

The Black Sea: An Environmental & Ecological Profile With a View Towards UNCED

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This report identifies the prominent issues that threaten the environmental security and the sustainable development of the Black Sea basin. Presented here is a principal scientific assessment of the environmental state of the Black Sea. A discussion of the major issues and concerns facing the Black Sea is depicted in tabular form as an inventory. The issues and concerns are prioritized according to a scientific weighting process developed and honed by the U.S. Environmental Protection Agency (see: U.S. EPA, 1990) and thus juxtaposed to the Black Sea through critical analyses.

Opportunities for regional and international cooperation are also addressed. The discussion includes aspects from the United Nations Conference on Environment and Development which took place in Rio de Janeiro in 1992 as well as a review of the fledgling program known as the Global Environmental Facility (GEF) for the Black Sea. This program is now being developed in response to an initial request from the government of Turkey to the World Bank and its GEF partners, and the recent signing in early July of 1993 in Varna, Bulgaria of the Convention on the Protection of the Black Sea Against Pollution. The GEF, with initial funding of some \$30 million, should commence by the fourth quarter of this year with a Program Coordination Unit located in Istanbul.

Included as part of this report is an outline for development of a draft strategy for public awareness on marine science and management (conservation) issues in addition to a draft strategy to strengthen monitoring, data management and environmental standards in the region. Information and a synopsis accumulated from the author's attendance at the first meeting for the establishment of the GEP for the Black Sea in Constanza, Romania in May 1992, as well as other sources are included in this report. Partial funding was also provided by IUCN the World Conservation Union in Gland, Switzerland and is gratefully acknowledged.

The Black Sea, situated between latitudes 40 55' and 46 32'N and longitudes 27 27' and 41 42'E, is the largest anoxic sea in the world with about 508,000 square kilometers. Approximately 90 percent of its volume ($5.37 \times 10^5 \text{ Km}^3$) is without oxygen. The total fresh water input into the Black Sea from the basin's rivers is estimated at 350 cubic kilometers per annum. The Danube presents the highest discharge with about 50-75 percent of the total input; the Dnieper provides another 15 percent of the total river discharge. Typically, annual precipitation exceeds evaporation but not enough to influence surface salinity to any appreciable extent.

The recent change of Eastern Europe countries from centrally planned governments to western-style democracies has rekindled interest in environmental research on

marginal seas within the jurisdiction of these countries. One such marginal sea, the Black Sea, evokes scientific interest not only because it is the largest anoxic marine basin in the world, but also because it provides a present analog of conditions by which oceans formed through geologic history. In addition, the severe pollution of this nearly enclosed basin provides a useful prototype for human-stressed marginal seas throughout the world.

The environmental issues associated with the rivers, deltas, and continental shelf of the Black Sea are increasingly critical with each passing year. Ecosystems are failing, marine pollution and contamination are on the increase, and biodiversity of this relatively impoverished region is declining from neglect. Efforts have been made both by individual countries and by international organizations to address some of these issues. But a concise, yet complete, scientifically based programme is needed to address the temporal and spatial scales of biogeochemical processes that cause the environmental changes, as well as management and policy analysis for potential mitigation of these changes. This programme is now taking shape with the genesis of the GEF Black Sea project.

Following extensive interaction between some Black Sea countries during the past decades and building on new opportunities made available during the past few years in Eastern Europe, an international coordination of activities in the Black Sea is at hand. Yet, until now, this cooperation was unattainable. Although each country has continued its century-long tradition of research in the Black Sea, coordination and communication of such activities must be improved. A Convention on the Protection of the Black Sea Against Pollution, signed in Varna, Bulgaria in July 1993 by the Black Sea countries (Turkey, Bulgaria, Romania, Ukraine, Russia and Georgia), is one indication of the emerging cooperation between these nations.