



**United Nations
Environment
Programme**



UNEP(OCA)/MED WG.161/5
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Original: ENGLISH

MEDITERRANEAN ACTION PLAN

Meeting of the MED POL National Coordinators to review
the implementation of MED POL-Phase III and of the
Strategic Action Programme

Reggio Calabria, Italy, 20-23 June 1999

**WASTEWATER TREATMENT PLANTS IN
MEDITERRANEAN COASTAL CITIES**

In collaboration with:



WHO

UNEP
Athens, 1999



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1. INTRODUCTION

1.1 Historical Background of the Study

Throughout the centuries and long before the industrial revolution started, men have been using the sea as the most convenient place for the disposal of wastes resulting from human activities. The self-purification ability of the sea has been largely abused. Dumping of domestic, industrial, and radioactive wastes, as well as the run-off from agricultural products have not only created considerable hazards to human health but have also endangered the marine environment.

The global concern about the importance of the marine environment date from 1972, when in Stockholm, the United Nations Conference on Human Environment underlined the growing importance of marine pollution. During the same year, in London, the Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matters was adopted. This Convention entered into force in 1975.

The major problems found linked to the uncontrolled disposal of wastes in the marine environment were:

- a) The dispersion of pathogen organisms capable of endangering human health.
- b) The toxic effects on aquatic life –including human life – caused by the various chemical substances reaching the marine environment.
- c) The deterioration of the sea water quality –eutrophication – resulting from the widespread dispersion of nutrients and other organic and inorganic matters.

The above-mentioned problems do not affect the area of activities of one single international organization or of one single country. Instead, they have an impact at global level, therefore several institutions of international character such as **UNEP, WHO, IMO, OECD** and others, developed programmes aimed at finding solutions to their respective priority problems.

At the level of the European Region, since the late 70's, studies and reports prepared by scientists and researchers from different European countries indicated that the quality of the marine environment of the Mediterranean Sea was deteriorating. The studies clearly demonstrated the urgency for introducing remedial measures to stop the pollution of the Mediterranean Sea.

The causes for this reduction in the quality of the marine environment are numerous and most of them are interconnected, resulting in a very complex pollution situation.

One of the important causes of marine pollution is the high rate of population growth that the coastal zones of the Mediterranean Basin have experienced since the 1960's and 1970's. This widespread population growth has been accompanied by an increase in the standard of living leading to an equal increase in industrial development to satisfy the needs of the population.

As a consequence of urban and rural development in areas of extraordinary geographical beauty, the tourist population visiting those places has not ceased to grow. This increase in population has had a profound impact on the quantity and in the quality of wastes produced. Quite often during the tourist season, municipal services in charge of the safe disposal of solid and liquid wastes are totally unable to cope with the additional waste-load that invariably reaches the coastal waters.

The diversification of the industry to satisfy the demand of people of different life-styles added new dimensions to the pollution problems by constantly producing new residual substances to be eliminated from liquid and solid waste matters before they reach the marine environment.

However, in spite of the importance of pollution loads originating directly from human agglomerations in coastal areas, they appeared to be of minor importance when compared to other forms of pollution originating in-land and discharged into the sea by various means. Discharges from "in-land" municipal, industrial and agricultural districts, which are only partially treated or even in an untreated form, are still reaching the sea through the hydrographic river network of the Mediterranean Basin.

This deterioration of the marine environment drew the attention of the Governments of the Mediterranean Region and following a series of scientific meetings and intergovernmental discussions, a comprehensive programme named *The Mediterranean Action Plan* was drafted. An Inter-Governmental Meeting on the Protection of the Mediterranean Sea, convened by the United Nations Environment Programme (UNEP) in Barcelona, Spain, from 28 January to 4 February 1975 ratified and approved the above-mentioned Programme, most currently known as MAP.

The four major components of the MAP Programme were:

- a) Integrated planning for the development and management of the resources of the Mediterranean Basin.
- b) A co-ordinated programme for research, monitoring, and exchange of information, and for assessment of the state of pollution and of protective measures to be taken.
- c) A framework convention and related protocols with their technical annexes for the protection of the Mediterranean environment.
- d) Institutional and financial implications of the Action Plan.

A year later, at a conference convened by UNEP in Barcelona, Representatives of Mediterranean countries adopted the legal support needed for the implementation of the MAP Programme. More specifically, in February 1976 the Barcelona Conference adopted and signed a landmark document that became known as **The Barcelona Convention**. This is an international agreement reached between Mediterranean Countries for the protection of the Mediterranean Sea against pollution.

In addition to the "Barcelona Convention", the Conference adopted and signed two supplementary Protocols. One concerning the preventive measures required for protecting the Mediterranean Sea against the dumping of polluting matters from ships and aircraft. The second protocol referred to the establishment of international co-operation to reduce pollution resulting from accidental spills of oil and other harmful substances. Both protocols were adopted and signed simultaneously with the Barcelona Convention, and entered into force in February 1978.

The legal framework of the MAP Programme has been enlarged and modified several times since the adoption of the Barcelona Convention. Amongst the most important legal instruments developed and approved, mention has to be made of three additional protocols:

- i. The Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources. This protocol was adopted and signed in Athens in May 1980 and entered into force in June 1983.
- ii. The Protocol concerning the protection of special Mediterranean Priority Areas. This protocol was adopted and signed at Geneva in April 1982 and entered into force in March 1986.

- iii. The Protocol for the protection of the Mediterranean Sea from pollution resulting from exploration and exploitation of the continental shelf, the seabed and its subsoil, adopted and signed in Madrid but not yet in force.

A subject of major concern has been the preparation of appropriate legal instruments to deal with land-based sources of pollution. According to estimations made, land-based sources of pollution constitute more than 80% of the total pollution load of the Mediterranean Sea.

A series of expert consultations were held between 1977 and 1979 and ended with the preparation and adoption in 1980, at a Conference in Athens, Greece, of the **Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources**.

This protocol classified polluting substances dividing them into two main categories; a "black list" for substances that eventually have to be eliminated and a "gray list" for those substances, pollution by which has to be restricted.

In 1985, in Genoa, Italy, the Contracting Parties to the Barcelona Convention reviewed the previous co-operation established, and adopted a new declaration named **The Genoa Declaration**, to cover the second decade of the Mediterranean Action Plan. Ten targets to be achieved by the end of the decade were approved. Amongst the targets approved, one of the priorities was the establishment of sewage treatment plants in all cities around the Mediterranean Sea with more than 100.000 inhabitants.

At the level of the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, the United Nations Environment Programme convened in Washington, (23.10 -03.11.1995), an Intergovernmental Conference to adopt the above-mentioned Plan of Action.

The Conference clearly defined the need for action at the various levels of interventions required. Thus, at national level, emphasis was placed on the introduction of strategies and measures to enable the appropriate management of priority problems. Recognizing the need for the participation of countries in regional and subregional arrangements, the Conference stressed the importance of ensuring at national level the resources and instruments required for the effective functioning of Regional and Subregional arrangements.

At the widest level, involving not only countries and international organizations but also non-governmental and private institutions, the Conference considered the mobilization of financial resources and the development of an institutional framework for international co-operation as the basis for success. The Conference recommended the introduction of **Integrated Coastal Area Management** to ensure the preservation of the natural habitat and normal functioning of the ecosystem of coastal areas.

In what concerns to the role and involvement of the World Health Organization, the Fiftieth World Health Assembly at Geneva, concerned about the potential risks to human health resulting from the deterioration of the Marine Environment endorsed the Washington Declaration and, in particular, to lead the development of the clearing-house mechanism for information on sewage.

1.2 Scope and Purposes of the Study

The chain of events leading to the discharge of wastewater in the marine environment is very simple and it is constituted by three basic elements:

- a) the production of wastewater (domestic, industrial, agricultural, and others),

- b) a network of pipes or conduits, (sewerage system), to convey the wastewater to a place of treatment prior to final disposal, or directly to the disposal place when there is no treatment available,
- c) the outfall system to discharge the wastewater into the marine environment.

The study presented in this document concerns the functioning of wastewater treatment plants. It refers to point "b" above and finds its justification from several studies made on the subject at different times and by different institutions. For example, the situation in the European Region concerning wastewater disposal as found at the end of the United Nations Programme on the International Water and Sanitation Decade, (1980-1990), drew the attention of all Members States of the Region on this problem and demanded the implementation of remedial measures.

WHO/EURO published the data gathered during the decade. Regarding the collection of wastewater, the figures of the evaluation made at the end of the decade showed that a large proportion of houses in urban agglomerations was still not connected to a sewerage network. The problems in those areas were caused by slum districts in the urban fringes where there was a lack of appropriate technology for the safe disposal of domestic wastes.

In the rural areas, scattered villages and isolated dwellings were usually served by individual systems not always constructed according to hygienic standards.

Regarding wastewater treatment and disposal, the percentage of wastewater undergoing appropriate treatment was considered to be insufficient. The analysis made showed the following situation:

- a) A relatively large number of urban agglomerations did not have adequate wastewater treatment facilities. This problem was of particular concern to the Mediterranean coastal towns where the capacity of the existing services was found to be insufficient to cope with the extra charge of seasonally fluctuating populations.
- b) Of the total volume of sewage produced, primary treatment represented 14% of the total. Secondary treatment represented 47%, and tertiary treatment was being applied to 18% of the treatment plants reported. The remaining 21% volume of wastewater was being discharged into the environment without treatment.
- a) Of both treated and untreated sewage, 62% was being discharged mainly into inland fresh-water bodies: rivers, lakes, lagoons, etc., while 30% was being discharged directly into the marine environment. The remaining 8% were being discharged into land for irrigation purposes or for aquifers recharging.
- b) The disposal of sludge was found to be effected as follows: 14% into the sea, 3% into surface waters, 42% onto farmland, 31% used as land-fill, and the remaining part was being incinerated.

Several years after the Barcelona Convention and at the end of the Water Decade, the MAP Programme considered it necessary to review the status of wastewater treatment in Mediterranean coastal towns of more than 10.000 persons. The Genoa Declaration established that sewage treatment plants were to be made available to all cities with more than 100.000 inhabitants and that appropriate outfalls and/or treatment plants for all towns with more than 10.000 inhabitants were also to be provided.

The **scope or geographical extension** of the study conducted includes all Mediterranean coastal countries. The **purpose** is the collection of data at country level in order to up-date and analyse information concerning the population served by wastewater treatment plants and the quality of the treatment provided.

The specific objectives of the Study are quoted below:

1. update the list of coastal cities and towns of more than 10,000 persons in all the coastal countries of the Mediterranean Sea, bringing the information as close as possible to the present.
2. collect data on the pressure to the wastewater treatment plants by the seasonal tourist population increases in Mediterranean coastal cities and towns of more than 10,000 persons.
3. collect data in all Mediterranean coastal cities and towns of more than 10,000 persons concerning the existence of wastewater treatment plants.
4. collect data on the years of service of wastewater treatment plants.
5. collect data concerning the percentage of population served by wastewater treatment plants.
6. collect data on the amount of wastewater treated per day and per plant.
7. collect data on the quality of wastewater treatment, (primary, secondary, tertiary, or other kind of treatment).
8. collect data concerning the volume of water discharged into the marine environment, treated or untreated, and on the places of discharge.
9. make a comprehensive analysis of the above-mentioned data at country and at regional level permitting an assessment of the present needs and the formulation of appropriate recommendations for solving the problems encountered.

1.3 Methodology and Procedures of the Study

The planning, methodology and working procedures of the Study were prepared within the framework of the MED POL Programme.

The collection of information at national level was left to an officially designated **national MED POL Coordinator**. In order to standardize the collection of data, special statistical forms were prepared together with relevant guidelines for the completion of the forms.

The national MED POL Coordinators were requested to gather the most recent information available from official sources only and to submit the information received to the Coordinating Unit. Base data resulting from previous activities (land-based sources of pollution and pollution hot spots) were used to form the basis on which information was exchanged.

2. RESULTS ACHIEVED

2.1 Brief Summary of Data Collection

Data from 19 Mediterranean countries were progressively collected until country summaries were produced using the most reliable information available. The following is a list, in alphabetic order of the countries involved in the study.

Albania, Algeria, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey.

Great variations in the data collected between countries and between towns were found. Such variations are considered normal as they reflect the existing differences between the quantity and the quality of wastewater services provided. The procedures and the time that each country adopted for the collection of this kind of data could also explain the differences found. Thus, while some countries have a relatively up-to-date list of coastal towns with the present population, other countries are using figures of a population census carried out several years ago because no better figures are available.

In view of the above-mentioned difficulties, a comparative analysis of data in between countries is not possible because the picture taken of the various countries corresponds to a picture taken at different times.

The tables and graphs presented in the attached annexes reflect the situation as reported and at the time the different country reports were made. For each individual country the present situation could now be a little worse or a little better depending upon the progress made by each country to cope with the ever increasing need for more and better wastewater treatment facilities.

2.2 Constraints Encountered

The Study faced several constraints that deserve the consideration of Contracting Parties to take the required measures needed to improve monitoring of the quality of the marine environment.

Acknowledge has to be made for the efforts made by national MED POL Coordinators to overcome the many constraints encountered. Without their interest and dedication to this Study, it would have not been possible to complete this work.

The most important constraints encountered are quoted below:

- Data concerning wastewater production, collection, treatment and final disposal was available but sometime limited, uncompleted, or scattered amongst several services and institutions of national or private character.
- For some countries, it is literally impossible to ascertain the actual seasonal increase of population because there is no established mechanism permitting the assessment of such increase. In addition, the recording of the fluctuation of population taking place during weekends is almost beyond any possible control. “**National tourists**” during weekends join the influx of foreign tourists creating “**service peaks**” exceeding the design capacity of wastewater systems.
- The Study was intended to collect data on the **population served by wastewater treatment plants**. However, many countries reported the absence of wastewater treatment plants while at the same time reported a given number of **populations served**. Obviously, the figure reported as population served referred to the population connected to a wastewater collection network sometimes having a wastewater treatment plant, sometimes without a treatment plant.
- The Study did not permit the establishment of a clear difference between the four situations that can be encountered:
 1. A town served totally by a sewerage network and a wastewater treatment plant with the capacity of treating the total amount of sewage produced and collected by the network. (**Discharge of 100% treated sewage**).

2. A town served totally by a sewerage network and a wastewater treatment plant, but the capacity of the plant does not permit the treatment of the total amount of sewage produced. **(Discharge of treated and untreated sewage).**
 3. A town with no treatment plant but with sewage network covering 100% of the population. **(Discharge of 100% untreated sewage).**
 4. A town with no treatment plant but with a sewerage network not covering the total population of the town. **(Discharge of untreated sewage, plus existence of autonomous wastewater disposal systems, i.e., septic tanks).**
 5. A fifth situation can be envisaged. A town with no sewage network at all and served only by autonomous systems. However, this situation usually does not exist for tourist coastal towns of more than 10,000 persons.
- In view of above-mentioned constraint, an assumption was made: that a sewerage network covering the total population serves all towns.
 - Accurate reporting on the **Degree of Treatment** of wastewater proved also to be difficult. In many instances the information was not available. There was sometimes confusion with regard to the accepted classification of wastewater treatment. The Study proposed to use the standard classification for Primary, Secondary and Tertiary Treatments. However, when only mechanical and physical methods of treatment were used (Primary Treatment), some countries opted to report such methods as “none”.
 - The collection of data on the **amount of wastewater treated and untreated and on the place and conditions of discharge** was equally difficult. National MED POL Coordinators made an exhaustive search looking for all available data and managed to present some data on this issue. Great variations between countries and between towns were found concerning the amounts of treated and untreated wastewater. The variations were recorded in terms of cubic metres per person per day or in terms of population equivalent.
 - With regard to the year of construction, information was not always available. Some plants were reported open to production as far back as 1950.
 - The collection of information concerning up grading of plants was also difficult and sometimes records were not available. Therefore, some plants were recorded as having primary treatment only, when in reality additional units for secondary treatment are already operational.
 - Equally difficult was the updating of information concerning plants that had temporarily interrupted their services. In some cases there is the possibility of plants been reported as “out of service” when in fact, they were back into operations just a few months after the survey.

2.3 General Tables and Graphs

Annex No. 1: Summary of Results

a)	Total number of countries	19	
b)	Total number of towns	525	
c)	Total number of "resident" population found	54,814,000	
d)	Total population served (residents + tourist)	57,866,000	
e)	Population served by a sewage network and a treatment plant	36,623,000	64%
f)	Population served by a sewage network only	21,243,000	36%
g)	Towns without a wastewater treatment plant	156	30%
h)	Towns with no information at all	94	18%
i)	Towns with a wastewater treatment plant	273	52%
j)	Primary Treatment	63	23%
k)	Secondary Treatment	142	52%
l)	Tertiary Treatment	32	12%
m)	Unknown Treatment	36	13%
n)	Total cubic metres of wastewater treated per day	6,590,254	41%
o)	Total cubic metres of untreated wastewater per day	9,301,857	59%
p)	Treated Wastewater, cubic metres per capita per day	0,18	
q)	Untreated Wastewater, cubic metres per capita per day	0,44	
r)	Total Wastewater, cubic metres per capita per day	0,27	

A visual image of above-mentioned results is presented in attached graphs at the end of the annex.

3. ANALYSIS PER COUNTRY

3.1 Albania

Four coastal towns were reported with a resident population of 254.000 persons. Seasonal increase of population varied from 5% to 20% and the total population receiving wastewater disposal services reached 262.000 persons.

Durres serves a population of 135,000 inhabitants and produces 1,200 cu.mt of wastewater per day. However, Vlora serving only 99,000 persons produces 11,000 cu.mt of sewage. Furthermore, Vlora has a total resident population of 110.000 persons and has a seasonal increase of 5%. According to this figure, the population served by the wastewater network of Vlora should be close to 115.000

persons and not 99,000. Unless part of the town is not served by the sewage network and instead other disposal systems are in use, i.e. septic tanks.

A revision of this information is recommended.

3.2 Algeria

A total of 38 coastal towns with a resident population of 4,297,000 persons were reported. This total includes the large urban agglomerations of Algiers, Annaba, Bejaia, Mostaganem, Oran and Skikda.

For this reason, the total population served by wastewater treatment plants reached 3,146,400 persons or 73,6% of the total population to be served. The remaining 26,4% of the population, (1,124,800 persons), are supposed to be connected to a piped sewage network.

When analysing the same data in terms of number of towns, the percentage of towns without a wastewater treatment plant appeared rather high, 55%, (21 towns).

A total of 12 towns were reported as having a treatment plant (32%), but half of them were found to be out of service. For the remaining 5 towns no information was available.

Most of the untreated wastewater comes from the above-mentioned large urban agglomerations. The total number of cubic metres of untreated sewage produced per day reached the figure of 603,984 cu.mt. or 95% of the total. Only 5% of the sewage produced appear to be treated.

3.3 Croatia

Eleven coastal towns were recorded with a resident population of 905,400 persons. The seasonal increase reported varied from 10% to 300%. However, the total population served (by a network with a treatment plant and by a network only) appeared to be less (653,800 persons) than the total resident population.

Two hypotheses can be formulated to explain this unusual situation:

- That the figures concerning both types of population served need to be revised.
- That other disposal methods are in use such as septic tanks.

The percentage of towns without a wastewater treatment plant is high: 45% (five towns out of a total of 11 towns). Primary treatment is the only kind of treatment reported.

Another interesting remark is the fact that the production of untreated wastewater per capita per day is of: 0,14 cu.mt, while for treated wastewater, production is reported as being: 0,07 cu.mt. only.

3.4 Cyprus

Only one out of four localities has no wastewater treatment plant and secondary and even tertiary treatment were reported. However, an important sector of the total population (80,000 persons or 35% of the total), appear as being served by a sewage network only.

No information was provided regarding the quantity of untreated wastewater for the towns of Larnaca and Limassol. The production per capita per day of treated and untreated wastewater was: 0,11 and 0,08 cu.mt respectively.

3.5 Egypt

A total of 11 coastal towns with a resident population of 4,363,000 persons were recorded, most of them residents of Alexandria and Port Said.

The number of towns with a wastewater treatment plan is 7, or 64% of the total. However, the two above-mentioned large coastal towns of Alexandria and Port Said are still producing large quantities of untreated wastewater, rising thus the general figure of untreated wastewater to 33% of the total wastewater produced.

Out of the seven treatment plants reported, one corresponded to primary treatment and two more to the secondary treatment type. Three additional secondary treatment plants were reported as being under construction. No information was available for the localities of Burg el Arab, El Daba, Hamman and Sidi Barrani. It was assumed that a sewage network was serving them.

3.6 France

The study covered a total of 40 coastal towns with a resident population of 3,024,200 persons.

Seasonal increase of population varied between 3% for the smallest increase, to 234% for the largest. The total population increase in summer time for the 40 reported localities reached 568,000 inhabitants only. This figure represents an increase of 18% only.

In terms of population, from the figures presented, 3,204,800 persons, or 90%, is provided with a wastewater treatment plant. The remaining 387,100 persons appear as being connected to a sewage network with no treatment plant.

In terms of number of towns, 24 settlements (60%) reported to have a treatment plant. No treatment plant was reported for 6 towns only (15%), and no information was available for the remaining 10 towns, (25%).

Secondary treatment is used in 20 out of the 24 plants reported. Four plants are using primary treatment and none was reported for tertiary treatment.

The total quantity of wastewater produced per day is 759,658 cubic metres, or 89% of the total. 91,649 cubic metres of untreated wastewater was reported, (11%). The average quantity of cubic metres per capita per day was the same for treated and for untreated water: 0,24 cu.mt./c/d.

3.7 Greece

A total of 40 localities were reported with a resident population of 5,898,600 persons. The most frequent seasonal increase of population was situated between 10% to 50%, with 0% for the lowest increase to 190% for the maximum reported. The total seasonal population appears to be rather important, over 1,000,000 persons.

A total number of 32 treatment plants are available. The population served by such plants reached the figure of 5,735,700 or 83% of the total, including the seasonal population. A treatment plant is not serving the remaining 17% or 1,171,000 persons.

Out of the 32 existing plants, data was collected from 13 of them (40%), leaving the remaining 19 plants without information with regard to the kind of treatment used. Secondary treatment is predominant, (10 plants).

Information regarding the quantities of treated and untreated wastewater was available and according to the data produced the amount of untreated wastewater reaching the marine environment

is only 10% of the total. The production per capita per day was of 0,16 cu.mt for treated water and of 0,08 cu.mt. for untreated wastewater.

Athens Greater Area was reporting as having primary treatment only. No information was provided concerning the quantity of untreated wastewater produced.

3.8 Israel

Ten localities with a resident population of 1,886,500 were reported. Detailed information per locality concerning seasonal population increase was not available.

The coverage of services provided reached 100% of the population, or 1,977,500 persons, figure that includes the seasonal population. The 10 plants appeared as being relatively new (constructed between 1980 and 1997).

Secondary and tertiary treatments were predominant. Information concerning the amount of wastewater treated was missing for two localities only. The total quantity of wastewater treated per day appears to be 205,500 cubic metres. An average production of 0,10 cu.mt. per capita per day was found.

3.9 Italy

The study covered a total of 164 towns with a resident population of 10,319.200 persons. Detailed information concerning seasonal population increase was provided. The fluctuating population in summer time appeared as being rather important, close to 4.000.000 persons.

Including the seasonal tourist population, the total population receiving services reaches a figure close to 14,000,000. A sewage network serves half of this population with a treatment plant. The other 50% possess a piped sewage network only and sewage is discharged raw mainly through submarine outfalls.

The existence of 91 treatment plants was reported (56%). No information was available for 26 localities (16%) and for the remaining 47 localities (28%), no treatment plant was reported.

Treatment of wastewater was distributed as follow: primary treatment 27 plants (30%); secondary treatment 43 plants (47%); tertiary treatment 11 plants (12%), and for the remaining 10 plants (11%), no information on the kind of treatment was available.

With regard to the age of the treatment plants, some of them started to operate since the early 50's but the majority appeared as having started in the 70's and 80's.

3.10 Lebanon

Seven coastal towns were reported with a resident population of 2,256.000 persons, nearly half of them coming from Beirut Greater Area. The seasonal increase of population did not appear to be important, just 100.000 persons.

Only one of the seven towns, (Beirut), reported to have a wastewater treatment plant of the primary type. Thus, a treatment plant serves only 27% of the population, while the remaining 73% are using a piped wastewater network only.

The total wastewater produced was reported as being 297,120 cubic metres per day, 70% of which is untreated and discharged raw in the marine environment.

3.11 Libya

The survey covered 17 coastal towns with a resident population of 3,368,000 persons. No report was available concerning seasonal population increase. No information was available for two localities and it was assumed that they were being served at least by a sewage network. When adding the population served by a treatment plant to the one supposed to be served by a sewage network only, the total appeared to be less than the resident population reported. The difference encountered is significant, 1,151,000 persons.

A revision of above-figures is recommended to explain this unusual situation. Most likely the actual population served is higher than reported and septic tanks or flushing toilets probably serve the remaining fraction

Six treatment plants were reported as being in full operational conditions. Three plants were being repaired, and six plants were reported to be under construction. No information available for the remaining two localities.

The kind of wastewater treatment selected is mainly of the tertiary type (8 plants), with 2 plants using secondary treatment. No information was given on the kind of treatment in use for the remaining five treatment plants reported. The plants were constructed in the early 70's and 80's.

The total amount of wastewater produced is: 448,460 cubic metres per day, 89% of which is treated and the remaining 11% not treated. The average figures per capita per day of wastewater produced were: 0,20 cu.mt./c/d for treated wastewater and of 0,02 cu.mt./c/d for untreated wastewater.

3.12 Malta

Twenty coastal towns were reported with a total resident population of 237,000 persons. One single wastewater treatment plant, constructed in 1983 is providing services to a total of eight localities. This is a tertiary treatment plant treating about 17,000 cu.mt of wastewater per day.

Different sewage networks discharging a total of 75,000 cubic metres of raw sewage serve seven other localities. No information was provided for the remaining five localities, (Valetta, Msida, Manoel Islands, Marsascale, and Birzebbuga).

A treatment plant serves approximately 55% of the population and around 80% of the treated sewage produced are discharged through submarine outfalls in the marine environment. Wastewater reutilization for agricultural purposes is common in Malta.

3.13 Monaco

One single locality is reported with a resident population of 60,000 persons. A sewage network together with a secondary treatment plant provides wastewater facilities. A total amount of 18,500 cubic metres of wastewater is produced per day. The plant was constructed in 1987.

The average production of wastewater per capita per day was found to be: 0,33 cubic metres.

3.14 Morocco

Four coastal settlements reported in the Mediterranean Sea with a resident population of 1,251,000 persons. No information was given with regard to seasonal increase. Only one tertiary plant in Nador was reported treating 8,100 cubic metres of wastewater per day. As the other three coastal towns do not have a treatment plant, 90% of the total sewage produced (69,654 cu.mt/day) is being discharged raw into the marine environment.

3.15 Slovenia

There are three coastal localities with a resident population of 76,000 persons. Seasonal increase of population varied between 13% to 46%. However, this population increase is not reflected in the total population served which appears to be the same as the resident population. A revision of the figures is recommended.

Two primary wastewater treatment plants were reported covering 53% of the population. A sewage network serves the remaining locality of Izola only. The plants in Koper and Piran were constructed in 1992 and are treating 11,553 cubic metres per day, with an average of 0,29 cu.mt per capita per day.

The sewage network in Izola discharges through a submarine outfall a total of 3,520 cubic metres per day, or nearly 50% of the total wastewater produced.

3.16 Spain

A total of 89 coastal towns were reported with a resident population of 6,760,900 persons. The information given for seasonal increases was very limited. The data collected permitted to establish that a total population of 7,678.00 has access to wastewater facilities.

Sewage networks with treatment plants are serving 4,259,400 persons (55%). The remaining 3,418,600 persons are served by piped sewage networks only.

A total of 37 plants were reported as being operational. Five of them are of the primary treatment type, (13%). Secondary plants were in the number of 31 or 84% of the total. No tertiary plant reported. One more plant was reported in Nerja, but with no information regarding the kind of treatment used.

The total number of cubic metres of wastewater treated per day was reported as being: 621,662 (64% of the total), giving an average figure of 0,14 cu.mt./capita/day. Regarding untreated wastewater, 344,735 cubic metres were reported, (or 36% of the total), giving an average figure of 0,10 cu.mt./c/day.

3.17 Syria

Seven Mediterranean coastal settlements were reported with a resident population of 1,408.000 persons. Data for the seasonal increase of population was given for four localities. In spite of the seasonal increase, the total population reported as served by a sewage network, (no treatment plant reported), is less than the resident population (999.000).

This information indicates that probably, around 410,000 persons are served by individual autonomous wastewater services such as septic tanks or other similar devices.

The total amount of untreated wastewater produced reached the figure of 186,128 cubic metres per day with an average figure of 0,19 cu.mt.per capita per day.

3.18 Tunisia

A total of 23 coastal towns were reported with a resident population of 3,640,500 persons. No data was provided regarding the seasonal increase of population. From the information provided on the kind of services, it was possible to find out that 2,774,500 (76% of the total), are served by a sewage network together with a wastewater treatment facility. Additional 670,200 persons, (24% of the total), are supposed to be served by a sewage network only. The addition of these two figures provides the quantity of 3,444,700 that is slightly less than the resident population reported.

The above-mentioned difference in population served can be explained by taking into account the sector of the population probably served by septic tanks or other similar devices.

A total of 17 treatment plants were reported. Secondary treatment was predominant, 13 plants (76%). One plant was reported having tertiary treatment, (Gabes), and no information on the degree of treatment was provided for the remaining 3 plants.

The use of small treatment plants using different treatment methods such as: Biological Digestors, Waste Stabilization Ponds, Aerated Lagoons, etc. is very common in Tunisia, as well as the re-utilization of wastewater for agricultural purposes.

The total amount of wastewater produced reached the figure of 353,501 cubic metres per day. From that total, 278,515 cu.mt. or 79% were reported as treated wastewater. The remaining 74,986 cu.mt. or 21%, were reported as untreated wastewater.

3.19 Turkey

A total of 32 coastal towns with a resident population of 4,610,500 people were reported. Increases of seasonal population were reported. However, like for other countries included in this study, when adding the population served with a treatment plant to the remaining population which is supposed to be served at least by a sewage network, the figure obtained is below the resident population reported

Such unusual situation not always can be explained by accepting that a sector of the population is using septic tanks or other similar methods of wastewater disposal. Therefore, a revision of the information is recommended.

Data collection on seasonal population peaks due to the arrival of tourists is difficult and therefore it is possible that during summer time, the actual population to receive services could be much higher than the figures reported

A total of 11 wastewater treatment plants were found (34%) and the total population served by such plants reached the figure of 1.138.000 persons, or 25 % of the total population reported.

No wastewater treatment plant was reported for the remaining six towns having a population of 3.467.000 resident persons. This figure represents 75% of the total population served. The town of Izmir is included into this group. It was assumed that such towns were having access to at least a piped sewage network.

No information was available for 15 towns (47%).

With regard to the kind of wastewater treatment used, out of the eleven plants reported, 10 of them were classified as primary treatment plants (90%). The remaining plant was classified as being a secondary treatment plant (10%).

424,007 cubic metres of treated wastewater per day were reported, representing 43% of the total produced, (974,931 cu.mt./day). The untreated wastewater recorded was equal to 550,924 cu.mt/day, or 57% of the total. The average figures of wastewater produced per capita per day were equal to 0,37 cu.mt for treated water and of 0,16 cu.mt. for untreated wastewater.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

- a) The Study clearly indicates that in spite of the efforts of Mediterranean countries to improve their information system, there are still important gaps to overcome. Among the most important ones detected are:
- Inaccurate population data, or existing information not updated, especially the one concerning seasonal increases of population.
 - Incomplete or diffuse information on the generation of wastewater treated or untreated.
 - Insufficient information concerning the kind of services being provided to the population. For example: exact population serviced by treatment plants, by a sewage network only, by other disposal systems; or simply information on the kind of treatment plants in operation, (primary, secondary or tertiary).
 - Data on the year of construction of plants was also incomplete. This information is needed for up-grading services and re-dimensioning systems according to the present needs.
- b) Acknowledgment has to be made to the work accomplished by the national MED POL Coordinators to overcome the constraints encountered. Thanks to their efforts, enough data could be gathered to permit this analysis.
- c) The importance of maintaining the most recent data on the population can not be overemphasised. This information is of vital importance for:
- the design of new wastewater disposal systems;
 - monitoring the functioning of existing systems;
 - evaluating the performance of existing systems;
 - maintaining an "alert mechanism" permitting early detection of any pollution risk of the marine environment and thus protecting the population involved.
- d) Recording of seasonal population movements is not yet under control. For many countries no information was available. Yet, this information is vital for estimating the "services peaks". It is indispensable for estimating appropriate dimensions of piped networks, of treatment plants, and of the personnel and supplies needed at the time of maximum output of the system units.
- e) Total protection against wastewater discharges requires other studies involving other forms of pollution. For example, the use of septic tanks, the discharges of sludge from treatment plants, and the discharging of wastewater from recreational marine vessels.

4.2 Recommendations

- a) The dispersion of data is probably the main cause of the absence of valuable information needed for the control of the quality of the marine environment. To be able to overcome these constraints, a coordinating mechanism should be created at national levels, and it should be supported by an appropriate legislation covering central, intermediate and peripheral levels.

- b) Collection of accurate data on seasonal variations of population is not an easy task. Therefore, considering that both, the benefits and the problems arising from tourism will impact directly on local population, it is at this level that recording of seasonal population movements should be developed.
- To this effect and under the leadership of community authorities, a local community committee should be created with full responsibility for the management of the marine environment of the locality.
 - Responsibilities of such committee can be of a varied nature, including the monitoring of water uses and water quality, as well as the control of population movement.
 - The participants of such committee can be representatives of the various sectors of the community. For example: managers of tourist establishments, (hotels, motels, restaurants), traffic authorities capable of monitoring movement of vehicles in and out during week-ends and other holidays, airport and airline authorities, etc.
 - The participation of health and environmental authorities is also indispensable.
- c) With regard to the collection of technical data, considering that as a result of privatization a central control of information on wastewater production, treatment and disposal is becoming more and more difficult, the only solution available appears to be to leave the collection of data to the local levels. However,
- in order to avoid the use of many different kinds of technical reports that nobody will be able to put together, it should be the responsibility of the central level, to produce standard forms;
 - the standard forms should be prepared in such a way so as to permit the reporting of each and all kinds of potential situations that could arise at local level.
- d) It is recommended that in order to supplement the present study, similar investigations should be conducted in small Mediterranean coastal towns concerning the following wastewater pollution problems:
- Infiltration of wastewater coming from poorly designed septic tanks constructed in the vicinity of the shorelines.
 - Periodical discharge in the marine environment of the content of septic tanks, (use of vacuum trucks),
 - Periodical discharge of residual pollutant material coming from existing primary, secondary or tertiary treatment plants.
 - Discharge of wastewater from large, medium and small size tourist vessel that can be seen by the thousands along the harbours of tourist towns in the Mediterranean Sea. Some of such vessels have their own wastewater treatment facilities and are supposed to discharge the treated sewage several kilometres away from the shore, but they don't. Some others do not have such facilities and discharge their wastewater right into the marine environment of the harbour, or they wait until a municipal collector is available, (which is not always the case).

The importance of this problem can not be underestimated. One only needs to look at the water quality of the many 'MARINAS' existing in Mediterranean Coastal towns. The degradation of water quality is such that bathing is no longer taking place there but miles away.

- e) The important contribution of large coastal towns to the modifications to the marine environment has to be acknowledged. The large urban agglomerations along the Mediterranean Sea of countries like Spain, Italy, Greece, Turkey, Egypt and Tunisia play a fundamental role in the equilibrium of the marine ecosystem.

Therefore, special attention and special control is needed for such situations.

ANNEX

WASTEWATER TREATMENT FACILITIES

DI = discharge directly into the sea
SO = discharge through a submarine outfall
SS = discharge through many small submarine outfalls
RB = discharge is reused

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ALGERIA (1)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Ain Benian	35.7	20.0		35.7	No					4,290.0	DI	
Ain Taya	21.6	50.0		21.6	No					2,592.0	DI	
Ain Temouchent	49.8	20.0	49.8		*Yes	1962	Secondary			5,977.0	DI	
Ain Turk	21.4	60.0	11.0	10.4	*Yes	1975	Secondary			2,554.0	DI	
Algiers	1,860.0	5.0	1,822.0	38.0	Yes	1987	Secondary			253,000.0	RD+DI	Hot Spot.
Annaba	388.5	30.0	349.6	38.9	Yes	1978	Lagoon	23,310.0	RD + DI	72,310.0	RD + DI	hot spot
Aokas	11.8	80.0	6.0	5.8	*Yes	1984				1,424.0	DI	
Arzew	41.0	5.0		41.0	No					4,923.0	DI	
Azeffoum	14.0	80.0		14.0	No					1,681.0	DI	
Bejaia	150.8	20.0	146.3	4.5	Yes	1985	Secondary	6,000.0	DI	23,000.0	RD+DI	hot spot
Beni-Haoua	12.7	10.0		12.7	No					1,527.0	DI	
Beni-Saf	32.1	10.0		32.1	No					3,857.0	DI	
Bordj El Bahri	19.0	40.0		19.0	No					2,282.0	DI	
Bord El Kiffan	61.0	20.0		61.0	No					7,324.0	DI	
Bou Ismail	27.0	10.0		27.0	No					3,249.0	DI	
Bou Merdes	22.3	30.0		22.3	No					2,681.0	DI	
Cherchell	33.2	10.0		33.2	No					3,992.0	DI	
Collo	24.5	70.0		24.5	No					2,934.0	DI	
Dellys	24.9	50.0		24.9	No					2,989.0	DI	
Douaouda + Kolea	49.6	30.0	39.5	10.1	Yes	1987	Secondary	474.0		1,211.0	RD	
El Aouana	12.7	70.0		12.7	No					1,529.0	DI	
El Kala	19.5	250.0	17.6	1.9	*Yes	1987	Secondary			2,342.0	DI	
Algeria (1)	2,933.1		2,441.8	491.3				29,784.0		407,668.0		
(*) Plant out of service												

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ALGERIA (2)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
El-Harrach	47.7	10.0		47.7						5,724.0	DI	
Foulka	26.7	10.0		26.7						3,212.0	DI	
Chazaouet	50.6	30.0		48.0	No					9,272.0	RD+DI	hot spot
Gouraya	13.6	10.0		13.6						1,629.0	DI	
Hadjout	33.3	5.0		33.3						3,999.0	RD	
Jijel	69.8	30.0		67.7	No					8,372.0	DI	
Mers El Kebir	11.4	<5.0		9.2	No					1,375.0	DI	
Mostaganem	116.6	25.0		109.6	No					17,192.0	DI	hot spot
Oran	708.4	40.0	651.7	56.7	*Yes					98,000.0	DI	hot spot
Skikda	175.0	30.0		168.0	No					37,000.0	RD+DI	hot spot
Staouali	23.7	60.0	22.5	1.2	Yes		Secondary	RD	269.0	143.0	DI	
Tenes	26.5	10.0		26.5						3,179.0		
Tichy	11.0	70.0	9.9	1.1	Yes	1977	Secondary			1,322.0	DI	
Tipaza	15.8	150.0		12.6	No					1,895.0	DI	
Zeralda	20.5	80.0	20.5		*Yes	1977	Primary			2,458.0	DI	
Ziama Mansouriah	12.9	80.0		11.6	No	1977	Primary			1,544.0	DI	
Algeria (2)	1,363.5		704.6	633.5				269.0		196,316.0		
Algeria (1)	2,933.1		2,441.8	491.3				29,784.0		407,668.0		
Total for ALGERIA	4,296.6		3,146.4	1,124.8				30,053.0		603,984.0		
(*) Plant out of service												

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: CROATIA**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Dubrovnik	50.0	17.0	45.0	5.0	Yes		Primary		SO +SS			hot spot
Makarska	11.9	100.0	8.9	3.0	Yes	1979	Primary	2,600.0	SO	650.0	SS	hot spot
Primosten (*)	2.0	200.0	1.6	0.9	Yes	1988	Primary	1,200.0	SO	300.0	SS	hot spot
Pula	63.9		56.0	7.9	Yes	1986	Primary		SO+SS			hot spot
Rijeka	206.2	4.0	185.0	21.2	Yes	1994	Primary	41,000.0		16,000.0		hot spot
Rovinj	11.3	310.0	7.0	4.3	Yes	1985	Primary	1,200.0	SO	4,900.0	DI+SS	hot spot
Sibenik	60.0	10.0		48.0	No		None				SS	hot spot
Solin	13.0				No		None			8,500.0	DI	hot spot
Split	350.0	3.0		180.0	No		None			45,000.0		hot spot
Susak (*) (**)	0.5	200.0		80.0	No		None			4,000.0	DI	hot spot
Zadar	136.6	10.0			No		None			12,750.0	SS	hot spot
Total for CROATIA	905.4		303.5	350.3				46,000.0				

(*) Included due high seasonal population increase.

(**) Including the islands of Ilovik and Unije.

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: CYPRUS**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Famagusia (Greater Area)	29.0	110.0	12.0	17.0	Yes		Secondary	2,140.0	RB	6,055.0	SS	LBS
Lamaca	55.0	9.0	46.0	9.0	Yes	1997	Secondary	1,500.0	RB			hot spot
Limassol	130.0	8.0	89.0	41.0	Yes	1995	Tertiary	10,000.0	RB		SS	hot spot
Paphos	13.0	100.0		13.0	No		None					hot spot
Total for CYPRUS	227.0		147.0	80.0				13,640.0		6,055.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: EGYPT**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Alexandria	3,328.0	1.6	2,300.0	1,028.0	Yes	1994	Primary	75,000.0	Lake+DI			AGOSD
Baitim	34.0	2.4		34.0	Under Construction		Secondary	10,000.0	DI			NOPWSD
Burg el Arab	41.0	3.0		41.0	No							NOPWSD
Dumya (Damietta)	118.0	3.0	118.0		Yes	1994	Secondary	60,000.0	Lake			NOPWSD
El Arish	100.0	2.4	100.0		Yes	1982	Secondary	3,500.0	Desert			Governorate
El Daba	38.0	3.7		38.0	No							AGOSD
Hammam	33.0	4.8		33.0	No							AGOSD
Marsa Matruh	87.0	2.2		87.0	Under Construction		Secondary	50,000.0	RB			NOPWSD
Port Said	495.0		495.0		Yes	1997	Secondary	190,000.0	Lake			NOPWSD
Rashid (Rosetta)	69.0	2.5		69.0	Under Construction		Secondary	20,000.0	RB			NOPWSD
Sidi Barrani	20.0	3.6		20.0	No							NOPWSD
Total for EGYPT	4,363.0		3,013.0	1,350.0				408,500.0		0.0		
AGOSD	Alexandria General Organization for Sanitary Drainage											
NPOWSD	National Organization for Potable water and Sanitary Drainage											

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: FRANCE (1)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+New	Network								
Adge	14.4	76.5	115.0		Yes		Secondary	19,444.0				LBS
Ajaccio (Corsica)	55.3	54.0	62.0		Yes		Secondary	15,278.0	SO			LBS
Antibes	68.1	71.0		110.0	No		None			40,555.0		LBS
Banyuls-sur-Mer	10.9											
Bastia (Corsica)	45.1	3.0	13.0	32.1	Yes		Secondary	1,073.0		2,760.0		LBS
Berre L'Etang	12.6	10.0	14.0		Yes		Secondary	2,222.0				LBS
Cagnes sur mer + others	51.0	234.0	165.0		Yes		Secondary	20,555.0	SO			LBS
Cannes	144.0	123.0	150.0		Yes		Primary	49,700.0	SO			Hot Spot
Chateauf-neuf-les Martigues	10.2	5.0	10.5		Yes		Secondary	1,667.0				LBS
Frejus	65.0	128.0	175.0		Yes		Primary	25,000.0	SO			Hot Spot
Frontignan	15.0											
Hyeres + Carqueiranne	50.9	127.0	102.0		Yes		Secondary	16,111.0	SO			LBS
Istres	34.6	4.0	34.6		Yes		Secondary	4,444.0				LBS
La Ciotat	31.7	135.0	73.0		Yes		Secondary	10,555.0				LBS
La Garde Freinet	20.0											
La Seyne-sur-Mer	58.1	43.0		80.0	No		None			11,944.0		LBS
Mandelieu	14.0											
Manuglio + Perols	16.0	188.0	41.2		Yes		Secondary	4,722.0				LBS
Marignane + Gignac + others	44.9	6.0	41.5		Yes		Secondary	7,778.0				LBS
Marseille	900.0	5.0	900.0		Yes		Primary	260,000.0	SO			Hot Spot
Martigues + others	67.3	21.0	73.0		Yes		Secondary	11,388.0				LBS
Mauguio	10.0											
Menton	25.4	216.0		70.0	No					7,500.0		LBS
France (1)	1,764.5		1,969.8	292.1				449,937.0		62,759.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: FRANCE (2)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Miramas + St. Chamas	26.3	3.0	24.0		Yes		Secondary	2,500.0				LBS
Montpellier + surroundings	228.0	5.0	225.0		Yes		Secondary	77,778.0				LBS
Narbonne sur Plage	43.0											
Nice + (St. Andre, La Trinite)	352.0	20.0	400.0		Yes		Secondary	138,890.0	SO			LBS
Port Saint Louis-du-Rhone	10.4	12.0		10.0	No		None			1,667.0		LBS
Port de Bouc	20.0											
Roquebrune-cap-Martin	12.6	165.0		25.0	No		None			3,889.0		LBS
Saint-Laurent du Var + others	39.5	16.0	40.0		Yes		Secondary	11,389.0				LBS
Saint Raphael	24.0											
Sainte Maxime	10.0											
Sanary-sur-mer + Bandols	18.4	27.2	40.0		Yes		Secondary	8,055.0	SO			LBS
Sete + Frontignan + others	62.7	51.0	91.0		Yes		Secondary	14,444.0	SO			LBS
Six-Fours-la-Plage	28.7	116.0		60.0	No		None			8,889.0		LBS
Toulon + others	234.9	13.0	350.0		Yes		Primary	39,444.0	SO			LBS
Vallauris	21.2	82.0	36.0		Yes		Secondary	6,944.0				LBS
Villefranche-sur-Mer	100.9											
Vitrolles	27.1	8.0	29.0		Yes		Secondary	10,277.0		14,445.0		LBS
France (2)	1,259.7		1,235.0	95.0				309,721.0		28,890.0		
France (1)	1,764.5		1,969.8	292.1				449,937.0		62,759.0		
Total for FRANCE	3,024.2		3,204.8	387.1				759,658.0		91,649.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: GREECE (1)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Aigio	22.3	35.0	12.0	10.3	Yes			960.0		1,458.0	R	LBS
Alexandria	16.0	0.0	16.0		Yes			2,300.0				LBS
Alexandroupoli	45.0	11.0	21.0	24.0	Yes		Secondary	1,260.0		1,140.0		LBS
Amaliada	18.0	39.0		18.0	No		None	0.0		?		LBS
Athens, Greater Area	3,345.0		3,345.0		Yes		Primary	660,000.0	SO + DI	?	?	Hot Spot
Chania	50.2	20.0	30.0		Yes			8,640.0				LBS
Chios	23.4	2.0	7.2	16.2	Yes			3,496.0		849.0		LBS
Corfu	39.9	53.0	48.9	12.1	Yes			8,800.0		7,145.0		LBS
Elefsina	23.0	0.0	23.0		Yes			3,312.0				LBS
Ermoupoli	14.7	22.0	18.0	4.0	Yes			2,590.0		1,928.0		LBS
Haikida	55.0	45.0	32.0	23.0	Yes		Secondary	1,601.0		1,810.0		LBS
Heraklio	117.0		540.0	360.0	Yes	1996	Tertiary	12,000.0	SO	8,000.0		Hot Spot
Ierapetra	13.0	54.0	13.0		Yes			2,900.0				LBS
Kalamata	43.6	15.0	35.0	8.6	Yes		Secondary	5,249.0	SO	1,951.0		LBS
Kalymnos	16.4	8.3		16.4	No		None	0.0		958.0		LBS
Katerini	39.1	33.0	18.2	20.9	Yes		Secondary	1,224.0		2,066.0		LBS
Kavala	55.7	6.0	59.0		Yes		Secondary	6,848.0				LBS
Kerkyra	37.0		37.0		Yes			8,800.0				
Komotini	40.1	2.0	40.1		Yes			5,900.0				LBS
Korinthos	30.0	67.0	60.0		Yes		Secondary	7,200.0				LBS
Kos	15.5	190.0	17.0	10.0	Yes		Secondary	1,799.0	SO	1,112.0		LBS
Lavrio	10.6	4.0	10.6		Yes			1,580.0				LBS
Loutrakl	11.2	614.0	68.7		Yes			11,540.0				LBS
Greece (1)	4,081.7		4,451.7	523.5				757,999.0		28,417.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: GREECE (2)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Markopoulo	10.4	478.0	18.5		Yes			8,640.0				LBS
Megara	20.1	24.0		25.0	No		None		2,660.0			LBS
Messolonghi	13.0		18.0		Yes		Secondary	SO				Hot Spot
Mytilini	27.0	48.0		34.0	No		None		19,202.0			LBS
Nafpaktos	11.0	82.0	14.0		Yes			2,880.0				LBS
Nauplio	11.0		11.0		Yes			2,000.0				LBS
Nea Makri	13.1	513.0	65.0		Yes			11,520.0				LBS
Patras	155.0		180.0		Yes			22,320.0			SS	Hot Spot
Preveza	15.0	30.0	8.5	11.5	Yes			2,590.0		3,500.0	DI	Hot Spot
Pylos	11.9	14.0		13.5	No		None					LBS
Reithymno	23.4	71.0	9.0	23.0	Yes			5,760.0		14,401.0		LBS
Rhodes	43.0	179.0	14.0	16.0	Yes		Secondary	SO	5,520.0			LBS
Salamina	21.0			21.0	No							
Syros	16.0			16.0	No							
Thessaloniki Greater Area	1,330.0		850.0	480.0	Yes		Secondary	SO	69,000.0	22,700.0	DI	Hot Spot
Thira	19.0	32.0		7.5	No		None			774.0		LBS
Volos and Nea Ionia	77.0		96.0		Yes		Tertiary	NA	15,000.0			Hot Spot
Greece (2)	1,816.9		1,284.0	647.5				148,420.0		68,757.0		
Greece (1)	4,081.7		4,451.7	523.5				757,999.0		28,417.0		
Total for GREECE	5,898.6		5,735.7	1,171.0				906,419.0		97,174.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ISRAEL**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Akko	46.0		46.0		Yes	1993	Primary	12,000.0	SO			Hot Spot
Ashdod	71.0		122.0		Yes		Secondary	20,000.0	RB	No	No	
Ashqelon	55.0		82.0		Yes		Secondary	17,000.0	RB	No	No	
Bat Yam (Shaftdam)	132.0		?		Yes	1980	Sec+ Tert.			No	No	
Hadera	41.0		61.0		Yes	1997	Tertiary		RB + D	No	No	
Haifa	223.0		300.0		Yes	1965	Secondary	95,000.0	RB + RD	No	No	
Herzliya	69.0		84.0		Yes		Secondary	15,000.0	RB + Soil	No	No	
Nahariyya	37.5		37.5		Yes	1991	Primary	10,000.0	SO			Hot Spot
Netanya	112.0		145.0		Yes		Secondary	35,000.0	RB	No	No	
Tel-Aviv	1,100.0		1,100.0		Yes	1985	Secondary	1,500.0	SO			Hot Spot
Total for ISRAEL	1,886.5		1,977.5					205,500.0				

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY (1)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m ³ /day)	Discharge of Treated Wastewater	Wastewater Untreated (m ³ /day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netwr	Network								
Aci Castello (Sicily) (****)	18.0	90.0		18.0	No							
Acireale (Sicily) (****)	46.2	100.0		50.0	No							
Agrigento	55.2	80.0	25.0	30.2	Yes	1996	Prim+Sec.	4,000.0	DI	6,000.0	DI	Region
Agropoli	18.0	80.0		18.0	No					6,000.0	SO	Region
Alassio (****)	11.6	100.0	22.0		No							Region
Albenga (****)	22.0	100.0	35.0		(***)		Secondary					
Albissola Marina (****)	5.9	100.0	12.0		(****)		Secondary					
Alghero (Sardinia)	39.0	100.0		39.0								
Amalfi	5.6	100.0		6.0	No					3,500.0	DI	Region
Amantea	12.0	150.0	12.0		Yes	1982-90	Prim+Sec.	2,678.0	DI	3,500.0	DI	Region
Ancona	101.3	100.0	65.0	36.3	Yes	1984	Pri+Sec+Ter.	41,500.0	DI	8,500.0	DI	Region
Anzio	33.5	100.0		40.0								
Arenzano (*)	11.2	90.0	12.0		(*)		Secondary					Genova
Augusta (Sicily)	34.2	80.0		34.2	No				NA	120,000.0	DI	Hot Spot
Avola (Sicily)	31.3	70.0		31.3	No					70,000.0	DI	ISTAT
Bacoli (**)	26.5	100.0	22.0		(**)		Unknown			11,000.0	DI	Region
Bagheria, (Sicily)	47.0	60.0	29.0	18.0	Yes	1980	Primary	15,000.0	DI	9,000.0	DI	Region
Bagnara Calabria	11.0	80.0		11.0	No							
Barcellona Pozzo di Gotto	40.5	70.0	22.0	18.5	Yes	1980-96	Primary	7,000.0	DI	7,000.0	DI	Region
Bari-Barletta	376.0	30.0		376.0	No					5,136,028.0		Hot Spot
Bellaria	12.8	150.0		12.8								
Bisceglie	47.4	55.0	15.0	32.4	Yes	1976	Prim+Sec.	10,000.0	DI	25,000.0	DI	Putignano
Bordighera	11.1	100.0		11.1								
Brindisi	95.0	4.0	50.0	45.0	Yes	1980	Secondary	50,000.0	DI			Hot Spot
Italy (1)	1,112.3		321.0	827.8				130,178.0		5,335,528.0		
(*) Connected Genova Plant												
(**) Connected Napoli Plant												
(****) Connected Savona Plant												
(*****) Under construction												

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY (2)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Unreated (m3/day)	Discharge of Unreated Wastewater	Source of Information
			Plant+Netw	Network								
Cagliari A (Sardinia)	270.0	80.0	230.0	40.0	Yes	1985	Primary	86,400.0	DI	15,000.0	DI	Region
Cagliari B (Sardinia)	550.0	80.0	550.0		Yes	1990	Secondary	172,800.0	DI			Region
Caorle	11.1	90.0	11.0	12.0	Yes	1980	Prim+Sec+Ter	30,000.0	SO	4,000.0	CH	Region
Capo d'Orlando (Sicily) (*)	12.0	70.0	12.0		Yes	1980	Primary	6,000.0	DI			Region
Carfati	9.2	90.0	10.0		Yes	1978	Primary	3,628.0	DI	1,700.0	DI	Region
Carovigno	14.6	65.0	3.2	11.4	Yes	1950	Primay	1,700.0	DI	6,000.0	DI	Putignano
Castel Volturno	15.1	80.0		15.1	No					6,000.0	DI	Region
Castellammare del Golfo	13.5	90.0		13.5	No					10,000.0	DI	Region
Castellammare di Stabia	68.7	100.0		68.7	No					30,950.0	DI	Region
Catania, Sicily	333.0	80.0	170.5	162.5	Yes	1997	Under Constr.			150,000.0	SO + DI	Region
Cattolica	15.1	100.0										
Cecina	24.6	90.0										
Cefalu	13.8	80.0	9.5	4.3	Yes	1980	Primary	4,500.0	DI	3,000.0	DI	Region
Cervia	25.0		25.0		Yes		Tertiary	10,958.0	DI			Hot Spot
Cesenatico	20.4	100.0		20.4								
Cetraro	10.4	90.0	7.0	3.4	Yes	1982	Primary	2,346.0	DI	2,300.0	DI	Region
Chiavari	28.6	100.0		28.6								
Chioggia	53.2	100.0	87.0	16.0	Yes	1990	Prim+Sec.	23,000.0	RD	4,000.0	RD	Region
Ciro Marina	14.1	150.0		15.0	No					8,000.0	DI	Region
Civitanova Marche	37.2	80.0	43.0	7.0	Yes	1975	Primary	30,800.0	DI	5,000.0	DI	Region
Civitavecchia	51.2	90.0		60.0								
Crotone	59.0	80.0	41.6	38.4	Yes	1970	Prim+Sec.	10,000.0	DI	9,000.0	DI	Region
Ercolano (**)	61.2	100.0	61.2		No					5,000.0	DI	Region
Falconara Marittima	30.1	70.0	65.0		Yes	1987	Prim+Sec.	25,500.0	CH			Region
Italy (2)	1,741.1		1,326.0	516.3				407,632.0		259,950.0		

(*) Plant out of service

(**) Connected Napoli Plant

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY (3)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Fano	54.0	100.0	48.6	5.4	Yes	1980	Primary	12,000.0	DI	1,200.0	DI	Region
Finale Ligure (*)	12.7	100.0	25.0		(*)		Secondary					
Follonica	21.4	80.0		21.4								
Forio (Ischia)	11.5	80.0		15.0	No					4,000.0	SO	Region
Formia	35.0	90.0	60.0	10.0	Yes	1997	Prim+Sec	18,000.0	SO	3,000.0	DI	Aurunci
Forte dei Marmi	9.5	90.0		9.5								
Francavilla al mare	21.7	90.0	44.0	6.0	Yes	1974	Prim+Sec	16,000.0	SO	2,000.0	DI	Region
Gaeta	22.3	80.0		40.0	No					6,000.0	DI	Aurunci
Gallipoli	20.0	100.0		35.0	No							
Gela	73.0			73.0	No							Hot Spot
Genova	679.0	2.0	679.0		Yes	1980	Secondary	175,000.0	SO			Hot Spot
Gioia Tauro	18.5	80.0		18.5	No							
Giovinazzo	21.0	65.0	12.0	11.0	Yes	1970	Prim+Sec	5,000.0	DI	5,000.0		Puigiano
Giulianova	22.0	90.0	38.0	7.0	Yes	1970	Prim+Sec	12,000.0	RD	2,000.0	RD	Region
Grado	9.1	100.0	9.9	2.1	Yes	1982/86	Primary	20,000.0	SO	3,000.0	DI	Region
Grottamare	12.8	100.0	12.8		Yes	1987	Prim+Sec	9,000.0	CH			Region
Isole	22.2	900.0	153.0	32.0	Yes	1970	Prim+Sec	50,000.0	RD	10,000.0	RD	Region
Imperia	40.7	100.0		40.7								
Ischia Island	16.0	800.0	59.0	75.0	Yes	1986	Primary	12,000.0		15,000.0	SO	Region
La Maddalena (Sardinia)	11.0	100.0		15.0	No					10,000.0	SO	Env. Minist.
La Spezia	110.0	3.0	42.0	68.0	Yes	1980	Secondary	7,400.0		12,000.0	DI	Hot Spot
Ladispoli	19.3	90.0		30.0								
Lavagna	13.4	100.0	20.0	6.0	Yes	1980	Primary	7,200.0	SO	2,000.0	DI	Province
Italy (3)	1,276.1		1,203.3	520.6				343,600.0		75,200.0		
(*) Connected Savona Plant												

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY (4)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Net	Network								
Leirici	12.2	90.0			(**)		Secondary					
Licata (Sicily)	41.3	80.0		41.3	No					20,000.0	DI	Region
Lipari (Lipari Islands)	10.3	200.0	15.0	30.0	Yes	1980	Primary	3,000.0	DI	3,000.0	DI	Region
Livorno	167.0	2.0	154.0	13.0	Yes	1984	Secondary	30,800.0		3,000.0	DI	Hot Spot
Loano (***)	11.2	100.0	20.0		(***)		Secondary					
Locri	12.7	70.0		12.7	No							
Malfas (Lipari Islands)	0.9	70.0		0.9	No							
Manfredonia	58.0			58.0	No							Hot Spot
Margherita di Savoia	12.4	90.0		12.4	No					13,000.0	DI	Region
Marsala (Sicily)	80.2	100.0	25.0	56.2	Yes	1980	Primary	5,000.0	DI	20,000.0	DI	Region
Massa Lubrense	12.0	90.0		15.0	No					12,000.0	SO	Region
Mazara del Vallo, (Sicily)	47.8	80.0	15.0	32.8	Yes	1980	Primary	3,500.0	DI	8,000.0	DI	Region
Messina, Sicily	231.7	90.0	43.4	188.3	Yes	1970/80	Unknown	17,280.0	DI	75,000.0	DI	Region
Milazzo, Sicily	32.0	5.0	32.0		Yes		Primary		NA			Hot Spot
Mola di Bari	25.8	50.0	15.0	10.8	Yes	1989	Prim+Sec	6,000.0	DI	7,000.0		Putignano
Molfetta	66.8	50.0	30.0	36.8	Yes	1990	Prim+Sec+Ter	12,500.0	DI	18,000.0		Putignano
Mondragone	22.2	90.0		22.2	No					7,500.0	DI	Region
Monopoli	46.7	65.0	25.0	21.7	Yes	1987/88	Prim+Sec+Ter	7,700.0	DI	19,000.0		Putignano
Monte di Procida (*)	12.5	90.0	12.5		(*)		Unknown					Region
Muggia	13.2	70.0	13.2		Yes	1997	Prim+Sec+Ter	15,000.0	SO			
Napoli West			1,448.8		Yes	1986	Prim+Sec	361,324.0	SO	100,000.0	SO	Region
Napoli East (****)	1,067.4		1,750.0		Yes	1986	Prim+Sec		SO	397,440.0	SO	Region
Nettuno	33.8	80.0		50.0								
Oibia, Sardinia	41.0	90.0		41.0	No					10,000.0	RB	E. Ministry
Italy (4)	2,059.1		3,598.9	643.1				462,104.0		712,940.0		

(*) Connected Napoli Plant ---- (**) Connected La Spezia Plant ---- (***) Connected Savona Plant ---- (****) Plant does not work. Revision: 07.12.98

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY (5)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw.	Network								
Orbetello	15.0	90.0		25.0	No							
Ortona	22.6	150.0	28.0	9.0	Yes	1974	Pr+Sec.	8,500.0	RD	2,500.0	RD	Region
Otranto	5.2	150.0	2.3	7.7	Yes	1981	Sec.	1,700.0	DI	4,000.0	DI	
Pachino, (Sicily) (*)	21.4	70.0		21.4	Yes		Unknown			30,000.0	DI	Region
Palermo (Sicily)	698.6	90.0	90.0	608.6	Yes	1996	Pr+Sec.	18,000.0	DI	122,000.0	DI	Region
Palmi	19.1	70.0		19.1	No							
Paola	17.1	90.0		17.1								
Patti (Sicily)	13.0	90.0		10.0	No							
Pesaro	88.7	100.0	79.0	9.7	Yes	1971	Pri.	20,000.0	DI	2,300.0	DI	Region
Pescara	122.2	100.0	80.0	42.0	Yes	1970	Pr+Sec+Ter.	20,000.0	RD	12,000.0	RD	Region
Pietra Ligure (**)	9.6	100.0		15.0	Yes		Secondary					
Pietrasanta	25.0	90.0		25.0								
Pineto (****)	12.0	90.0	78.0		Yes	1970	Pri.+Sec.	25,000.0	RD	5,000.0	RD	Region
Piombino	36.8	90.0		36.8								
Polignano a Mare	15.8	80.0	5.0	10.8	Yes	1980	Sec+Ter	2,700.0	DI	6,000.0	DI	Region
Portici (***)	69.0	70.0	75.0		Yes		Unknown					Region
Porto Empedocle, (Sicily)	17.0	100.0		17.0	No						CH	Region
Porto San Giorgio	16.0	100.0	16.0		Yes	1970	Prim+Sec					Region
Portoferrato (Elba)	11.0	100.0		11.0								Region
Pozzallo (Sicily)	17.2	70.0	13.0	4.2	Yes	1960	Pri.	3,500.0	DI	1,000.0	DI	Region
Pozzuoli (****)	75.1	90.0	80.0		Yes		Unknown					Region
Priolo, (Sicily)	11.5	50.0	68.0	12.0	Yes	1980	Pr+Sec.	30,000.0	SO	5,000.0	DI	Min. Env.
Procida	10.6	100.0	6.6	4.0	Yes	1986	Primary	1,641.0	SO	1,000.0	DI	Region
Italy (5)	1,349.5		541.9	905.4				131,041.0		190,800.0		
(*) Temporarily out of service												
(**) Connected Savona Plant												
(***) Connected Napoli Plant												
(****) Connected Napoli Plant												

Pineto: Population permanent and temporary served by same treatment plant Revision: 07.12.98

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY (6)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Net	Network								
Quartu Sant'Elena (Sardinia)	61.6	80.0	61.6		(*)		Secondary					
Rapallo	27.4	100.0	49.0	5.0	Yes	1980	Primary	10,720.0	SO	1,000.0	DI	Province
Ravenna	135.0		135.0		Yes	1983	Tertiary	37,182.0	DI			Hot Spot
Recco	10.1	100.0	14.0	6.0	Yes	1980	Primary	3,800.0	SO	1,500.0	DI	Province
Reggio Calabria	177.6	70.0		177.6	No							
Riccione	32.9	100.0		32.9								
Rimini	128.0	100.0		128.0								
Riposto (Sicily)	14.0	80.0		15.0	No					7,000.0	DI	
Roseto degli Abruzzi	21.1	90.0	25.0		(**)		Secondary					
Rosignano Marittimo	30.0			30.0								
Sabaudia	14.2	100.0		29.0	No					5,000.0	DI	Region
Salerno	148.9	90.0		148.9							SO	Region
San Benedetto del Tronto	42.6	100.0	45.0		Yes	1977	Pri.+Sec.	45,000.0	CH			Region
San Remo	56.0	100.0		56.0								
Sant'Antioco (Sardinia)	12.3	150.0		12.3	No					3,000.0	DI	Region
Santa Agata di Militello	12.8	90.0	9.6	3.2	Yes	1980	Primary	2,800.0	DI	1,500.0	DI	Region
Santa Margherita Ligure	11.0	100.0	14.7	8.3	Yes	1980	Primary	5,300.0	SO	3,000.0	SO	Province
Santa Marinella	11.8	90.0		15.0								
Savona	73.0	90.0	327.0	63.0	Yes	1990	Prim + Sec.	52,000.0	DI	10,000.0	DI	Region
Sciaccia (Sicily)	38.3	100.0		38.3	No						DI	Region
Senigallia	41.1	100.0	41.1		Yes	1974	Pri.+Sec.	30,000.0	CH			Region
Sestri Levante	20.4	200.0	26.0	14.0	Yes	1980	Primary	8,000.0	SO	4,000.0	DI	Province
Sidero Marina	16.2	70.0		16.2	No							
Italy (6)	1,103.4		748.0	798.7				194,802.0				
(*) Connected Cagliari Plant												
(**) Connected Pineto Plant												

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY (7)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw.	Network								
Silvi (*)	12.7	80.0	15.0		(*)		Unknown	25,000.0	RD			Region
Siracusa, (Sicily)	126.0	100.0	80.0	80.0	Yes	1980	Prim+Sec.	160,000.0	DI	160,000.0	DI	Env.Min.
Sorrento	16.5	100.0		20.0	No					15,000.0	SO	Region
Soverato	10.4	90.0	4.6	5.8	Yes	1986	Primary	2,400.0	DI	3,000.0	DI	Region
Taormina (Sicily)	10.1	300.0		10.1	No					5,500.0	DI	Region
Taranto (**)	232.3	75.0	320.0		Yes	1978/90	Unknown	85,000.0			DI	Region
Termini Imerese (Sicily)	26.5	80.0	9.5	17.0	Yes	1980	Primary	3,000.0	DI	6,500.0	DI	Region
Termoli	28.5	5.0	42.5	7.5	Yes	1980	Prim + Sec.	17,500.0	CH	2,500.0	DI	Region
Terracina	37.0	100.0	20.0	17.0	Yes	1980	Prim+Sec.	5,000.0	DI	5,000.0	DI	Private
Torre Annunziata	52.9	80.0		60.0	No					28,000.0	DI	Region
Torre del Greco	101.4	80.0		150.0	No					49,000.0	SO	Region
Trani	50.4	80.0	30.0	20.4	Yes	1983/90	Pri+Sec+Ter.	8,200.0	DI	20,000.0	DI	Puignano
Trapani (Sicily)	69.5	70.0		75.0	No					20,000.0	DI	Region
Trieste	223.0		173.0	100.0	Yes		Secondary	155,000.0	SO	45,000.0	DI	Hot Spot
Vado Savona	144.0	20.0	133.0	11.0	Yes	1990	Secondary	52,000.0	SO	?		Hot Spot
Varazze	14.2	220.0	10.0	4.2	Yes	1980	Primary	11,220.0	SO	2,200.0	SO	Region
Vasto	32.9	300.0	19.0	14.0	Yes	1982	Pri.+Sec.	7,000.0	RD	5,000.0	RD	Region
Venezia	337.0	80.0	290.0		Yes	1980	Tertiary	130,000.0	DI			Hot Spot
Ventimiglia	25.3	100.0		25.3								
Viareggio	57.5	90.0		57.5								
Vico Equense	19.0	70.0		20.0	No					10,000.0	SO	Region
Vieste	13.3	200.0	10.0	13.3	Yes	1978	Secondary	4,000.0	DI	9,000.0	DI	Puignano
Vietri sui Mare	9.4	90.0		15.0	No						SO	Region
Villa San Giovanni	13.0	90.0		13.0	No							
Villabate (Sicily)	14.9	80.0		15.0	No					6,000.0	DI	Region
Italy (7)	1,877.7		1,156.6	751.1				665,320.0		391,700.0		

(*) Connected Montesilvano Plant

(**) Plant does not work efficiently

Population served by same treatment plant in Taranto Revision: 07.12.98

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: ITALY**

Cities	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Italy (1)	1,112.3		321.0	827.8				130,178.0		5,335,528.0		
Italy (2)	1,741.1		1,326.0	516.3				407,632.0		259,950.0		
Italy (3)	1,276.1		1,203.3	520.6				343,600.0		75,200.0		
Italy (4)	2,059.1		3,598.9	643.1				462,104.0		712,940.0		
Italy (5)	1,349.5		541.9	905.4				131,041.0		190,800.0		
Italy (6)	1,103.4		748.0	798.7				194,802.0		53,000.0		
Italy (7)	1,677.7		1,156.6	751.1				665,320.0		391,700.0		
Total for ITALY	10,319.2		8,895.7	4,963.0				2,334,677.0		6,828,318.0		
Revision: 07.12.98												

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: LEBANON**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Batroun	51.0			51.0	No					6,120.0	SS	Hot Spot
Beirut Greater Area	1,200.0		720.0	880.0	Yes		Primary	87,000.0	SO	105,000.0	SS	Hot Spot
Jounieh	200.0			200.0	No					2,400.0	SS	Hot Spot
Jubayl, (Jbail), (Byblos)	66.0			66.0	No					7,920.0	SS	Hot Spot
Saida - Ghaziye (Sidon)	205.0			205.0	No					24,600.0	DI	Hot Spot
Sour (Sur or Tyre)	181.0			181.0	No					21,720.0	SS	Hot Spot
Tripoli - (Tarabalus)	353.0			353.0	No					42,360.0		Hot Spot
Total for LEBANON	2,256.0		720.0	1,936.0				87,000.0		210,120.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: LIBYA**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw.	Network								
Al Bayda	60.0			60.0								
Al-Brega	75.0		23.0		Yes	1990	Tertiary	3,500.0				
Al Khums	80.0		40.0		Under Construction			8,000.0	?			Min. Housing
Al Qarabulli (Garabulli)	20.0			20.0	No							
Az Zawiyah	200.0		66.0		Under Construction		Tertiary	13,200.0	?			Min. Housing
Benghazi	750.0		300.0		Yes	1975	Tertiary	70,000.0		14,000.0		Hot Spot
Darnah	105.0		47.3		Yes	1987	Tertiary	12,800.0				
Ejdabia	85.0		75.0		Yes		Tertiary	15,000.0		2,000.0		
Misratah	178.0		156.0		Yes		Tertiary	25,360.0				
Sabratah	40.0		35.0		Under Maintenance			6,000.0				
Sirt	108.0		100.0		Under Construction			27,600.0				
Surman	39.0				Under Construction			21,000.0				
Tripoli	1,200.0		960.0		Yes	1982	Tertiary	110,000.0		34,000.0	SS + DI	Hot Spot
Tubruck	90.0		90.0		Under Maintenance			33,000.0				
Zanzour	69.0		40.0		Under Construction		Tertiary	6,000.0				
Zlitan	101.0		26.0		Under Maintenance 1987		Secondary	6,000.0				
Zuwarah	168.0		140.0		Under Construction n. 1987		Secondary	41,000.0				
Total for LIBYA	3,368.0		2,098.3	119.0				398,460.0		50,000.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: MALTA**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	ork Network								
Birzebbuga (?)	6.0											
B'Kara	21.5		21.5		Yes	1983	Tertiary	(*)	RB			
Fgura	11.4			11.4	No					(**)	SO	
Gozo	26.0	5.0		26.0	No					(**)	SO	Hot Spot
Gzira/Ta'Xbiex	10.5			10.5	No					(**)	SO	Env. Dept
Hamrun	13.7		13.7		Yes	1983	Tertiary	(*)	RB			Env. Dept
Manoel Island (?)												
Marsascala	2.2											
Mosta	17.4		17.4		Yes	1983	Tertiary	(*)	RB			Env. Dept
Msida	6.1											
Paola	11.9		11.9		Yes	1983	Tertiary	(*)	RB			Env. Dept
Qormi	18.4		18.4		Yes	1983	Tertiary	(*)	RB			Env. Dept
Rabat	13.2		13.2		Yes	1983	Tertiary	(*)	RB			Env. Dept
S Gwann	12.2		12.2		Yes	1983	Tertiary	(*)	RB			Env. Dept
Sliema	12.3			12.3	No					(**)	SO	Env. Dept
St. Julian's	10.3			10.3	No					(**)	SO	Env. Dept
Valetta	9.2											
Zabbar	13.7			13.7	No					(**)	SO	Env. Dept
Zejtun	11.3			11.3	No					(**)	SO	Env. Dept
Zebbug	10.1		10.1		Yes	1983	Tertiary	(*)	RB			Env. Dept
Total for MALTA	237.4		118.4	95.5				17,000.0		75,000.0		

(*) All these towns are served by the same wastewater treatment plant, which started operating in 1983, and treats about 17,000 cu.mt of wastewater per day.

(**) Towns served by different sewerage networks discharging a total of 75,000 cu.mt of wastewater per day through submarine outfalls. Two in Malta: ic-Cumnija and Wied Ghammieg, and one at Ras il-Hobz in Gozo.

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: MONACO**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m ³ /day)	Discharge of Treated Wastewater	Wastewater Untreated (m ³ /day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Total for MONACO (*)	30.0	20.0	30.0		Yes	1987	Sec+Biolog	18,500.0	SO	0.0	0.0	Envir. Serv.

(*) Revised Dec/98

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: MOROCCO**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Al-Hoceima	112.0			72.0	No					4,195.0	DI	Hot Spot
Nador	246.0		160.0	86.0	Yes		Tertiary	8,100.0	DI	4,340.0	DI	Hot Spot
Tanger	526.0			373.0	No					33,123.0	DI	Hot Spot
Tetouan	367.0			283.0	No					27,996.0	DI	Hot Spot
Total for MOROCCO	1,251.0		160.0	814.0				8,100.0		69,654.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: SLOVENIA**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Izola	13.0	19.0		12.0	No					3,520.0	SS	Hot Spot
Koper	46.0	10.0	25.0	21.0	Yes	1992	Primary	7,800.0		2,600.0	DI + SS	Hot Spot
Piran	17.0	86.0	15.0	2.0	Yes		Primary	3,753.0	SO	600.0		Hot Spot
Total for SLOVENIA	76.0		40.0	35.0				11,553.0		6,720.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL COUNTRIES
Country SPAIN (1)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant	Network								
Adra	19.0											
Aguilas	23.0											
Albaniaoraya	11.1	45.0	16.1		No		0.0			2,389.0		LBS
Algeciras	97.0											
Alicante	266.0											
Almassora	15.3	0.0	15.3		No					3,083.0		LBS
Almeria	157.0											
Almunezar	18.0											
Altea	12.0											
Arenys de Mar	10.0											
Badalona	223.0											
Barcelona	1,694.0											
Benalmadena	28.9	346.0	128.9		Yes		14,057.0	SO		0.0		LBS
Benicarlo	17.0											
Benidorm	66.0											
Bianes	22.0											
Burriana	25.0											
Calella de la Costa	16.0											
Calpe	10.0											
Calvia	33.9	42.0	81.0	46.0	Yes		12,750.0			7,001.0		LBS
Cambrils	14.0											
Canet de Mar	23.5	187.0	67.5		Yes		6,583.0					LBS
Campello	10.0											
Cartagena	168.6	55.0	230.0	17.6	Yes		37,500.0			2,778.0		LBS
Castelldefels	27.6	315.0	10.3	92.9	Yes		897.0	SO		8,075.0		LBS
Castellon de la Plana	134.0		129.8		Yes		25,974.0					LBS
Ceuta	65.0											
Ciudadela (Menorca)	19.4	105.0	39.9		Yes		4,917.0	SO		0.0		LBS
Spain (1)	3,226.3		687.4	187.9			102,678.0			23,326.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: SPAIN (2)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Cullera	19.2	521.0		119.2	No		None			716.7		LBS
Deltebre	10.2	29.0		13.2	No		None			2,278.0		LBS
Denia	23.2	862.0		223.2	No		None			11,306.0		LBS
Eivissa	28.6	145.0	71.0		Yes		Secondary	SO				LBS
El Vendrell	13.3	330.0	69.6		Yes		Primary	SO				LBS
Estepona	34.4	35.0	46.4		Yes		Secondary	SO				LBS
Fuengirola	42.8	105.0	87.8		Yes		Secondary	SO				LBS
Gandia	51.5	388.0	251.5		Yes		Secondary	SO				LBS
Ibiza	29.0											
Javea	13.0	1,000.0		143.0	No		None			6,723.0		LBS
La Linea de la Concepcion	59.3	8.0	63.0		Yes		Secondary	SO				LBS
Lloret de Mar	14.8	1,014.0		164.8	No		None			8,501.0		LBS
Mahon (Menorca)	22.2	49.0		32.3	No		None			494.4		LBS
Malaga	502.0	29.0		765.3	No		None			165,124.0		LBS
Malgrat de Mar	72.6	201.0		218.6	No		None					LBS
Malltaaro Systeme	127.2	42.0	181.2		Yes		Secondary	SO				LBS
Marbella	82.7	103.0	121.0	46.7	Yes		Secondary	SO		4,917.0		LBS
Masama Greecell	12.0			12.0	No		None			2,250.0		LBS
Masnou	15.0											
Mataro	100.0											
Mellilla	53.0											
Motril	44.0	182.0		124.0	No		None					LBS
Spain (2)	1,370.0		891.5	1,862.3					80,254.0			
										15,833.0		LBS
										218,143.1		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: SPAIN (3)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+New	Network								
Nerja	13.8	231.0	4.4	36.8	Yes		305.0		2,666.0			LBS
Nules	11.2	9.0		12.1	No				2,111.0			LBS
Oliva	20.0	500.0	120.0		Yes		7,334.0					LBS
Palafugell (Système Palamos)	33.5	440.0	181.0		Yes		11,195.0					LBS
Palamos	12.0											
Palmas de Mallorca	320.0	221.0	444.0		Yes		81,280.0					LBS
Pineda	14.0											
Playa Castell de Agro	21.1	667.0	21.1	141.0	Yes		738.4		4,923.0			LBS
Pollenca	12.5	140.0	29.8		Yes		3,361.0					LBS
Prat de Llobegat	62.7	8.0		67.7	No				1,361.0			LBS
Premia de Mar (Système)	48.6	165.0		122.0	No							LBS
Puzol	12.0	25.0		15.0	No				2,334.0			LBS
Roquetas de Mar	25.2	250.0	88.2		Yes		7,500.0					LBS
Sagunto (El Puerto de)	31.9	9.0	23.2		Yes		69,127.0					LBS
San Adrian del Besos	34.0											
San Antonio Abad (Ibiza)	10.4	313.0	33.0		Yes		3,723.0	SO				LBS
San Carlos de la Rapitaly	10.3	195.0		30.3	No				2,889.0			LBS
Santa Coloma de Grammanet	141.0											
Santa Eulalia del Rio	13.0	392.0	56.0		Yes		5,139.0	SO				LBS
San Feliu de Guixols	15.0											
San Javier	13.5	668.0	32.4	57.6	Yes		1,945.0		3,500.0			LBS
San Pedro del Pinatar	10.9	367.0	50.9		Yes		3,194.0	SO	0.0			LBS
San Pere de Ribes	11.6	60.0	8.8	7.9	Yes		1,516.0		1,344.0			LBS
Santa Pola	13.6	809.0	123.6		Yes		8,223.0					LBS
San Roque	23.1	43.0	3.3	26.5	Yes		417.0		3,611.0			LBS
Spain (3)	934.9		1,219.7	516.9			204,997.4			24,739.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: SPAIN (4)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Sitges	11.8	481.0	17.0	39.8	Yes		Secondary	1,366.0	SO	3,189.0		LBS
Tabernes de la V.	16.0	156.0	41.0		Yes		Secondary	4,028.0				LBS
Tarifa	15.9	13.0	3.7	14.2	Yes		Primary	250.0		972.0		LBS
Tarragona	109.6	137.0		259.6	No		None			35,892.0		LBS
Torre Vieja	18.5	813.0	75.8	75.8	Yes		Secondary	5,585.0		5,583.0		LBS
Torrox	10.0											
Valencia	753.0	41.0	1,038.6		Yes		Secondary	181,111.0				LBS
Velez - Malaga	50.6	69.0		57.7	No		None			7,389.0		LBS
Viladecans (Gava ..)	130.2	41.0	184.2		Yes		Secondary	29,697.0				LBS
Vilanova i la Geltru	44.7	136.0	100.4		Yes		Primary	11,696.0	SO			LBS
Vilasar de Mar	10.0											
Vilaseca i Salou	20.5	1,124.0		250.5	No		None			12,557.0		LBS
Villajoyosa	21.4	374.0		101.4	No		None			8,278.0		LBS
Vinaroz	17.5	200.0		52.5	No		None			4,667.0		LBS
Spain (4)	1,229.7		1,460.8	851.5				233,733.0		78,527.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: SPAIN**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+netw	Network								
Spain (1)	3,226.3		687.4	187.9				102,678.0		23,326.0		
Spain (2)	1,370.0		891.5	1,862.3				80,254.0		218,143.1		
Spain (3)	934.9		1,219.7	516.9				204,997.4		24,739.0		
Spain (4)	1,229.7		1,460.8	851.5				233,733.0		78,527.0		
Total for SPAIN	6,760.9		4,259.4	3,418.6				621,662.4		344,735.1		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: SYRIA**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Banias	143.0	100.0		143.0	No							
Hwaez, Burg Islam	10.0			10.0	No		None			194.0		LBS
Jableh	167.0	60.0		167.0	No					25,017.0	SS	Hot Spot
Karfis, Senao	13.0			13.0	No		None			44.0		LBS
Lattakia	746.0	30.0		500.0	No					112,028.0	SS	Hot Spot
Maitan al Sahel	10.0			2.0	No		None			972.0		LBS
Tartous	319.0	15.0		164.0	No					47,873.0	SS	Hot Spot
Total for SYRIA	1,408.0			999.0						186,128.0		

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: TUNISIA**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Ajlm (Jerba)	92.0		92.0		Yes	(*)		11,800.0	SS+15%RB			APAL
Bizerfe	400.0		400.0		Yes	1997	Secondary	26,600.0	DI			APAL
Gabes	150.0		92.0	58.0	Yes	1995	Tertiary	8,625.0	SO+1%RB	6,635.0		APAL
Ghar El Melh	35.0	5.0		8.0	No				DI	1,600.0		Hot Spot
Ghannouche	10.9				No							APAL
Hammamet	10.9		8.7	2.2	Yes	1980	Secondary	7,593.0	DI	1,848.0	RB	APAL
Kelibia	28.0		28.0		Yes	1976	Secondary	4,059.0	RD+DI			APAL
Korba	30.0				No							APAL
Ksour Essaf	22.0				No							APAL
La Goulette	10.9				No							APAL
Mahdia	41.0		41.0		Yes	1995	Secondary	3,170.0	DI	8.0	RB	APAL
Mahres	11.0		11.0		Yes	1994	Secondary	409.0	DI	2.0	RB	APAL
Menzel Bourguiba	17.0		17.0		Yes	1997	Secondary	1,500.0				APAL
Menzel Temime	27.0				No							APAL
Moknine	10.9		10.9		Yes	1986	Secondary	3,899.0		232.0	RB	APAL
Monastir	213.0		175.0	38.0	Yes	(**)	(*)	7,853.0	SO	1,727.0	RB	APAL
Nabeul	10.9		9.4	1.5	Yes	1980	Secondary	11,077.0	SO	1,853.0	RB	APAL
Sfax	395.0		229.0	98.0	Yes	1983	Secondary	24,272.0		10,000.0		Hot Spot
Soliman	19.0		19.0		Yes	1983	Secondary	1,983.0	RD	42.0	RB	APAL
Sousse	340.0		272.0	68.0	Yes	1979	Secondary	22,549.0	SO	5,610.0	RB	APAL
Tabarka	11.0		5.5	5.5	Yes	1993	Secondary	1,750.0	RD + DI	1,723.0	RB	APAL
Tunis	1,700.0		1,309.0	391.0	Yes	?	(*)	137,016.0	DI	40,706.0	RB	APAL
Zarzis	55.0		55.0		Yes	1992	Secondary	4,350.0	DI	3,000.0	RB	APAL
Total for TUNISIA	3,640.5		2,774.5	670.2				278,515.0				

(*) If includes several small treatment plants using different treatment methods, (Biological Digestion, Stabilization Ponds, Aerated Lagoons, Activated Sludge, etc).

(**) Constructed between 1962 - 1995

**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Country: TURKEY (1)**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Alanya	52.0	70.0	57.0		Yes	Primary	22,861.0	SO				LBS
Aliaga	25.5											
Anamur	37.3											
Antalya Main City	506.0		506.0		No	Prim+Sec			80,938.0	SO		Hot spot
Ayvalik	25.0	0.0		26.0	No	None					SO	LBS
Bahce	16.0											
Bodrum	21.0	519.0	130.0		Yes	Primary	53,944.0	SO				LBS
Bozyazi	22.0											
Burhaniye	21.8		21.8		Yes	Primary		SO				
Canakkale	54.0	42.0	77.0		Yes	Primary	27,305.0	SO				LBS
Cesme	28.0	1,287.0	386.0		Yes	Primary	169,444.0					LBS
Dalaman	15.0											
Dikli	10.0	290.0	40.0		Yes	Primary	16,511.0	SO				LBS
Dortyol	47.1											
Edremit	35.5											
Erdemli	108.0			108.0	No							
Fethiye	37.0	21.0	45.0		Yes	Primary	27,361.0	SO	17,428.0			Hot Spot
Finike	6.7											LBS
Gazipasa	13.7											
Iskenderun	154.8											
Izmir	2,018.0			2,018.0	No							
Kumluca	17.2											
Kusadasi	32.0	525.0	200.0		Yes	Primary	41,666.0	SO				Hot Spot
Turkey (1)	3,303.6		956.8	2,658.0			359,092.0		421,200.0			LBS

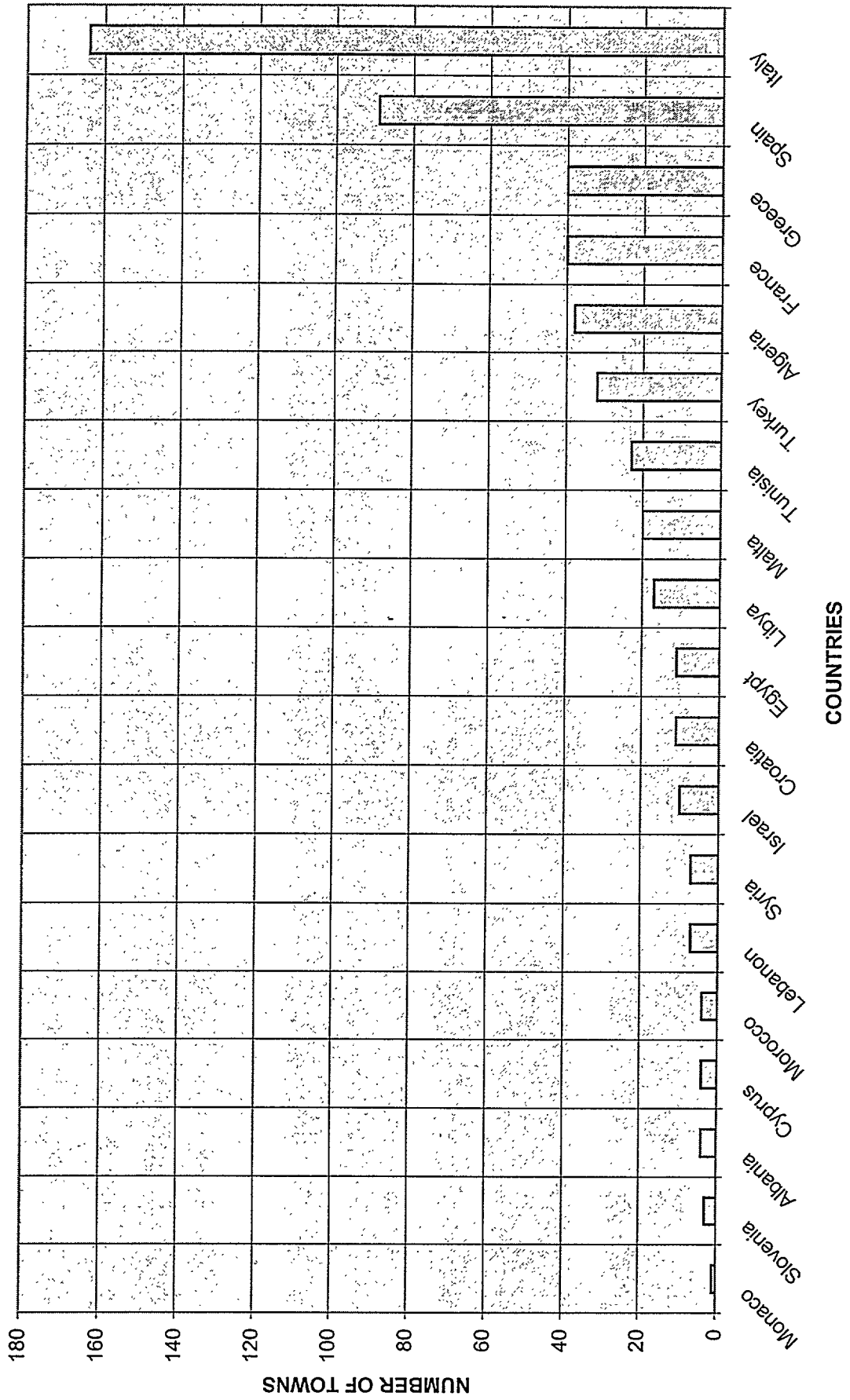
**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
TURKEY**

City	Permanent Population (*1000)	Seasonal Increase (%)	Population Served (*1000)		Waste water Treatment Plant	Year of Construction	Degree of Treatment of Wastewater	Wastewater Treated (m3/day)	Discharge of Treated Wastewater	Wastewater Untreated (m3/day)	Discharge of Untreated Wastewater	Source of Information
			Plant+Netw	Network								
Manavgat	38.5		39.2		Yes		Secondary	15,855.0				
Marmaris	28.0	300.0	122.0		Yes		Primary	46,000.0	SO			
Mersin	685.0			632.0	No					101,173.0		Hot Spot
Samandag	29.9											
Serik	23.1											
Silifke	129.0											
Tarsus	333.0		20.0	64.0	No					10,281.0		Hot Spot
Yakacik	29.0			113.0	Yes	1994	Primary	3,060.0		18,270.0	DI	Hot Spot
Yenihisar	11.4											
Turkey (2)	1,306.9		181.2	809.0				64,915.0		129,724.0		
Turkey (1)	3,303.6		956.8	2,658.0				359,092.0		421,200.0		
Total for TURKEY	4,610.5		1,138.0	3,467.0				424,007.0		550,924.0		

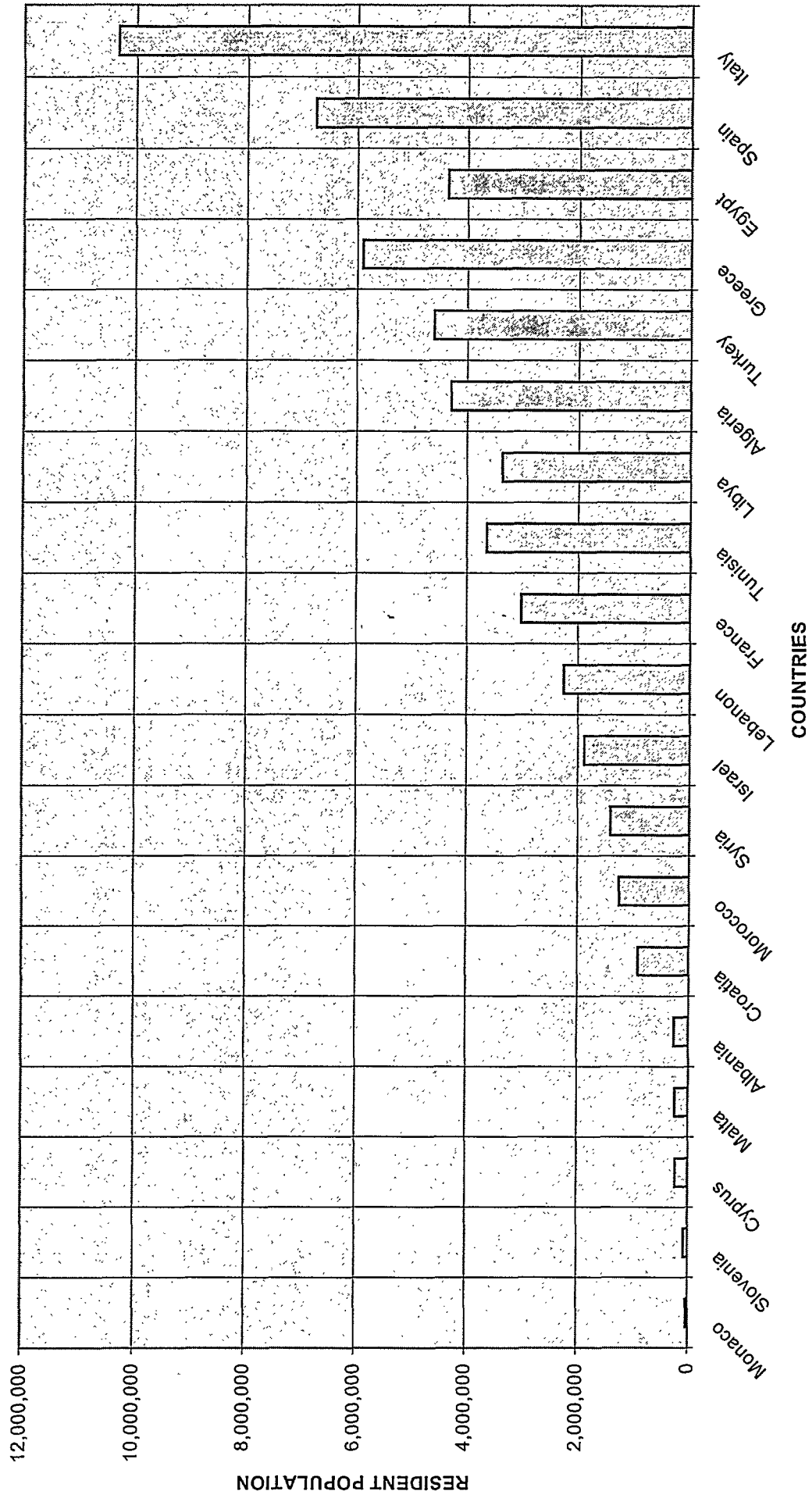
**WASTEWATER TREATMENT FACILITIES
MEDITERRANEAN COASTAL CITIES
Summary of Results**

Country	No. of Towns	Permanent Population (*1000)	Population Served (*1000)		Waste Water Treatment Plants								Wastewater Treated cu.mt./day	Untreated Wastewater cu.mt./day	
			Netw+Plant	Netw. Only	None	Unkn. Treat	Primary	Secondary	Tertiary	No Info					
Albania	4	254	0	262	4									0	14,310
Algeria	38	4,297	3,146	1,125	21	1		3	8					30,053	603,984
Croatia	11	905	304	350	5			6						46,000	92,100
Cyprus	4	227	147	80	1				2	1				13,640	6,055
Egypt	11	4,363	3,013	1,350	3			2	5				1	408,500	
France	40	3,024	3,205	387	6			4	20				10	759,658	91,649
Greece	40	5,899	5,736	1,171	8	19		1	10	2				906,419	97,174
Israel	10	1,887	1,976					2	6	2				205,500	
Italy	164	10,319	8,896	4,963	47	10		27	43	11			26	2,334,677	6,828,318
Lebanon	7	2,256	720	1,936	6			1						87,000	210,120
Libya	17	3,368	2,098	119	3	2			2	6			2	398,460	50,000
Malta	20	237	118	96	7					8			5	17,000	75,000
Monaco	1	30	30						1					18,500	
Morocco	4	1,251	160	814	3									8,100	69,654
Slovenia	3	76	40	35	1			2						11,563	6,720
Spain	89	6,761	4,259	3,419	22	1		5	31				30	621,662	344,735
Syria	7	1,408		999	7										186,128
Tunisia	23	3,641	2,775	670	6	3			13	1				278,515	74,986
Turkey	32	4,611	1,138	3,467	6			10	1				15	424,007	550,924
TOTAL	525	54,814	36,623	21,243	156	36		63	142	32			94	6,569,254	9,301,857
%			64	36	30	13		23	52	12			18	41	59
Total Plants								273							

MEDITERRANEAN COASTAL TOWNS

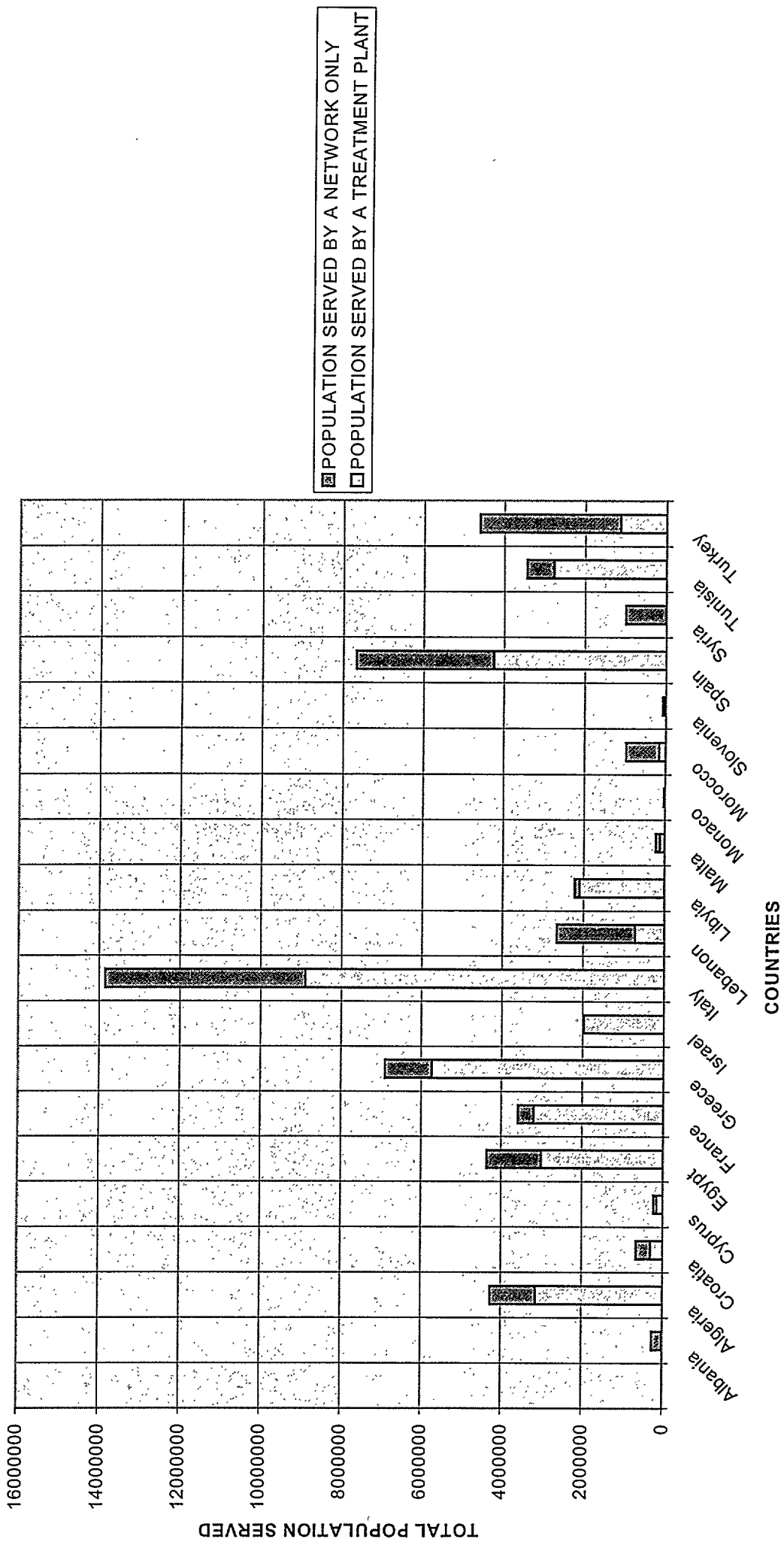


MEDITERRANEAN COASTAL TOWNS

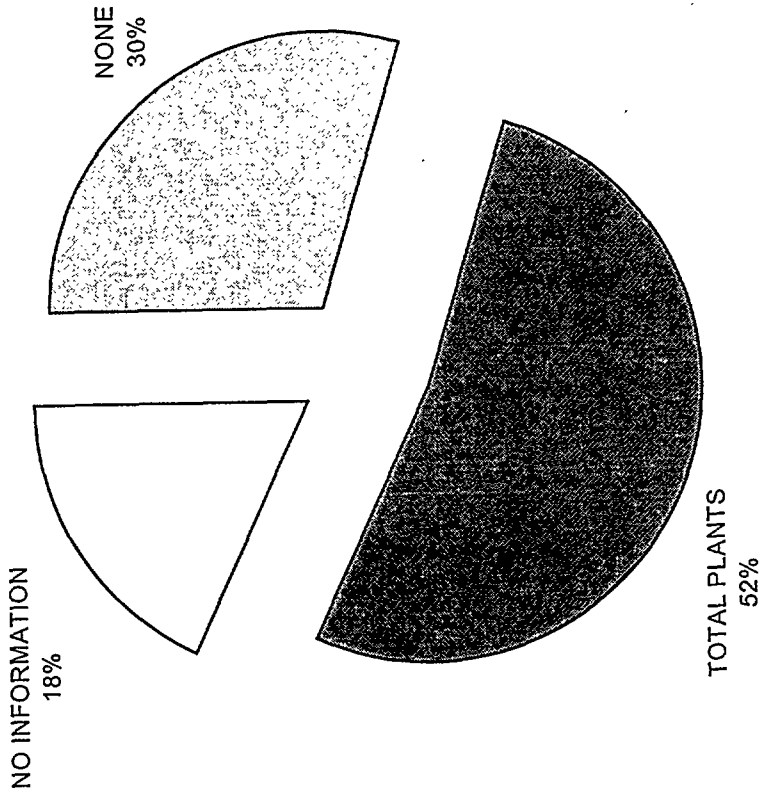


MEDITERRANEAN COASTAL TOWNS

TREATMENT FACILITIES SITUATION

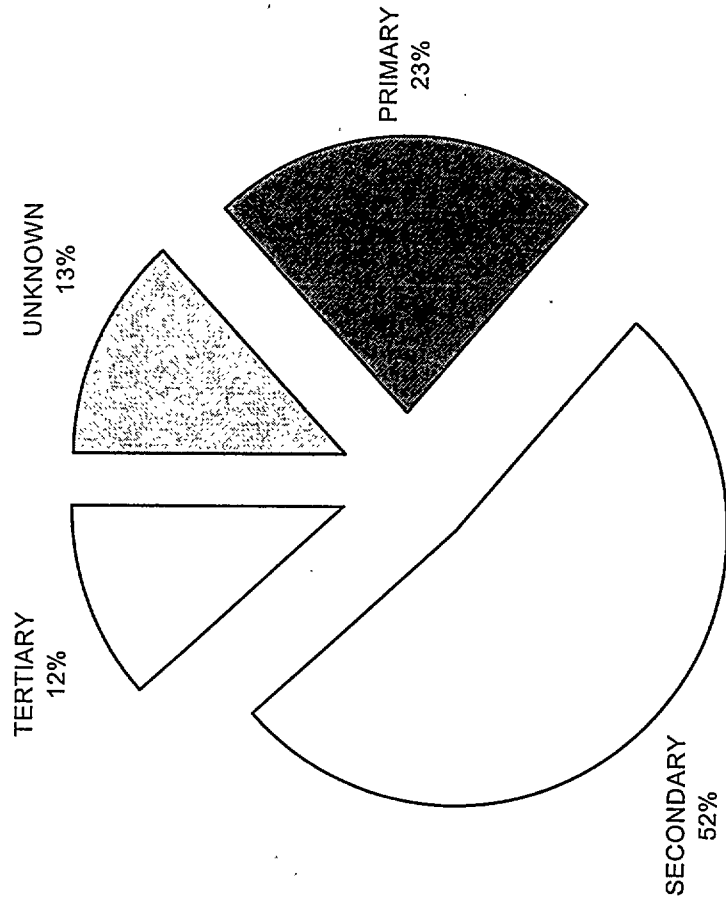


TREATMENT PLANTS AVAILABILITY



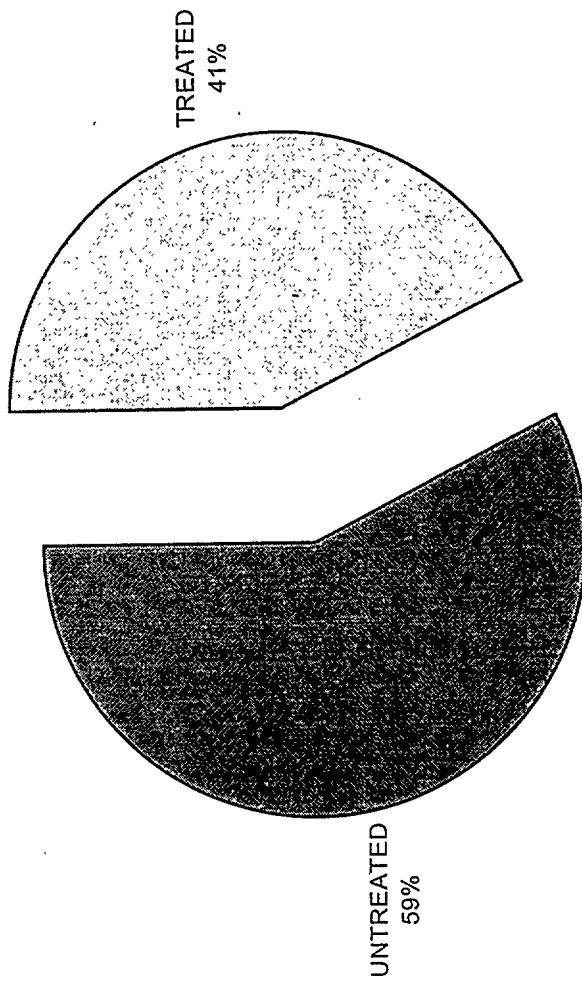
NONE TOTAL PLANTS NO INFORMATION

KIND OF TREATMENT PLANTS



□ UNKNOWN ■ PRIMARY □ SECONDARY □ TERTIARY

WASTEWATER PRODUCTION



□ TREATED ■ UNTREATED