9th Edition of International Conference on **Environmental Science &Technology**
&
48th World Congress on **Microbiology**
&
50th International Congress on **Nursing Care**

June 24-25, 2019   Moscow, Russia

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Integrated approach for identifying trends for changes in the state of aquatic ecosystems

Currently, there is a search of approaches for integrated assessment by the state of the aquatic ecosystem by observations of water quality by chemical and biological indicators. This forms the background for this study. In this paper, a statistical processing of hydrochemical and hydrobiological information was conducted for the period of observations from 1997–2017 on the Kuybyshev reservoir. For the analysis of chemical data, an integral index was used not only considering the multiplicity by exceeding the standards but also the frequency of cases. From the biological data, the gradation of the state of ecosystems according to the long term indicators of phytoplankton, zooplankton, zoobenthos proposed by V A Abakumov (1992) was used in background and no changes of dominant species; anthropogenic environmental stress by increasing the diversity of biocenosis, spatial and temporal heterogeneity; anthropogenic ecological regression by reducing the diversity of the biocenosis, spatial and temporal heterogeneity; anthropogenic metabolic regression and reducing the activity of a biocenosis by the sum of all the processes of formation and destruction of organic matter. The chemical monitoring showed that the water quality changed from "polluted" and "very polluted" to "dirty". The tendency of increasing ammonium, nitrites, phosphates content was revealed. On abiotic components, the ecosystem of the Kuibyshev reservoir is characterized as transition state from equilibrium to crisis. The hydrobiological data showed the tendency of phytoplankton decrease, including blue-green algae; rotifers and increase of the total number of crustaceans. The total number of zoobenthos remained at the same level with a decrease of oligochaeta and a low increase in the number of polychaeta. On biotic indicators, the reservoir is characterized as anthropogenic ecological tension. Thus, the analysis of data from monitoring of the Kuybyshev reservoir showed that ecological state is characterized as transition from equilibrium level to a crisis level.

Biography

Nadezhda Yuilevna Stepanova is the Head of Department of Applied Ecology of Kazan Federal University, Russia. She has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of reputed journals.

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Notes:

Archives of Medicine
ISSN: 1989-5216

Microbiology 2019 & Nursing Care 2019
Environmental Science 2019
Nursing Care 2019

Volume 11

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