

**ASSESSMENT OF THE CURRENT STATE OF
SOME TRIBUTORS OF THE SOUTHERN BUG RIVER
BY HYDROCHEMICAL INDICATORS**

*Yaroslav Yarov, master, senior lecturer,
Tetiana Graschenkova, master, senior lecturer,
Viktor Pylip'yuk, PhD (Geogr.), senior lecturer*

Odesa I. I. Mechnikov National University, Ukraine

In the modern period, due to the high level of anthropogenic load, there is a deterioration in the qualitative state of the rivers that are part of the hydrographic network of the Southern Bug basin.

Purpose of the work: assessment of the qualitative state of the Kodyma River and the Velyka Vys River according to hydrochemical indicators based on actual monitoring data of the State Agency of Water Resources of Ukraine. An ecological assessment of water quality, an assessment of water quality for fishery use and an assessment of the risks of not achieving good ecological status according to hydrochemical indicators were performed.

The Kodyma River [1] (area 2470 km²) is a right tributary of the Southern Bug River, there is 1 industrial water intake in the basin, there are no recorded wastewater discharges. The basin is used for agricultural needs (there are 33 settlements, 1 oil pipeline and 11 gas pipelines cross the river; water is taken for industrial water supply and irrigation, there are 31 ponds). The river has been polluted for a long time by discharges of insufficiently treated wastewater from the cities of Kodyma and Balta, and runoff from farms and farmland.

The Velyka Vys River [2] (area of 2860 km²) is a left tributary of the Synyukha River. The basin has 6 industrial water intakes and 7 wastewater discharges (4 discharges of the «polluted, untreated» category, 2 discharges of «standardly treated» type, and 1 discharge of «polluted, insufficiently treated» type). The river basin has a significant degree of urbanization and agricultural activity (106 ponds, 20 pressure sewer collectors pass through the river).

The work used data from monitoring of the Kodyma River (Balta city, 2008–2018) and the Velyka Vys River (Likareve village, 2012–2018).

Ecological assessment of water quality: according to average indicators, the waters of the Kodyma River belong to class III (category №5) («medium, moderately polluted»), the Velyka Vys River - to class III (category №4) («satisfactory, slightly polluted»); according to the worst values, the waters of the Kodyma River belong to class V (category № 7) («very bad, very dirty»), and the waters of the Velyka Vys River have class III (category № 5) («medium, moderately polluted»). In both rivers, the water has a high content of biogenic compounds and indicators of organic pollution.

Assessment of water quality compliance with fishery standards using the PKIZ method showed: the waters of the Kodyma River belong to the IV-a water quality class («very dirty»); the waters of the Velyka Vys River belong to the III-a quality class («dirty»); the waters of both rivers are unsuitable for safe fish farming; the high level of nitrite nitrogen pollution indicates constant fresh fecal pollution by wastewater and indicates a low level of anthropogenic load, which is at the limit of the self-purification capabilities of the rivers.

The analysis of hydrochemical indicators of the studied rivers showed that the risk of failure to achieve environmental goals for the Kodima River arises due to the high content of ammonium nitrogen, phosphates, and biochemical oxygen consumption (5) in the water; for the Velyka Vys River - due to ammonium nitrogen and phosphates. Water pollution by these substances indicates the presence of point sources of untreated municipal wastewater, which may be caused by the absence and improper operation of treatment facilities in the studied surface water body.

Thus, the current state of the Kodima River and Velyka Vys River can be described as unsatisfactory, which is manifested in poor water quality, a high risk of failure to achieve ecological well-being and requires solving a whole complex of problems that have accumulated in the catchments of the studied rivers in recent times. The first priority should be to improve the treatment of wastewater from settlements that are discharged into the rivers. Also, for the Velyka Vys R., it is important to resolve issues with the closure and reclamation of the uranium mine on the Kiltan River in the village of Smolino, from which not only household wastewater is discharged into the river, but also drainage water pumped from a non-operating mine without appropriate treatment.

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