

## Quo vadis NW Black Sea benthic ecosystems?

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The author briefly presents a general review on the evolution trends of benthic ecosystems at the Romanian Black Sea coast, referring to some recent data from the literature.

The Black Sea represents a "unicum hydrobiologicum" by some of its basic characteristics, such as:

1. a large semi-enclosed basin with an intense exchange of waters;
2. a sea receiving a large amount of fresh water, especially in its northwestern sector, brought by the Danube, Dnieper and Dniester Rivers;
3. a large meromictic sea - euxinic-azoic below depths of 150 - 200 m;
4. around the sea there is a large filter-holding belt consisting of bivalves (*Mytilus galloprovincialis* and *Modiolula phaseolina*);
5. a sea having in its northwestern sector a large area covered by red algae of the genus *Phyllophora*;
6. a sea undergoing, in the last 50 years, intense environmental pressures (pollution by large rivers and direct discharges of wastewater from urban areas, the development of maritime traffic, overfishing by bottom trawling, coastal facilities and especially by many defense works of the new port);
7. a sea registering in the last decades of the past century many events of eutrophication;
8. a sea enriching its biodiversity by alien species.

After the political and socio-economic changes triggered by the events of 1989 and especially after Romania's accession to EU, the state of the northwestern Black Sea coastal ecosystems, has recorded positive changes:

- Decrease in environmental pressures;
- Decreasing pollutant / fertilizing discharges into the Danube;
- Reduction of domestic sewage quantities from coastal settlements;
- Improvement in the quality of the wastewater discharged into the sea;
- Reduction of active fishing by bottom trawling;
- Adopting and implementing a national / international set of guidelines concerning marine environment;
- Adopting regulations on the protection of the marine environment against pollution in marine economy: transport / shipping, tourism / thalassotherapy.

Black Sea ecosystem restoration - Certainties and Uncertainties: Pressure on the Danube and other rivers has decreased, chemical discharges have decreased obviously, and yet there appear phenomena of water flowering - "red waters", hypoxia is still present at times and there is mass mortality of fish and other benthic organisms. Why? Signs of recovery should be considered cautiously and uncertainties may be resolved only in a longer time by increasing our scientific efforts.

The results of the EU FP7 Project PERSEUS led to the identification of three important issues that should be resolved in order to achieve good environmental status:

- Applying an adaptive management to increase the resilience of the ecosystems and to diminish the vulnerability of biodiversity;
- Necessity of participative approach by stakeholders;
- Identifying and obtaining adequate financial support for new R-D-I projects.

Who are the actors in addressing and implementing the actions?

- Academic educational and research institutions for adequate working condition;
- More specialists trained for taxonomic groups;
- Reasonable diversity of coordinating specialists, capable team leaders / satisfactory work packages;
- Attracting NGO members towards nature conservation issues;
- Reasonable stakeholders committed to environmental issues.

Studying the results of researches carried out by GeoEcoMar on the Romanian Black Sea coast in recent

years, the author concluded that the major problems hampering progress towards a good ecosystem in NW Bent Black Sea are:

- lack of diversity in the fields of research, both in theoretical and applied realms;
- structural and functional consequences of ecological pressures and the disordered state of the ecosystems in the periods of paroxysmal eutrophication / pollution at the end of the 20th Century;
- scarcity of data and knowledge on the Social-Economic System;
- high costs of the new marine technology used directly in the sea and laboratories.