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An approach to determining regional standards for the concentration of natural or anthropogenic substances in the coastal waters of southwestern Sakhalin, taking into account the natural hydrochemical background

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Abstract. Preserving stable functioning of coastal marine ecosystems under transforming anthropogenic impact requires an objective assessment of their ecological state. Regulation of natural or anthropogenic substances using the all-Russian standards of maximum allowable concentrations does not always reliably evaluate the well-being of water bodies. Therefore, existing approaches to determining regional standards of the concentration of some substances were clarified, taking into account the natural hydrochemical background. Based on the statistical processing of hydrochemical monitoring data of the southwestern coast of Sakhalin from 2007 to 2022, using parametric and non-parametric methods, it was established that the background concentrations of some natural or anthropogenic substances exceed or are significantly lower than the all-Russian standards. The list of indicators of water state that require regulation, taking into account the current natural and climatic conditions, includes the following substances: nitrite nitrogen, nitrate nitrogen, ammonium nitrogen, phosphate phosphorus, iron (total), biochemical oxygen demand, phenols, and petroleum products. When establishing regional standards, it was recognized that it was more correct to use the lower quantile limit of 0.75 (P = 0.95) for calculating background concentrations of individual substances, which considers the distribution features for the most unfavorable testing site and season of the year in terms of water quality.

Keywords:

southwestern coast of Sakhalin, maximum allowable concentration, regional standard, natural and anthropogenic substances

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