

# Analysis of Spatial Transfer Biogenic Elements in Water Ecosystems of Southern Priaralye

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**Abstract:** *In article results on research of processes of an eutrophication of water ecosystems are given in Southern Priaralye. The main distributions of forms of phosphorus in water, its balance, definition of characteristics of phosphoric loading and streams of its forms in ecosystems by means of imitating model of phosphoric system in Southern Priaralye water ecosystems were calculated.*

**Keywords:** Southern Priaralye, water ecosystems, imitating model, phosphoric system

## 1. Introduction

One of major indexes of degradation in the region of Southern Priaralye is the considerable anthropogenic affecting water resources. Change of the water mode due to natural interannual climatic changes, and also due to the supposed large scale aquicultural events resulted in violations, balance in water ecosystems and to the processes of eutrophication of reservoirs and worsening of quality of water resources on the whole [1, 3]. Last years from the sharp increase of upcast of different biogenic elements in reservoirs and currents, and also original violations of the hydrochemical and hydrobiological mode of reservoirs happened as a result of adjusting of the river Amudarya [1, 3]. Accumulations of biogenic elements entering water ecosystems with an agricultural flow, assists the accumulation of biogenic elements, that results in forming of the certain mode inherent to the eutrophic lakes [2, 4].

The biotic components of water ecosystems reflect trophic status of water object, that, in turn, depends on the amount of organic substances a cut-in in water. In accordance with it there are populations, types and associations of organisms have a certain level of tolerance in the folded terms [5]. There is a great number of methods of estimation of the state of water ecosystems on different parameters. At the same time majority from them applicably not to all categories of water objects and factors of influence. A few worked out methods of integral estimations allowing to apply them on any water objects and for the estimation of most factors of influence are known only [2].

So, for example, an amount of in water biogenic permeates is the integral index of the state of waters and water ecosystems on the whole, because consists of organic substances arising up in the process of vital functions of organisms on all trophic levels, and also brought in from the pool of водобора as a result of natural and anthropogenic processes.

## 2. Material and Methods

Eutrophication of many reservoirs, foremost, is conditioned by the increase of the phosphoric loading. In this connection,

we undertook an attempt to trace conformities to law of distribution of forms of phosphorus in water, his balance, determination of descriptions of the phosphoric loading and streams of his forms in ecosystems by means of simulation model of the phosphoric system in the lakes of Dautkul and Shegekul - important objects of pertaining to national economy value. A model is based on principles and methodology of analysis of the systems: in her taken into account variety of forms of being of substances of different origin in a water environment, different cooperation's of components of chemical and biological nature and influence on them physical, chemical and biological inwardly reservoir processes. A model, from one side, reproduces development of processes of biotransformation and rotation of forms of phosphorus, and with other reflects changeability of maintenance of oxygen (integral index of the state of water environment) [4, 6].

The used mathematical simulation model also takes into account the spatial transport of phosphorus components by the water flow and with its help it is possible to correctly evaluate the main components of the phosphorus input and expenditure balance for the studied aquatic ecosystem. The role of internal and external flows in the formation of the balances of individual forms of phosphorus is different. In shallow reservoirs, phosphorus input from bottom sediments directly affects the eutrophication of the reservoir. The interactions of these forms of phosphorus (P), taken into account in the model, form the basis of biochemical processes, form a certain mode of ecosystem functioning and the general orientation of phosphorus transformation in a reservoir.

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### 3. Results and Discussion

In recent years, the impact of human activities on water has increased dramatically. The main types of economic activity that have the greatest impact on the region's water resources are water consumption for agricultural, industrial and municipal needs, as well as discharges of wastewater into water bodies.

The analysis showed that the main role in the external phosphorus load of the lake belongs to the external tributary, which comes in the form of DIP (its supply with river runoff is 0.197 mg P / (1 year), or 70.7% of the total phosphorus intake. DP and DOP accounts for 21.2 and 2.1%, and DIP (76.4%) is found to dominate among phosphorus forms, with DIP (50.6%) and the sum of phytoplankton and F + B bacteria dominating the phosphorus (23.4%), as well as phosphorus in detritus PD (17.3%) and phosphorus in organic DOP (8.7%). This is probably due to the fact that the above part forms of phosphorus, associated with phytoplankton and bacteria, and some are discharged with runoff. It should be noted that the main accumulation of forms of phosphorus occurs in the bottom sediments in the form of DIP (94.2%), where its reserves are quite large, which cannot but affect Under certain conditions (especially anaerobic, in the absence of oxygen), part of the phosphorus is released, thereby stimulating the development of autotrophic organisms, changing the level of production processes, which leads to the eutrophication of the reservoir, i.e. is busy material basis of secondary pollution of water bodies and sediments - microcenters eutrophication.

We also note that the more phosphorus enters the reservoir under study, the more actively the processes of its intra-water transformation occur in it. This is partly due to the influence of the life of the community of hydrobionts, which reacts in a certain way to fluctuations in external conditions. The change in the ratio of the forms of phosphorus in the water entering and leaving the reservoir is apparently explained by a change in the conditions for the transformation of phosphorus in the reservoir.

The formation of water quality in water bodies is a complex, multifaceted process, depending on a set of various factors related to the functioning of aquatic ecosystems and the conditions of the surrounding landscape and the bed of the reservoir [4, 5]. It has been established that the existing economic mechanisms for nature conservation are ineffective primarily because they do not create incentives for the use of resource and energy-saving technologies and do not provide sufficient funds from payments for emissions and discharges, waste disposal and the use of natural resources to finance environmental protection on a required scale. The problem of rational use of water resources in the Southern Aral Sea region is becoming more acute every year and determines the need for large organizational and technical measures. Such activities may include the following:

- restoration of the system of ecological monitoring of water ecosystems in the Southern Aral region;
- development and implementation of new methods for collecting and processing information on biodiversity, structural and functional organization and the main types of anthropogenic impact on ecosystems of water bodies;
- introduction of modern innovative technologies;

The results of the studies allow us to explain the observed features of the functioning of aquatic ecosystems and the specificity of the dynamics of phosphorus, where it acts as one of the parts of the trigger in the process of eutrophication of water bodies. The model can be used to predict and solve the problems of protection and rational use of natural water resources of the Southern Aral Sea region.

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