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Geoecological Danger of Anthropogenic Eutrophy

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Abstract

The most priority problems of modern geoecology still include the issues of anthropogenic eutrophication of water bodies. A special place in the above problems is occupied by the issues of anthropogenic eutrophy of water bodies in the arid steppe zone, since one of the very significant factors of eutrophy, as is known, is the increased temperature of the air and, as a result, of the water surface during the warm season. Anthropogenic eutrophy, of course, having some dependence on the temperature of the environment, is determined primarily by the amount and intensity of nutrient intake, among which phosphorus compounds present in detergents used by the population are of decisive importance. Hence, the most difficult situations associated with anthropogenic eutrophy of waters are observed near large settlements and urban areas. The territory washed by the Sea of Azov is characterized by a significant number of settlements that intensively discharge municipal wastewater rich in nutrients, including phosphorus compounds. The Taganrog Bay, as an object of research, is interesting in that it combines natural conditions that are very favorable for the development of water eutrophy (shallow water, warming during the warm season, lack of water stratification, low salinity) with an intensive supply of anthropogenically determined nutrients, which, as is known, are conditions for the development of anthropogenic eutrophy.

Keywords: Eutrophy; Nutrients; Water bodies; Pollution of water bodies; Natural factors; Anthropogenic eutrophy

Introduction

Eutrophy is a naturally determined process of increasing the biomass of the living matter of aquatic ecosystems. In this sense, natural eutrophy is a completely logical climax stage of the highest development and biomass growth of the studied ecosystems. It is important to understand that this highest stage of their development - eutrophic, which is very often climax - is very dynamic and, perhaps, in the near future it will again move to the mesotrophic stage, without leading to a general degradation of the entire aquatic ecosystem. Also, natural eutrophy can proceed for decades, developing very slowly, without generally reducing the diversity and productivity of aquatic ecosystems. In this sense, there is no geoecological danger from natural eutrophy. However, its study is necessary as a kind of basis for the development of anthropogenic eutrophy. The main factors of euthhrosis due to natural causes are: the shallowness of the object, the absence of a well-defined stratification of the reservoir, a certain configuration of bottom currents, insufficient mixing of water, and also its good heating. Anthropogenically induced eutrophy, in contrast to natural eutrophy, develops at a very rapid pace, affecting a variety of water bodies, mainly depending only on the amount of incoming nutrients. In this sense, the study summarizes the main ideas about anthropogenic eutrophy, which depends on the natural component and provides a geoecological hazard not only for aquatic ecosystems of water bodies, but also for society [1-3].

Conclusion

The scale and rate of pollution of the hydrosphere appears to be much higher than that of other natural environments. Increasing volumes of domestic wastewater discharge into water bodies and irrational use of water causes, as practice shows, significant socio-economic damage to society. The growing degradation of natural waters requires decisive action and special targeted programs to save them.

Given that the Taganrog Bay is part of a closed marine water body, a reservoir that is close to a lake type and for which, for example:

a) the Woodiwiss method is not applicable, since the Taganrog Bay does not belong to river watercourses;

b) macrophytes are not suitable for assessing trophicity (bay, hydrodynamic factor, waves, higher aquatic vegetation will be absent);

c) the assessment by the shares of algocommunities within the phytocenosis is quite applicable;

d) the method of surveying the reservoir for changes in the value of phytoplankton biomass will be the most acceptable.

In connection with the possible complete loss of the biological resources of the Taganrog Bay, as well as their significant deterioration against the background of an increase in the environmental hazard of the water body, it seems to the author of the work that it is necessary to immediately develop and implement possible systems to prevent the entry of nutrients into the bay.

It is important to emphasize that the use of various methods for cleaning wastewater that enters an already eutrophicated reservoir is ineffective, since this will only slightly slow down the death of the reservoir. Therefore, it is necessary to carry out the procedure for restoring the reservoir and minimizing the ingress of new nutrients into it.

It should be noted that when choosing measures to solve the problem of intensifying eutrophication of the waters of the Taganrog Bay, it is important to take into account the factors of safety and environmental friendliness of the chosen measures.

In the absence of due attention to the problems of anthropogenically caused eutrophy, the risk of toxic effects of low-quality eutrophicated water from a water body affected by eutrophy for the population will increase. Due to the fact that there is a risk of danger to health, and even human life, when staying near a eutrophicated reservoir, it is necessary to take immediate measures to reduce the rate of development of anthropogenic eutrophication, which will ultimately lead to a decrease in the likelihood of hazardous factors. Having approved the priority principles of environmental safety, with a careful approach to the deeutrophication of a reservoir, one can achieve a very successful and positive result.

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