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INTERNAL PHOSPHORUS LOAD OF THE IVAN'KOVSKOE RESERVOIR

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The purpose of the work is to evaluate the internal phosphorus load in Ivan'kovskoe reservoir based on the results of field observations and experimental studies and compare it with the inflow of phosphorus from the catchment area. It is an important source of additional nutrients even if pollution from the catchment area is diminished. The main factors influencing the flux of phosphorus from bottom sediments are: redox potential, pH and temperature, as well as microbiological activity. Ivan'kovskoe reservoir with seasonal flow regulation is under significant anthropogenic stress. Periods with anoxic conditions occur in summer and in winter periods. Bottom sediments are represented by a diverse type of material depending on the region and morphological parts of the flooded valley. External phosphorus load of the reservoir was calculated using results of monthly sampling in the mouths of 14 tributaries in 2022–2023. The phosphorus flux from bottom sediments was determined using a tube method during the period of surveys in 2020–2024. Mathematical quasi-two-dimensional hydrological reservoir model HRM-MSU model was used to clarify the periods with oxygen deficiency in the bottom layer, during which phosphorus is intensively released from sediments. According to the sampling data in 2022 and 2023, the total inflow of phosphates into the reservoir using data from Gorokhovo (downstream from Tver water treatment plant) amounted to 1 359 and 2 125 t. Phosphorus intake from basins of Lama, Shosha and other tributaries amounted to 160 and 246 t/year. In total, the inflow of phosphates into the reservoir with rivers is estimated at 1 519 and 2 371 t PO₄/year or in terms of phosphorus 495 and 773 t P/year. By multiplying the amount of phosphorus flux from the sediments of the region on their area, it was obtained that in 2020–2022 the mineral phosphorus output amounted to 1 903, 1 717 and 1 646 t P/year, respectively. At the same time, the riverbed accounts for 36–38% of the total output due to its smaller area. So, the autochthonous load plays a significant role for the Ivan'kovskoe reservoir, exceeding the inflow with tributaries.

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