

Europe and Central Asia Region



M. Hatzigeorgidis

In the Black and Mediterranean Seas, excessive nutrient discharges from agriculture and other point sources of pollution have created unsustainable conditions, causing periodic algal blooms, or “red tides,” which kill fish and irritate bathers, and “dead zones,” large submerged areas with too little oxygen to sustain marine life in the coastal waters of these semi-enclosed and hence highly vulnerable marine systems.

These conditions endanger the economy and livelihoods of many coastal communities. For example, the drastic decline in Black Sea fish stocks in the 1970s—a result of overfishing, water quality degradation, and alien species invasion—led to a collapse of the fishing industry and resulted in more than \$2 billion in losses over the 1970–90 period. The nutrient-fed algal blooms in the Adriatic Sea in the 1980s caused several million dollars in losses in the Italian tourism industry.

The decline in fish stocks also eliminated the prey of an invasive and highly predatory comb jelly, thus controlling further outbreaks

of this invasive species and allowing the population of plankton-eating fish and foodwebs to recover, bringing back some balance to the ecosystem. In many cases, however, curbing fishing pressure is not sufficient to return the ecosystem to its former state; controlling nitrogen and phosphorus pollution and protecting critical habitats and species biodiversity also are essential, as is careful management of the river basins that drain to the sea.

The Black Sea — A Dramatic Recovery

The Black Sea coastline has endured serious anthropogenic pressures. Untreated wastewater and agricultural runoff remain major sources of pollution. Nitrogen and phosphorus runoff from agricultural, municipal, and industrial sources has seriously degraded the ecosystem, disrupted fisheries, reduced biodiversity, posed health threats to humans, and resulted in billions of dollars of economic losses.

All this contributed to the collapse of the Black Sea ecosystem in the 1970s and 1980s, when vast amounts of dead plants and animals covered the beaches of Romania and western Ukraine. Between the 1980s and today, Romania and Bulgaria experienced a tenfold drop in the Black Sea fishery catch. From 1973 to 1990, an estimated 60 million tons of bottom animals were lost, including 5 million tons of fish.

Losses in fish catch alone might have been worth \$2 billion. In addition, the annual loss in tourism revenue from poor bathing water quality was estimated at over \$500 million. Health impacts associated with environmental degradation and inadequate infrastructure were also significant across the region, with more than 21,000 cases of serious waterborne infections a year in littoral states.

The economic collapse in Central and Eastern Europe that followed the breakup of the Soviet Union in the early 1990s brought about the closure of numerous livestock facilities, a dramatic reduction in the use of fertilizers, and less pressure on fishing. By 2007, the “dead zone” in the western Black Sea had been virtually eliminated and the invasive alien comb jelly (*Mnemiopsis*) was significantly curtailed. The concerted actions taken by the Black Sea littoral states (Roma-

nia, Bulgaria, Turkey, Georgia, Russia, and the Ukraine) also contributed to the recovery. As a result of these efforts, including key investments supported by the World Bank under the GEF Strategic Partnership for the Danube/Black Sea Basin, nitrogen emissions have decreased about 20 percent and phosphorus almost 50 percent in the Danube/Black Sea basin in the last 15 years.

The Mediterranean Sea — Under Threat from the Land

The Mediterranean Sea is under increasing threat of degradation, and some of its more enclosed parts, like the Adriatic Sea, already show some of the signs that preceded the Black Sea ecosystem collapse. Nevertheless, the Mediterranean coastline is an area of valuable biodiversity. It harbors 10 percent of the world’s higher plant species, half of them endemic to this region, as well as 6 percent of known marine species, one-third of which are endemic.

The population of the Mediterranean’s coastal states has doubled in the last 40 years to 450 million in 1999 and is expected to reach over 600 million in 2050. Between 1970 and 2005, international tourist arrivals quadrupled, reaching 265 million in 2005, and are expected to rise to 350 million in 2025, doubling the population along the coast during the summer. Twenty million inhabitants along the sea’s southern and eastern shores have no access to drinking water, 47 million have no access to sanitation, and 290 million could face water shortages by 2050. Climate change is likely to exacerbate some of these trends. The region has been experiencing significant effects of climate change: air temperatures in the Mediterranean basin rose 1.5–4° C in the last century (the global average increased 0.7°C), with an accompanying drop of 20 percent in precipitation in some areas.

As much as 80 percent of the sea’s pollution load originates from land sources, mainly in the form of untreated discharges of urban wastewater from coastal sources and rivers. Lack of sewage collection, treatment, and disposal infrastructure is still the greatest problem in many Mediterranean countries. Nevertheless, despite many donors’ initiatives, coordination appears to be inadequate, both in the region and within countries. Only 55 percent of coastal cities with more than 10,000 inhabitants have sewage treatment plants, resulting in a large annual discharge of more than 3 billion cubic meters of untreated sewage to the sea. Overall, 66 million m³ of untreated industrial wastewater is discharged to the Mediterranean each year. Uncontrolled coastal development, population expansion and increasing coastal tourism, unregulated and unsustainable fishing, damming, and pollution are the greatest threats to the sea’s coastal and marine ecosystems.

Partnering with the World Bank for the Recovery of the Seas

Launched by the World Bank together with UN agencies and the European Union (EU), and cofunded by GEF in 2001, the Strategic Partnership for Nutrient Reduction in the Danube/Black Sea Basin was intended to support the restoration of the Black Sea to pre-1960 environmental conditions. The initiative addresses the degradation of the ecosystem at its roots: in the large agricultural plains of Romania, along the Danube wetlands of Bulgaria and Romania, and upstream, even reaching the discharges of raw sewage in Budapest and the river basins of inland Turkey.

Through the Black Sea/Danube Basin Investment Fund for Nutrient Reduction, the World Bank provided \$65 million in GEF grants and leveraged about \$200 million in



S. Mihov

cofinancing to support investments in both the agriculture sector and municipal and industrial wastewater treatment sector, as well as for wetland restoration. Active since 2002, the fund has supported projects in Bosnia and Herzegovina, Bulgaria (see *Bulgaria Box*, below), Croatia, Moldova (see *Moldova Box*, right), Romania (see *Romania Box*, bottom right), and Serbia and Turkey. These projects promoted reforms, innovative investments, and new approaches, including low-cost wastewater treatment methods (Bosnia and Herzegovina, Moldova); wetland restoration and management (Hungary, Moldova, Bulgaria); restoration of degraded land and reduction of soil erosion (Moldova); waste segregation and water quality monitoring (Romania); and manure management facilities and support for organic farming (Turkey).

As of 2007, a number of remarkable improvements in the environmental conditions of the Black Sea were detected: the “dead zone” in the western Black Sea has been virtually eliminated (although dead zones in the deeper areas of the Black Sea persist); oxygen levels were at near-saturation in many areas;

Bulgaria Wetlands Restoration and Nutrient Reduction

Active since 2002, the project seeks to reduce transboundary nutrient loads and other pollution in the Danube River and the Black Sea. It conserves biodiversity through the restoration and management of two wetlands along the Danube. The project also supports the adoption of environmentally friendly agricultural practices. Besides providing a model for nutrient trapping that can be replicated in the region, it led to the return of several rare animal species. The restoration of the two wetlands provided a boost to fishing and additional protection against flooding.

See: www.worldbank.org/blacksea

Moldova Agricultural Pollution Control Project



The project promotes mitigation measures to reduce nutrient runoff into water bodies through manure management techniques, promotion of environmentally friendly agricultural practices, planting forest vegetation, restoration of wetlands, and monitoring water and soil quality. It also strengthens national policy and regulation capacity in the agriculture sector, raises public awareness about water pollution, and replicates results from pilot areas at the country level.

As a result of the project, 8,250 farmers in Moldova adopted at least one environmentally friendly agricultural practice on 14,028 hectares of land.

See: www.worldbank.org/blacksea

Romania Agricultural Pollution Control

The project focuses on reducing the discharge of nutrients and other agricultural pollutants into the Danube River and Black Sea through integrated land and water management and ecologically sustainable use of natural resources. Rural communities increased their ability to control expected nutrient releases by building manure storage and household bunkers and by segregating waste materials. The percentage of area under nutrient management systems rose from 1 to 34 percent. Nutrient discharge into surface and groundwater decreased about 15 percent for nitrogen and 27 percent for phosphorus in 2006. For local communities, the project provided additional income from more effective use of organic waste (manure as fertilizer), crop rotation, organic produce, and improved livestock grazing practices. It also provided improved production efficiency through better farm management.

See: www.worldbank.org/blacksea

the number of benthic species increased 1.5–2 times (since 1980); invasive alien species (*Mnemiopsis*) were significantly curtailed; and the upper reaches of the Danube Basin were no longer considered at risk.

The observed recovery is certainly linked to the dramatically reduced use of fertilizers that followed the economic collapse in central/eastern Europe in the early 1990s, but also to the significant nutrient reductions achieved through the investments and governance reforms promoted through the GEF Strategic Partnership and the EU accession processes.

In the Mediterranean, a recently formed alliance between the Mediterranean Action

Plan (the Secretariat of the Barcelona Convention for the Protection of the Mediterranean Sea) and its regional centers, GEF, UNEP, and the World Bank supported the establishment of an effective partnership among key agencies and institutions. The Strategic Partnership for the Mediterranean Sea Large Marine Ecosystem was launched in 2006 to accelerate investments and policy reforms that address the threat of dead zones in pollution hot spots and protect key natural habitats.

In September 2008, Bosnia and Herzegovina and Croatia signed an agreement with the World Bank and GEF to work together toward improving environmental quality



along their rivers and protecting coastal and marine biodiversity. The Neretva and Trebisnjica River Basin Management Project is the first to receive funding from the World Bank–GEF Investment Fund for the Mediterranean Sea, the financing mechanism for the Mediterranean Sea Partnership (see *Cro-*

atia Box, below). With an initial GEF contribution of \$25 million, an expected overall envelope of \$70 million in GEF grants, and cofinancing of more than \$200 million, the Mediterranean Sea Investment Fund supports interventions addressing land-based pollution and coastal habitat degradation.

Countries eligible for financing include Albania, Algeria, Bosnia and Herzegovina, Bulgaria, Croatia, Egypt, FYR Macedonia, Lebanon, Libya, Morocco, Montenegro, Syria, Tunisia, and Turkey, as well as West Bank and Gaza.

Croatia/ Bosnia and Herzegovina — Neretva and Trebisnjica Management Project

The project seeks to reduce pollution discharges into the eastern Adriatic Sea from the Neretva and Trebisnjica River basin through improved transboundary water resource management. The lower course of the Neretva River contains the largest and most valuable remnants of the Mediterranean wetlands in the eastern Adriatic coast and is one of the few areas of this kind remaining in Europe. The wetlands serve a number of functions important to water resource management, including water purification, nutrient reduction, sedimentation sink, flood management, and prevention of shoreline erosion. They also provide critical habitats and support the local economy. The project's expected outcomes include a reduction in nutrient and other pollution from municipal and industrial sources in selected municipalities in the basin, improved maintenance of environmental flows, and a reduction in saltwater intrusion.

See: www.worldbank.org/medfund

The Mediterranean Sea Investment Fund recently approved financing for the Croatia Coastal Cities Pollution Control Program (wastewater treatment). Projects in the pipeline include the Land and Water Optimization Project (Tunisia), the Coastal Zone Management Project in Alexandria (Egypt), and the Sustainable Tourism Development Project (Montenegro).

This article was prepared by Emilia Battaglini (ebattaglini@worldbank.org) of the East Asia and Pacific Sustainable Development Department; Beata Plonka (bplonka@worldbank.org) and Andrea Merla of the Europe and Central Asia Sustainable Development Department. ECA website: www.worldbank.org/eca.