposed environmental quality criteria (standards of use) for bathing waters, shellfish-growing waters and edible marine organisms.
- (e) Development of proposals for guidelines and criteria governing the application of the Land-Based Sources Protocol, as requested in Article 7 of that Protocol.
- (f) Research on oceanographic processes, with particular emphasis on surface circulation and vertical transport. Needed for the understanding of the distribution of pollutants through the Mediterranean and for the development of contingency plans for cases of emergency.
- (g) Research on the toxicity, persistence, bioaccumulation, carcinogenicity and mutagenicity of selected substances listed in annexes of the Land-Based Sources Protocol and the Dumping Protocol.
- (h) Research on eutrophication and concomitant plankton blooms. Needed to assess the feasibility of alleviating the consequences and damage from such recurring blooms.
- (i) Study of ecosystem modifications in areas influenced by pollutants, and in areas where ecosystem modifications are caused by large-scale coastal or inland engineering activity.
- (j) Effects of thermal discharges on marine and coastal ecosystems, including the study of associated effects.
- (k) Biogeochemical cycle of specific pollutants, particularly those relevant to human health (mercury, lead, survival of pathogens in the Mediterranean Sea, etc.).
- (l) Study of pollutant-transfer processes (i) at river/sea and air/sea interface, (ii) by sedimentation and (iii) through the straits linking the Mediterranean with other seas.

ASSISTANCE COMPONENT

43. In addition to the assistance envisaged through the activities of the Regional Oil Combating Centre, direct assistance in the fields of science, education and technology related to MED POL - PHASE II will be provided as described in the following paragraphs.

44. Individual and collective training will be provided for scientists and technicians in techniques (methods) required for their effective participation in monitoring and research envisaged in the framework of MED POL - PHASE II. This assistance will be in the form of fellowships, experts, workshops, seminars, study tours, grants for attendance to meetings, etc., and will cover training in analytical and sampling techniques, data processing, interpretation of results and various research topics.

45. Training for technicians and administrators will be organized in order to facilitate the application of the Land-Based Sources and the Dumping Protocols. The forms of training will be similar to those mentioned in the preceding paragraph.

46. A quality control programme will be a part of MED POL - PHASE II to ensure the highest degree of quality and of comparability of data. The national research centres participating in monitoring will receive standards and reference substances enabling them to participate in the continuing Mediterranean and global intercalibration exercise. Weaknesses detected through the quality control programme will be corrected through additional training and technical assistance, whenever necessary.

47. The common maintenance services for the sophisticated analytical equipment (atomic absorption spectrophotometers, gas chromatographs, etc.), developed during MED POL - PHASE I, will remain at the disposal of participants in PHASE II enabling the proper functioning of the equipment used by national research centres.

48. In the matter of requirements and to the extent possible, standardized material and some equipment will be put at the disposal of national centres participating in MED POL - PHASE II to enable their full participation in the monitoring and/or research programme.

CO-ORDINATION

49. The periodic meetings of the Contracting Parties will decide on the programme, approve its budget, review its progress and evaluate its results.

50. The overall co-ordination and day-to-day organization of MED POL - PHASE II will be ensured by UNEP through the Co-ordinating Unit for the Mediterranean Action Plan, with the assistance of the international organizations. Such co-ordination shall be achieved as economically as possible.

51. A standing Working Group for Scientific and Technical Co-operation will be established by the Contracting Parties to assist them in their review of the progress of the programme and the evaluation of the results. It will advise UNEP on technical and policy matters related to the programme and prepare recommendations for submission through UNEP, as the secretariat of the Convention, to the meetings of Contracting Parties. The Group will consist of national MED POL co-ordinators designated by the relevant national authorities and will meet at least once a year.

52. The data quality control programme (paragraph 46) and maintenance services (paragraph 47) will be organized and carried out by competent international organizations or selected national institutions including those performing these programmes on a global level, under the overall guidance of the Mediterranean Action Plan Co-ordinating Unit.

53. In addition to the organizations belonging to the United Nations system, the collaboration with other competent international, regional and intergovernmental organizations in the implementation of MED POL - PHASE II will be actively pursued.

BUDGETARY CONSIDERATIONS

54. The financial resources needed for the work envisaged in the framework of MED POL - PHASE II will come from:

- (a) Contracting Parties to the Barcelona Convention (cash contributions through the Mediterranean Trust Fund and contributions in kind through participation of their national institutions);
- (b) UNEP (cash contributions on a project funding basis and contributions in kind through certain services);
- (c) National institutions participating in the programme (contributions in kind through services, staff time, etc.);
- (d) International organizations participating in and supporting the programme (contributions in kind through services, staff time, and activities related to the Mediterranean Action Plan);
- (e) Voluntary contributions.

APPENDIX

Articles of the
Convention for the Protection of the Mediterranean Sea Against Pollution
and its related protocols
relevant to MED POL - Phase II

CONVENTION FOR THE PROTECTION OF THE MEDITERRANEAN SEA AGAINST POLLUTION

Article 1

Geographical Coverage

1. For the purposes of this Convention, the Mediterranean Sea Area shall mean the maritime waters of the Mediterranean Sea proper, including its gulfs and seas, bounded to the West by the meridian passing through Cape Spartel lighthouse, at the entrance of the Straits of Gibraltar, and to the East by the southern limits of the Straits of the Dardanelles between Menmetcik and Kumkale lighthouses.
2. Except as may be otherwise provided in any protocol to this Convention, the Mediterranean Sea Area shall not include internal waters of the Contracting Parties.

Article 2

Definitions

For the purposes of this Convention:

- (a) "Pollution" means the 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.

Article 3

General Provisions

1. The Contracting Parties may enter into bilateral or multilateral agreements, including regional or subregional agreements, for the protection of the marine environment of the Mediterranean Sea against pollution, provided that such agreements are consistent with this Convention and conform to international law.

Article 4

General Undertakings

1. The Contracting Parties shall individually or jointly take all appropriate measures in accordance with the provisions of this Convention and those protocols in force to which they are party, to prevent, abate and combat pollution of the Mediterranean Sea Area and to protect and enhance the marine environment in that Area.

Article 9

Co-operation in Dealing with Pollution Emergencies

2. Any Contracting Party which becomes aware of any pollution emergency in the Mediterranean Sea Area shall without delay notify the Organization^{1/} and, either through the Organization or directly, any Contracting Party likely to be affected by such emergency.

Article 10

Monitoring

1. The Contracting Parties shall endeavour to establish, in close co-operation with the international bodies which they consider competent, complementary or joint programmes, including, as appropriate, programmes at the bilateral or multilateral levels, for pollution monitoring in the Mediterranean Sea Area and shall endeavour to establish a pollution monitoring system for that Area.

2. For this purpose, the Contracting Parties shall designate the competent authorities responsible for pollution monitoring within areas under their jurisdiction and shall participate as far as practicable in international arrangements for pollution monitoring in areas beyond national jurisdiction.

3. The Contracting Parties undertake to co-operate in the formulation, adoption and implementation of such annexes to this Convention as may be required to prescribe common procedures and standards for pollution monitoring.

Article 11

Scientific and Technological Co-operation

1. The Contracting Parties undertake as far as possible to co-operate directly, or when appropriate through competent regional or other international organizations, in the fields of science and technology and to exchange data as well as other scientific information for the purpose of this Convention.

2. The Contracting Parties undertake as far as possible to develop and co-ordinate their national research programmes relating to all types of marine pollution in the Mediterranean Sea Area and to co-operate in the establishment and implementation of regional and other international research programmes for the purposes of this Convention.

3. The Contracting Parties undertake to co-operate in the provision of technical and other possible assistance in fields relating to marine pollution with priority to be given to the special needs of developing countries in the Mediterranean region.

Article 14

Meetings of the Contracting Parties

1. The Contracting Parties shall hold ordinary meetings once every two years and extraordinary meetings at any other time deemed necessary, upon the request of the Organization or at the

^{1/} Article 13 of the Convention designates UNEP as the "Organization".

request of any Contracting Party, provided that such requests are supported by at least two Contracting Parties.

2. It shall be the function of the meetings of the Contracting Parties to keep under review the implementation of this Convention and the protocols and, in particular:

- (i) To review generally the inventories carried out by Contracting Parties and competent international organizations on the state of marine pollution and its effects in the Mediterranean Sea Areas:
- (iii) To adopt, review and amend as required the annexes to this Convention and to the protocols....
- (v) To establish working groups as required to consider any matters related to this Convention and the protocols and annexes.

Article 20

Reports

The Contracting Parties shall transmit to the Organization reports on the measures adopted in the implementation of this Convention and of Protocols to which they are Parties in such form and at such intervals as the meeting of Contracting Parties may determine.

Article 21

Compliance Control

The Contracting Parties undertake to co-operate in the development of procedures enabling them to control the application of this Convention and the protocols.

PROTOCOL FOR THE PREVENTION OF POLLUTION OF THE MEDITERRANEAN SEA BY DUMPING FROM SHIPS AND AIRCRAFT

Article 1

The Contracting Parties to this Protocol (hereinafter referred to as "the Parties") shall take all appropriate measures to prevent and abate pollution of the Mediterranean Sea Area caused by dumping from ships and aircraft.

Article 2

The area to which this Protocol applies shall be the Mediterranean Sea Area as defined in article 1 of the Convention for the Protection of the Mediterranean Sea against Pollution (hereinafter referred to as "the Convention").

Article 7

The permits referred to in articles 5 and 6 above^{2/} shall be issued only after careful consideration of all the factors set forth in Annex III to this Protocol. The Organization shall receive records of such permits.

Article 8

The provisions of articles 4,5 and 6 shall not apply in case of force majeure due to stress of weather or any other cause when human life or the safety of a ship or aircraft is threatened. Such dumpings shall immediately be reported to the Organization and, either through the Organization or directly, to any Party or Parties likely to be affected, together with full details of the circumstances and of the nature and quantities of the wastes or other matter dumped.

Article 9

If a Party in a critical situation of an exceptional nature considers that wastes or other matter listed in Annex I to this Protocol cannot be disposed of on land without unacceptable danger or damage, above all for the safety of human life, the Party concerned shall forthwith consult the Organization. The Organization, after consulting the Parties to this Protocol, shall recommend methods of storage or the most satisfactory means of destruction or disposal under the prevailing circumstances. The Party shall inform the Organization of the steps adopted in pursuance of these recommendations. The Parties pledge themselves to assist one another in such situations.

Article 14

1. Ordinary meetings of the Parties to this Protocol shall be held in conjunction with ordinary meetings of the Contracting Parties to the Convention held pursuant to article 14 of the Convention. The Parties to this protocol may also hold extraordinary meetings in conformity with article 14 of this Convention.
2. It shall be the function of the meetings of the Parties to this Protocol:
 - (a) To keep under review the implementation of this Protocol, and to consider the efficacy of the measures adopted and the need for any other measures, in particular in the form of annexes;
 - (b) To study and consider the records of the permits issued in accordance with articles 5,6 and 7 and of the dumping which has taken place.

PROTOCOL CONCERNING CO-OPERATION IN
COMBATING POLLUTION OF THE MEDITERRANEAN SEA BY OIL AND OTHER HARMFUL SUBSTANCES
IN CASES OF EMERGENCY

Article 1

The Contracting Parties to this Protocol (hereinafter referred to as "the Parties") shall co-operate in taking the necessary measures in cases of grave and imminent danger to the marine environment, the coast or related interests of one or more of the Parties due to the presence of

^{2/} Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols. UNEP, 1982 and 1984

massive quantities of oil or other harmful substances resulting from accidental causes or an accumulation of small discharges which are polluting or threatening to pollute the sea within the area defined in Article 1 of the Convention for the Protection of the Mediterranean Sea against Pollution (hereinafter referred to as "the Convention").

Article 4

The Parties shall develop and apply, either individually or through bilateral or multilateral co-operation, monitoring activities covering the Mediterranean Sea Area in order to have as precise information as possible on the situation referred to in article 1 of this Protocol.

Article 6

1. Each Party undertakes to disseminate to the other Parties information concerning:
 - (a) The competent national organization or authorities responsible for combating pollution of the sea by oil and other harmful substances;
 - (b) The competent national authorities responsible for receiving reports of pollution of the sea by oil and other harmful substances and for dealing with matters concerning measures of assistance between Parties;
 - (c) New ways in which pollution of the sea by oil and other harmful substances may be avoided, new measures of combating pollution and the development of research programmes.
2. Parties which have agreed to exchange information directly between themselves shall nevertheless communicate such information to the regional centre^{3/}. The latter shall communicate this information to the other Parties and, on a basis of reciprocity, to coastal States of the Mediterranean Sea Area which are not Parties to this Protocol.

Article 8

1. Each Party shall issue instructions to the masters of ships flying its flag and to the pilots of aircraft registered in its territory requiring them to report by the most rapid and adequate channels in the circumstances, and in accordance with annex I to this Protocol, either to a party or to the regional centre:
 - (a) All accidents causing or likely to cause pollution of the sea by oil or other harmful substances;
 - (b) The presence, characteristics and extent of spillages of oil or other harmful substances observed at sea which are likely to present a serious and imminent threat to the marine environment or to the coast or related interests of one or more of the Parties.

Article 9

1. Any Party faced with a situation of the kind defined in article 1 of this Protocol shall:
 - (a) Make the necessary assessments of the nature and extent of the casualty or emergency or, as the case may be, of the type and approximate quantity of oil or other harmful substances and the direction and speed or drift of the spillage;

^{3/} Regional Oil Combating Centre for the Mediterranean Sea, Malta

- (b) Take every practicable measure to avoid or reduce the effects of pollution;
- (c) Immediately inform all other Parties, either directly or through the regional centre of these assessments and of any action which it has taken or which it intends to take to combat the pollution.

Article 12

1. Ordinary meetings of the Parties of this Protocol shall be held in conjunction with ordinary meetings of the Contracting Parties to the Convention, held pursuant to article 14 of the Convention. The Parties to this Protocol may also hold extraordinary meetings as provided in article 14 of the Convention.

2. It shall be the function of the meetings of the Parties to this Protocol, in particular:

- (a) To keep under review the implementation of this Protocol, and to consider the efficacy of the measures adopted and the need for any other measures, in particular in the form of annexes.

PROTOCOL
FOR THE PROTECTION OF THE MEDITERRANEAN SEA
AGAINST POLLUTION FROM LAND-BASED SOURCES

Article 1

The Contracting Parties to this Protocol (hereinafter referred to as "the Parties") shall take all appropriate measures to prevent, abate, combat and control pollution of the Mediterranean Sea Area caused by discharges from rivers, coastal establishments or outfalls, or emanating from any other land-based sources within their territories.

Article 3

The area to which this Protocol applies (hereinafter referred to as the "Protocol Area") shall be:

- (a) the Mediterranean Sea Area as defined in article 1 of the Convention;
- (b) waters on the landward side of the baselines from which the breadth of the territorial sea is measured and extending, in the case of watercourses, up to the freshwater limit;
- (c) saltwater marshes communicating with the sea.

Article 5

1. The Parties undertake to eliminate pollution of the Protocol Area from land-based sources by substances listed in annex I to this Protocol.

2. To this end they shall elaborate and implement, jointly or individually, as appropriate, the necessary programmes and measures.

3. These programmes and measures shall include, in particular, common emission standards and standards for use.

4. The standards and the time-tables for the implementation of the programmes and measures aimed at eliminating pollution from land-based sources shall be fixed by the Parties and periodically reviewed....

Article 6

1. The Parties shall strictly limit pollution from land-based sources in the Protocol Area by substances or sources listed in annex II to this Protocol.

2. To this end they shall elaborate and implement, jointly or individually, as appropriate, suitable programmes and measures.

3. Discharges shall be strictly subject to the issue, by the competent national authorities, of an authorization taking due account of the provisions of annex III to this Protocol.

Article 7

1. The Parties shall progressively formulate and adopt, in co-operation with the competent international organizations, common guidelines and, as appropriate, standards or criteria dealing in particular with:

(a) the length, depth and position of pipelines for coastal outfalls, taking into account, in particular, the methods used for pretreatment of effluents;

(b) special requirements for effluents necessitating separate treatment;

(c) the quality of sea water used for specific purposes that is necessary for the protection of human health, living resources and ecosystems;

(d) the control and progressive replacement of products, installations and industrial and other processes causing significant pollution of the marine environment;

(e) specific requirements concerning the quantities of the substances listed in annexes I and II discharged, their concentration in effluents and methods of discharging them.

2. Without prejudice to the provisions of article 5 of this Protocol, such common guidelines, standards or criteria shall take into account local ecological, geographical and physical characteristics, the economic capacity of the Parties and their need for development, the level of existing pollution and the real absorptive capacity of the marine environment.

3. The programmes and measures referred to in articles 5 and 6 shall be adopted by taking into account, for their progressive implementation, the capacity to adapt and reconvert existing installations, the economic capacity of the Parties and their need for development.

Article 8

Within the framework of the provisions of, and the monitoring programmes provided for in article 10 of the Convention, and if necessary in co-operation with the competent international organizations, the Parties shall carry out at the earliest possible date monitoring activities in order to:

(a) systematically assess, as far as possible, the levels of pollution along their coasts, in particular with regard to the substances or sources listed in annexes I and II, and periodically to provide information in this respect;

- (b) evaluate the effects of measures taken under this Protocol to reduce pollution of the marine environment.

Article 9

In conformity with article 11 of the Convention, the Parties shall co-operate as far as possible in scientific and technological fields related to pollution from land-based sources, particularly research on inputs, pathways and effects of pollutants and on the development of new methods for their treatment, reduction or elimination. To this end the Parties shall, in particular, endeavour to:

- (a) exchange scientific and technical information;
- (b) co-ordinate their research programmes.

Article 10

1. The Parties shall, directly or with the assistance of competent regional or other international organizations or bilaterally, co-operate with a view to formulating and, as far as possible, implementing programmes of assistance to developing countries, particularly in the fields of science, education and technology, with a view to preventing pollution from land-based sources and its harmful effects in the marine environment.

2. Technical assistance would include, in particular, the training of scientific and technical personnel, as well as the acquisition, utilization and production by those countries of appropriate equipment on advantageous terms to be agreed upon among the Parties concerned.

Article 13

1. The Parties shall inform one another through the Organization of measures taken, of results achieved and, if the case arises, of difficulties encountered in the application of this Protocol. Procedures for the collection and submission of such information shall be determined at the meetings of the Parties.

2. Such information shall include, inter alia:

- (a) statistical data on the authorizations granted in accordance with article 6 of this Protocol;
- (b) data resulting from monitoring as provided for in article 8 of this Protocol;
- (c) quantities of pollutants discharged from their territories;
- (d) measures taken in accordance with articles 5 and 6 of this Protocol.

Article 14

1. Ordinary meetings of the parties shall take place in conjunction with ordinary meetings of the Contracting Parties to the Convention held pursuant to article 14 of the Convention. The Parties may also hold extraordinary meetings in accordance with article 14 of the Convention.

2. The functions of the meetings of the Parties to this Protocol shall be, inter alia:

- (a) to keep under review the implementation of this Protocol and to consider the efficacy of the measures adopted and the advisability of any other measures;
- (b) to revise and amend any annex to this Protocol, as appropriate;
- (c) to formulate and adopt programmes and measures in accordance with article 5,6 and 15 of this Protocol;
- (d) to adopt, in accordance with article 7 of this Protocol, common guidelines, standards or criteria, in any form decided upon by the Parties.

Note: For the full text of the Convention and its Protocol see the publication:

Convention for the Protection of the Mediterranean Sea Against Pollution (including: Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft; Protocol concerning Co-operation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency; Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources). UNEP 1982 (45 pages).

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