

Foreword

The MED POL Programme for the Assessment and Control of Marine Pollution in the Mediterranean is, among other, responsible to follow up the implementation of the provisions of the Protocol related to the control of pollution from land-based activities (LBS Protocol). In 1996 a Strategic Action Programme (SAP) to Address Pollution from Land-based Activities was formulated and one year after was adopted by the Contracting Parties in the framework of the implementation of the LBS Protocol. One of the most important activities of the SAP was the identification of priority pollution hot spots and sensitive areas, which would provide a general assessment of the state of pollution of the Mediterranean. As a result, a report was prepared including a list of pollution hot spots and sensitive areas of national priority, which were compiled according to the country reports prepared by national or international consultants with the assistance and input of the MED POL National Coordinators.

Following the meeting of the Contracting Parties held in Monaco from 14-17 November 2001 and the related recommendations, the need was felt to update the pollution hot spots in the Mediterranean taking also into consideration the financial aspect of the measures required to abate pollution. As in the past, the above task was entrusted to WHO/EURO, within the framework of the MED POL Phase III Programme. For this purpose the Contracting Parties to the Barcelona Convention were asked to revise the already existing lists as they were included in the MAP Technical Reports Series issue no. 124 and to make possible changes related to new data and information, based on surveys or new measurements and analyses carried out in the meantime.

In the new national lists that appear in the present document, changes were made on the pollution hot spots in relation to the following: (a) the reduction of pollution loads; (b) the elimination of pollution sources, (c) the measures taken for progressive or immediate decrease of loads polluting the sea; (d) the existence of another pollution hot spots with greater impact to human health and the environment than the listed ones; and (e) the inappropriate inclusion in the list.

New hot spots are also indicated and supported by relevant data on pollution load, collection, treatment and disposal of municipal and industrial wastewater.

The present document includes the revised country reports on pollution hot spots on the basis of new and existing information, which were adopted by the respective MED POL National Coordinators with the assistance of national experts.

1. REVIEW OF POLLUTION HOT SPOTS IN THE MEDITERRANEAN

1.1 Description of the Task

The task consists of the following:

- 1.1.1 Review of the national inventories existing (MAP Technical Reports Series 124) of Mediterranean pollution hot spots as approved by the meeting of the Contracting Parties in Tunis in 1997. The nature of the hot spots which are included in the national inventories continues to be related to (a) coastal cities and urban coastal agglomerates with considerable population (e.g. more than 100,000 taking also into consideration the size of each individual country) and (b) main industrial facilities discharging directly into the Mediterranean.

By reviewing the existing lists, it appears that some of the already indicated hot spots do not continue to be so due to (a) the reduction of pollution loads; (b) the elimination of pollution sources; (c) measures taken for progressive or immediate decrease of loads polluting the sea; (d) existence of another pollution hot spot with greater impact to human health and the environment than the listed ones; and (e) inappropriate inclusion in the list.

On the basis of the above, some new hot spots are indicated and supported by relevant information, which comprise:

- (a) data on load, collection, treatment and disposal of the coastal cities wastewater and for each (whenever possible) of the characteristics according to the questionnaire provided; and
- (b) data on industrial pollution for every major industrial facility, discharging directly into the sea, for each of the parameters according to the questionnaire provided. If, for certain reasons, technical data are not available, then data on the activity of the industry/activity are provided (raw materials consumed or products manufactured).

2. HOT SPOTS DEFINITION AND CRITERIA

2.1 Hot Spots

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

2.2 Hot Spots Indicators (primary)

- BOD, COD
- nutrients (phosphorus, nitrogen)
- total suspended solids
- oil (petroleum hydrocarbons)
- heavy metals
- persistent organic pollutants
- radioactive substances (whenever applicable)
- litter
- microorganisms (faecal coliforms, *E.coli*)

2.3 Evaluation of National Hot Spots

A ranking system from 1-6 is followed to show the severity of each of the effects on the identified hot spots.

A table is prepared on the national hot spots by evaluating them using the following criteria:

- The risk exerted by the point sources with effects on:
 - public health
 - drinking water quality
 - recreation
 - other beneficial uses
 - aquatic life (including biodiversity)
 - economy and welfare (including marine resources of economic value).

has been graded as follows:

- | | |
|---|----------------------|
| 1 | for no effects |
| 2 | for slight effects |
| 3 | for moderate effects |
| 4 | for major effects |
| 5 | for severe effects |
| 6 | for extreme effects |

- In order to weigh the risk in an equal manner, a multiplier depending on the importance of the effects on the several issues should be applied to the grades:

- | | |
|-----|--|
| 1.0 | for public health |
| 0.9 | for drinking water quality |
| 0.8 | for recreation |
| 0.8 | other beneficial uses |
| 0.7 | for aquatic life including biodiversity |
| 0.7 | economy and welfare including marine resources of economic value |

The following table explains the criteria for ranking the effects:

| Public Health | |
|-----------------------------|--|
| <u>extreme effects</u> (6) | Domestic wastewater loads of more than 30 tons BOD/day with no disinfection and having a high probability of direct contact to human beings. Wastewater containing more than 50 mg/L of heavy metals and having a possible contact to the public at the discharge point. Wastewater containing radioactivity or hazardous substances above WHO limitation. |
| <u>severe effects</u> (5) | Domestic wastewater loads of more than 15 tons BOD/day with no disinfection and having a high probability of direct contact to human beings. Wastewater containing more than 20 mg/L of heavy metals and having a possible contact to the public at the discharge point. |
| <u>major effects</u> (4) | Domestic wastewater loads of more than 10 tons BOD/day with no disinfection and having a high probability of direct contact to human beings. Wastewater containing more than 10 mg/L of heavy metals and having a possible contact to the public at the discharge point. |
| <u>moderate effects</u> (3) | Domestic wastewater or water containing heavy metals with no direct effect to human beings. |
| <u>slight effects</u> (2) | Any discharge which contains toxic substances or pathogens and is not mentioned in (3) - (6). |
| <u>no effects</u> (1) | Discharge with no effect. |

| Drinking Water Quality | |
|-------------------------------|--|
| <u>extreme effects</u> (6) | Any wastewater directly discharged to a water body which is used as drinking water. |
| <u>severe effects</u> (5) | Any wastewater directly discharged to a water body which is not used as drinking water but is potentially a drinking water source. |
| <u>major effects</u> (4) | Indirect discharges to water sources with improper filtration. |
| <u>moderate effects</u> (3) | Indirect discharges to a water body with proper infiltration. |
| <u>slight effects</u> (2) | Discharge representing a potential risk in emergency situations (flood, earthquake). |
| <u>no effects</u> (1) | Discharge with no effect. |

| Recreation | |
|-----------------------------|---|
| <u>extreme effects</u> (6) | Discharges with more than 300 mg/L of oil which may cause a significant odour that directly affects a recreational area from a distance of 100 m. |
| <u>severe effects</u> (5) | Discharges which may cause a significant odour that directly affects a recreational area from a distance of 500 m. |
| <u>major effects</u> (4) | Discharges with no odour at a distance of 1000 m from the recreational area deteriorating the aesthetic quality of waters. |
| <u>moderate effects</u> (3) | Discharges at a distance of 5000 m from the recreational area. |
| <u>slight effects</u> (2) | Discharges causing a potential risk to the environment. |
| <u>no effects</u> (1) | No effect. |

| Other Beneficial Uses | |
|------------------------------|--|
| <u>extreme effects</u> (6) | Discharges containing a high level of solid wastes or odours which can cease the present beneficial use of the water body (transportation, sport activities, aquaculture). |
| <u>severe effects</u> (5) | Discharges containing a high level of solid wastes or odours which can potentially cease the present beneficial use of the water body (transportation, sport activities, aquaculture). |
| <u>major effects</u> (4) | Discharges containing a high level of solid wastes or odours which can harm the present beneficial use of the water body (transportation, sport activities, aquaculture). |
| <u>moderate effects</u> (3) | Discharges containing a high level of solid wastes or odours which can potentially harm the present beneficial use of the water body (transportation, sport activities, aquaculture). |
| <u>slight effects</u> (2) | Discharges containing a high level of solid wastes or odours which may harm the present beneficial use of the water body (transportation, sport activities, aquaculture). |
| <u>no effects</u> (1) | Discharge with no effect. |

| <i>Aquatic Life (including biodiversity)</i> | |
|---|---|
| <u>extreme effects</u> (6) | Any discharge which may reduce the oxygen content of the receiving body below 0.5 mg O ₂ /L. Any discharge which contains a heavy metal concentration of more than 50 mg/L. Any discharge which contains an oil concentration of 400 mg/L. |
| <u>severe effects</u> (5) | Any discharge which may reduce the oxygen content of the receiving body below 1 mg O ₂ /L. Any discharge which contains a heavy metal concentration of more than 30 mg/L. Any discharge which contains an oil concentration of 200 mg/L. |
| <u>major effects</u> (4) | Any discharge which may reduce the oxygen content of the receiving body below 2 mg O ₂ /L. Any discharge which contains a heavy metal concentration of more than 20 mg/L. Any discharge which contains an oil concentration of 100 mg/L. |
| <u>moderate effects</u> (3) | Any discharge which causes oxygen depletion. |
| <u>slight effects</u> (2) | Any suspicious discharge. |
| <u>no effects</u> (1) | Discharge with no effect. |

| <i>Economy and Welfare</i> | |
|-----------------------------------|--|
| <u>extreme effects</u> (6) | Shutting down of discharging industries would have significant effect on the economy. Investment needed for environmental sound solution more than 20 million dollars. |
| <u>severe effects</u> (5) | Shutting down of discharging industries would have severe effect on the economy. Investment needed for environmental sound solution more than 10 million dollars. |
| <u>major effects</u> (4) | Shutting down of discharging industries would have major effect on the economy. Investment needed for environmental sound solution more than 5 million dollars. |
| <u>moderate effects</u> (3) | Discharging industries having little effect on the economy. |
| <u>slight effects</u> (2) | Discharging industries having no effect on the economy. |
| <u>no effects</u> (1) | Discharging industries having no effect on the economy, and already non-feasible for investment. |

2.4 Nature of Investment and Economic Costs

The identification of the previous hot spots was necessarily linked to the identification of the causes and the problems that led to this critical situation. Therefore it was essential that a determination of the nature of investment, based on the causes identified and the intervention to be followed were required and a preliminary estimated financial requirement be proposed, taking into consideration the costs involved for similar projects in the particular country. The same is also followed for the new pollution hot spots areas to be included in the national lists.

- **Procedure**

For the successful implementation of the above task, every National Coordinator provided information and existing data on the new Hot Spots to be included in the national lists. In order to facilitate the procedure and in view of the limited available time for the completion of this task, the following approach was followed:

each National Coordinator reviewed the list of hot spots in his/her country according to his expertise and knowledge and based on existing data, surveys carried out so far and on information already existing. As an indication, the number of hot spots proposed is related to (a) coastal cities and urban coastal agglomerates with a population of more than 100,000 inhabitants, and other selected coastal cities with considerable population, taking into account the seasonal influence due to tourists and the size of each individual country, and (b) main industrial facilities discharging directly into the Mediterranean and not through a municipal sewerage system, which are considered as potential hot spots. For the above purpose, and after the identification of the hot spots for which the above mentioned material was of assistance, it was of major importance that the following questionnaires were filled in, with already-existing information, in order to support the fact that the proposed hot spot represents a real one.

The methodology is also the same with the one in the past, the only exception being that when calculating the weighted total, instead of writing a number, the category appears expressed with letters A, B, C, D, E, where the calculated number falls, according to the following table:

| <u>Category</u> | <u>Weighted Total</u> |
|-----------------|-----------------------|
| A | 29.4 - 24.5 |
| B | 24.5 - 19.6 |
| C | 19.6 - 14.7 |
| D | 14.7 - 9.8 |
| E | 9.8 - 4.9 |

The above also counts for the national hot spots already listed. It should also be added that river mouths are not referred to as hot spots because although they sometimes represent a very considerable source of pollution, they belong to another category of pollution areas.

STANDARD QUESTIONNAIRES

9. Type and location of discharge: (when more than one, specify for each one)

.....

10. Pollution loads at the discharge point:

- 10.1 BOD₅ (t/y)
- 10.2 COD (t/y)
- 10.3 Total-N (t/y)
- 10.4 Total-P (t/y)
- 10.5 TSS (t/y)
- 10.6 Oil (Petroleum Hydrocarbons) (t/y)
- 10.7 Heavy metals
 - 10.7.1 (Kg/y)
 - 10.7.2 (Kg/y)
 - 10.7.3 (Kg/y)
- 10.8 Organochlorines
 - 10.8.1 (Kg/y)
 - 10.8.2 (kg/y)
- 10.9 Faecal coliforms(col/100 mL)

11. Quality of receiving environment (water, sediments and biota)

- 11.1 Total-N (mg/L)
- 11.2 Total-P (mg/L)
- 11.3 TSS (mg/L)
- 11.4 Oil (Petroleum Hydrocarbons) (mg/L)
- 11.5 Heavy metals
 - 11.5.1 (µg/L)
 - 11.5.2 (µg/L)
 - 11.5.3 (µg/L)
- 11.6 Organochlorines

11.6.1 (µg/L)

11.6.2 (µg/L)

11.7 Faecal coliforms(col/100 mL)

11.8 PCBs (µg/L)

11.9 Radioactive Substances (if applicable)

11.10 Any other relevant information

12. When a sewage treatment plant and/or sewer system are non-existent, give estimation of the cost needed for the construction (secondary treatment will be included):

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13. Additional information regarding the disposal of solid wastes that may affect the receiving waters:

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.....

14. Any other remarks:

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.....

Table to be used in connection with point 4.1

| Name of enterprise | Type of activity | Size | Population equivalent * |
|--------------------|------------------|------|-------------------------|
| | | | |
| | | | |
| | | | |

* Population equivalent will be estimated by using conventional references.



HOT SPOTS IN THE MEDITERRANEAN

INDUSTRIES DISCHARGING DIRECTLY INTO THE SEA

INDUSTRIAL DISCHARGES

INDUSTRIAL DISCHARGES DIRECTLY INTO THE SEA

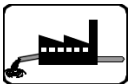
Country:

Name of Company:



1. Discharge site (geographical position)

.....



2. Type of industry: (according to the indicated list)

.....

3. Industrial wastewater treatment
(if YES, please specify type of treatment):

.....

.....

.....

.....

- Energy production
- Fertilizer production
- Production and formulation of biocides
- The pharmaceutical industry
- Petroleum refining
- The paper and paper-pulp industry
- Cement production
- The tanning industry
- The metal industry
- The shipbuilding and repairing industry
- The textile industry
- The electronic industry
- The recycling industry
- Other sectors of the organic chemical industry
- Other sectors of the inorganic chemical industry
- Food processing
- Treatment and disposal of hazardous wastes
- The waste management industry



4. Way of discharge:

4.1 By Outfall (YES or NO)

4.2 On shore (YES or NO)

5. Total wastewater treated (m³/day)

6. Total wastewater discharged: 6.1 Treated (m³/day)

6.2 Untreated (m³/day)

7. Wastewater quality and pollution loads at point of discharge:

| | <u>Wastewater Quality</u> | <u>Pollution Loads</u> |
|-----|------------------------------------|-------------------------------|
| 7.1 | BOD ₅ (mg/L) | (t/y) |
| 7.2 | COD (mg/L) | (t/y) |
| 7.3 | Total-N (mg/L) | (t/y) |
| 7.4 | Total-P (mg/L) | (t/y) |
| 7.5 | TSS (mg/L) | (t/y) |
| 7.6 | Heavy metals..... (µg/L) | (Kg/y) |
| | 7.6.1 (µg/L) | (Kg/y) |
| | 7.6.2 (µg/L) | (Kg/y) |
| | 7.6.3 (µg/L) | (Kg/y) |
| 7.7 | Persistent Organic Pollutants: | |
| | 7.7.1 PCBs (µg/L) | (Kg/y) |
| | 7.7.2 (µg/L) | (Kg/y) |
| | 7.7.3 (µg/L) | (Kg/y) |
| | 7.7.4 (µg/L) | (Kg/y) |
| 7.8 | Oil (petroleum hydrocarbons) | (t/y) |

8. Indirect evaluation of pollution (to be filled in when 5, 6 and 7 are not answered):

PRODUCTION FIGURES

| Type of Product | Unit | Annual Production |
|-----------------|-------|-------------------|
| | | |
| | | |
| | | |
| | | |

RAW MATERIALS IN USE

| Type of Raw Material | Unit | Annual Consumption |
|----------------------|-------|--------------------|
| | | |
| | | |
| | | |
| | | |

| <u>ESTIMATED POLLUTION LOAD</u> | | |
|--|-------|-------|
| Pollution loads discharged into receiving waters | mg/L | t/y |
| | | |
| | | |
| | | |
| | | |

9. Any other remarks:

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10. Selected remedial measures (including preventive and end-of-pipe treatment methods) and cost estimates:

.....

.....

11. Air emission loads (if any):

.....

12. When power plants above 200 MW (including nuclear) and cement industries are existing in the coastal zone, specify their emission loads:

.....
.....

13. Solid and hazardous wastes with water pollution potential (if any):

.....
.....