

## Eutrophication Influence on Black Sea Ecology

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Black Sea ecosystem was seriously damaged over the period 1970 to 1980 because of the large amounts of nutrients carried by the rivers into the sea, which lead to the high level of eutrophication. These processes were especially intensive at the North-West coast of the sea, due to influence of River Danube, brought different kind of contaminants, though the eutrophication was also evident at the Eastern part in Georgian coastal waters.

Eutrophication caused severe degradation of what was previously a very rich ecosystem; the seabed organisms were destroyed; and the composition of marine flora and fauna species has significantly changed. The commercial value of marine species has also decreased. For instance, where 26 commercial species were registered in 1960, today only four species have a commercial value.

Nowadays, concentrations of the nutrient substances in coastal waters were still twice as high as of the background levels observed in 1980, that is why in 2006-2013, the phytoplankton of Georgian coastal waters were much more diverse compared to 1980s. Six main groups of plants are presented: Diatoms (Bacillariophyta), Dinoflagellates (Dinophyta), Green (Chlorophyta), Blue-green (Cyanophyta), Yellow-green algae (Xantophyta) and Chromista (Chromophyta).

It should be noted that in some areas (Adjara coast) local eutrophication is observed during the warm months of the year. Especially the aquatorial waters of the River Supsa where quite high numbers of Blue-green and Yellow-green algae has been observed.

An additional indicator of the local eutrophication is the dominance of the fagotrophic species of dinoflagellates in the estuaries of the rivers Tchorokhi and Supsa. The total number of phytoplankton, among them toxic ones, in Georgian coastal waters experience ordinary seasonal fluctuations. During spring and summer of 1980 their number was 1.4 to 2.3 billion cells/m<sup>3</sup> on average, while in autumn and winter the number was reduced to 0.2 to 1 billion cells/m<sup>3</sup>. From our point of view, recent increment of their quantity by 15% on average, is caused by currents, transported plants from neighboring countries waters.

To improve the recreational water quality of Georgian coastal waters it is necessary to strengthen the monitoring of discharges from enterprises along the marine coastal line and all surface water bodies. It is also necessary to improve the level of state control to ensure compliance with the requirements of water protection zones for small rivers. The improvement of self-monitoring by enterprises is also necessary. Special attention should be given to the introduction and development of new more modern energy efficient waste water treatment technologies. The creation of artificial reefs using of natural stones and their allocation along the coast with further settling of shellfish and sea plants in coastal zone will much improve water chemical and biological state.