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PABSEC

ECONOMIC, COMMERCIAL, TECHNOLOGICAL AND ENVIRONMENTAL AFFAIRS COMMITTEE

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REPORT

ON

"THE BLACK SEA ENVIRONMENTAL HEALTH"

THE STATE OF THE BLACK SEA ECOSYSTEMS WITH A SPECIAL FOCUS ON ENVIRONMENTAL GEOLOGY

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INTRODUCTION

According to the decision made at the Second Meeting of the Economic, Commercial, Technological and Environmental Affairs Committee held in Trabzon on 20-22 April 1994 and further reiterated during the special session of the Committee in Bucharest on 20-21 June 1994, upon the proposal made by the Delegation of Romania, a report, which follows, has been drafted on "The Black Sea Environmental Health: The State of the Black Sea Ecosystems with a Special Focus on Environmental Geology."

The purpose of this report is to identify the facts, problems and the effects of existing problems and to come up with the most practical solutions of how to approach current problems and face the realities for the future environmental well-being of the Black Sea region. Staying in the functional boundaries and objectives of the PABSEC which mandate dealing with issues in the most practical means without going into technical details, the report aims to support a cooperative approach which will urge all interested and responsible bodies gearing their efforts towards an integrated and coordinated manner of activities.

Among the PABSEC member delegations, the Romanian and Turkish Delegations have responded and provided relevant documents (See Annex 1 and 2). In addition, the Ministry of Environment of Turkey and Global Environment Facility (GEF) which oversees Programme for Environmental Management and Protection of the Black Sea have furnished the International Secretariat with substantial and valuable information on the topic. In this respect, the International Secretariat has drafted this report based on the information received from the above mentioned parties and through the research of other relevant literature.

The Black Sea, the ancient link between Europe and Asia, is suffering dramatic changes and biologists warn it could become an ecological graveyard by early next century. Nowadays, the Black Sea has become one of the most polluted bodies of water on earth. Heavy pollution, over exploitation of marine and coastal resources and the accidental introduction of exotic species of predatory animals, has eventually strangled the Black Sea having a 4000-km coastline with a basin-wide population of over 160 million people.

The growing tide of human, farm and industrial effluent pouring in from the six coastal Black Sea countries - Bulgaria, Georgia, Romania, Russia, Turkey and Ukraine - that almost use the land-locked sea as a dump and sewer rapidly deteriorate the conditions. "Ecologically, the Black Sea is in an extremely critical situation. It could become dead in ten or fifteen years if nothing is done to rescue it," says Simion Nicolaev, Director of the Romanian Marine Research Institute in Costanza.

Under this gloomy view of the the Black Sea environment, although it has become very difficult to remedy the present outlook, generating effective rescue operations will still

benefit not only the economic and environmental obligations but also human, animal and plant life inhabiting the Black Sea region.

THE FACTS AND PROBLEMS

The geographical situation of the Black Sea makes it particularly susceptible to the effects of land-based sources of pollution. Although of similar area to the Baltic Sea or North Sea, it is virtually enclosed and connected to the Mediterranean by the narrow and relatively shallow Bosphorus and the contaminated Sea of Marmara. Three quarters of the Black Sea are deep (200-2000 meters) and permanently anoxic below about 150 meters due to limited deep water exchange with the Mediterranean and the naturally rather high production of the surface waters.

Dozens of rivers and streams deliver waste from a catchment area of over 160 million people in eleven countries, spanning much of Europe. Among the biggest and most polluted are the Dnieper, the Dniester and the Bug flowing through Ukraine, and the Danube, acting like a large trade artery for the Balkan countries. They carry tons of toxic materials - hydrocarbons, organic substances, detergents, pesticides, heavy metals. The total river water discharge, over 300 km^3/y running from a drainage, is of more than 2 million sq. km.

The shallow Sea of Azov in the northeast corner of the Black Sea is fed by the rivers Don and Kuban. Together, these major rivers drain almost one third of continental Europe, including substantial portions of non-coastal states, mostly riparian countries of the Danube (Germany, Austria, Slovakia, Hungary, Croatia, Slovenia and former Yugoslavia). In brief, the Black Sea drainage basin, five times larger than the sea, covers large areas of eleven other countries stretching from Germany to Belarus (See map).

One other important problem is the drastic reduction in the flow of some rivers because of upstream dams and diversions for irrigation and hydropower. This has reduced the water quality and has increased coastal erosion by trapping riverborne sediments in reservoirs, particularly in the Sea of Azov, where increased salinity has hurried the demise of stocks of sturgeon.

Another problem is the radioactive fallout from the 1986 nuclear accident at Chernobyl, which gets into the sea through the waters of the Dnieper River after rains in the contaminated area.

Apart from the runoffs of these mighty rivers, pollution also comes from discharges of cities and industrial complexes along the coast, as well as shipping. Vast areas of the coasts have lost their natural plant and animal life; fishing and tourism have been devastated. For instance, combined lost from fishing and tourism totals $650 million yearly for the entire Black Sea basin. Considering the Black Sea is the only warm-water marine environmental resource for Eastern Europe and, until quite recently, was home to fisheries that were five times richer than those of the neighboring Mediterranean, the

present situation looks quite dramatic. Unfortunately, many fishing boats sit in ports, idled by the sharp drop in numbers of caviar-laden sturgeon, anchovy, sprat and mackerel.
In addition, much of the industry within the basin was the product of centrally planned economies in which pollution control and waste management were inadequate. The annual loads of many critical contaminants reaching the Black Sea from the Danube, for example, often exceed those of all river inputs to the North Sea. Furthermore, considerable contaminant loads reach the Black Sea via atmospheric fall-out, by direct discharge through outfalls, and by dumping (mostly of sewage sludge and spoils from harbor dredging). Economic stagnation has left many coastal settlements with half-completed sewage treatment plants, or in some cases, with no sewerage system at all.

Additionally, offshore oil and gas wells are now being exploited, the Black Sea is heavily transited by shipping and there is little or no control over deballasting of oil tankers.

As a consequence of contamination, for example, swimming at Istanbul beaches in Turkey has been declared a health hazard because of dangerous concentrations of coliform bacteria from human and animal waste coming from untreated sewage emptying into the sea.

Beaches near Odessa, Ukraine have been closed in recent summers because of toxicity and the smelly froth of algae.

In Mamaia, one of Romania's top resorts just north of this city port, the winds carry the noxious smell from the Midia-Navodari petrochemical complex whose tall chimneys can be seen in the distance belching black smoke.

The most dramatic environmental problem, however, has been caused by eutrophication-overfertilization of the sea by nutrients from land-based sources. This has resulted in a shallowing of the euphotic zone (the surface layer in which the light level is sufficient for primary biological production). It has also led to widespread anoxia (absence of oxygen) and shortening of the marine food chain. The profound alteration of the marine ecosystem of the Black Sea from eutrophication has contributed to the decline (almost demise) of its fisheries, which are suffering from overexploitation. Harvesting of commercial crustaceans and benthic species, such as oysters, has suffered, due largely to anoxia in feeding and nursery areas, especially on the northwest shelf.

Wetlands, sparsely scattered around the rim of the Black Sea, serve as natural filters, trapping pollutants and sediments from rivers. These estuaries and floodplains are threatened by development, deforestration, unregulated housing, pollution from agriculture and industrial plants. Continuing degradation of these wetlands could eliminate an important natural buffer between the polluted rivers and the Black Sea.

Finally, one of the major problem areas is the lack of an integrated approach to coastal zone management (that is, the integration of all sectors involved in decision making in the coastal zone).

Although the aim of this report is generalizing the problem areas instead of detailing them, in compliance with the principles and functions of the PABSEC, there may be dozens of

other problems threatening the environmental well-being of the Black Sea. In this respect, summarizing "the sources of environmental degradation in the Black Sea" under the following subheadings will facilitate the better identification of the problems.

Atmospheric fallout, intensive agriculture, urbanization, industry, coastal zone and port development, and maritime pollution have gradually degraded the Black Sea and the Sea of Azov through the years. Much of the pollution originates in the agricultural and industrial areas of Russia and Ukraine and in the vast catchment of the Danube.

Nitrogen and phosphorus, the two major pollutants that cause eutrophication, are largely transported by rivers, mainly the Danube.

ATMOSPHERIC POLLUTION

Pollutants from industry, coal and oil-fired power stations, residential heating, and vehicles. Some atmospheric pollutants may be deposited directly on the Black Sea or washed into it by rivers. Such airborne pollution may carry heavy metals, but of more concern for the Black Sea are the nutrients carried by airborne particles.

AGRICULTURE

A major polluter of the Black Sea is the runoff of nutrients and agricultural chemicals. A big problem is unreliable mineral fertilizer storage and excessive application leads to leaching into rivers and pollution of groundwater.

URBANIZATION

Untreated or insufficiently treated sewage and municipal wastewater are main sources of pollution in coastal cities and villages. Microbiological pollution is mostly a local problem.

INDUSTRIAL ACTIVITY AND MINING

Every type of heavy industry - oil refining, ferrous and nonferrous metal refining, chemicals, pulp and paper production, and food processing - as well as production of coal, iron ore, and oil and gas contribute to the heavy pollution of the Black Sea by discharging wastewater, runoff from waste dumps or air pollution that is then deposited by rainfall. Heavy-metal contamination and chloro-organic pollution are generally limited to well-defined, source-related hot spots mainly in coastal and transitional zones.

Official dumping has become a major problem. There are sixteen official dump sites in the Western Black Sea. Most are on the continental shelf and are used for dredging spoils (or sludge) from harbors and channels which has substantial negative effects on marine life. Other types of dumping as well as illegal dumping which violates the international and national laws are additional causes of pollution in the region.

MARITIME POLLUTION

There are very high levels of hydrocarbons spotted along navigation routes from the Danube to the Bosphorus that are ten times higher than typical levels in the Gulf. Also,

the contaminated Danube River itself pours the equivalent of 45,000 tons of oil a year into the Black Sea. Other than land-based pollution, the major cause of contamination stems from shipping (that is, the illegal discharge of ballast and bilge and accidental spills during loading and unloading). Part of the reason is that so few Black Sea ports have adequate reception facilities.

Oil pollution from military installations and navies as well as the pollution caused by offshore oil and gas exploration and production can be accounted for other types of environmental concern in the Black Sea region.

THE EFFECTS

The problems related with the environment of the Black Sea are many in number and importance. Naturally, this phenomenon has lead to enormous economic losses. Indeed, the cost of pollution and contamination of the Black Sea environment loads a gigantic economic, social and financial burden on the Black Sea countries. Economic losses are estimated at about $240 million annually in the fisheries sector. The losses in the tourism sector are even worse, at about $400 million annually. The social costs of Black Sea pollution, such as health problems and unemployment, are substantially high. If the cost of lost working days, health care, reintroducing of the lost species to the ecosystem, coastal lands lost to erosion, finding alternatives to polluted drinking water supplies are taken into consideration, the amount may well exceed $1million not to mention the indirect economic losses.

The following under subheadings will indicate many of the negative effects of the polluting of the Black Sea Environment:

HUMAN HEALTH

- Pollution from sewage problems has led to outbreaks of cholera and increased gastrointestinal diseases in recent years.

- Unsanitary conditions have caused health risks on beaches all around the Black Sea.

- Large human population living or vacationing on the Black Sea coast endangers the limited fresh water supplies as well as puts stress on biological resources.

- Shortages of drinking water as well as poor quality drinking water endangers the well-being of the local population and tourists.

- Contaminated fish and shellfish threaten human health.

FISHERIES

- The Black Sea fishing industry is already on the verge of collapsing due to pollution. Total catches, estimated at 900,000 tons in 1986, fell to about 100,000 tons for all countries in 1992.

- Turkey, which relied on the Black Sea for eighty percent of its supply of fish in 1970s and 1980s, has been hit the worst. The anchovy catch of Turkey has declined from 500,000 tons to 70,000 tons.

- The cause of the fall of the fish catch stems not only from overfishing but also from eutrophication and predation on their larvae by the comb jellyfish, *Mnemiopsis leidyi*.

- Employment in the fishery sector has been affected vastly. In Romania and Ukraine, the loss of fishery jobs is a grave socioeconomic problem. The total job losses from the collapse of the Black Sea fisheries is estimated at 150,000.

- On the continental shelf of the Black Sea, other marine resources such as macroalgal communities - which are sources for many natural products, such as agar, natural dyes, and raw materials harvested for pharmaceutical industries - have virtually disappeared.

- Shellfish have also been affected by pollution and by predation from *Mnemiopsis*.

- Native Black Sea species have been largely replaced by exotic ones accidentally introduced over the past half century.

TOURISM

- Pollution by contamination effect substantially the benefits of all coastal Black Sea countries from tourism.

- Unsanitary conditions have caused closures of beaches in all the Black Sea countries, therefore causing economical revenues expected from tourism.

- Although the Black Sea offers beautiful beaches and landscapes, mineral waters, and medicinal muds, furnished by relatively good highways and other forms of transportation, the revenue loss due to pollution in recent years is enormous for the coastal countries.

- Unregulated health resort development does not do much for the well-being of the environment and humans, therefore having negative effects on tourism revenues.

- Closure of beaches puts pressure on cleaner ones nearby, speeding their degradation.

- Although the Black Sea is the only marine area available to millions of Eastern European citizens and the fact that tourism used to be a major revenue for some of the Black Sea countries, the number of people vacationing on the Black Sea has gone down substantially in recent years, and the loss of income is estimated to be more than $400 million.

EUTROPHICATION AND BIODIVERSITY CHANGES

- Eutrophication and other types of ecosystem degradation have caused the following biodiversity changes and imbalanced ecosystems in the Black Sea:

  * The Black Sea has been transformed from a diverse ecosystem supporting varied marine life to a *eutrophic plankton culture* - environmental conditions unsuitable for most organisms higher in the food chain.

  * Opportunistic settler species like the predatory see snail, *Rapana thomasiana,* brought in the ballast water of ships, may be held responsible for the demise of commercially harvested oyster populations.

  * Large banks of clams and mussels have been eliminated by the effects of anoxia (lack of oxygen).

  * The impact of the *ctenophore* (comb jellyfish), *Mnemiopsis leidyi,* together with the jellyfish, *Aurelia aurita,* is so dramatic that it represents a trophic "dead end."

  * The construction of irrigation and hydroelectric dams on major rivers reduce the fish stocks in the Black Sea.

  * Valuable migratory fish species have declined because of heavy pollution in the Bosphorus and the Sea of Marmara.

  * As the sprat, horse mackerel, anchovy, red mullet, bluefish, Black Sea whiting and crustaceans have declined greatly due to pollution, the dolphin population has been greatly affected as they feed on them.

  * Dolphins have also suffered substantially because of intensive hunting by fisherman.

INSUFFICIENT INSTITUTIONAL POLICIES AND ENFORCEMENT

The lack of institutional policies and the enforcement of existing ones has also contributed to the downward slope of the environmental pollution and degradation of the Black Sea. Naturally, this has led to dramatic social and economic losses in the region. Together with the lack of effective management strategies and international cooperation in coping with the problems, the environmental situation of the Black Sea region has come to serious dimensions.

The following are some of the factors stemming from institutional causes contributing to the pollution of the Black Sea environment:

ECONOMIC POLICIES

- The legacy of central economic planning in order to reach high volumes industrial production that may be a measure of economic success.

- Production of heavy industrial goods with little concern on environmental pollution, e.g., The industrial pollution of the Sea of Azov and the eastern Black Sea.

- Giving low priority to the treatment and disposal of waste.

- Insufficient use of raw materials.

- Underpriced values of water, energy, and raw materials which yielded resource waste and therefore pollution.

INSTITUTIONAL DEFICIENCIES

- Insufficient number of regional agencies an environmental issues.

- Lack of coordination for policy implementation, monitoring and enforcement.

- Cuts in government funding.

- Poor coordination between economic and sectoral ministries on environmental policies and actions.

- Weak communication of the national environmental bodies in the basin countries with other government agencies.

- Ineffective outlay of economic goals and policies with little or no consideration of the potential impact on environment.

- Information deficiency for strategic planning and action.

- Unreliable technical and scientific data.

- Insufficient assessment of data due to lack of financial and public policy experts.

LEGISLATIVE FACTORS

- Limited legislation to regulate discharges from off-shore industries.

- Limited legislation on dumping (wastes, sludge) and discharging in the open sea (ships, off-shore industry).

- Lack of enforcement and of standardization on environmental penalties and crimes, e.g., Romania, the Russian Federation, Turkey, and Ukraine have laws on direct discharges into rivers and seas. But in Romania, for instance, those discharges are not effectively monitored. Ukraine has legislation to control discharges from ships but no laws covering the dumping of wastes at sea.

RECOMMENDATIONS

Taking into consideration the utmost significance of the issues related with the environmental well-being of the Black Sea region, the following are highly recommended to restore and preserve the environmental health in this region.

A) The Parricipating States of PABSEC, individually and/or as PABSEC, where and when necessary, will partly and/or fully support, encourage, cooperate and participate in:

- the activities, programs and projects underway or projected,
- the initatives, decisions and measures taken, and
- the effective implementation of those decisions and measures taken

in regard to the following agreements, conventions, declarations, countries and organizations:

- The Odessa Declaration, Odessa, 7 April 1993 (See Annex 3).
  It provides a clear indication of the principles, approaches, goals, and common priorities for regional action. The signatories recognize that the "the rehabilitation, protection and preservation of the Black Sea can be ensured only through bilateral and multilateral cooperation, including cooperation with relevant international organizations."

- Report of the Meeting of the Working Group on Environmental Protection - Black Sea Economic Cooperation (BSEC), Varna, 4 November 1993 (See Annex 4).

- The Bucharest Convention and its Three Protocols, Bucharest, 21 April 1992 (See Annex 5).
  It establishes common legal tools for controlling marine pollution and provides the decision-making and institutional framework for the development adoption of guidelines.

- Programme for the Environmental Management and Protection of the Black Sea to be funded from 1993 to 1995 by the Global Environment Facility (GEF), a trust fund managed by the World Bank, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP), Varna, 30 June 1993.
  The GEF Program provides a framework for the periodic preassessment and adjustment of actions to protect the marine environment. It aims through capacity-building, funding, and technical support, to strengthen the efforts of the Black Sea coastal states towards the protection and preservation of the Black Sea. Through the support of the preparation of the Black Sea Action Plan, this program will give high priority to the implementation and development of:

  - The Bucharest Convention on the Protection of the Black Sea against Pollution and Odessa Ministerial Declaration on the Protection of the Black Sea.

  - Short-term actions for a more sustainable ecosystem in the Black Sea.

- Water quality monitoring.
- Emission control.
- Preservation of the ecological sites.
- Legislation and integration of policies.
- Economic investments.
- Data management systems.
- Applied research.
- Integrated Coastal Zone Management.
- Agricultural development.
- Fisheries.
- Urban Waste Management.
- Port establishments.

- The Danube River Basin Project supported by GEF.
  It aims to improve the environmental management of the basin and its tributaries through a regional approach.

  The Danube Delta Biodiversity Project supported by GEF and managed by the World Bank.
  It covers the two delta countries - Romania and Ukraine.

  These two projects provide a unique opportunity to link the concepts of river basin management, marine resource management and integrated coastal zone management.

- The Black Sea Commission which will be headquartered in Istanbul and will start its activities in 1995.
  It will deal with drawing up criteria for preventing, reducing and controlling marine pollution.

- PABSEC - BSEC - GEF Cooperation
  It could be coordinated by the Black Sea Commission.

- The European River-Ocean System Project (EROS - 2000)

- The NATO Science for Stability Programme and the Marine Sciences Cooperation Programme for the Black Sea (COMSBLACK)

- The Earth Summit, Rio de Janeiro, 1992. (UN World Environment and Development Convention, the application of the AGENDA 21).
  It produces new concepts on the issues of environment and development.

- The European Conference, Lucerne, 1993.
  It confirmes that the sustainable economic development is not possible without the parallel solution of environmental problems.

- Environmental Action Programme for Central and Eastern Europe.

- Bulgaria's policies for Integrated Coastal Zone Management (Office of Coastal Zone Management).
  It is modeled on the best practices in the European Union countries and the U.S.A.

- The 1973 International Convention for the Prevention of Pollution from Ships (MARPOL).
  It deals with oil, bulk chemicals, harmful substances, sewage and garbage. The ratification of this convention is beneficial by the liable countries, without jeopardizing their national interests.

- The Agreement between the Supreme Soviet of the Crimean SSR and Nikolaev, Kherson and Odessa Councils of People's Deputies, Simferopol, 19 November 1991, on Ecological Safety and Environmental Protection and Recuperation in the Black Sea Area of Ukraine (See Annex 6).

B) The Participating States of PABSEC, individually and/or as PABSEC, will agree upon, and support the following concepts, principles and activities in general:

- Beginning regional and international action to save the Black Sea.

- Encouraging a coherent approach to international cooperation involving government sectors.

- Encouraging the participation of the non-governmental organizations in the environmental issues and programs.

- Encouraging the programs for public awareness.

- Properly assessing the pollution in the Black Sea.

- Reinforcing better development and functioning of strategic planning and action units.

- Generating sustainable policies which will facilitate the coordination of long-term regional programs and investment strategies.

- Establishing an effective array of local and regional departments and agencies responsible for policy implementation, monitoring and enforcement.

- Strengthening the overall institutional structure which facilitates the coordination of environmental policies and objectives.

- Putting more emphasis on environmental regulations and monitoring while economic investments are underway.

- Putting into action effective environmental enforcement and standardization measures through concrete legislation.

- Establishing effective management tools and networks for exchanging environmental knowledge and information.

- Allocating more funding by governments to environmental issues and providing assistance to develop the institutional and financial capacity to improve the situation.

- Resolving environmental liability and compensation issues.

- Conducting work on maintaining and enhancing the amenity value of the environment.

- Putting into action comprehensive Environmental Impact Assessments (EIAs) of new projects which are mandated under the laws of all riparian countries and as required by the Odessa Declaration.

- Giving full support to the activities of the "Programme for the Environmental Management and Protection of the Black Sea," funded by the Global Environment Facility (GEF).

- Cooperating, when and where necessary, with other international, governmental, non-governmental, private and voluntary organizations and agencies for the environmental well-being of the Black Sea region.

- Calling upon the International Maritime Organization to take action with respect to the Black Sea region.

CONCLUSION

The environmental problems of the Black sea region should be courageously recognized and faced. Only then will coping these problems become easier. Indeed, the magnitude of these problems are so vast that they call for dramatic actions and measures to reverse the downslide. Taking into account the substantial cost and labor factor of remedying the current situation, the effective collaboration and cooperation among all interested parties who care for the environmental health of the Black Sea region need to be established. One way or another, the pollution in the Black Sea region ought to be halted, especially considering the vital interests of all the riparian countries in the region. For instance, pollution from extensive oil and cement terminals in the port of Odessa and port

operations at Sevastopol in Ukraine, danger of spills from oil traffic through Istanbul and Ãanakkale straits in Turkey, leakage from oil refineries near the port of Burgas in Bulgaria, and problems encountered in the Midia-Navodari oil refinery near Mamaia in Romania are a few examples among others and they need to be remedied without further delay.

In this respect, the Black Sea region urgently calls for the successful generation, coordination and implementation of the programs mentioned earlier in this report, not only for its environmental well-being but also the prosperity and well-being of the riparian countries and their inhabitants.

The effective cooperation af all interested parties in order to preserve and protect the treasures of the region and to enhance environmental conditions for a better living is a must.
The success of the programs will depend on the generation and effective implementation of policies, institutional strengthening, human resource development and further investment activities.

All these efforts require the development of an effective regional institutional structure for environmental management in the Black Sea region.

In general, the desired results should gradually be expected and eventually yield the following benefits:

- Health, tourism and fisheries would benefit directly from capacity-building and investments.

- Improvements in the control of non-point-source pollution in the Black Sea region would become evident after a number of years.

- Action taken for the conservation of nature in key areas would have broad regional benefits.

- The people of all Black Sea countries, in particular, those who live in coastal zones and the drainage basins of the inflowing rivers will enjoy improved water quality, the rehabilitation of the renewable natural resources and better health conditions.

- Several million tourists will be able to take advantage of clean and pleasing recreational facilities.

- In the short term, governments and institutions will benefit from institutional strengthening as a consequence of networking, training programs and the provision of key items of equipment.

- Proper environmental assessments and preinvestment studies will help the release of vital credits for improving waste management and for stimulating the development of key sectors.

- The fisheries industry will benefit from sustainable catch quotas.

Finally, and most of all, the future generations will be able to enjoy the generously abundant offerings of the Black Sea region, bearing full responsibility for the protection, preservation and enhancement of this gifted environment.