Black and Caspian Seas: Marine Environmental Degradation

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The opening of eastern Europe to increased environmental cooperation has led to clarification of significant environmental issues of the marginal and inland seas of the former Soviet Union. Significant efforts from the international environmental community will now address this environmental degradation, and must be accompanied by enhanced regional cooperation. Two deep and proximate marine areas have been examined in detail recently: the Black Sea and the Caspian Sea, the former a marginal sea connected to the world ocean via the narrow, shallow Bosphorus Strait, and the latter a landlocked, though marine, lake.

Study of the two seas presents interesting similarities and contrasts, insights which have significant impact on their proper management. Some of the similarities include contamination from river-borne (and to a lesser extent, atmospheric) sources as well as non-point sources (agricultural run-off) of different kinds. Both areas are located along a major climatic boundary, making these regions sensitive to climate change of different types (rainfall, evaporation, windiness, etc.). River regulation has affected the ecosystems of both the Caspian and Black seas, though the effects on the Caspian Sea have been far more significant. Finally, both regions have (or have had) significant fisheries which have been adversely affected by human activities including contamination and over-fishing.

Contrasts are equally revealing: the Black Sea by virtue of its connection to the world ocean has a shorter residence time for pollutants than the Caspian Sea. By virtue of its lack of connection to the world oceans, the Caspian Sea experiences large swings in water levels (nearly 4 m between 1930 and present), which are not buffered by the open oceans. This sea-level rise is the major concern in the Caspian Sea, whereas its priority in the Black Sea is much less. Another significant contrast lies in extent of eutrophication: parts of the Black Sea are heavily eutrophied with consequences being felt at all levels of the ecosystem. Till now, the Caspian Sea is much less eutrophied, though the danger of increased eutrophication still faces the northern Caspian Sea. Finally, the Black Sea ecosystem has been modified strongly by invasionary species (jellyfish, comb jellies, etc.) which have dominated the biomass of the Black Sea at different times, decreasing the diversity of the region. Up to now, this serious invasionary degradation has not been experienced within the Caspian Sea, though the Volga-Don canal indirectly links these two regions and threatens direct exchange of organisms (as has been documented in the past).

In order to address the environmental ills of these seas, regional cooperation on all levels will be required. Amongst the required cooperation is open exchange amongst scientists in each region, to prioritize the environmental ills correctly and to help evaluate the effectiveness of various mitigation alternatives. Such a direct cooperative program exists in the Black Sea: the Cooperative Marine Science Program for the Black Sea (CoMSBlack). CoMSBlack is one example of a regional, non-governmental cooperation designed to help provide scientific input to assist in these debates on natural resource management.