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THE CURRENT STATE OF THE ISOLATED WATER BODIES – THE FORMER SEA BAYS OF OLENIY ISLAND (Kandalaksha Bay, White Sea)

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The isolation of marine areas during the construction of various hydraulic structures may be accompanied by a reduction in their natural water exchange with the sea, the development of stratification, and the emergence of hydrogen sulfide in anaerobic waters. In the late 19th century, for the technical needs of a timber mill being built on Oleniy Island (Kovda Bay, Kandalaksha Bay of the White Sea), two nearby marine bays were isolated from the sea by stone dams. Over the relatively short period (about 130 years) that has passed since their isolation, lakes have formed in place of the marine bays: Bolshiye Khruslomeny (saline lake) and Bannoye (freshwater lake). The current state of both reservoirs was studied in August 2024. The main hydrochemical characteristics were determined directly on board the boat. In the field laboratory, the concentrations of hydrogen sulfide (determined by photometric and iodometric methods), dissolved iron forms (determined by photometric methods using ferrozin in water samples filtered through a 0.45 μm filter), and biogenic elements were determined using standard and validated methods. At the same time, analytical procedures were carried out taking into account all the subtleties of the selection and analysis of water with a high content of hydrogen sulfide, which made it possible to minimize its losses as much as possible and obtain correct results. The ionic composition of water was determined on a Shimadzu LC-20 Prominence liquid chromatograph with a conductometric detector. Bolshiye Khruslomeny Lake (maximum depth 19.5 *m*), although it has not yet completely lost its connection with the sea, is a saline meromictic water body with clearly expressed stratification and the presence of thermocline, chemocline, and halocline. The anaerobic waters of the monimolimnion contain hydrogen sulfide at concentrations of 500–600 *mg*/*L*, which is significantly higher than, for example, in the well known meromictic Mogilnoye Lake (200 *mg*/*L*). In the bottom waters, a decrease in sulfate concentrations is accompanied by a reduction in the sulfate to chloride ratio, which indirectly confirms the high intensity of the bacterial sulfate reduction process. In freshwater Bannoye Lake (maximum depth 5.5 *m*), stratification develops twice a year – in winter and summer. For instance, in August 2024, although the upper water layers were supersaturated with oxygen (up to 130%), hydrogen sulfide appeared in the bottom water layers (0.43–0.49 *mg*/*L*) with complete depletion of oxygen. A comparable contribution to the sum of the main ions in the salt composition, along with bicarbonate and calcium, is made by chloride and sodium. This most likely reflects both the island location of Bannoye Lake and the influence of White Sea marine aerosol on the composition of its waters, the marine past of this water body.

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