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MEDITERRANEAN ACTION PLAN

Meeting of Government-designated Experts to examine
a Strategic Action Programme to Address Pollution from
Land-based Activities

● Ischia, Italy, 15-18 June 1997

DRAFT REPORT

ON PRIORITY POLLUTION HOT SPOTS

In collaboration with



WHO

UNEP
Athens, 1997

**IDENTIFICATION OF PRIORITY POLLUTION HOT
SPOTS AND SENSITIVE AREAS IN THE
MEDITERRANEAN**

May, 1997

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IDENTIFICATION OF PRIORITY POLLUTION HOT SPOTS AND SENSITIVE AREAS IN THE MEDITERRANEAN

A- Introduction

- This report has been prepared in the framework of the development of a Strategic Action Programme for the Mediterranean, as a follow-up to the signing of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities. The activity was funded by a Project Development Facility (PDF) Block B grant of the Global Environment Facility. It is one of a number of reports prepared to support the preparation of a Transboundary Diagnostic Analysis (TDA) of land-based sources of pollution from coastal zones in the Mediterranean. The TDA identifies priority regional actions which are the basis for a Strategic Action Programme (SAP), and national action programmes for the Mediterranean. The results of the TDA are to be presented to a Donors Conference at the end of the project.
- In this context, the WHO Office of the Coordinating Unit of MAP, within the framework of the Mediterranean Action Plan and, in particular, within the MED POL Programme, was given the responsibility of carrying out the activities specifically related to the "Identification of priority pollution hot spots and sensitive areas in the Mediterranean".
- The report summarises the results of consolidating and analysing country reports prepared by national teams headed by the government-designated national coordinators for the strategic Action Programme in the country. The national teams were supported by consultants whenever necessary. For this purpose adequate questionnaires were prepared, which were reviewed at an informal meeting in Athens during December 1996, dealing with municipal discharges from coastal cities or urban coastal agglomerates with a population above 100,000 inhabitants (taking into consideration the particular situation in each country related to its size) and from main industries discharging directly into the sea. Questionnaires on rivers and water courses discharging into the sea were also prepared so as to enable the information gathered to be included in the appropriate TDA chapter on rivers. Detailed guidelines were also provided, outlining procedures for:-

- identification of pollution hot spots and prioritisation
- evaluation of the impacts of priority pollution hot spots (focusing on transboundary effects)
- identification of sensitive areas
- remedial actions proposed and estimates of investments needed

The questionnaires are enclosed, as well as a brief outline of the methodology proposed for the analysis (Annex I).

- The questionnaires and the guidelines were discussed in a preliminary meeting to brief the consultants on the project, the proposed methodology, and the time schedule for implementation of the project. The questionnaires and guidelines were sent to the national focal points and the national coordinators were asked to start collecting as much as possible of the data required, drawing on the help and support of the national inter-ministry working groups, to be established whenever possible to ensure that the views of all relevant government structures are taken into account⁽¹⁾. The nominated consultants visited the different countries whenever necessary and worked with national teams on finalizing the country reports.
- The country reports were next discussed at length and edited during a meeting attended by the national coordinators and the consultants.
- Finally the country reports were consolidated by a consultant in a report that has been reviewed by WHO/MAP Coordinating Unit to produce the present report.

⁽¹⁾ In fact, only one country referred to the establishment of an inter-ministry working group

B- Summary and Analysis of Country Results

One- PRESENTATION OF RESULTS:

I- HOT SPOTS

- 1- The results of the country analyses are given in **Annex II** in separate tables for the hot spots and sensitive areas for each of the 17 countries who prepared country reports (Monaco replied that there are no pollution hot spots and sensitive areas and Bosnia-Herzegovina did not reply at all). Each table of hot spots is followed by brief notes highlighting the more important comments made in the country reports addressing the main constraints, gaps and the particular methods used in compiling some data in the tables.
- 2- **Annex III** gives summary tables of the data compiled in the country reports. It contains three summary tables:-
 - 2.1- **Table (III-1)** lists the 109 priority hot spots identified in the country reports, ranked in descending order of their weighted total impact. For each hot spot, the table lists the source of pollution (domestic, industrial or mixed), and the estimated cost for proposed remedial actions.
 - 2.2- **In Table (III-2)**, the population and pollution loads (BOD, COD, Total-N, Total-P and TSS) are given for each hot spot listed in Table (III-1)
 - 2.3- **Table (III-3)** compiles the data in the national reports on Toxic, Persistent and liable to Bioaccumulate substances (TPBs) (Hg, Cd, Pb, Cr, Cu, Zn, Ni, POPs and others (mainly hydrocarbons)
 - 2.4 **Table (III-4)** consolidates the information on sensitive areas contained in the country reports.

Two- ANALYSIS OF RESULTS:

- 3- 109 priority hot spots have been identified as impacting public health, drinking water quality, recreation and other beneficial uses, aquatic life (including biodiversity), as well as economy and welfare (including marine resources of economic value). Some idea of the **distribution of their weighted total impacts** can be gleaned from Table (1).

Table (1)

	Number of Hot Spots	% of Total
<i>Hot Spots scoring > 25</i>	2	1.8 %
<i>Hot Spots scoring 25-20</i>	25	23.9 %
<i>Hot Spots scoring 20-15</i>	52	47.7 %
<i>Hot Spots scoring 15-10</i>	27	24.8 %
<i>Hot Spots scoring < 10</i>	3	2.8 %
Total	109	100%

- 4- Only two hot spots (Lake Manzala in Egypt and Izmir in Turkey) scored a total weighted impact greater than 25. A little over one fifth were in the (25-20) bracket, while about one fourth are in the (15-10) bracket. Almost one half of the hot spots are in the (20-15) bracket.
- 5- Almost all hot spots are considered, in the national reports, as having transboundary impacts on the six issues considered in the analysis.
- 6- Table (2) groups the hot spots according to the **sources of pollution** (domestic, industrial, mixed). For more than half the number, the sources are mixed. For just under one quarter, the sources are industrial, and the same for domestic sources.

Table (2)

Source of the pollution	Domestic	Industrial	Mixed
No. of Hot Spots	26	26	57
% of total	23.9 %	23.9 %	52.2 %

- 7- It is worth noting that a limited number of pollution hot spots is responsible for the bulk of pollution loads:
 - 7,1- **BOD loads:** of the total reported according to existing data, BOD load (865,214 t/yr) **four hot spots** contribute more than 50,000 t/yr each. They account for no less than (488,553 t/yr) or 56.5 % of the total. Table (3) lists these four hot spots in descending order of BOD loads.

Table (3)

Hot Spot	BOD load (t/yr)	% of total BOD load
1- El-Mex Bay (Egypt)	219,498	25.4 %
2- Weid Ghammieq (Malta)	117,968	13.6 %
3- Abu-Qir Bay (Egypt)	91,701	10.6 %
4- Inner Saronic Bay (Greece)	59,386	6.9 %
Totals	448,553	56.5 %

- Of these four hot spots, two are in the greater Alexandria area (Abu-Qir Bay to the east and El-Mex Bay to the west). They account for 36.1 % of the total BOD load for all 109 hot spots.

2- **COD loads: Seven hot spots** are responsible for COD loads of more than 100,000 t/yr. Together they account for 69.9 % of the total COD loads (2,198,802 t/yr) as shown in table (4)

Table (4)

Hot spot	COD load (t/yr)	% of total COD load
1- Abu-Qir Bay (Egypt)	575,490	26.2%
2- Iskendrun (Turkey)	222,080	10.1%
3- Haifa Bay (Israel)	183,770	8.4%
4- El-Mex Bay (Egypt)	175,654	8.0%
5- Weid Ghammieq (Malta)	153,556	7.0%
6- Inner Saronic Bay (Greece)	118,735	5.4%
7- Silifke (Turkey)	100,290	4.6%
Total	1,529,575	69.6%

- One hot spot (Abu Qir Bay) is responsible for slightly more than one quarter of the total COD load.
- Two hot spots in Alexandria account for 34.2% of the total COD loads. They are the same two hot spots responsible for 36.1% of the total BOD load.
- Once more, Weid Ghammeiq in Malta appears as a not insignificant source of total pollution load (7.0% of COD, 13.6% of BOD).

7,3- TPBs:- within the limitations of the considerable gaps in the data collected on TPBs, compared to other parameters, **eight hot spots**, are prominent as main sources of TPBs. Table (5) summarises their contributions to the different TPBs for which data were compiled in the national reports, and the percentages of their combined shares of the total discharges of TPBs.

Table (5)

TPB (Kg/yr)	Hg	Cd	Pb	Cr	Cu	Zn	Ni	POPs	Others (t/yr) mainly hydro- carbons
<i>Hot Spot</i>									
(3) Abu Qir Bay (Egypt)		31+	193+	362+	2,669+	3,394+	859		1906 (oil)
(4) Haifa Bay (Israel)		2,600			3,250	58,500			50,000 (oil)
(7) Tartous (Svria)		54	2,703	1,784	5,406	5,163	2,649		
(10) Lattakia (Svria)		85.4	4,271	2,135	4,271	7,686	2,562		
(35) El-Mex Bay (Egypt)	1278 ^(*)	1,562		530	25,430	46,524			1,319 (oil)
(40) Gush Dan (Israel)	60	430	1,670	11,400	19,000	54,000	2,500		

(*) A caustic soda plant at this location, using mercury cells, has been dismantled and is buried in a secure land fill south of Alexandria in the desert.

TPB (Kg/yr)	Hg	Cd	Pb	Cr	Cu	Zn	Ni	POPs	Others (t/yr) mainly hydro- carbons
(46) Sfax South (Tunisia)					3,456	17,000			
(100) Larymna Bav (Greece)						313,170			
Totals	1338	4762.4+	8837+	16211+	63.482+	505.737+	8570		53.225
% of total TPB discharges	93.0%	81.4%	48.2%	70.1%	96.3%	82.15	75.1%		97.2%

- As can be seen from the table, these eight hot spots are responsible for:
 - more than 90% of the discharges of mercury, copper and oil.
 - more than 80% of cadmium and zinc.
 - more than 70% of chromium and nickel.
 - and just under 50% of lead.

8- The concentration of population in and around the pollution hot spots identified reveals some significant aspects (Table 6).

Table (6)

Population	> 1,000,000	1,000,000 - 500,000	500,000 - 250,000
No. of cities	9	8	15
Total population for the group	17,963,503	5,875,966	4,959,722
% of total	57.3%	18.7%	15.8%

8,1- Although the number of urban concentrations around hot spots of populations of one million and more is only nine, they account for just under 60% of the total population in and around hot spots:-

- **Greater Alexandria** with a population of over 4 million. and responsible for around 40% of Egypt's total industrial production. is prominent as a major source of pollution. As indicated earlier on

(Table 3,4), it is responsible for 36.1% of total BOD load, 34.2% of COD load, 89.3% of mercury discharges, 27.2% of cadmium and 42.6% of copper (Table 5).

- **Inner Saronic Gulf** in Greece, with a population of over 3 million is also a significant source of BOD (6.9% of total) and COD (5.4%)

8,2 There are **eight cities** with populations between one million and half a million. They house just under 6 million people and thus account for a little less than one fifth of total population around hot spots. None of these cities is particularly prominent as a significant source of pollution.

8,3 **Fifteen cities** have populations between 500,000 and 250,000. Their total population is about one million less than that of the previous group.

- Of these 15 cities, Weid Ghammeiq in Malta figures as a noticeable source of pollution (13.6% of total BOD load, 7.0% of total COD load), While Tarsus, in Syria, also appears on the list of major sources of TPBs (Table 5).

9- Table (7) shows the **total number of pollution hot spots for each source of pollution** (domestic, industrial, mixed) as well as the share of each group of the total BOD and COD loads of all hot spots.

Table (7)

Source of pollution		Domestic	Industrial	Mixed	Totals
No. of Hot Spots		26	26	57	109
% of total number		23.9%	23.9%	52.2%	100%
BOD load	t/yr	119,881	18,994	740,839	878,914
	% of total	13.6%	2.2%	84.3%	100%
COD load	t/yr	505,496	79,307	1,638,799	2,223,602
	% of total	22.7%	3.6%	73.7%	100%

9,1- The fifty seven hot spots having mixed sources of pollution account for 84% of total BOD load and about three quarters of COD load. Six of them appear in Table (6) as main sources of TPBs.

- All four hot spots identified as main sources of total BOD load (table 3) have mixed sources of pollution.
- Four of the six hot spots identified as main sources of total COD load (table 4) have mixed sources of pollution..

II. SENSITIVE AREAS

As for sensitive areas (SAs), the national reports identified 25 sensitive areas in 8 countries, as shown in the tables in Annex II. Table (8) gives the number of sensitive areas in each of the eight countries.

Table (8)

<i>Country</i>	<i>Albania</i>	<i>Croatia</i>	<i>Cyprus</i>	<i>Egypt</i>	<i>France</i>	<i>Greece</i>	<i>Lebanon</i>	<i>Slovenia</i>	<i>Syria</i>	<i>Total</i>
No. of SAs	3	5	1	1	4	2	2	2	5	25

Estimates of costs for remedial actions for protecting the sensitive areas are given for 12 SAs in 4 countries only. These total US\$ 76-79 millions.

Table 9.1 Pollution Hot Spots - Proposed Actions and Associated Costs

Problems	Impact	Stakeholders	Uncertainties	Proposed actions & Associated Costs	Products & Milestones
<p>I - Control of Pollution at the Priority Hot Spots in the Mediterranean</p> <p>List of 109 pollution hot spots (of which 29 were identified as Priority Hot Spots with weighted impact factor of 20 or more) was prepared on the basis of assessment carried out at the country level by national and local authorities and experts. Hot spots were ranked by weighted factors determined by multicriteria analysis and according to the relative importance of their impacts on public health, drinking water quality, recreation and other beneficial uses, aquatic life (including biodiversity) and economy and welfare.</p> <p>Summary of the results of the assessment are presented in Annex III and details of the assessment are contained in country reports (summarised in Annex II)</p>	<p>L-II N-II T-II</p>	<ul style="list-style-type: none"> National and local authorities Polluting enterprises Municipalities Industry Tourism Private sector Academia institutions NGOs General public International organizations 	<ul style="list-style-type: none"> Cost estimates for individual hot spots were either given by national or local authorities or were estimated by experts assisting in the preparation of national reports. Further work is needed to improve the reliability of the estimates. Methodology for the determination of weighted factors for impact should be revised and improved. Financing of reinvestment studies, remedial actions and monitoring programmes is uncertain. Identification of transboundary impacts is unreliable. 	<ul style="list-style-type: none"> Present a list of 29 Priority Hot Spots Prepare preinvestment studies for each of the Priority Hot Spots <i>Cost Estimate: US\$ 290,000</i> Prepare action plan for remedial actions in order to control pollution at Priority Hot Spots <i>Cost Estimate: US\$ 50,000</i> Implement action plan for remedial actions <i>Cost Estimate: US\$ 1,566,000,000</i> Revision of methodology used in determination of weighted factors for impact (including transboundary impact) and their comparative analysis. <i>Cost Estimate: US\$ 50,000</i> Implementation of relevant compliance and trend pollution monitoring programmes at the locations of 29 hot spots. <i>Cost Estimate: US\$ 2,000,000</i> Study on approaches in ICZM to clarify and optimise the complex relationship between urbanisation and industrialisation in the Mediterranean coastal zone. <i>Cost Estimate: US\$ 60,000</i> Carry out environmental audits of industries in priority hot spots, revise cost estimates accordingly <i>Cost Estimate: US\$ 580,000</i> 	<ul style="list-style-type: none"> List presented at the Conference of Donors -by the end of 1997 Preinvestment studies prepared by year 1998 Action plan for remedial actions prepared -by year 1998 Methodology for the determination of weighted factors revised -by the end of year 1997 Pollution monitoring programmes prepared -by year 1998 Study on approaches in ICZM prepared by year 1998 Environmental audit prepared -by year 1998

T= Transboundary

II= High impact

N= National

M= Medium impact

L= Local

I= Insignificant impact

Table 9.1 Pollution Hot Spots - Proposed Actions and Associated Costs

Problems	Impact	Stakeholders	Uncertainties	Proposed actions & Associated Costs	Products & Milestones
2. Control of pollution at 80 Hot Spots in the Mediterranean (See explanation under point 1. Above)	L-II N-II T-M	<ul style="list-style-type: none"> National and local authorities Polluting enterprises Municipalities Industry Tourism Private sector NGOs General public International organizations 	<ul style="list-style-type: none"> Cost estimate for individual hot spots were either given by national or local authorities or were estimated by experts assisting in the preparation of national reports. Further work is needed to improve the reliability of estimates Methodology for the determination of weighted factors for impact should be revised and improved Financing of preinvestment studies, remedial actions and monitoring programmes is uncertain Identification of transboundary impacts is unreliable 	<ul style="list-style-type: none"> Present a list of 80 Hot Spots Select hot spots for which preinvestment studies will be prepared and prepare such studies <i>Cost Estimate: US\$ 200,000</i> Prepare action plan for remedial actions in order to control pollution at selected Hot Spots <i>Cost Estimate: US\$ 20,000</i> Implement action plan for remedial actions <i>Cost Estimate: US\$ 1,000,000</i> Implementation of relevant compliance and trend pollution monitoring programmes at the locations of selected hot spots <i>Cost Estimate: US\$ 1,000,000</i> 	<ul style="list-style-type: none"> List presented at the Conference of Donors -by the end of 1997 Preinvestment studies prepared -by year 1998 Action plan for remedial actions prepared -by year 1998 Pollution monitoring programmes prepared -by year 1998

T= Transboundary

H= High impact

N= National

M= Medium impact

L= Local

I= Insignificant impact

Table 9.2 Pollution Sensitive Areas - Proposed Actions and Associated Costs

Problems	Impact	Stakeholders	Uncertainties	Proposed actions & Associated Costs	Products & Milestones
<p>1. Assessment and protection of sensitive coastal areas</p> <p>Twenty five sensitive areas were identified but criteria for their selection were not standardized</p>	<p>L-H N-H T-M</p>	<ul style="list-style-type: none"> • National and local authorities • Polluting enterprises • Municipalities • Industry • Tourism • Private sector • NGOs • General public • International organizations 	<ul style="list-style-type: none"> • Lack of standard methodology for the selection of establishment of sensitive areas • Information on sensitive areas is incomplete 	<ul style="list-style-type: none"> • Prepare action plan for the remedial actions for identified sensitive areas <i>Cost Estimate: US\$ 30,000</i> • Remedial actions for identified sensitive areas, in accordance with preliminary cost estimates <i>Cost Estimate: US\$ 80,000,000</i> • Development of the standardized methodology for the selection of sensitive areas and for the determination of the cost of their protection <i>Cost Estimate: US\$ 30,000</i> 	<ul style="list-style-type: none"> • Action plan prepared -by year 1998 • Remedial actions implemented -by year 2000 • Standardized methodology developed -by year 1998

T= Transboundary

H = High impact

N= National

M= Medium impact

L= Local

I= Insignificant impact

D- Comments

General:-

- 1- Time constraints and the tight schedule for preparing and reviewing the country reports meant that the results are based on existing data. There was no time available for further measurements or verification of existing information. Had it not been for the previous efforts of MEDPOL focal points and the data they accumulated, it would not have been possible to prepare a more or less coherent picture of the situation in the Mediterranean coastal zones in such short time.
- 2- It is particularly worthwhile to note that all the Mediterranean countries eligible for GEF or donor funding have prepared national reports that provide useful information.
3. Most country reports underscore important gaps and constraints that are worth highlighting here. Most important among these are:
 - scarcity of information on quality of receiving waters
 - difficulty of obtaining sufficient information on industrial effluents and estimates of remedial actions to reduce their undesirable impacts.
 - The need under the new orientations of MAP and the Barcelona Convention on LBS to establish good working relations between the, so far, predominantly scientific nature of the MEDPOL national focal points and other socio-economic institutions involved in environmental protection (government, business, academia and NGOs).

Specific Comments:-

- 1- It is clear that while most pollution hot spots were considered as having all embracing transboundary impacts, no consideration of location, prevailing currents, etc. seem to have been involved in characterising these impacts as transboundary.
- 2- The identification of sensitive areas and their analysis leaves a lot to be desired. The impression given by the national reports is that there has been in many cases confusion about applying the definition of sensitive areas given in the guidelines as well as reporting on the sensitive areas identified.

3. The majority of remedial actions proposed are of the wastewater treatment type. While appropriate in the case of domestic waste waters, this is highly undesirable for industrial effluents, where pollution prevention/ cleaner production, pollution prevention, approaches are more rational and efficient than "end of pipe" treatment of effluents.
4. There are notable gaps in cost estimates for remedial actions. The total for all hot spots identified could be more than the estimated amounts.
5. Some estimates are given for necessary feasibility studies or capacity building projects.
6. Estimates for new plant and systems, or the upgrading of existing ones, cover only procurement, construction and start-up costs. No costs are given for operating and maintenance costs.

Annex I

I-1 Questionnaires:

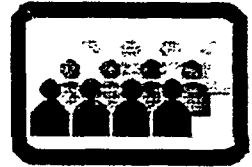
Municipal Discharges

Industrial Discharges

Discharges from Rivers and Canals

I-2 Outline of Methodology Used in the Analysis





HOT SPOTS IN THE MEDITERRANEAN

COASTAL CITIES

MUNICIPAL DISCHARGES

MUNICIPAL DISCHARGES

Country:

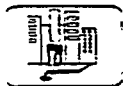
City:



1. Permanent population (last census taken



2. Average seasonal increase.....
(months of tourist season

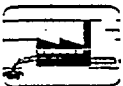


3. Population served by municipal sewer system



4. Main industries (individual or group) served by municipal sewer system:

4.1 Name and type of activity and size (if many, use table at the end)



5. Sewage treatment plant: 5.1 Existent since when
5.2 Non-existent

5.3 Planned to be constructed on

6. Wastewater flow to the treatment plant (m³/day)

(When more than one exists, specify for each one) (m³/day)

6.1 Type of final treatment before discharge:

- Primary (YES or NO)
- Secondary (YES or NO)
- Tertiary (YES or NO)

7. Total wastewater treated (m³/day)



Total wastewater discharged (into the marine environment)
(for the entire city)

8.1 Treated (m³/day)
8.2 Untreated (m³/day)

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 (t'y)
- 11.2 Total-P(t y)
- 11.3 TSS (t y)
- 11.4 Oil (Petroleum Hydrocarbons) (t/y)
- 11.5 Heavy metals
 - 11.5.1 (Kg/y)
 - 11.5.2 (Kg/y)
 - 11.5.3 (Kg y)
- 11.6 Organochlorines
 - 11.6.1 (Kg/y)
 - 11.6.2(kg/y)
- 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):

.....

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

.....
.....
.....

14. Any other remarks:

.....
.....
.....

Table to be used in connection to 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):

.....
.....
.....
.....

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)

- 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

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

		<u>Wastewater Quality</u>	<u>Pollution Loads</u>	
7.1	BOD ₅	..... (mg/L)	.....	(ty)
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:

.....

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):

.....

.....

DISCHARGES FROM RIVERS AND CANALS

DISCHARGES FROM RIVERS AND CANALS INTO THE SEA

Country:

Name of River/Canal:

1. Discharge site (geographical position)

2. Average daily flow: (m³/day)

3. River water quality and pollution loads at point of discharge:

	<u>River Water Quality</u>		<u>Pollution Loads</u>
3.1	BOD ₅	(mg/L)	..... (t/y)
3.2	COD	(mg/L)	..... (t/y)
3.3	Total-N	(mg/L)	..... (t/y)
3.4	Total-P	(mg/L)	..... (t/y)
3.5	TSS	(mg/L)	..... (t/y)
3.6	metals	(µg/L)	..... (Kg/y)
	3.6.1	(µg/L)	..... (Kg/y)
	3.6.2	(µg/L)	..... (Kg/y)
	3.6.3	(µg/L)	..... (Kg/y)
3.7	Persistent Organic Pollutants:		
	3.7.1 PCBs	(µg/L)	..... (Kg/y)
	3.7.2	(µg/L)	..... (Kg/y)
	3.7.3	(µg/L)	..... (Kg/y)
	3.7.4	(µg/L)	..... (Kg/y)
3.8	Oil (petroleum hydrocarbons .....		..... (t/y)

4. Any other remarks:

I-2 Outline of Methodology Used in the Analysis

- The **priority pollution hot spots** identified for each country are graded (on a scale of "1" (no effects) to "6" (extreme effects) according to the relative importance of their impacts on six aspects, viz:-
 - public health
 - drinking water quality
 - recreation
 - other beneficial uses
 - aquatic life (including biodiversity)
 - economy and welfare (including marine resources of economic value)

- The risks associated with them are also evaluated, as a weighted total, using a multiplier applied to the previous gradings. This reflects the importance of the effect on each of the six issues considered. The multipliers are:-
 - 1.0 for public health
 - 0.9 for drinking water quality
 - 0.8 for recreation
 - 0.8 for other beneficial uses
 - 0.7 for aquatic life (including biodiversity)
 - 0.7 for economy and welfare (including marine resources of economic value)

- As a first attempt at identifying the **transboundary effects** of the priority hot spots, the impacts on each of the following considerations are to be listed in a separate column in the tables:-
 - Fisheries (F)
 - Biodiversity (B)
 - Reduction of regional value of Mediterranean tourism (L)
 - Public health (P)
 - Habitats (H)

- Finally, available estimates of the costs of selected remedial actions are to be listed.

- Approaches for identifying the **sensitive areas** in each country are also outlined. Sensitive areas are defined as:
 - Estuaries and coastal waters of natural or socio-economic value that are at higher risk to suffer negative impacts from human activities.

- Natural characteristics may determine the vulnerability of a coastal system, For example a bay with low flushing rate is more sensitive to pollution impacts than one which is well flushed. Human activities determine the level of risk, hence planned development may increase the risk of environmental degradation. Both vulnerability and risk contribute to the "sensitivity" of a particular area or system in the context of this assessment.

Annex II

Summary Country Tables:

A - Priority Hot Spots

B - Priority Sensitive Areas

A - PRIORITY POLLUTION HOT SPOTS

Priority Hot Spots in Albania

NAME	TYPE	PH	D W Q	AL	R	OB V	WE	WT	RI	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Durres	domestic	4	1	3	4	3	1	13.3	100	WWTP + reconstruction of a sewerage system	P, L, H	48 million US\$
Vlore	domestic	4	1	3	4	3	1	13.3	98	WWTP + reconstruction of a sewerage system	P, L, H	48 million US\$
Drini river	domestic industrial	2	1	3	4	2	2	11.2		Study of pollution sources in the river basin	B, F	500,000 US\$
Mati river	domestic	2	1	3	4	2	2	11.2		- ditto -	B, F	500,000 US\$
Semani river	domestic	2	1	3	4	2	2	11.2		- ditto -	B, F	500,000 US\$
Shkumbini river	domestic	2	1	3	4	2	2	11.2		- ditto -	B, F	500,000 US\$
ex PVC factory - Vlova	industrial	4	1	2	1	1	2	9.3	80	sanitation of mercury spoiled soil (See Chapter 6)	P	2 million US\$
ex chemical factory - Durres	industrial	4	1	5	1	1	2	11.4		sanitation of toxic solid waste dumping site (See Chapter 6)	F, B, P	2-3 million US\$

- Data used does not always reflect the current situation
- Lack of reliable information on pollution loads or quality of receiving waters
- No information on sources of costing remedial actions provided

Priority Hot Spots in Algeria

NAME	TYPE	PH	D W Q	AL	R	OB U	WE	WT	RI	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Oran (Ville)	dom. + industrial	5	1	4	6	5	5	21	100	DWWTP (Extension) IWWTP (Construction)	FHBLP	
Rouiba-Peghaia (Ville)	dom. + industrial	5	2	5	5	4	5	21	100	IWWTP (Construction)	FHBLP	
Ghazaouet (Ville)	waste + dom + industrial	5	1	6	5	4	5	20,8	99	DWWTP (Construction) IWWTP (Construction)	FHBLP	
Alger	domestic + industrial	5	1	4	6	4	5	20,2	96,2	DWWTP (Rehabilitation) IWWTP (Construction)	FHBLP	
Mostaganem	domestic + industrial	4	1	6	4	4	5	20	95,2	DWWTP (Construction) IWWTP (Construction)	FPHLB	
Bejaia	domestic + industrial	5	1	5	5	4	4	19,4	92,4	DWWTP (Extension) IWWTP (Construction)	FPHLB	
Annaba	dom + industrial	5	1	4	5	4	4	18,7	89	IWWTP (Construction)	FPHLB	
Skikda	dom + industrial	5	1	5	4	3	4	17,8	85	DWWTP (Construction) IWWTP (Construction)	FHBLP	

- No detailed measurements of industrial pollution loads available. Little cooperation from industry.
- Measurements of quality of receiving waters are beginning to yield results.
- Data used were compiled at different dates
- Basic assumptions of cost estimates of remedial actions for municipal wastewaters are given, but none for industry.

Priority Hot Spots in Croatia

Name	Type	PH	DW Q	AL	R	OBU	WE	WT	RI	Nature of investment	Transbound ary Aspect(s)	Preliminary Estim. Financial requirement
Pula	domestic industr.	4	1	4	4	3	6	17.5	94	sewer + WWTP extension	B, L, P	30,000,000 US \$
Rijeka	domestic industr.	4	1	3	4	1	6	15.2	83	WWTP extension	F, B, L, P	25,000,000 US \$
Oil refin.	industr.	2	1	6	4	3	6	16.9	93	underground sanitation	B, P	8,000,000 US \$
Cokcely	industr.	6	1	4	5	1	1	15.2	87	wastewater treatment	B, P	1,500,000 US \$
Zadar	domestic industr.	5	1	4	4	3	6	18.5	97	sewer+ WWTP construction	F, B, L, P	35,000,000 US \$
Tannery	industr.	6	1	2	2	1	2	12.1	75	WWTP reconstruction	B,	1,500,000 US \$
Adria	industr.	2	1	3	6	5	3	15.9	90	WWTP reconstruction	L	2,000,000 US \$
Sibenik	domestic industr.	5	1	3	4	3	6	18.8	98	sewer exten. + WWTP construction	B, L, P, H	30,000,000 US \$
Split	domestic industr.	6	1	6	3	3	6	21.1	100	sewerage+WWTP const.	F, B, L, P, H	66,000,000 US \$
Kastela b.	domestic industr.	6	1	1	6	4	6	21.7	100	See Split		
Kaltenberg	industr.	2	1	6	3	3	3	16.0	91	WWTP construction	B,	2,000,000 US \$
Dubrovnik	domestic	3	1	2	4	1	6	14.5	80	sewer extension	L, P	6,000,000 US \$
Krka river	domestic industr.	2	1	2	4	1	3	10.4	78	See Krka est.	B,L,P	
Neretva river	domestic industr.	2	1	2	2	1	3	8.8	70	Management plan	F,B,L,P	700,000 US\$

- Some cities of populations less than 50,000 were considered (either for being tourist areas, or on semi-enclosed bays and channels)
- Some coastal areas not researched could become sensitive areas
- No information on sources/ basis of costing remedial actions provided

Priority Hot Spots in Cyprus

NAME	TYPE	Public Health	Drinking Water Quantity	Aquatic life	Recreation	other beneficial uses	Welfare and Economy	WEIGHTED TOTAL	Relative Importance	Nature of Investment	Transboundary Aspects	Preliminary estimated Financial Requirements
ETKO	Winery and distillery	2	1	4	3	3	3	12.6	100	WWT		US \$ 550,000
SODAP	do.	2	1	4	3	3	3	12.6	100	WWT		US \$ 720,000
LOEL	do.	2	1	4	3	3	3	12.6	100	WWT		US \$ 500,000
KIEO	do.	2	1	4	3	3	3	12.6	100	WWT		US \$ 745,000
KIEO B	Brewery	2	1	4	3	3	3	12.6	100	WWT		US \$ 560,000
SEA OUTFALL OF LIMASSOL SEWERAGE TREATMENT PLANT	Domestic	2	1	2	2	2	2	8.9	71	Extension of sea outfall to be 1 km length		US \$ 2,000,000
VASSILIKOS CEMENT FACTORY	Dust	2	1	3	4	2	3	11.9	94	Improve or installation of better filters		US \$ 500,000
CYPRUS PETROLEUM REFINERY	Metal and oil Contamination	2	1	2	2	1	2	8.1	64	Separation of contaminated material and incineration		US \$ 1,000,000
TOTAL												

• Cost estimates for remedial actions based on previous feasibility studies or estimates.

Priority Hot Spots in Egypt

COUNTRY	NAME	TYPE	PH	DWQ	AL	R	OB	WE	WT	RI	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Egypt	El-Manzala	Mixed (Wastewater)	6	4	6	5	6	5	26.1	100	WWTP (Rehabilitation)	FHBLP	
	Abu-Qir Bay	Mixed	6	1	6	6	6	6	24.9	95	WWTP (Construction)	FHBLP	61,600,000+
	El-Mex Bay	Mixed (Wastewater)	6	1	3	5	5	3	19.1	73	WWTP (Construction)	FHBLP	101,200,000+
	Alexandria	Domestic	4	1	4	6	4	3	17.8	68	WWTP (Construction)	FHBLP	In implementation
	Damietta	Mixed (River)	6	6	2	2	1	1	16	61		FHBLP	

• Although sources of cost estimates are provided (see next page), they do not cover all pollution sources

ESTIMATED INVESTMENTS
FOR INDUSTRIAL POLLUTION CONTROL IN ALEXANDRIA

ABO QIR INDUSTRIAL AREA

Establishment	Projects	Investment US\$	Source of Inf.
1. RAKTA company	Paper Water Recycling. Waste Minimization. Black Liquor Recovery. WW treatment	60,000,000	UNEP/ Dutch Gov.
2. National company	Paper WW treat. CP	8,000,000	AQ IEMP/STC
3. Abo Qir fertilizers	Urea and AMM. Nitrate recovery. Water Recycling	14,000,000	AQ IEMP/STC
4. ISMADYES	Acids recovery. Process modifications. WW treatment	7,500,000	AQ IEMP/STC
5. Misr Rayon	Chemical recovery. Water Recycling CP, residue processing	5,300,000	AQ IEMP/STC
6. Food (Canning, Milk)	CP, residue processing	5,300,000	AQ IEMP/STC
	Sub-total	101,200,000	

MEX INDUSTRIAL AREA

7. Alex. National Steel	Monitoring Network. Water recycling, acid recovery. WW treatment	8,000,000	EPAP Audit
8. Misr Chemical company	water recycling, chemical recovery	4,500,000	Company estimates
9. El-Nasr tanneries	Chrome recovery. CP WW treatment	8,000,000	EPAP Audit
10. Alexandria Refinery	Pet. Water recycling. DAF, process modifications	12,000,000	Company estimates
11. Amerya Textiles	Color matching. Water recycling, upgrading existing WW Treatment plant	7,600,000	EPAP Audit
12. Egyptian petrochemicals	Chemical recovery process rehabilitation	9,500,000	EPAP Audit
13. Amerya Refinery	water recycling, process modifications	12,000,000	EPAP Audit
	Sub-total	61,600,000	

AQ IEMP/STC is Danish and US technical reports
EPAP Audit is World Bank Project for pollution abatement

Priority Hot Spots in France

NAME	TYPE	PII	DW Q	AL	R	OB U	WE	WT	RI	NATURE OF INVESTMENT	TRANS- BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENT (Million US\$)
Marseille	Municipal	2	1	3	3	3	3	11.9	100	L, J	Secondary Treatment Plant	110
Toulon	Municipal	2	1	3	2	2	3	10.4	87	L	Secondary Treatment Plant	40
Cannes	Municipal	2	1	3	2	2	3	10.4	87	L	Secondary Treatment Plant	32
Frejus	Municipal	2	1	3	2	2	3	10.4	87	L	Secondary Treatment Plant	18
Gardanne	Industrial	2	1	1	2	3	5	10.9	92	low, B?	Implement Investments required by new permit	n.a.

Costs for remedial actions are for upgrading sewage treatment, to EC Directive 91/271/EEC, and are based on informal communication from Agence de l'eau Rhone - Mediterranee-Corse
Remedial action at Gardanne involves stepwise reduction of discharges according to a permit timetable (p. 9 of the National Report). No economic cost elements were available.

Priority Hot Spots in Greece

Name	Type	Public health	Drinking water quality	Recreation	Other beneficial uses	Aquatic life	Economy/welfare	WEIGHTED TOTAL	Relative importance index	Trans-boundary aspects	Nature of investment	Preliminary total estimated financial requirements (mil \$)
Thermaikos gulf	municipal, industrial	6	1	3	4	4	6	19.5	100	L	expansion of plant & industrial feasibility studies	40.6
Inner Saronic gulf	municipal, industrial	6	1	3	4	4	5	18.8	96	L	secondary treatment	130
Patraikos gulf	municipal, industrial	5	1	4	4	4	4	17.9	92	L	treatment plant & outfall	15
Pagassitikos gulf	municipal, industrial	3	1	4	3	2	4	13.7	70	L	expansion of plant	8
Gulf of Heraklio	municipal, industrial	3	1	3	3	2	4	12.9	66	L	-	-
Elefsis bay	industrial,	3	1	2	1	3	6	12.6	65		industrial feasibility studies	0.6
North Western Saronic gulf	industrial,	3	1	2	1	2	5	11.2	57		industrial feasibility studies	0.3
Larymna bay	industrial	3	1	2	1	3	4	11.2	57		industrial feasibility studies	0.3
Nea Karvall bay	industrial	2	1	2	1	2	4	9.5	49		industrial feasibility studies	0.3

- Scattering of data does not provide a unified basis for data interpretation
- A degree of confidentiality has affected reliability of information on industrial effluents. Contacts with authorities and reviews of EIAs were needed to extract information on industrial effluents
- Basic assumptions used are given
- Costs of remedial action in industry refer to the necessary feasibility studies (\$300,000/ Study)
- Costs for remedial actions for municipal discharges are those provided by authorities for ongoing construction programmes

Assessment of Hot Spots in Israel

Name	Type	PH	DW	AL	R	OBV	WE	WT	RI	Nature of Investment	Transboundary Aspect(s)	Preliminary Estimated Financial Requirement (in US\$)
Haifa Bay	Mixed (River)	6	1	6	6	6	6	24.9	100	WWTPs	F,B,L,P,H	80,000,000
Akko	Domestic	4	1	5	6	6	5	21.4	85.9	WWTP upgrade	F,B,L,P,H	10,000,000
Nahariya	Domestic	4	1	5	6	6	5	21.4	85.9	WWTP upgrade	F,B,L,P,H	18,000,000
Gush Dan	Mixed (Sludge)	3	1	6	3	5	6	18.8	75.5	Option trials	F,B,L,P,H	700,000
Ashdod	Industrial	3	1	3	4	3	6	15.8	63.5	WWTP upgrade	F,B,L,P,H	20,000,000
Haifa Bay	Industrial	3	1	4	4	2	3	13.8	55.4	WWTP upgrade	F,B,L,P,H	650,000

- No information on quality of receiving waters
- Pollution loads estimated using total discharges and specific values of pollutants
- All cost estimates are preliminary and indicative; but considered reasonably accurate

Priority Hot Spots in Italy

NAME	TYPE	PH	DWQ	AL	R	OB U	WE	WT	RH	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Genova	mixed	3	1	6	3	5	4	16.7	2	VTS-HAC/Delocalization/WWTP (Monitoring)	F-H-L	d = 10 million US\$ i = 80 million US\$
La Spezia	mixed	3	1	6	3	4	3	16.0	5	VTS-HAC/Delocalization/WWTP (Energy/Power Station)	L-H-F	65 million US\$
Livorno	ind.	3	1	6	2	3	4	15.2	13	VTS-HAC/Delocalization/WWTP (Monitoring)	F-H-L-B	n.a
Rosignano Solvay	Cl-NaOH, ethylen	4	1	6	3	3	2	15.6	11	BAT Chlorine/ Remedial on landfill	P-B-H-L	40 million US\$
Golfo de Napoli	Port, refinery, domestic	3	1	4	4	3	5	15.9	7	VTS-HAC/WWTP	L-H-P	60 million US\$
Milazzo	Port, refinery, domestic	3	1	6	3	3	4	16.0	5	VTS-HAC/Delocalization/WWTP	P-F-H-L	45 million US\$
Gela	Port, refinery, domestic	4	1	6	4	3	2	16.4	10	VTS-HAC/Delocalization/WWTP	P-F-H-L	35 million US\$
Augusta-Melilli	Port, refinery, domestic	5	1	6	3	3	2	16.6	3	VTS-HAC/Delocalization/BAT Chlorine/WWTP	P-F-H-L	70 million US\$
Taranto	Port, refinery, domestic	5	1	6	2			15.8	8	VTS-HAC/WWTP		n.a
Brindisi	Port, refinery, domestic	5	1	6	2	4	2	16.5	4	VTS-HAC/Delocalization inol/BAT Chlorine/WWTP	P-F-H-L	40 million US\$
Bari-Bartetta	Domestic	6	3	3	2	2	2	15.5	12	WWTP	P-H-B	100 million US\$

HOT SPOTS IN ITALY (Continued)

NAME	TYPE	PH	DWQ	AL	R	OB U	WE	WT	RII	NATURE OF INVESTMENT	TRANS- BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Manfredonia	Port, refinery, domestic	4	1	5	2	2	2	13.3	14	VTS-IIAC/WWTP	H-B	25 million US\$
Ancona- Falcone	Port, refinery	3	1	4	4	2	2	13.1	15	Monitoring	L-H	60 million US\$
Ravenna	Port, refinery	3	1	6	2	4	4	15.9	8	Monitoring/ Delocalization	L-H-F	n.a
Porto Marghera (VI)	Port, ind. & dom	6	1	6	4	5	5	21.9	1	VTS-IIAC/Monitoring/BAT CVM/BAT Chlorine	P-L-H-F-B	120 million US\$

- Lack of data for some regions
- Many relevant authorities unwilling to provide information
- Parameters in the questionnaires are not measured systematically
- Conversion factors proposed by the National Council for Scientific Research (CNR, 1986) were used where no effluent data were not available from enterprises
- Typical costs of generic remedial actions provided, citing sources; but no estimates for each hot spot provided

Priority Hot Spots in Lebanon

Name	Type	Public health)	drinking water quality	recreation	other beneficial uses	aquatic life	economy/welfare	WEIGHTED TOTAL	relative importance Index	trans-boundary aspects	nature of investment	preliminary total estimated financial requirements (mil \$)
Greater Beirut area	municipal , industrial	6	1	5	6	4	3	20.6	100	L	WWTP- construction: primary (planned) & secondary (assumed)	140
Jounieh	municipal , industrial	4	1	5	5	5	5	19.9	97	L	WWTP- construction: primary (planned) & secondary (assumed)	62.6
Saida-Ghaziye	municipal , industrial	5	1	4	4	5	5	19.3	94	L	WWTP- construction: primary (planned) & secondary (assumed)	44
Tripoli	municipal	5	1	5	6	4	2	18.9	92	L, F	WWTP- construction: primary (planned) & secondary (assumed)	126.5
Batroun-Selaata	municipal , industrial	4	1	3	4	4	5	16.8	82	L	feasibility study (on-going) & secondary treatment (assumed)	5.9

- Lack of reliable systematic data for the last five years
- No actual measurements of effluents carried out as yet. Estimates of pollution loads from major industries are based on 1991 study by Bechtel
- Basic assumptions for estimating municipal discharges given
- MITAP report figures used where none are available for industries discharging in the sewage network

Priority Hot Spots in Libya

NAME	TYPE	PH	D W Q	AL	R	OB U	WE	WT	RI	NATURE OF INVESTMENT	TRANS- BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
ZAWIA	dom.	2	1	3	5	2	2	12	95	(WWTP Maintenance)		\$ 2,000,000
TRIPOLI	dom.	3	1	4	6	3	2	15.3	96	(Extension)		\$ 12,000,000
ZANZUR	industrial	4	1	4	6	3	3	17	90	(Maintenance)		\$ 100,000
BENGHIAZI	domestic	3	1	3	5	3	2	13.8	95	(Extension)		\$ 1,000,000
TOBRUK	domestic	2	1	3	5	2	2	17	93	(WWTP Maintenance)		\$ 1,500,000

- Low reliability of data provided by treatment plants
- Main obstacle is not funding; but lack of skilled personnel

Priority Hot Spots in Malta

LOCALITY	TYPE OF POLLUTION	EFFECTS										NATURE OF INVESTMENT	TRANSBOUNDARY EFFECTS	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENT (US \$)
		PH	DWQ	AL	R	OBV	WE	WT	RI					
WIED GHAMMIEQ	MIXED	6	1	6	4	4	6	21.9	100.0	WWTP (EXT) WWTP (NEW)	F,I,B,L,P	4,000,000 32,000,000		
CUMNIJA	MIXED	6	1	4	3	3	5	18.1	82.6	WWTP	F,I,B,L,P	8,000,000		
RAS IL-HOBZ	MIXED	5	1	5	3	3	5	17.9	81.7	WWTP	F,I,B,L,P	4,000,000		

- Lack of information on concentrations of certain POPs, and quality of receiving waters
- Cost estimates are based on projections of original estimates, and indicative of levels of investment

Priority Hot Spots in Morocco

NAME	TYPE	PH	DWQ	AL	R	OBU	WE	WT	RI	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Tanger	dom. + industrial	5	3	3	3	5	6	21	100	DWWTP IWWTP	FHBLP	\$ 28,000.000 NA
Tetouan	dom. + industrial	5	3	3	3	4	6	19	90.5	DWWTP IWWTP	FHBLP	\$ 19,630.000 NA
Nador	dom + industrial	3	3	2	3	4	3	15	71.4	DWWTP IWWTP	FHBLP	\$ 100.000 NA
Al-Hoseima	domestic + industrial	3	2	3	2	3	3	13	61.9	DWWTP IWWTP	FHBLP	\$ 6,016.000 NA

- No detailed measurements of industrial pollution loads available.
- Little cooperation from industry.
- Measurements of quality of receiving waters are beginning to yield results.
- Data used were compiled at different dates
- Basic assumptions of cost estimates of remedial actions for municipal wastewaters are given; but none for industry.

Priority Hot Spots in Slovenia

NAME	TYPE	PHI	DW Q	AL	R	OBU	WE	WT	RH	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Rizana river	dom. + ind.	3	1	5	5	4	5	18.2	100	WWTP extension + sewerage systems for Koper City	B, F, L, H	13 million US\$ + 3 million US\$
Izola	dom. + ind.	3	1	3	5	3	4	15.3	95	WWTP construction + sewerage system reconstruction	B, P, H	10 million US\$ + 2 million US\$
Piran submarine outfall	domestic	2	1	3	4	2	1	10.7	90	WWTP extension + sewerage system reconstruction	B, F, H	6 million US\$ + 2.5 million US\$
Delamaris	industrial	2	1	4	5	3	3	14.2	93	WWTP extension	L, F, H	2.0 million US\$ + 0.5 million US\$
Badasevica river	dom. + ind.	2	1	2	3	2	3	10.4	88	See Rizana river	B, L, P	See Rizana river
Dragonja river	dom. + agricul.	2	1	2	2	2	2	8.9	75	management plant of the river basin	B, L, P	1.5 million US\$
Drnica river	dom. + agricul.	2	1	2	2	2	2	8.9	76	do.	B, L, P	1.2 million US\$

- Quantities and compositions of wastewater discharged by various industries are unknown
- Estimates of costs of remedial actions for industrial wastewaters are difficult. The estimate for a national management plan is given. However, estimates for municipal wastewaters are given.

Priority Hot Spots in Syria

Name	Type	Public health	Drinking water quality	Recreation	Other beneficial uses	Aquatic life	Economy / welfare	WEIGHTED TOTAL	Relative importance index	Trans-boundary aspects	Nature of investment	Preliminary total estimated financial requirements (mil \$)
Tartous	municipal, industrial	5	4	5	5	5	5	23.6	100	L, F, B	WWTP- construction: secondary (planned)	41
Lattakia	municipal, industrial	6	4	5	5	4	3	22.5	95	L	WWTP- construction: secondary (planned)	73
Banias	municipal, industrial	3	4	4	4	4	6	20	85	L	WWTP- construction: secondary (suggested)	35.6
Jableh	municipal, industrial	4	4	3	4	3	5	18.8	80	L	WWTP- construction: secondary (planned)	41.7
											capacity building & industrial waste management plan	1.5

- Data collected in February, 1997
- Some estimates are based on per capita parameters
- WHO Reference Guide used to calculate industrial pollution

Priority Hot Spots in Tunisia

NAME	TYPE	PH	D W Q	AL	R	OB U	WE	WT	RI	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENT'S
Gabes	Municipal	4	2	3	5	3	5	17.8		- WWTP (Extension)	FBHPL	30,000.000
	Industrial	6	2	6	5	3	5	(22.2)		- IWWTP (Construction) - Disposal area of Phosphogypsum	FBHPL	2,500.00 100,000.000
Lake of Tunis	Municipal	4	1	3	4	2	3	14.0		WWTP (Extension)	PBH	5,000.000
	Industrial	5	2	6	5	3	6	(21.2)		WWTP (Construction)	FPHB	50,000.000
Lake of Bizerte	Municipal	5	2	4	4	3	5	17.8		WWTP (Construction)	FPBH	39,000.000
	Industrial	5	2	5	4	3	5	(18.5)		WWTP (Construction)	FPIL	38,000.000
Sfax-South	Municipal	4	1	3	3	2	3	13.8		WWTP (Extension & Rehabilitation)	FPBH	30,000.000
	Industrial	6	1	5	2	3	5	(18.1)		WWTP (Construction)	FPILB	NA
										Treatment of exhaust gas		Need preliminary studies

• Cost estimates for remedial actions are based on previous studies

Priority Hot Spots in Turkey

COUNTRY	CITY	TYPE OF POLLUTION	EFFECTS										NATURE OF INVESTMENT	TRANSBOUNDARY EFFECTS	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENT (US\$)		
			P	D	A	R	O	W	WT	RI							
			II	W	L	U	B	E	Q	Q	Q	Q	Q	Q	Q	Q	Q
	IZMIR	DOMESTIC	6	2	6	6	6	6	6	6	6	25.8	100.0	WWTP	F,H,B,L,P	78,500,000	
	IZMIR	INDUSTRIAL	6	2	6	6	6	6	6	6	6	25.8	100.0	WWTPs	F,H,B,L,P	NOT AVAILABLE	
	ICEL (City)	DOMESTIC	6	3	6	6	6	6	6	4	5	24.6	95.3	WWTP + sew ext	F,H,B,L,P	97,000,000	
	ICEL	INDUSTRIAL	5	4	6	6	6	6	6	4	5	24.5	95.0	WWTPs	F,H,B,L,P	NOT AVAILABLE	
	ANTALYA	DOMESTIC	5	5	6	4	3	6	23.8	92.2	WWTP + sewerage	F,H,B,L,P	136,000,000				
	HATAY	INDUSTRIAL	6	2	6	5	4	6	23.6	91.5	WWTPs	F,H,B,L,P	NOT AVAILABLE				
	ADANA	DOMESTIC	6	4	4	5	4	5	23.1	89.5	WWTP + sew ext	F,H,B,L,P	99,800,000				
	TARSUS	DOMESTIC	5	4	5	3	4	5	21.3	82.6	WWTP + sew ext	F,H,B,L,P	76,400,000				
	ADANA	INDUSTRIAL	4	5	4	4	4	4	21.2	82.2	WWTPs	F,H,B,L,P	NOT AVAILABLE				
	ANTAKYA	DOMESTIC	5	4	5	4	3	4	20.7	80.2	WWTP + sew ext	F,H,B,L,P	79,700,000				
	ISKENDERUN	DOMESTIC	5	2	5	5	3	4	19.7	76.4	WWTP	F,H,B,L,P	13,400,000				
	KIRIKHAN	DOMESTIC	3	5	4	3	2	4	17.3	67.1	WWTP + sewerage	F,H,B,L,P	35,900,000				
	DORTYOL	DOMESTIC	3	4	4	3	3	4	17.1	66.3	WWTP + sewerage	F,H,B,L,P	41,700,000				
	ERDEMLI	DOMESTIC	3	4	4	3	3	4	17.1	66.3	WWTP + sewerage	F,H,B,L,P	52,200,000				
	SILIFKE	DOMESTIC	3	4	4	3	3	3	16.4	63.6	WWTP + sew ext	F,H,B,L,P	40,500,000				
	OSMANIYE	DOMESTIC	3	4	3	3	2	4	15.6	60.5	WWTP + sew ext	F,H,B,L,P	22,700,000				

- Per capita parameters used in estimating loads of different pollutants
- Cost of remedial actions for municipal wastewaters are based on current cost figures and population served
- No cost estimates for industry could be made
- No information on quality of receiving waters

B - PRIORITY SENSITIVE AREAS

Priority Sensitive Areas in Albania

NAME	TYPE										NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATED FINANCIAL REQUIREMENTS
Kuna - Vain lagoons	domestic industrial	2	1	4	1	1	1	2	7.7		WWTP + construction of a sewerage system with establishment of proper management	B, F	25 million US\$ 1 million US\$
Karavasta lagoon	domestic	2	1	3	1	1	1	2	8.0		establishment of proper management with appropriate monitoring program	B, F	1-2 million US\$
Narta lagoon	agriculture water extraction	2	1	2	1	1	1	2	7.3		dredging of outlet channel + establishment of proper management with appropriate monitoring program	B, F	3-5 million US\$

Priority Sensitive Areas in Croatia

Name	Type	PH	DW Q	AL	R	OBU	W E	WT	RI	Nature of investment	Transboundary Aspect(s)	Preliminary Estim. Financial requirement
Malostonski	domestic industr.	2	1	2	2	2	2	8.9		Management plan and monitoring programme	L,P	1,200,000 US\$
Ljinski ch.	industr.	2	1	2	2	2	2	8.9		Management plan and monitoring programme	L,P	700,000 US\$
Kornati	pleasure boats tourism	1	1	2	2	1	1	6.4		Management plan and monitoring programme	L	900,000 US\$
Mijet	pleasure boats domestic	2	1	2	2	1	1	7.4		Management plan and monitoring programme	L	200,000 US\$
Krka est.	domestic industr.	4	1	2	2	2	4	12.3		Management plan and monitoring programme	P,L	1,500,000 US\$

Priority Sensitive Areas in Cyprus

SENSITIVE AREA	Main sources of pollution	Principal supporting data
VASSILIKOS BAY	<p>Cement factory - dust Vassiliko port; Dust (Cement) during loading operation. Operation of C.C.F industries 1987 - 1990. This chemical complex stopped operating since 1990. During its operations large amount of metal like Cu, Zn, Fe, Cd have been entered the bay. The construction of a new power station of 360 MW capacity</p>	<p>The effects of pollution to marine communities were severe up to 50 metres depth. Ecological study on Marine communities and ecosystems in relation to the Pollution effect from the CCF industries by M. Hadjichristophorou, Fisheries Officer, 1991. The sea bottom of the east area of the bay to a great extent has been contaminated with metals Fe, Cu, Zn as a result of the coastal activities of the CCF industries and cement factory. Contamination of Vassilikos bay with metals, S. Varnavas University of Patras, 2nd Symposium of Environmental Science and Technology - Mytiline Sept. 1991</p>

Sensitive Areas in Egypt

Name	
Lake Bardawil	<p>Lake of Bardawil on the coast of Sinai is a source of high value aquatic resources that has one outlet to the Mediterranean. It has been reasonably well protected so far. It is close to a natural reserve frequented by birds on their annual migrations from North to South and back.</p> <p>Ongoing and planned development projects in North Sinai could easily become a serious cause for irretrievable degradation of this valuable resource.</p>

Priority Sensitive Areas in France

French Litoral Zone Numbers	Designation and Class under SDAGE Study Typology	Main Resources at Risk	Main Risks and Risky Factors
2	COLLIOURE-CAP LEUCATE	Fisheries spawning and growing areas High fishing resources Natural shellfish sites Posidonia Protected area at the mouth of Tech river	Eutrophication (from small rivers of mediocre quality) Toxic phytoplankton Marinas: 5 775 boat sites
7 to 10	CAP LEUCATE - L'ESPIQUETTE	Fisheries spawning and growing areas High fishing resources Natural and aquatic shellfish sites, some very large Zostera Tourism, beaches	Accidental pollution, pollution from rivers. Some pesticides and tributyltin Contamination from treated urban effluent Envisaged modification (from small river to sea outfall) of discharge point for Montpellier treated sewage
16	RHONE MOUTH - FOS GULF	Fisheries spawning and growing areas, exchange of juveniles with Etang de Berre Posidonia, Zostera RAMSAR Zone	Eutrophication Rhone-carried pollution loads Bacterial contamination of shellfish Accidental marine pollution (navigation, harbour activity) Marinas 550 boat sites

1 No prioritisation was attempted amongst the identified sensitive areas. The sensitive areas selected here are those categorised as in the highest risk class amongst the 50 homogenous zones in which the French Coast is divided.

Priority Sensitive Areas in Greece

Name	Type	Public health	Drinking water quality	Recreation	Other beneficial uses	Aquatic life	Economy/welfare	WEIGHTED TOTAL	Relative importance index	Trans-boundary aspects	Nature of investment	Preliminary total estimated financial requirements (mil \$)
Amvrakikos gulf	municipal, agricultural	2	1	2	2	2	2	8.9	46	L	treatment plant & outfall	11
Lagoon of Mesologgi	municipal	1	1	1	1	2	2	6.3	32		capacity building/monitoring	1

Priority Sensitive Areas in Italy

NAME:	TYPE	PH	DWQ	AL	R	OBU	WE	WT	RII	NATURE OF INVESTMENT	TRANS-BOUND. ASPECT(S)	PRELIMINARY ESTIMATE: FINANCIAL REQUIREMENT
Vado Ligure-Savona	Power plant, industry, domestic	2	1	5	4	3	4	15.0	5	WWTP reconstruction/ VTS IIAC/Monitoring	B,F,H	
Secche della Meloria	Power plant, industry, domestic	2	1	6	3	2	3	13.6	7	SPA integral conservation	B-F-II	
Isola d'Elba	Power plant, industry, domestic	2	1	5	6	5	6	19.4	2	Monitoring/ WWTP/ Treatment for emission from steel industry	B-F-L-II	
Pesaro - Cervia	Domestic Seasonal	4	1	2	5	3	6	16.8	4	WWTP in summer/ Po sediment prevention	L-II-F	
Mouth Po	Power plant, industry, domestic	3	1	6	4	3	4	16.8	4	Delocalization pig farming/ WWTP upstream/ Monitoring	P-H-B-L	
Venezia and its lagoon	Power plant, industry, domestic	5	1	6	4	5	4	21.2	1	Delocalization CFM/WWTP	P-II-B-L	
Panzano Bay	Mercury and Cl-NaOH, oil	4	1	5	3	6	5	19.0	3	BAT for chlorine atcaii industry/ WWTP		

Priority Sensitive Areas in Lebanon

Name	Type	Public health	drinking water quality	recreation	other beneficial uses	aquatic life	economy/welfare	WEIGHTED TOTAL	relative importance index	trans-boundary aspects	nature of investment	preliminary total estimated financial requirements (mil \$)
Sour	municipal,	4	1	4	2	3	2	13.2	64	L	WWTP-construction : secondary (planned)	19
Jbail (Byblos)	municipal, industrial	2	1	4	3	2	3	12	58	L	feasibility study (on-going) & secondary treatment (assumed)	7.5
											capacity building & ind.waste masterplan	3

Priority Sensitive Areas in Slovenia

NAME	TYPE	PH	D W Q	AL	R	OB U	WE	WT	RII	NATURE OF INVESTMENT	TRANS- BOUND. ASPECT(S)	PRELIMINARY ESTIMATE FINANCIAL REQUIREMENTS
Koper Bay	dom. + ind.	3	1	5	5	4	5	18.2		See Rizana river	P,B,F,L,H	See Rizana river
Piran Bay	domestic	2	1	3	4	2	1	10.7		See Piran	B,F,H	See Piran

Sensitive Areas in Syria

Rank	Sensitive area	Protective measures
1	Umit Tiur	management plan for touristic activities, removal of illegal buildings
2	Arwad island	rehabilitation plan, prohibition - control of illegal fishing, preservation of submarine life
3	Wadi Qandeel	characterization as specially protected area, suitable for passive recreation only (bathing, sightseeing boat tours)
4	Lattakia beach (southeast)	protection from urban development, prohibition of excavations, designation as public beach
5	Rasl Fassouri	management plan for touristic activities, restoration of surrounding environment

Annex III

Annex III
Summary Tables

Table III-1:

List of hot spots in descending order of their weighted total impact.

Table III-2:

Population and main pollution loads (BOD, COD, N_T, P_T, TSS) for each hot spot

Table III-3:

TPB Discharges (Hg, Cd, Pb, Cr, Cu, Zn, Ni, POPs, others) for hot spots

Table III-4:

Priority Sensitive Areas

Table III-1 Priority Hot Spots

(ranked in descending order of their weighted total impacts)

No.	Country	Hot Spot	Source of Pollution	Weighted Total Impact	Economic Costs for Remedial Actions (Mln US\$)
1	<i>Egypt</i>	El-Manzala	m	26.1	na
2	<i>Turkey</i>	Izmir	m	25.8	78.5+
3	<i>Egypt</i>	Abu-Qir Bay	m	24.9	101.2+
4	<i>Israel</i>	Haifa Bay	m	24.9	80
5	<i>Turkey</i>	Icel City	m	24.6	97
6	<i>Turkey</i>	Antalya	d	23.8	136
7	<i>Syria</i>	Tartous	m	23.6	41
8	<i>Turkey</i>	Hatay	i	23.6	na
9	<i>Turkey</i>	Adana	d	23.1	99.8
10	<i>Syria</i>	Lattakia	m	22.5	73
11	<i>Tunisia</i>	Gabes	m	22.2	132.5
12	<i>Italy</i>	Porto Marghera (VE)	m	21.9	120
13	<i>Malta</i>	Weid Ghammieg	m	21.9	36
14	<i>Croatia</i>	Kastela Bay	m	21.7	<i>See Split</i>
15	<i>Israel</i>	Nahariya	d	21.4	18
16	<i>Israel</i>	Akko	m	21.4	10
17	<i>Turkey</i>	Tarsus	d	21.3	76.4
18	<i>Tunisia</i>	Lake of Tunis	i	21.2	55
19	<i>Turkey</i>	Adana	i	21.2	na
20	<i>Croatia</i>	Split	m	21.1	66
21	<i>Algeria</i>	Oran Ville	m	21.0	na
22	<i>Algeria</i>	Rouiba	m	21.0	na
23	<i>Morocco</i>	Tangier	m	21.0	28
24	<i>Algeria</i>	Ghazaouet	m	20.8	na
25	<i>Turkey</i>	Antakya	d	20.7	97.7
26	<i>Lebanon</i>	Gt Beirut Area	m	20.6	140
27	<i>Algeria</i>	Alger	m	20.2	na
28	<i>Algeria</i>	Mostaganem	m	20.0	na
29	<i>Syria</i>	Banias	m	20.0	35.6
30	<i>Lebanon</i>	Jounieh	m	19.9	62.6
31	<i>Turkey</i>	Iskenderun	d	19.7	13.4
32	<i>Greece</i>	Thermaikos Gulf	m	19.5	40.6
33	<i>Algeria</i>	Bejaia	m	19.4	na
34	<i>Lebanon</i>	Saida-Ghaziye	m	19.3	44
35	<i>Egypt</i>	El-Mex Bay	m	19.1	61.6
36	<i>Morocco</i>	Tetouan	m	19.0	19.6
37	<i>Lebanon</i>	Tripoli	m	18.9	126.5
38	<i>Syria</i>	Jableh	m	18.8	41.7
39	<i>Greece</i>	Inner Saronic Gulf	m	18.8	130
40	<i>Israel</i>	Gush Dan	m	18.8	0.7
41	<i>Croatia</i>	Sibenik	m	18.8	30

d= domestic i= industrial m=mixed na=not available

Table III-1 Priority Hot Spots

(ranked in descending order of their weighted total impacts)

42	<i>Algeria</i>	Annaba	m	18.7	na
43	<i>Tunisia</i>	Lake of Bizerte	i	18.5	77
44	<i>Croatia</i>	Zadar	m	18.5	35
45	<i>Slovenia</i>	Koper (including Rizana river)	m	18.2	16
46	<i>Tunisia</i>	Sfax-South	i	18.1	30+
47	<i>Malta</i>	Cumnija	m	18.1	8
48	<i>Greece</i>	Patraikos Gulf	m	17.9	15
49	<i>Malta</i>	Ras il-Hobz	m	17.9	4
50	<i>Algeria</i>	Skikda	m	17.8	na
51	<i>Egypt</i>	Alexandria	d	17.8	in implementation
52	<i>Croatia</i>	Pula	m	17.5	30
53	<i>Turkey</i>	Kirikhan	d	17.3	35.9
54	<i>Turkey</i>	Dortyol	d	17.1	41.7
55	<i>Turkey</i>	Erdemli	d	17.1	52.2
56	<i>Libya</i>	Zanzur	i	17.0	0.1
57	<i>Croatia</i>	Rijeka (Oil Refinery)	i	16.9	8
58	<i>Lebanon</i>	Batroun Selaata	m	16.8	5.9
59	<i>Italy</i>	Genova	m	16.7	d = 10 i = 80 500 (environmental damage caused by Haven oil spill)
60	<i>Italy</i>	Augusta-Melilli	m	16.6	70
61	<i>Italy</i>	Brindisi	m	16.5	40
62	<i>Italy</i>	Gela	m	16.4	35
63	<i>Turkey</i>	Silifke	d	16.4	40.5
64	<i>Croatia</i>	Kastela Bay (Kaltenberg)	i	16.0	2
65	<i>Italy</i>	La Spezia	m	16.0	65
66	<i>Italy</i>	Milazzo	m	16.0	45
67	<i>Croatia</i>	Zadar (Adria)	i	15.9	2
68	<i>Italy</i>	Golfo di Napoli	m	15.9	60
69	<i>Italy</i>	Ravenna	i	15.9	na
70	<i>Israel</i>	Ashdod	i	15.8	20
71	<i>Italy</i>	Taranto	m	15.8	na
72	<i>Turkey</i>	Osmaniye	d	15.6	22.7
73	<i>Italy</i>	Rosignano Solvay	i	15.6	40
74	<i>Italy</i>	Bari-Barletta	d	15.5	100
75	<i>Libya</i>	Tripoli	d	15.3	12
76	<i>Slovenia</i>	Izola	m	15.3	12
77	<i>Croatia</i>	Rijeka	d	15.2	25
78	<i>Croatia</i>	Bakar (ex Cokery)	i	15.2	1.5
79	<i>Italy</i>	Livorno	i	15.2	na
80	<i>Morocco</i>	Nador	m	15.0	na
81	<i>Croatia</i>	Dubrovnik	d	14.5	6
82	<i>Slovenia</i>	Delamaris	i	14.2	2.5

d= domestic i= industrial m=mixed na=not available

Table III-1 Priority Hot Spots

(ranked in descending order of their weighted total impacts)

83	<i>Libya</i>	Benghazi	d	13.8	1
84	<i>Israel</i>	Haifa Bay	i	13.8	0.45
85	<i>Greece</i>	Pagasetikos Gulf	m	13.7	8
86	<i>Albania</i>	Durres	d	13.3	48
87	<i>Albania</i>	Vlore	d	13.3	48
88	<i>Italy</i>	Manfredonia	m	13.3	25
89	<i>Italy</i>	Ancona-Falc	i	13.1	60
90	<i>Cyprus</i>	Limassol	m	13.0	32.75
91	<i>Morocco</i>	Al-Hociema	m	13.0	na
92	<i>Greece</i>	Heraklio Gulf	m	12.9	na
93	<i>Greece</i>	Elefsis Bay	i	12.6	0.6
94	<i>Croatia</i>	Zadar (Tannery)	i	12.1	1.5
95	<i>Libya</i>	Zawwia	d	12.0	2
96	<i>Libya</i>	Tobruk	d	12.0	1.5
97	<i>Cyprus</i>	Larnaca	m	11.9	0.5
98	<i>France</i>	Marseille	d	11.9	110
99	<i>Albania</i>	Durres (Chemical factory)	i	11.4	2 to 3
100	<i>Greece</i>	NW Saronic Gulf	i	11.2	0.3
101	<i>Greece</i>	Larymna Bay	i	11.2	0.3
102	<i>France</i>	Gardanne	i	10.9	na
103	<i>Slovenia</i>	Piran Submarine Outfall	d	10.7	8.5
104	<i>France</i>	Toulon	d	10.4	40
105	<i>France</i>	Cannes	d	10.4	32
106	<i>France</i>	Frejus	d	10.4	18
107	<i>Greece</i>	Nea Karvali Bay	i	9.5	0.3
108	<i>Albania</i>	Vlore (PVC Factory)	i	9.3	2
109	<i>Cyprus</i>	Larnaca	i	8.1	1

d= domestic i= industrial m=mixed na=not available

Table III-2 Main Pollution Loads

No.	Country	Hot Spot	Population	BOD t/vr	COD t/vr	Total-N t/vr	Total-P t/vr	TSS t/vr
1	<i>Egypt</i>	El-Manzala	-	-	-	-	-	-
2	<i>Turkey</i>	Izmir	2,017,711	44,188	73,647	11,047	4,419	66,285
3	<i>Egypt</i>	Abu-Qir Bay	-	91,701	575,490	4,966	8,248	120,035
4	<i>Israel</i>	Haifa Bay	-	28,940	183,770	11,055	1,272	6,800
5	<i>Turkey</i>	Icel City	694,867	15,218	25,363	3,804	1,522	22,830
6	<i>Turkey</i>	Antalya	505,862	11,078	18,463	2,769	1,108	16,620
7	<i>Syria</i>	Tartous	319,152	18.5+	-	73.5+	34.3+	-
8	<i>Turkey</i>	Hatay	-	-	-	-	-	-
9	<i>Turkey</i>	Adana	1,066,005	23,346	38,910	5,837	2,335	35,025
10	<i>Syria</i>	Lattakia	746,851	530	-	-	-	168
11	<i>Tunisia</i>	Gabes	150,000	1,732	-	320	724	4,860
12	<i>Italy</i>	Porto Marghera (VE)	309,422	9,988	39,953	3,746	2,497	19,977
13	<i>Malta</i>	Weid Ghammieg	270,085	117,968	153,556	135,415	12,447	124,538
14	<i>Croatia</i>	Kastela Bay	See Split (20)	5,006	11,095	594	129	8,481
15	<i>Israel</i>	Naharaiya	37,500	2,900	6,200	122	86	2,250
16	<i>Israel</i>	Akko	46,000	2,000	4,400	330	53	2,200
17	<i>Turkey</i>	Tarsus	333,302	7,299	12,165	1,825	730	10,950
18	<i>Tunisia</i>	Lake of Tunis	400,000	2,243	4,384	300	26	1,210
19	<i>Turkey</i>	Adana	-	-	-	-	-	-
20	<i>Croatia</i>	Split	350,000+	1,643	3,286	411	115	1,232
21	<i>Algeria</i>	Oran Ville	na	-	-	-	-	-
22	<i>Algeria</i>	Rouiba	na	-	-	-	-	-
23	<i>Morocco</i>	Tangier	526,215	2,496	5,187	-	-	1,057
24	<i>Algeria</i>	Ghazaouet	na	-	-	-	-	-
25	<i>Turkey</i>	Antakya	317,725	6,958	11,597	1,740	696	10,440
26	<i>Lebanon</i>	Gt Beirut Area	-	29,235	-	-	-	14
27	<i>Algeria</i>	Alger	na	-	-	-	-	-
28	<i>Algeria</i>	Mostaganem	na	-	-	-	-	-
29	<i>Syria</i>	Banias	142,564	163	316	-	-	-
30	<i>Lebanon</i>	Jounieh	200,000	4,280	-	-	-	80
31	<i>Turkey</i>	Iskenderun	276,163	10,047	222,080	115,512	76,005	9,075+
32	<i>Greece</i>	Thermaikos Gulf	-	297	1,043	-	15	142
33	<i>Algeria</i>	Bejaia	na	-	-	-	-	-
34	<i>Lebanon</i>	Saida-Ghaziye	205,000	5,134	-	-	-	293
35	<i>Egypt</i>	El-Mex Bay	-	219,498	175,654	2,081	2,628	286,645
36	<i>Morocco</i>	Tetouan	367,349	6,861	15,304	723	114	7,143
37	<i>Lebanon</i>	Tripoli	353,000	7,446	-	-	-	-
38	<i>Syria</i>	Jableh	166,779	542	-	-	-	225
39	<i>Greece</i>	Inner Saronic Gulf	3,345,000	59,386	118,735	-	-	42,815
40	<i>Israel</i>	Gush Dan	1,100,000	-	-	2,900	1,200	44,000
41	<i>Croatia</i>	Sibenik	60,000+	201	410	89	20	240
42	<i>Algeria</i>	Annaba	na	-	-	-	-	-
43	<i>Tunisia</i>	Lake of Bizerte	250,000	2,687	-	476	118	2,329
44	<i>Croatia</i>	Zadar	85,000+	1,056	3,940	154	26	1,410
45	<i>Slovenia</i>	Koper (incl. Rizana River)	46,221	485	5,111	76	8	250
46	<i>Tunisia</i>	Sfax-South	395,277	843	1,900	100	40	345
47	<i>Malta</i>	Cumnija	59,224	17,361	31,515	1,914	1,495	14,240
48	<i>Greece</i>	Patraikos Gulf	155,180	127	473	110	29	110
49	<i>Malta</i>	Ras il-Hobz	25,957	15,136	26,916	1,777	2,233	28,165
50	<i>Algeria</i>	Skikda	na	-	-	-	-	-

Blank cells mean no information available. + signs after figures mean more pollution loads, not quantified.
na means not available.

Table III-2 Main Pollution Loads

51	<i>Egypt</i>	Alexandria	4,000,000	1,632	-	1,520	2,266	8,831
52	<i>Croatia</i>	Pula	63,979+	329	513	-	4	259
53	<i>Turkey</i>	Kirikhan	120,472	2,638	4,397	660	264	3,960
54	<i>Turkey</i>	Dortyol	116,380	2,549	4,248	637	225	3,825
55	<i>Turkey</i>	Erdemli	108,927	2,386	3,977	597	239	3,585
56	<i>Libya</i>	Zanzur	-	-	-	-	-	-
57	<i>Croatia</i>	Rijeka (Oil Refinery)	-	32	121	-	-	25
58	<i>Lebanon</i>	Batroun Selaata	51,000	1,077+	-	-	-	-
59	<i>Italy</i>	Genova	678,771	15,796	63,184	5,923	3,949	31,592
60	<i>Italy</i>	Augusta-Melilli-Priolo	57,311	1,808	7,232	678	452	3,616
61	<i>Italy</i>	Brindisi	95,383	2,077	8,308	779	519	4,154
62	<i>Italy</i>	Gela	72,535	2,144	8,578	804	536	4,289
63	<i>Turkey</i>	Silifke	128,509	9,084	100,290	57,604	38,481	4,215
64	<i>Croatia</i>	Kastela Bay (Kaltenberg)	-	35	1,287	6	2	149
65	<i>Italy</i>	La Spezia	101,422	3,949	15,796	1,450	940	7,346
66	<i>Italy</i>	Milazzo	31,541	616	2,464	231	154	1,232
67	<i>Croatia</i>	Zadar (Adria)	-	67	121	2	1	18
68	<i>Italy</i>	Golfo di Napoli	1,540,814	16,251	65,005	6,094	4,063	32,502
69	<i>Italy</i>	Ravenna	135,844	6,363	25,453	2,386	1,591	12,727
70	<i>Israel</i>	Ashdod	-	2,630	12,150	600	7	258
71	<i>Italy</i>	Taranto	232,334	2,484	9,937	932	621	4,968
72	<i>Turkey</i>	Osmanive	139,116	3,047	5,078	761	305	4,575
73	<i>Italy</i>	Rosignano Solvay (Marittimo)	30,021	187	747	70	47	373
74	<i>Italy</i>	Bari-Barletta (Global)	1,200,000	7,707	30,827	2,890	1,927	15,413
75	<i>Libya</i>	Tripoli	1,200,000	3,100	4,650	740	-	4,300
76	<i>Slovenia</i>	Izola	13,770	1,092	-	90	21	414
77	<i>Croatia</i>	Rijeka	206,229+	1,927	4,614	201	33	1,728
78	<i>Croatia</i>	Bakar (ex Cokery)	-	-	-	-	-	-
79	<i>Italy</i>	Livorno	167,512	2,698	10,792	1,012	674	5,396
80	<i>Morocco</i>	Nador	246,113	1,888	4,435	83	100	1,433
81	<i>Croatia</i>	Dubrovnik	50,000+	160	310	79	19	139
82	<i>Slovenia</i>	Delamaris	(See Izola No. 77)					
83	<i>Libya</i>	Benghazi	750,000	2	2,100	306	-	1,226
84	<i>Israel</i>	Haifa Bay (industrial)	-	800	-	-	-	1,400
85	<i>Greece</i>	Pagasitikos Gulf	77,907	657	1,095	-	-	-
86	<i>Albania</i>	Durres	120,000	2,864	-	477	96	4,300
87	<i>Albania</i>	Vlore	110,000	2,628	-	438	88	3,942
88	<i>Italy</i>	Manfredonia	58,318	1,272	5,087	477	318	2,543
89	<i>Italy</i>	Ancona-Falc	101,285 + 30,105	2,990	11,959	1,121	747	5,979
90	<i>Cyprus</i>	Limassol	130,000	1,181	2,185	39	15	336
91	<i>Morocco</i>	Al-Hociema	112,588	519	1,073	-	-	452
92	<i>Greece</i>	Heraklio Gulf	117,167	84	141	-	-	29
93	<i>Greece</i>	Elefsis Bay	-	61	446	-	-	70
94	<i>Croatia</i>	Zadar (Tannery)	-	23	68	5	0	15
95	<i>Libya</i>	Zawwia	-	-	-	-	-	-
96	<i>Libya</i>	Tobruk	-	-	-	-	-	-
97	<i>Cyprus</i>	Larnaca	-	-	-	-	-	-
98	<i>France</i>	Marseille	900,000	13,700	24,800	4,700	300	3,100
99	<i>Albania</i>	Durres	-	-	-	-	-	-
100	<i>Greece</i>	NW Saronic Gulf	-	22	22	-	-	5
101	<i>Greece</i>	Larymna Bay	-	-	7,516	-	-	2,505

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Table III-2 Main Pollution Loads

102	France	Gardanne	-	-	-	-	-	31,600
103	Slovenia	Piran Submarine Outfall	17,000	125	290	23	26	116
104	France	Toulon	310,000	1,300	5,000	1,500	150	1,000
105	France	Cannes	144,000	1,900	3,800	600	150	1,000
106	France	Frejus	175,000	650	1,700	400	40	400
107	Greece	Nea Karvali Bay	-	295	739	625	126	-
108	Albania	Vlore (PVC Factory)	-	-	-	-	-	-
109	Cyprus	Larnaca	55,346	-	6,000 (mg/l)	-	-	-

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Table III-3 TPB Discharges

No.	Country	Hot Spot	Hg kg/yr	Cd kg/yr	Pb kg/yr	Cr kg/yr	Cu kg/yr	Zn kg/yr	Ni kg/yr	POPs	Other
1	Egypt	El-Manzala	-	-	-	-	-	-	-	-	-
2	Turkey	Iznir	-	-	-	-	-	-	-	-	-
3	Egypt	Abu-Qir Bay	311	-	193+	362+	2,669+	3,394+	859	-	Oil (1,906 t/yr)
4	Israel	Haifa Bay	2,600	-	-	-	3,250	58,500	-	-	Oil (50,000 t/yr)
5	Turkey	Icel City	-	-	-	-	-	-	-	-	-
6	Turkey	Antalya	-	-	-	-	-	-	-	-	-
7	Syria	Tartous	54	54	2,703	1,784	5,406	5,163	2,649	-	-
8	Turkey	Hatay	-	-	-	-	-	-	-	-	-
9	Turkey	Adana	-	-	-	-	-	-	-	-	-
10	Syria	Lattakia	85.4	85.4	4,271	2,135	4,271	7,687	2,562	-	-
11	Tunisia	Gabes	13.6	13.6	80+ (ppm)	36.2	-	91.6+	-	-	-
12	Italy	Porto Marghera	-	-	-	-	-	-	-	-	-
13	Malta	Weid Ghamnicq	-	-	-	-	-	-	-	-	-
14	Croatia	Kastela Bay	23.3	23.3	555.1	-	-	3,499	-	-	13,860
15	Israel	Nahariya	-	-	-	-	-	-	-	-	-
16	Israel	Akko	-	-	-	-	-	-	-	-	-
17	Turkey	Tursus	-	-	-	-	-	-	-	-	-
18	Tunisia	Lake of Tunis	0.15	0.15	0.6	70	23.4	11.3	4.4	-	-
19	Turkey	Adana	-	-	-	-	-	-	-	-	-
20	Croatia	Split (See No.14)	-	-	-	-	-	-	-	-	-
21	Algeria	Oran Ville	-	-	-	-	-	-	-	-	-
22	Algeria	Rouiba	-	-	-	-	-	-	-	-	-
23	Morocco	Tangier	-	-	-	-	-	-	-	-	-
24	Algeria	Ghazaouet	-	-	-	-	-	-	-	-	-
25	Turkey	Antalya	-	-	-	-	-	-	-	-	-
26	Lebanon	Gt Beirut Area	-	-	-	-	-	-	-	-	-
27	Algeria	Alger	-	-	-	-	-	-	-	-	-
28	Algeria	Mostaganem	-	-	-	-	-	-	-	-	-
29	Syria	Baniyas	-	-	-	-	-	-	-	-	Oil (438 t/yr)
30	Lebanon	Jounieh	-	-	-	-	-	-	-	-	-
31	Turkey	Iskenderun	15.4	15.4	-	-	-	-	-	-	-
32	Greece	Thermaikos Gulf	19.21	19.21	-	-	-	-	-	-	Oil (38 t/yr)
33	Algeria	Bejaia	-	-	-	-	-	-	-	-	-

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Table III-3 TPB Discharges

96	Eiþya	Tobruk	-	-	-	-	-	-	-	-	-	-	-
97	Cyprus	Larnaca	-	-	-	-	-	-	-	-	-	-	-
98	France	Marseille	-	-	-	-	-	-	-	-	-	-	-
99	Albania	Durres (ex Chem Factory)	-	-	-	-	-	-	-	-	-	-	-
100	Greece	NW Saronic Gulf	-	-	-	-	-	-	-	-	-	-	Oil (5.4 t/yr)
101	Greece	Larymna Bay	-	-	-	-	-	-	-	-	-	-	Oil (940 t/yr)
102	France	Gardanne	-	-	-	-	-	-	-	-	-	-	-
103	Slovenia	Piran	4.26	60.96	8.43	27.26	703	9.8	-	-	-	-	-
104	France	Toulon	-	-	-	-	-	-	-	-	-	-	-
105	France	Cannes	-	-	-	-	-	-	-	-	-	-	-
106	France	Frejus	-	-	-	-	-	-	-	-	-	-	-
107	Greece	Nea Karvali Bay	-	-	-	-	-	-	-	-	-	-	-
108	Albania	Vlore (PVC factory)	-	-	-	-	-	-	-	-	-	-	-
109	Cyprus	Larnaca	5 (micro g/L)	0.4 (micro g/L)	-	80 (micro g/L)	75 (micro g/L)	2,586	-	-	-	-	Oil (0.018 t/yr)

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Table III-4 Priority Sensitive Areas

Country	Sensitive Area	Estimated Costs of Protective Action (millions of dollars)
<i>Albania</i>	Kuna-Vain Lagoons	26
	Karavasta Lagoon	1-2
	Narta Lagoon	3-5
<i>Croatia</i>	Malostonski	1.2
	Limski Channel	0.7
	Kornati	0.9
	Mljet	0.2
	Krka est.	1.5
<i>Cyprus</i>	Vassilikos Bay	
<i>Egypt</i>	Lake Bardawil	-
<i>France</i>	• Collioure- Cap Leucate	-
	• Cap Leucate- L'Espiguette	-
	• Rhone Mouth Fos Gulf	-
	• Bonifacio	-
<i>Greece</i>	Amvrakikos Gulf Lagoon of Mesologgi	11
<i>Italy</i>	Vado Ligure-Savona	-
	Secche della Meloria	-
	Isola d'Elba	-
	Pesaro-Cervia	-
	Mouth of Po	-
	Venezia and its lagoon	-
	Panzana Bay	-
<i>Lebanon</i>	Sour	19
	Jbail (Byblos)	7.5
<i>Slovenia</i>	Koper Bay	(included in Rizana River)
	Piran Bay	(see Piran)