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FOREST FIRES IN THE MEDITERRANEAN

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FOREST FIRES IN THE MEDITERRANEAN

During the last meeting of the Bureau of Contracting Parties in Cairo (february 1992) the MAP Coordinator, M.S. Busuttil, stressed that forest fires constitute one of the major problems in the Mediterranean region. He informed the meeting about the Council of Europe's intention to elaborate a convention which would cover issues of fires and reforestation and which would be a "partially open agreement". In other words, a convention which south coast Mediterranean countries could adopt. Forest fires do not occupy a specific place within the context of the Mediterranean Action Plan because the means and resources necessary for preventing and fighting them surpass the framework of the programme and the budget of the cooperating coastal countries. However, it should be noted that, one of the ten objectives for the second decade of MAP, adopted at Genova in 1985, is the "intensification of efficient measures to prevent and combat forest fires". Many meetings, seminars and conferences are regularly organised on forest fires in the Mediterranean, especially with the support and the encouragement of FAO. Briefly reviewing this issue, we hereby present certain conclusions derived from these meetings. Also, on this occasion, we wish to rectify certain views which are widely spread in the general public and the medias.

A fire as old as Man

We often wrongly believe that forest fires have only recently become a major cause of deforestation in the region. Man has mastered fire (produced by nature) for 500,000 years and learnt how to light fires

Coastal countries must make a greater effort in the field of prevention in order to face this curse which is as old as Man and which has partially moulded the present Mediterranean landscape

20,000 years ago. Just as the Mediterranean has given birth to a number of major civilizations, fire was used at a very early date to develop pottery, metal, glass and other industries. But, it was also used to reduce forests, transforming them into grazing areas and arable land. Furthermore, the dense cover of evergreen forests which entirely occupied the basin, including the present desert areas of the south and east coast, was cleared for building, navigation and heating. Grazing in the forest has also had deleterious effects, as animals feed on young plants and prevent tree regeneration. As a result of these various factors, the Mediterranean forest has suffered continuous reduction during the centuries to a point where today it only covers 5% of the region's area (without accounting for its degraded forms). Throughout this long evolution, fire has played an essential role and one can say that the Mediterranean forest as we know it today is at the same time "its child and its victim". It is derived from a gradual adaptation to climate, soil and repeated fires which favoured "pyrophytic" species (whose regrowth and seed germination are favoured by fire). Thus, forests of conifers such as the Aleppo pine, the Stone pine and the maritime pine have become dominant all around the Mediterranean. But when these forests are hit by repeated fires at short intervals, they end up by dis-

sappearing and are replaced by a cover of brush (maquis and garrigue) and, at a more advanced stage of degradation, by bare limestone outcrops. These processes are accompanied by gradual mineralization of the soil which, no longer able to retain water, in the case of torrential rains, has fatal effects: floods, mud slides, land slides. In general, deforestation constitutes a threat because it disturbs the water cycle and accelerates erosion.

50,000 fires per year

Each year brings the same pathetic scenario: an area in flames somewhere along the Mediterranean coastline. About 50,000 fires devastate the region each year, some of which are suppressed within a few hours and others which persist for several days destroying hundreds of hectares. The area swept by fire varies from 200,000 to 700,000 hectares each year, according to the climatic conditions prevailing during the summer. One must also take into account a lack of precision in national statistics, concerning the definition of "forest areas" and the "Mediterranean region". These figures are not added from one year to the next because a number of fires occur on the same exposed sites. It is estimated that about 0.6% of the Mediterranean forest and subforest area is swept by fire each year - this percentage reaching 4 to 5% along the coast and up to 10% in certain vulnerable zones. The mean life-expectancy of forests does not exceed 25 years, whereas 50 years are necessary for the regeneration of a conifer forest. Thus, reforestation rarely attains its objectives. In general, climatic

conditions have been unfavourable during the past 25 years. During the period 1989- 1991, drought led to an increase of fires causing important damages despite the improvement and the strengthening of means of prevention and suppression. The economic effects of fires are important: cost of prevention, prediction, monitoring, suppression once a fire has broken out, reforestation. One must add the losses in human life (especially in the coastal forests where the number of villas occupied by residents and holiday makers is increasing), the forgone value of wood productivity, amenity cost (destruction of natural parks and touristic sites). And, in total, a worrying ecological cost: "At the present time, notes the Spanish expert Ricardo Velez, situations are appearing in Mediterranean countries with a very high danger of irreversibility. The huge, frequent forest fires of the past few years, together with the irregularity in rainfall, may aggravate the risk of desertification, at least locally".

Favourable factors

The Mediterranean climate is the accomplice of fire. The heat and dryness of the long summer period (which sometimes lasts from June to November), combined with the frequency of dry and strong winds blowing off the land (the Provençal mistral, the Catalane and Italian tramontane, the Lebanese and Syrian rhamsin, the Magreb sirocco, the Israeli sharav) favour the outbreak and the propagation of fire, multiplying the opportunities for transforming the smallest causes of outbreak into an inferno: electric spark, lightning, match and ci-

garrette, shepherd's fire, garbage burning. To the permanent climatic factors, one must add the socioeconomic parameters of the past century. The depopulation of rural areas has led to the abandonment of the forest and the hinterland which has thus been deprived of traditional practices which rid it of brushwood, dry wood and leaves. A small fire has little chance of developing into a "monstrous" one without the accumulation of this subforest which ensures the continuity of combustion. On the contrary, maximum tourist pressure during the period which is climatically vulnerable and the gradual encroachment of coastal forests by built-up areas whose residents have no concern for their management, increase the risks.

Who is responsible?

In more than 90% of cases, fire is due to human weakness. Forest experts only attribute 5-7% of fires to lightning. Knowledge of human causes and of their distribution would ensure efficient prevention. But it is realized that, today as in the past, it remains difficult to identify the causing agents. The cases of undeniable offence or of irrefutable material proof remain rare. The aura of mystery which surrounds the outbreak of fires gives rise to passionate interpretations or, to put it another way, to collective fantasies. Rumours concerning "pyromaniacs", "suspect tourists" and even "foreign agents" find favourable ground for their propagation in public opinion and the medias (see frame). Proof of the criminal character of a fire is systematically derived from the simultaneous outbreak of several

BEYOND RIO

Being ready for printing at the time of the Conference of the United Nations on the environment and development to be held at Rio de Janeiro, the reader should not be surprised at not finding any review or echoes of the final preparations in this issue of MEDWAVES. Even before its happening, this major event on which the fate of the environment will partly depend and the quality of our life during the decades to come, has given rise to plentiful discussions in the medias all over the world. No doubt, an international summit has never raised - to the exclusion of the conferences which ended military confrontations - as many questions and hopes, doubts and apprehensions. Also, never have such important dossiers, mixing political, economic and scientific stakes, opposing over-consumption and poverty, prosperity and survival, been placed on a negotiation table around which practically all 177 member States of the United Nations were present. In this impressive gathering which reflects the actual rapport of power in a world which has been turned upside down, the 18 countries which form the MAP, together with the E.C., only represent a small part of the Planet. One plan of action out of 12. A sea whose surface constitutes 0.7% of the world ocean. But throughout history, the voice of the Mediterranean has gone much further than its geographical limits, its demographic and economic importance. The dossier which it has submitted to the planet debate of Rio is one of the most complete and convincing. Since 17 years, the Mediterranean Action Plan can boast of having made the theme of the Conference - environment and development - its privileged area of thought and intervention, with visible results in the field. The framework of cooperation which permitted this, has served as a model for many other regional seas. The North-South and the Euro-Arab dialogues are not, in the context of MAP pure figures of rhetoric for external use. They have become concrete day after day since 1975, through numerous political and technical meetings, seminars, study days, exchange of knowledge and know-how, training courses, consultancy missions. Whichever the agreements made at Rio, this achievement of MAP, strengthened by the active participation of the E.C. and the support of important financial institutions - as was shown at the Conference of Cairo on the Nicosia Charter last april -, will remain for the future as a token of efficiency for the realization of the objectives set at Barcelona by the coastal states. The "post-Rio" era has begun. That is because, just like the Stockholm conference twenty years ago, the UNCED is not an end in itself but the starting point of a long process, it leads us straight towards the XXIst century. It will be necessary, at all levels of Mediterranean cooperation to meditate on the results and the prospects for the region. MEDWAVES will contribute to this by devoting its next issue to post-Rio and by inviting all partners within the context of MAP - experts, those responsible for the environment, NGOs - to present their first comments.

Medwaves

fires at different sites in a given forest. This indicator, however, is typical of the propagation of fire caused by strong wind, especially in conifer forests where burning pine-cones and pine needles are projected at a great distance. Since a number of years, statistical studies using computer analysis and modelling have permitted to obtain more reliable estimates for the various causes. It follows that ill-will is responsible for 6-12% of fires (and for 7-15% of the burnt area) for various reasons but most often of local nature: vengeance, conflicts related to forest policy (refusal of national parks), land speculation (obtaining the classification of a piece of land as constructible), etc. Indisputedly, it is negligence and carelessness which explain the majority of cases (45-65% according to the author). They concern different sectors of the population, urban and rural being equally responsible: tourists, campers and smokers who are unconscious of the consequences of a gesture (such as throwing a cigarette-butt from a moving car), town dwellers and municipalities which burn rubbish near combustible areas, shepherds setting fires in autumn in order to help the regrowth of pastures when the first rains arrive, farmers burning farm remains in their fields. In the past, fires set by shepherds and farmers were incriminated and they still appear to explain the important percentage (20-35%) of fires which occur outside the summer period (and even in winter), when the wind is strong and dry. Finally, one should include negligence, bad maintenance and bad insulation of pylons and electric cables (4-6% of fires) among the causes.

The limit of means of suppression has been reached

Since several years, the Mediterranean countries most hit by fires have developed an important suppression mechanism. About 5,000 people in the region are mobilized during the summer period on a per-

manent basis, without taking into account soldiers and auxiliaries employed when the fire fronts are numerous. These people are backed by more and more sophisticated technical and logistic means: special vehicles, motorised pumps, chemical retardants, airplanes. Helicopters are used more and more for the supervision of operations, the transportation of fire brigades and for dropping water. Around 150 aircrafts operate in the region during peak months. Certain countries have important aircraft fleets which are on permanent alert (Spain, France, Greece, Italy). Their usefulness and efficiency is undeniable, despite their limitations which must be accounted for in the general fighting strategy. According to a number of experts and authorities in Mediterranean countries, the strengthening of this means no longer constitutes a priority today, because a limit has been reached beyond which no progress in suppression can be detected. It has become apparent that

counted for in the statistics. If the efforts and the enormous cost were allocated to prevention, important fires could partially be avoided.

Priority to prevention

Without directly constituting part of prevention, alert and detection play an important role because they allow to "gain time", an essential factor in the reduction of the size of areas burnt in the exposed zones. They include watches, patrols, fixed and mobile stations, remote sensing and electronic surveillance, local meteorological prediction systems, in order to establish "daily risk indicators". The installation of water sources, the management of access routes, the tracing and maintenance of fire lanes in mountainous terrain complete the mechanism necessary for rapid intervention. Actual prevention is geared towards two important objectives: limitation of human causes, maintenance and re-population of the forest in order to render it less inflammable. The



Fire-fighting planes are not a panacea

we are practically powerless when confronted with a very important fire which is reinforced by strong winds and other favourable conditions. Heat intensity is sometimes such that the water dropped by aircraft volatilizes before reaching its target. In such cases, one has to wait for a decrease in wind intensity and combustible material. These important fires are rare but represent over 3/4 of burnt surfaces ac-

first objective can be attained with the help of information and public awareness campaigns. Increasingly, campaigns are not addressed to a "large public" which is vague and anonymous but, rather, to specific "publics" corresponding to various causes of carelessness: campers, excursionists, farmers, shepherds, etc. Concerning rural populations, whose fires are of a professional nature, it is certain that they have

a good knowledge of the value and the positive influence of the forest on the ecosystem. However, they must be convinced to abandon certain secular practices where fire is perceived as a regenerating and enriching element whose immediate risks and long term effects are underestimated. The subject of "information and public awareness" must be completed by silvicultural measures aimed at reducing the inflammability of forests: rational management, grubbing and prun-

ning, thinning, elimination of brushwood, prescribed burning, controlled grazing, choice of appropriate reforestation species. The rehabilitation of the hinterland, together with the reduction of coastal urbanization, the reintroduction of a form of "sylvo- pastoralism" associated to a judicious management of the forest, also figure among the recommendations of the meetings of experts on Mediterranean forests. Without forgetting, paradoxically, fire itself which

permits to fight against fire when it is "administered according to prescription", under well defined conditions and by qualified personnel, in order to burn subforest vegetation which renders the forests so vulnerable. As is noted in the Blue Plan booklet on Mediterranean forests, "fire, one of the most important enemies of the Mediterranean forest, can become an efficient auxiliary if it is properly managed".

Annual risk of forest fire, percentage of the burnt surface and mean area per fire in certain Mediterranean countries.

COUNTRY	Cyprus	France	Greece	Israel	Italy	Spain	Turkey	Yugoslavia
Annual risk - number of fires (per 10,000 ha of forest)	4	3	2	81	14	3	1	1
Percentage of the burnt area (area burnt / forest area×100)	0.004	0.3	0.8	0.9	0.8	0.9	0.1	0.9
Mean area burnt (ha) per fire (forest area / number of fires)	61.1	8.3	43.0	2.7	14.0	31.5	8.8	22.2

Source: *Unasylva*, international review of forests and forest industries, FAO, vol.41, no 162, 1990/3. Data elaborated by Ricardo Velez based on statistics from the joint EEC/FAO Division, 1988 and presented in a article on forest fires in the Mediterranean region.

THREE COMMON OPINIONS CONCERNING FOREST FIRES

- **A HAZARD RECENTLY INTRODUCED BY TOURISM:** the history of the Mediterranean proves this statement to be wrong. Not only have forest fires always existed but, during certain periods, they have been more devastating than today. According to the archives of the last century, it appears that in the countries of the north coast, 3 to 4 times more fires occurred than today. During wars and repressions, fire was used as an arm against rural populations whose villages and forests, where they found refuge, were burnt.
- **INCENDIARISM IS PRIMARILY RESPONSIBLE:** nothing in the surveys, the statistics and extrapolations suggests this. According to our current knowledge and taking into account the yet important margin of uncertainty, ill-will explains only one or two fires out of ten per year, at the most. Of course, this percentage is not insignificant and the psychological, social and economic motives which cause it, together with their legal implications merit a study. However, it does in no way justify public opinion campaigns - orchestrated or transmitted by the medias - which attribute most summer fires to incendiaries. The effect of the omnipresent pyromaniac is to avert the attention of authorities and the population from the real sources of evil, by masking the part due to carelessness which concerns everybody because each person always thinks that "the accident only happens to others". Thus, this myth is demobilizatory because it associates fires to a type of mental or social fatality ("They are mad!" "They are criminals!").
- **MORE AIRPLANES ARE NECESSARY:** it is undeniable that aircraft have permitted to gain points against fires. But they are not a panacea. They cannot intervene under bad meteorological conditions, which precisely stir up important fires, their intervention is interrupted during the night, etc. Due to these facts, they have never permitted the extinction of most devastating fires. The important funds invested in the purchase, the maintenance and the operation of an airborne fleet could often be more profitable if allocated to long term prevention. Aircraft also have a demobilizatory effect. Local authorities and the population expect their salvation from the sky and have the tendency not to mobilize themselves on the ground in order to take measures which remain the base of every fire suppression mechanism.

On 25 and 26 February 1992

THE MEETING OF THE BUREAU IN CAIRO

Members of the Bureau of Contracting Parties examined issues of legal procedures, not discussed by the Seventh Meeting of Contracting Parties, as well as recent developments in MAP.

On 25 and 26 February 1992, the Bureau of Contracting Parties convened for the first time since the seventh meeting which took place in Cairo in October 1991. Its first object was to discuss certain issues of legal procedures left pending by the Mediterranean countries who had asked the Bureau to look into and to settle. Concerning the Off-shore Protocol, it was decided that the Secretariat distribute the latest version of the draft, with proposed amendments for certain articles, to all Contracting Parties requesting their comments. After review and examination of these comments, the Bureau is to decide on whether to convene another meeting of experts or authorize the Executive Director of UNEP to call the Conference of Plenipotentiaries (which would also be charged with including the banning of incineration at sea and the banning of dumping of industrial wastes in the Mediterranean, in the Dumping Protocol). The issue of transfrontier movements of dangerous wastes and of the new legal instrument which will deal with it, was also another issue which the Cairo meeting asked the Bureau to look into. Participants decided that the Secretariat prepare a technical evaluation study based on information supplied by the Contracting Parties, and that the Bureau will review this issue during its next meeting. Mr. S. Busuttil, MAP Co-ordinator, presented the progress report concerning the various activities of MAP, since the Seventh Meeting in Cairo. He also informed members of the Bureau about certain recent developments. The Yu-

goslav crisis, without affecting the activities of the Split Centre, causes uncertainty concerning the status and the financing of the Centre. This uncertainty will remain for as long as the recognition of new national entities by the United Nations and by the Mediterranean countries remains unclear. Mr. S. Busuttil also informed the Bureau concerning the preparation of the Action Plan for the Black Sea which is of immediate interest for MAP because it constitutes an "annex" sea to the Mediterranean with which it shares a number of problems. For this new Action Plan, a steering committee has been set up and is composed of representatives from the World Bank, UNDP and UNEP. Three months before the meeting of the U.N. Conference on Environment and Development was held, the coordinator of MAP indicated that several Mediterranean countries had pointed out that it would be desirable to organise a special session devoted to Mediterranean affairs during the Rio Conference. Mr. Busuttil also mentioned the next ministerial meeting on the Nicosia Charter to be held in Cairo (see opposite article reserved to this meeting). Finally, the Bureau was informed about the Centre for remote sensing established, equipped, staffed and financed by Italy. The Italian Government proposed that this Centre offer its services, in a bilateral context. While recognising the potential of this Centre to operate as a Regional Activity Centre under the umbrella of MAP, the Bureau requested the Secretariat to obtain full information about the Centre and its programme. This information will be distributed to all Contracting Parties seeking their views on the Italian proposal.

The activit.

Held in Cairo 2

THE SECOND MINISTERIAL CONFERENCE ON EUROMEDITERRANEAN COOPERATION decides to set up an EC/MAP

The Nicosia Charter, adopted in June 1990, was elaborated by the Commission of the European Communities and 12 Mediterranean countries. The Charter defined priority actions in view of the year 2025 and based on the solidarity between Mediterranean countries and the Commission of Communities in the framework of the Mediterranean Action Plan. The Charter stated, in particular, that Mediterranean partners and the E.C. proposed to regularly evaluate the results of Euro-Mediterranean cooperation for the environment by publishing reports every two years, and in any case, before the U.N. conference on Environment. The second Ministerial Conference on Euro-Mediterranean cooperation was held in Cairo from 28 to 30 April 1992. It was organised by the E.C. as a follow-up to the first meeting which took place in Nicosia in 1990. It was attended by fourteen Mediterranean countries as well as representatives from Portugal, UNDP, the European Parliament, the World Bank, EIB and the European Environmental Bureau (representing NGOs). The participation of Greenpeace was accepted informally. The first part of the conference was dedicated to the presentation and the discussion of the long-term strategy of the Action Plan - follow up to the Nicosia Charter and Programme of specific actions. Mr L. J. Brinkhorst, Director General of EC DGXI, stressed that the European Community recognised the role and the experience of MAP/UNEP and that by no means was any action proposed by the E.C. in the document, intended to be implemented outside MAP. He stated that in fact the only scope of the entire E.C. initiative was to strengthen MAP. During the long discussion which followed, participants examined the mechanisms which would permit the coordination of

28-30 April 1992

TERIAL CONFERENCE NEAN COOPERATION AP coordination mechanism

the agreed activities. The result was that all Mediterranean countries present, without exceptions, were in favour of a system in which MAP would represent the basis and the starting point for the implementation of all activities, by exploiting existing mechanisms. The meeting agreed to include in the Declaration, that it adopted the basic principles of such a mechanism. The Declaration specifically announced that partners "set up a coordinating mechanism under the initiative of the European Communities and the Mediterranean Action Plan, with the participation of the multilateral financial institutions and other donor agencies, the results of which will be transmitted to and examined by the Contracting Parties to the Barcelona Convention". It must therefore be stressed that the Cairo conference recognised the central role played by MAP in the coordination of all future activities related to the environment and the development of the Mediterranean, with the full approbation of the E.C. The most concrete result of the new phase of Euro-Mediterranean agreement in the field of the environment should be to ensure that the objectives of the Nicosia Charter have the necessary funds - through the mediation of the World Bank and the European Investment Bank - for the execution of activities which could not be carried out by MAP alone, due to limited means. In the immediate future, it is for the E.C. and the MAP coordinating Unit to define the details of the mechanism of the envisaged coordination. The reaffirmation by the signatories of the Cairo Declaration of the important role which Mediterranean countries and the E.C. should play at the Rio Conference was good news in view of deliberations devoted to the Mediterranean in the framework of UNCED.

From 6 to 9 May 1992

The meeting of MED POL National Coordinators was held in Athens

The Seventh meeting of Contracting Parties, held last October in Cairo, decided that in 1992, the meeting of focal points for the various activities of MAP would take place separately and not in the context of a joint meeting as in previous years. The meeting of MED POL Coordinators in Athens (6-9 May) was the first of the series to be held. Representatives from 17 Mediterranean countries and the E.C., 5 international organisations and 4 NGOs participated. Representatives of most countries reviewed their monitoring activities and the progress of their programmes in the framework of the agreement signed with MAP/UNEP. Tunisia announced that it intended to include monitoring of transfrontier air-borne pollution and that a project on the subject would soon commence in the town of Sfax. Algeria informed the participants that the network of sampling stations was being progressively strengthened and hopes that more emphasis is placed on the methodological aspect of the programme. Turkey has also extended its monitoring programme to air-borne pollutants with the establishment of a monitoring station at Antalya. In conclusion to the general discussion on the progress of the programme and taking into account the suggestions made by many delegations, the President of the meeting (the representative of the E.C.) asked the Secretariat to draw up a document on monitoring and present it at the next joint Committees meeting in 1993. This document should include the areas monitored, parameters measured and sampling stations, during the last 5 years. This synthesis of programme activities should permit, if necessary, a reorientation of monitoring objectives. A long discussion was held on the activities of MED POL data elaboration. The

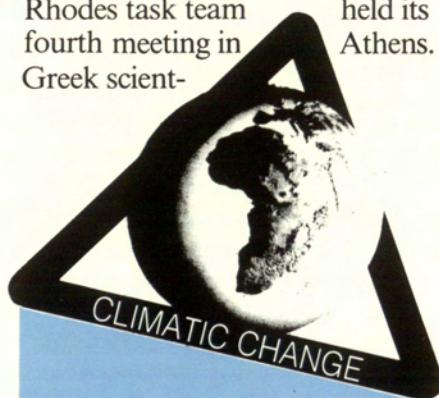
representative of Israel suggested that theoretical and practical training on computerized data presentation should form an integral part of training courses and intercalibration exercises, whereas the representative of Algeria insisted on the future compatibility of national computer systems for environmental data. The Secretariat informed the meeting of the MED POL activities related to eutrophication and plankton blooms. A consultation meeting held in Athens in March 1992, estimated that it would be desirable to organise case studies in areas where eutrophication is most pronounced, because although this phenomenon occurs all around the area, it is mainly a local one. Thus MED POL Coordinators examined the most representative areas and approved a detailed scientific programme for each case study. Finally, the WHO representative presented an assessment of pollution in the Mediterranean sea by carcinogenic, teratogenic and mutagenic substances. Participants expressed a number of comments in view of establishing the final draft of the document which will be submitted to the joint meeting of the Committees in 1993. In this respect, the representative of Italy confirmed that the Italian Institute on cancer research, at Genova, was in the process of setting up a regional Centre for carcinogenic and mutagenic marine pollutants in the Mediterranean. In the context of MED POL, this Centre should assure the link between scientific institutions in the Mediterranean working in the field and organise meetings at an international level (the first one is planned for March 1993).

STUDIES OF TASK TEAMS ON CLIMATIC CHANGES IN THE MEDITERRANEAN

The first meeting of the Mediterranean Task Team on climatic changes (Split, 1988), recommended that a specific regional scenario be developed on climatic changes in the Mediterranean basin. This scenario was developed in 1990/1991, by the Climate Research Unit of the University of East Anglia, UK, with the financial support of UNEP. Results of this project, which concentrates on the prediction of temperature and precipitation changes, will considerably help the preparation of the second generation of site specific case studies. The basis of these scenarios was the grid-point output from four General Circulation Models (GCMs). The direct scenarios indicate that, for the Mediterranean Basin, temperature change due to the greenhouse effect must be similar to the global one. Precipitation is shown to increase in autumn and winter, but decrease in summer and, in the eastern Mediterranean, in spring as well. The mean change is, in winter, around $+3\%/^{\circ}\text{C}$ and, in summer, around $-3\%/^{\circ}\text{C}$. The study has revealed that a wealth of regional detail can be extracted by synthesizing modelled and observed data. However, the accuracy of such regional scenarios is constrained by the reliability of GCM results. The scenarios can, therefore, only be taken as

an indication of the range of possible changes that might occur as a result of greenhouse warming. Parallel with this project, carried out for the whole Mediterranean, the task teams of the second generation studies continued their work. The team working on the implications of climatic changes on the Cres/Losinj islands, in Dalmatia, held its first meeting at Rijeka and on the island of Losinj, on the 2nd and 3rd March 1992. The ecosystems of these islands being very complex and vulnerable, any aspect of climatic change and a sea level rise could cause a wide range of effects on the environment. On 30 and 31 March, the Rhodes task team held its fourth meeting in Athens. Greek scientists

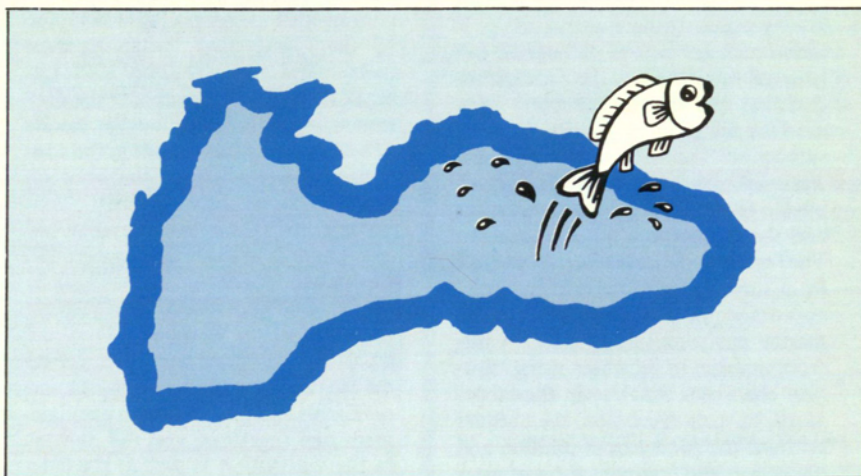
presented the geology, the hydrology and water resources, marine physical processes and the ecosystems of the island of Rhodes, outlining the first evaluation of the effects of climatic change on each of the above. As for the Syrian coast team, it held its third meeting in Damascus between 11 and 13 April 1992, during which various preliminary project reports were presented (on the lithosphere, the hydrosphere, the atmosphere, natural ecosystems, managed ecosystems, energy and industry, tourism, transport, services, health, public health). Following this, the team discussed the possible implications of climatic change on all aspects of the physical and contemporary socio-economic situation of the Syrian coastline. For all the studies mentioned above, the University of East Anglia will supply the respective teams with sub-regionally specific scenarios of climatic change. This technical support from the British Unit will permit teams to improve their predictions and to enlarge the range of impacts of changes in each study.





THE ACTION PLAN FOR THE BLACK SEA IS PROGRESSING WELL

A Diplomatic Conference on the Protection of the Black Sea against Pollution took place in Bucharest from 21 to 22 April 1992. The following coastal countries of the Black Sea took part in the conference: Bulgaria, Georgia, Romania, the Russian Federation, Ukraine and Turkey. Representatives of UNEP, WHO, WMO, UNDP, IOC and IMO also attended the conference as observers. The conference adopted the Bucharest Convention and three Protocols. It also decided to invite UNEP-OCA/PAC, to Nairobi, in order to cooperate with the Commission in the elaboration of a Black Sea Action Plan. It also decided to establish the Commission's headquarters and the Secretariat in Istanbul. In this new Action Plan, Turkey plays a particular role because, being party to the Barcelona Convention due to its west and south coastline, it benefits from long experience with MAP and, in a way, constitutes a link between MAP and the new Plan of action. The Global Environment Fund (GEF) has prepared a draft report on the ecological management and the protection of the Black Sea. In its latest issue, *The Sirene*, UNEP's Oceans and Coastal Areas Programme (OCA/PAC) publication (whose resurfacing after two years, a time of tumultuous changes in OCA/PAC, we are happy to welcome), announces the elaboration of this new Action Plan, which brings UNEP's regional seas action programmes to 12. *The Sirene* also contains some information on the Black Sea taken from a study made by the UNEP/



FAO/IOC working group for this region. The Black Sea communicates with the Mediterranean Sea through the Bosphorus and the Dardanelle straits. Apart from pollution problems which are common to most regional seas, the Black Sea presents certain particularities. The world's largest land-locked inland sea suffers from a natural deficiency in oxygen in 90% of its water volume (that below 50-70 m). It has been exploited and degraded in multiple ways and in particular by unregulated and unplanned freshwater withdrawal for irrigation purposes, power generation, the use of coastal areas for permanent human settlements and the discharge of large quantities of untreated industrial and agricultural wastes into rivers that drain into the sea (Danube, Dnepr, Don - by the strait of Kertch which links it to the Sea of Azov). Fish and shellfish yields have declined substantially and a number of commercially important species have disappeared. Eutrophication is a common phenomenon in the west-

ern part of the sea. In 1989 and 1990, the coastal countries of the Black sea had considered cooperation with MAP and the adoption of the Barcelona Convention. The geopolitical changes which affected the ex-Soviet Union and the formation of new independent states on the north coast of the Black sea led to the consideration of an Action Plan and of a separate legal framework for this region. This new type of regional cooperation will necessarily have positive effects on the Mediterranean and the two Action plans, "brothers and neighbours", are encouraged to develop mutual relations in many areas of common interest.

MAP PUBLICATIONS

UNEP/WHO: Biogeochemical Cycles of Specific Pollutants. Final report on project on survival of pathogenic organisms in seawater. This document is a review of work done in the context of a research project concerning activity "K" of MED POL, by the department of microbiology of the University of Malaga, Spain. Following a general part on marine pollution and survival of pathogenic organisms in sea water, the publication describes the project sampling area used for the study of distribution and survival in the field of 15 different strains of microorganisms, the control medias used, the methods of detection and the recovery of microorganisms. The results obtained were derived from three types of experiments: disappearance of microorganisms in the marine environment, survival of microorganisms in seawater using diffusion chambers, survival in the laboratory. In their discussion, the authors examine the processes of dilution and dispersion and compare survival rates between the various microorganisms under different experimental conditions (MAP Technical Reports Series, No 55, 95 pages, in English only).

UNEP/IOC, in cooperation with FAO and IAEA: Assessment of the state of pollution of the Mediterranean sea by persistent synthetic materials which may float, sink or remain in suspension. This volume contains the text, in English and French, of the document of evaluation of persistent synthetic materials whose conclusions and recommended measures were adopted by the Contracting Parties at their meeting in Cairo in October 1991. Litter is difficult to quantify and the document is partly based on the results of a first survey carried out in the context of MED POL on the litter on beaches. About three quarters of litter is composed of plastic materials. Field observations yield the impression that the container fraction of coastal litter in the Mediterranean consists mostly of those used for beverages, food and cosmetics. The document then reviews the damage caused to fish, marine mammals and birds through entanglement and ingestion, and the damage to free navigation as well as the deterioration of the esthetic value of sites (MAP Technical Reports Series, No 56, 113 pages, in English and French).

UNEP/WHO: Research on the toxicity, persistence, bioaccumulation, carcinogenicity and mutagenicity of selected substances. Final reports on projects dealing with carcinogenicity and mutagenicity (in the context of MED POL "G" research activity). The document contains two distinct studies. The first one, carried out by the marine research Centre of Rovinj, Yugoslavia, concerns the evaluation of genotoxic risk in the marine environment using invertebrates as indicator organisms. The usefulness of the method of alkaline elution, for monitoring DNA damage in mussels caused by pollution, is shown as well as the advantages of the use of the haemolymph as a target-organ. The second study deals with the effects of solar radiation on the mutagenes and the impact of marine pollution on the biotransformation of cancerigenous agents in the liver of fish. It was carried out by a scientific team from the Institute of Hygiene and Preventive Medicine and the Institute of Zoology of the University of Genova, Italy (MAP Technical Reports Series, No 57, 59 pages, in English only).

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UNEP/FAO, in cooperation with WHO and IAEA: Assessment of the state of pollution of the Mediterranean sea by organophosphorous compounds. Like the previous one (No 56) on synthetic materials, this technical report contains one of the evaluation documents whose conclusions and recommended measures were adopted by the Contracting parties at their meeting in Cairo in October 1991. Available data on organophosphorous compounds is limited and fragmentary. Organophosphorous compounds are comprised of a series of pesticides some of which are highly toxic. They reach the marine environment through rivers, the atmosphere, agricultural run-off and industrial point sources. On the whole, observed concentrations in the sea (coastal waters and fish) are lower than those found in fresh water systems. The document also gives figures on the production and the use of organophosphorous compounds in various Mediterranean countries, as well as legislation and national and international regulations on the prevention of this type of pollution (MAP Technical Reports Series, No 58, 122, pages in English and French).

UNEP/FAO, in cooperation with IAEA: Proceedings of FAO/UNEP/IAEA consultation meeting on the accumulation and transformation of chemical contaminants by biotic and abiotic processes in the marine environment. This report contains the proceedings of a consultation meeting which took place at La Spezia, Italy, from 24 to 28 September 1990, in the framework of Research Area IV of MED POL "Fates/Environmental transformation". The key-note paper and the other 22 papers appear in full in the annex, while the discussions which took place and the recommendations constitute the main body of the report. During the discussion, the term "transformation" was taken to encompass not only changes in molecular structure but also changes in the physical matrix and the medium in which a chemical entity is found. The meeting also recognised the difficulty of treating separately biotic and abiotic transformations since they are often indistinguishable in nature. A large part of the discussions concentrated on methodological problems (MAP Technical Reports Series, No 59, 392 pages, in English only).

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UNEP/WHO: Development and testing of sampling and analytical techniques for monitoring of marine pollutants (activity A). Final reports on Selected Microbiological projects (1987-1990). The sections of this document concern the following subjects: studies on the occurrence of *Staphylococcus aureus* and *Pseudomonas aeruginosa* in coastal water in Israel; quantitative determination of *E.coli* from faecal coliforms in seawater; development of analytical techniques for monitoring the hygienic quality of shellfish; investigation on neurotoxins in shellfish; evaluation of the specificity and the sensibility of a fluorometric method for counting *E.coli* in water samples and marine sediments (MAP Technical Reports Series, No 60, 76 pages, in English and French).

ECHOES OF MEDITERRANEAN COUNTRIES

Forseen meetings and events

Ulysse 92: the Second film festival on the Mediterranean environment will take place in Sardinia from 3 to 8 december 1992.

After the success of the first film festival which took place at Alghero, Sardinia, in september 1990 (see MEDWAVES, no 21), the organisers, MEDMARAVIS (The Mediterranean Marine Bird Association) and the Sardinian film association CIAK, decided to repeat it at Alghero, from 3 to 8 december 1992, naming it ULYSSE 92. During this second festival 16mm, 35mm and video films will be presented. Producers and film directors wishing to participate can contact:

The festival's secretariat: ULYSSE 92, via Roma 85, 07041, Alghero, Sardinia, Italy. Fax (39)79.98.06.09.

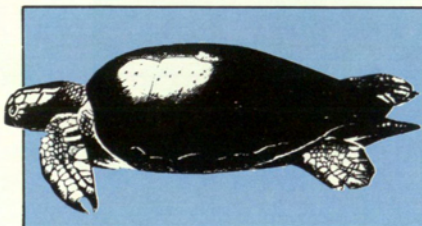
Three meetings of the Euro-Mediterranean Centre on marine contamination hazards:

- Workshop on Co-operation in the field of marine contamination hazards: Valetta, Malta, 19-20 November 1992 (to ascertain possible cooperation between marine-related research organizations within the Euro-Mediterranean sphere).
- Workshop on the application of oil dispersants in the Mediterranean sea: Valletta, Malta, 1-4 December 1992 (review of the various efficiency and toxicity test protocols, their applicability and relevance to the Mediterranean and formulation of recommendations to the regional environmental authorities).
- Round-table on the Black sea and the Mediterranean Basin: Trieste, Italy, 16 October 1992 (physical exchanges between the two seas and more standardised approach to the study and the management of these two bodies of water).

For more detailed information, contact: Foundation of International Studies, University of Malta, St Paul Street, Valletta, Malta, tel.: 234/121/2-224067, fax:230551.

MEDITERRANEAN MARINE TURTLES

An original "adoption" campaign in order to promote the protection of the turtle *Caretta caretta*.



The Association for the protection of the marine turtle, whose headquarters is in Athens, has launched an original idea in order to inform the public - and especially children - about the need to protect the marine turtle and its reproduction sites. The Association invites people to "adopt" a turtle, a nest or a sea turtle hatchery. In order to do that, all one has to do is to sign a contract for a more or less important contribution (according to whether one wants to adopt a turtle hatchling, a tagged turtle, a nest or a hatchery) and, in return, one receives a book of information on turtles as well as on the animal or the site specifically involved in the contract. This initiative is addressed in particular to children who can thus follow the progress of the adopted turtle, learn where it comes from, which is its reproductive activity and whether it reappeared during the new nesting season (in the case where the animal is tagged). The adoption of a hatchery implies an important contribution justified by the cost of organisation and of maintenance and is addressed to companies, organizations, institutions etc.

For more information, contact: Association for the protection of the marine turtle, Solomou 35, 106 82 Athens, Greece.

ECHOES FROM OUTSIDE THE MEDITERRANEAN

EMECS' 93, Maryland, USA

The second international conference on the environmental management of enclosed coastal seas (EMECS' 93) will take place at Baltimore, Maryland (USA), from 19 to 21 July 1993. It is organised by the State of Maryland and the U.S. Federal Government in cooperation with the Hyogo Prefectural Government (Japan) and is sponsored by various institutions and organisations such as UNEP. Participants will examine the interactions of science, policy and management in maintaining coastal environments for the sustained use of their irreplaceable natural resources

For more detailed information, contact: EMECS' 93 Secretariat, c/o University of Maryland CEES, P.O.Box 775, Cambridge, Maryland 21613 USA, Tel. +1 410 - 228-9250, Fax. +1 410 - 228-3843.

AN INTERNATIONAL POSTER COMPETITION FOR YOUTH ON THE SUBJECT OF DOLPHINS IS ORGANISED WITH THE SPONSORSHIP OF UNEP

An international poster competition for young people is organised on the subject "Dolphins: alive, in good health and free" by UNEP, the Centre for Marine Conservation, the world confederation of underwater activities and various other organisations. The aim of the competition is to make young people aware of the general concern for the protection of the marine environment and invites them to express themselves in a drawing. It is open to all young people under 19 years old. There is a sponsoring organization in every country to which drawings must be sent; the deadline for registration being the 1st of December 1992. The drawings selected at a national level will then be submitted to an international jury of personalities working in the field of the marine environment, in New York.



THE MEDITERRANEAN LAUREATES OF THE ROLL OF HONOUR FOR ENVIRONMENTAL ACHIEVEMENT

At the end of March 1992, UNEP published the names of the last 75 global awards for environmental achievement. This roll of honour created in 1987, permits the reward and honouring of individuals and organisations who have contributed to the protection of the environment worldwide. The object of this event was to exemplify this contribution and to encourage future genera-

tions. Prizes are to be awarded at Rio de Janeiro, on June the 5th, on the occasion of International Environment Day and in the framework of "Summit Earth". The Mediterranean laureates are eight. We address them our congratulations and include their names here together with a short summary of their environmental action.

● **Ahmed Abdel-Wahab Abdel-Gawaad.**

Professor Abdel-Gawaad teaches environmental science at the faculty of agriculture of Mostohar, in Egypt. Most of his research (120 papers) has been directed to the problem of pollution by pesticide residues and he has helped advance knowledge of this problem through national and international symposiums and congresses, television programmes, public and governmental organisations.

● **Brigitte Bardot.**

This famous French actress of the 50s and 60s, has set up a foundation which is called after her and has provided funds for promoting the protection of animals threatened by Man, such as seal pups. Having retired from all filming activity, she has placed her reputation at the service of this cause. Her foundation has been officially recognised as a public utility.

● **Rose Cotta.**

Founder member of the Soroptimist club of Barcelona, this Spaniard has acquired a four-hectare area of land in Catalunya in order to convert the use of conventional non-organic techniques to organic methods. As a result, animal and plant species which had disappeared returned to the area and it has become an example of sound and sustainable agricultural development.

● **Francesco di Castri.**

Coordinator for the Environment in UNESCO, Paris, he has written 12 important scientific volumes and some 300 papers on theoretical and applied ecology. He specialized in this field in Padova University and has taught at universities in Chile and Austria.

● **Edwige Guillon.**

Resident of the small french town of Saint- Calais, she persuaded the local community of teachers to speak to children and adolescents about environmental issues. This initiative resulted in a series of conferences, exhibitions, treeplanting programmes, recycled paper, etc. Furthermore, a new association, to reduce pollution and increase the quality of life in Saint-Calais, has been formed.

● **Hayrettin Karaca.**

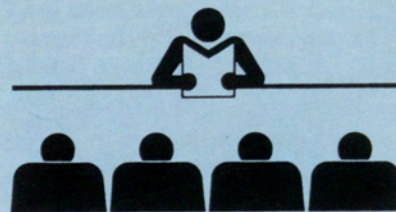
This Turkish businessman gave up his 31 year old business life to begin work on conserving flora. He has created the only private arboretum in Turkey. The Karaca Arboretum has a variety of approximately 6,000 trees and shrubs from Turkey and the rest of the world. It is open to the public, to scientific foundations and to students. It publishes the Karaca Arboretum Magazine, a scientific periodical.

● **Josip Movcan.**

A forestry engineer, he has for 32 years been responsible for the protection and the development of one of Yugoslavia's oldest national parks - the Plitvice Lakes in Croatia, a site included on UNESCO's World Heritage List. He has been actively engaged in propagating the abandonment of logging in national parks in order to preserve ecosystems.

● **Society for the Protection of Nature in Israel.**

Since 1953, this Society has involved members of all communities (Jewish, Christian and Muslim) in outdoor recreational and learning activities, in its efforts to raise environmental awareness. The Society operates 25 Field Study Centres that organise direct public action to save threatened natural and historic sites and conducts research in conjunction with Israeli and foreign universities.



THE MAP CALENDAR OF MEETINGS

Training course on chemical pollution preparedness and response	May/June Malta
Training course on waste water treatment plants	May/June Sophia Antipolis France
Training workshop on the techniques for monitoring biological effects of pollutants	14-26 september Nice France
Meeting of REMPEC Focal Points	21-25 September Malta
Training and inter-calibration exercise on determination of microbiological pollution	Sept./Oct. Athens Greece
Meeting of PAP Focal Points	8-10 October Athens Greece
Meeting of the Bureau of the Contracting Parties	20-21 October Athens Greece
Meeting of Blue Plan Focal Points	22-23 October Sophia Antipolis France
Meeting of SPA Focal Points	26-30 October Athens Greece
National training course on EIA	October Tripoli Libya
Training course on GIS	October Split Croatia

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