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## **MEDITERRANEAN ACTION PLAN**

Consultation Meeting on the identification of  
Mediterranean pollution emerging issues

Rome, Italy, 31 May - 1 June 2000

## **MEDPOL STRATEGIC PAPER ON EMERGING MEDITERRANEAN ISSUES**

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The MEDPOL 2000-2001 programme, adopted by the Contracting Parties in 1999 includes the creation of a mechanism which could ensure a continuous link with the actual pollution problems of the region and enable MED POL to concretely bridge between scientific issues and managerial aspects. To this end, a process started which would aim at the identification of emerging pollution issues which may deserve more in depth assessment and possibly suggestions for action to the countries. More in particular, the purpose of this process is to identify from the international, regional and national scientific on-going work, emerging issues that could be recognized for the Mediterranean. This would allow MED POL to better plan its biennium activities and orientation programme which would be undertaken by the Mediterranean scientific institutions under the provisions of the Barcelona Convention for the protection of the Mediterranean sea from pollution.

As a result, a number of scientists familiar with the Mediterranean were contacted and were asked to contribute to the process by indicating, in their opinion, the major environmental pollution issues which affect or may likely affect the region in the future, and which may not have been enough dealt with or which have not been given enough attention.

As a result of the papers, **5 scientific issues** are being proposed as priority. The issues are as follows:

- marine eutrophication
- risk assessment for metals and organics
- impact of climate change on marine environment, and
- impact of anthropogenic activities on marine environment
- development of monitoring programme methodology

Two managerial issues are also proposed to be discussed during the meeting in order to help the Secretariat in the implementation of their activities. The 2 issues are:

- waste dumping policy
- extension of MED POL "Terms of References"

## **1. SCIENTIFIC EMERGING ISSUES**

### **COASTAL EUTROPHICATION**

This is still the most damaging process to the Mediterranean marine environment because of the possibly irreversible impacts made on the coastal ecosystem.

The growing concern on coastal eutrophication as a research subject derives from the alarming spreading of eutrophication symptoms along the Mediterranean coastlines.

The research on Mediterranean coastal eutrophication is lagging by about 20 years relative to that in freshwaters, so that models comparable to those developed for freshwaters have not been developed for the coastal zone. In the absence of models specific to Mediterranean coastal waters, the models derived for freshwaters are being applied.

Legislators in the Mediterranean region are presently debating the tools to be used in establishing critical nutrient loading to be implemented, whether the models transferred from fresh water are applicable to marine coastal waters has not been sufficiently tested, largely because of the paucity of studies on coastal eutrophication. Yet, these models are essential to the management of the quality of Mediterranean coastal waters.

The literature shows that the research effort on Mediterranean coastal eutrophication declines from west to east and that there is no evidence of a growing effort towards the study of coastal eutrophication in the Mediterranean. Reliable data on eutrophication still needed.

Programmes to assess the general problem of eutrophication require measurements to be made over a large area and over a time-scale of decades.

The addition of dissolved or particulate nutrients (inorganic or organic) to the fresh water of rivers particularly from urban sewage or agriculture runoff exacerbates the normal processes and extends the eutrophic zones beyond the normal influence of fresh waters plumes thus the need for river water pollution prevention plan, in other word river pollution control and management.

### **MARINE AND HEALTH RISK ASSESSMENT OF METALS AND ORGANICS**

During the last 15 years and under the provisions of MED POL research components, Mediterranean scientific institutions have conducted a considerable number of appreciable studies dealing with the Mediterranean pollution by heavy metals and different types of organics and uptake of this compounds by marine fauna and flora.

The main lesson to be considered from these studies is that MED POL should target the reduction of these pollutants from their sources. In fact MEDPOL in the biennium 2000-2001 programmes and under the Strategic Action Programme (SAP) will implement a wide range of activities dealing with pollution control, compliance and enforcement, application of BET and BAT to reduce the discharge of pollutants in the Mediterranean sea. In fact most of the standards restrict discharge according to economic consideration. They have nothing to do with environmental risks. The main objectives of the SAP is the protection of human health and marine environment.

The problematic issue in this orientation is the adoption of National or Regional standards to be considered as references in the pollution control activities. The literature

shows an implicitly controversial discussions about the scientific evidence of the notions that have been used to set the standards such as “persistent, toxic and bioaccumulative”.

The adoption of the precautionary approach which was developed to reconcile the widening gap between sciences and the pragmatic needs for regulation, in this contest has some limitation.

An overprecautionary measure is not scientifically economically and technically feasible, it is an unrealistic approach, and, on the other hand, under precautionary measures are useless, ineffective and unusable.

The literature argue about the scientific validity of the Precautionary Principle used in setting up these standards. Scientists commonly agreed on the adoption of the scientifically defendable “the Risk Assessment approach” to classify metals and organics and finally set up standards.

This approach would imply to substances that have potential impacts on the living resources of the Mediterranean. In other words, classification and setting limit of discharging of substances according to their impacts.

The common framework of risk assessment comprises hazard identification and assessment together with an exposure assessment. The utility of a risk-based approach in prioritising issues for regulatory action has been recognized.

Clearly, in order for a risk to be managed it must first be identified and quantified. What cannot be measured cannot be managed.

The first substantive step in risk assessment is hazard identification and assessment that attempts to define properties inherent to a particular substance or activity in quantitative term albeit within the limitations imposed by the range of hazards considered and the methods employed. The output of this activity together with the exposure assessment is then used to conduct a comprehensive risk assessment.

Attempts have been made to set up environmental criteria according to the controversial LD-50 for single biological species, these methods considered uptake from water only, for one single marine species, and one form of chemical substance. This concept was insufficient to assess the risk even to single species because in most cases, most paths have not been considered such as intake through food.

In addition, it is a common practice to assess hazards in simplified rate scenarios: persistence is measured in terms of an environmental half life. The potential to bioaccumulate is determined either from direct measurement or by use of octanol/water partition coefficient.

An alternative approach, which could be relevant scientifically and technically and would reduce the gaps and uncertainties is the “Integrated Risk Assessment”.

It consists of the exploration of the sum of the different types of risks such as those resulting from different:

- sources of pollutant (food chain, water air)
- chemical forms of the pollutant (metal species, metabolites)
- marine compartments
- synergic toxic effects (availability of nutrients, ....)

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## **EMERGING MARINE DISEASES-CLIMATE LINKS AND ANTHROPOGENIC FACTORS**

In the past few years, there has been a worldwide increase in reports of diseases affecting marine environment. Here are some examples to situate the issue.

- global increase in the severity of coral bleaching in 1997-1998.
- the increase of the frequency of the mass mortalities of marine mammals in the North Atlantic.
- large scale epidemic impact on the economically important species from temperate oceans such as seagrasses, oysters, and sea urchins.
- mass illness of Gorgonia communities in western Mediterranean.

In addition to diseases, there has been an apparent increase in the frequency of reports of toxic algal blooms. The latest one is the Arabic Gulf case where tons of fish died due to algal bloom.

The literature mentioned that it appears that most new diseases are not caused by new microorganisms but rather known agents infecting new or previously unrecognized hosts.

Two conditions, climate variability and human activities, appear to have played roles in epidemics by undermining host resistance and facilitating transmission.

The current trend toward a warming climate could result in modifications to the basic biological properties of marine population, thereby making them more susceptible to disease. A lot of example are given in the literature.

The human activities has greatly enhanced global transport of marine species (e.g. non-indigenous organisms) including pathogens. Habitat degradation and pollutants inputs, often brought about by human activity can facilitate the disease outbreaks.

Little is done in these fields in the Mediterranean region. The MATER project mentioned that climate changes were observed with an increase of temperatures of the deep layers during the last three to four decades. The Gorgonia case in the western Mediterranean would be an indicators for the susceptibility of the Mediterranean to disease outbreaks. Research programmes would clarify the Mediterranean issue.

## **IMPACT OF HUMAN ACTIVITIES ON MARINE ENVIRONMENT**

The alterations caused by human activities have been widely studied and monitored and legislation has been or is being issued to prevent part of their impact. In spite of these activities the perception of the environmental problems arising from specific human activities which consider legitimate the cases of marine environment, is still lacking. The fisheries activities are relevant examples. There was never a serious attempts at evaluating the impact of commercial fishing on the health of the marine environment. Overfishing is known to affect not only the yield of the commercial activity but also the well being of other parts of the marine ecosystem and destroy the non-commercial organisms and habitats (rocky coasts, benthic fauna and flora,...).

The lack of data on organic hazardous substances is very apparent, e.g. Dioxin, marine biocides, surfactants, metals and related species and their organometallic compounds.

The application of Environmental Impact Assessment (EIA) concept is still limited due to the lack of tools for its implementation which directly related to the absence of real attempts to understand the local and regional Mediterranean ecosystem as integrated system. There is a good conceptual knowledge but are less sure quantitatively in order to indicate in which direction a community would change and the amount of change that would occur, the structure, the behaviour and physiological response and the expected populations structure and dynamics following any human induced changes.

Setting Environmental Quality objectives (EQO) or Ecological Quality Objectives (EcoQO) provide the basis for a better marine environment protection.

Various coastal problems are related to the improvement of watershed management. The application of river water pollution management concept is becoming a crucial issue in the marine environment protection activities.

The introduction of non-indigenous organisms, the aquaculture impacts on the marine environment, the invasion of various species (e.g. jelly fish), coastal erosion and coastline alterations, urban development and many others human activities could be emerging issues in the Mediterranean region.

## **IMPROVE THE MONITORING PROGRAMME METHODOLOGY**

Monitoring programmes are effective tools for environmental management. It reflects the impacts of anthropogenic activities on coastal marine environment and ecosystems. A diverse procedure arrangement already exists and is applied by different Mediterranean institutions. According to records, many Mediterranean countries could not afford the implementation of effective, reliable and productive monitoring programmes due to technical and economical reasons. In fact, the proposed programmes are expensive to perform, must be carried out by highly required scientists and necessitate, in most cases, the use of sophisticated sampling and analytical techniques.

There is a need to develop:

- Cost effective monitoring technologies. In fact, the market is offering a wide range of chemical and biological analytical techniques to be used in monitoring programmes. This could be ranged from the ultra sophisticated analytical tools to the simplest ones. The main questions to be answered in this contest is what is the accuracy needed for monitoring programmes. Do the analytical tools give the necessary reliability, frequency to meet the objectives requirements? what types of tools are preferable, those based on chemical or biological concepts? could tracers be useful?
- The link between the monitoring programme and the managerial issues related to these programmes. In fact, MED POL, has established a trends and compliance monitoring programme to be implemented by the countries under MED POL Phase III and a full scale quality assurance programme with the collaboration of IAEA Monaco Laboratory. These programmes, if properly implemented, could generate a set of high quality of data. The question that needs to be answered is how to invest these scientific programme in the national and/or regional managerial issues.

## **2. MANAGERIAL ISSUES**

### **1. WASTE DUMPING POLICY**

Under the Barcelona Convention provisions, MAP has developed regulatory frameworks (Protocols) for dumping and discharging "waste" into the Mediterranean sea, all attempting to control the problem of using the Mediterranean marine environment as a fall-back waste dumpster. The main policy behind is that there is a need to have preferred or protected status in view of the increasing waste discharges and illegal industrial dumping activities. The Mediterranean sea should not be considered as a fall-back waste dumpster for any material deemed too toxic or too controversial to dump on the land.

These two regulatory frameworks contain measures to be considered when dumping and/or discharging of certain number of water is permitted.

Recent scientific perspectives against this policy have been voiced by several Mediterranean scientists that support the policy that the Mediterranean sea could be used as dumpster for wastes in certain circumstances (e.g. brine, urban waste water, ....). These perspectives, unfortunately, are supported by the idea that the preferred status of the sea could force the development of an environmentally undesirable land disposal, an option which could lead to fresh water contamination.

The deep analysis of the two Protocols reveal, that, effectively, they would not permit the dumping and the discharging of any type of waste in the Mediterranean sea. The question that could be raised in certain cases is what do we do with the waste? (e.g. brine, waste water,...).

It should be stated that we believe that these Protocols are governed by the following principles:

- the protection of the Mediterranean sea from significant adverse effects of waste disposal;
- in any specific case, allow dumping and/or discharge of waste only if we can show that no practicable alternatives are available that have an impact on the total environment.
- the dumping and/or discharging practices should comply with the measures considered to be part of the Protocols;
- in long term perspective, encourage the implementation of the environmental management approaches such as waste minimization, recycling, re-use, .....

## **2. EXTEND THE MED POL "TERMS OF REFERENCES"**

The MED POL programme was created in 1975 as the scientific and technical component of the MAP to answer the specific needs to better assess, qualify and quantify the environmental problems of the Mediterranean sea.

The MED POL Phase I and II were devoted to the improvement of technical capacity of Mediterranean Institutions and monitoring programme.

As regards MED POL Phase III, it will focus principally, on the reduction of the land-based sources of pollutants.

There are scientific evidences that pollutants reach the Mediterranean sea through Mediterranean rivers. 80 rivers have been identified which are contributing significantly to pollution inputs to the Mediterranean sea. Metals, some micro pollutants and some nutrients and organic carbon are attached to river water particles and are carried into the sea.

The origin of these pollutants in river waters are mainly the urban and industrial waste water, agriculture run-off and coastal inland erosion.

It was difficult to date, to estimate the quality and quantity of pollutants reaching the Mediterranean sea through rivers due to the lack of related data. It is therefore necessary to integrate the coastal rivers catchment areas in the budgeting of inputs of pollutants into the Mediterranean sea.

Furthermore, regarding the legal framework it should be noted that the provisions of the LBS Protocol (art.3) cover "the hydrological basin of the Mediterranean Sea Area" and several activities of the Strategic Action Programme (SAP) are dealing with river pollution management.

This would allow at a medium term, a better understanding of the current situation and its evolution and the establishment of a river water budgets for each pollutant at the level of the sub-basin, and at long term, to elaborate the necessary national legal framework to control the rivers inputs into the Mediterranean sea.