

HYDROMORPHOLOGICAL ANALYSIS OF THE RIVER NETWORK OF THE NORTHERN PART OF LVIV

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Hydrological studies are an important part of complex geoecological studies. The requirements of the European Union Water Framework Directive assess the state of river waters on the basis of hydrobiological and hydrochemical indicators, taking into account hydromorphological parameters. Hydromorphological analysis of streams of Lviv can be found in the works of H. Bayrak [1], Ye. Ivanov, O. Pylypovych, & H. Ternovetska [4], I. Koynova, & A. Chorna [6], M. Nazaruk [7], Ya. Burachynskyi, R. Hnatyuk, & Yu. Zinko [10]. The research was conducted in 2024-2025 as part of the project: “Geological, hydrogeological and biodiversity analysis of the territory of the Northern districts of Lviv”. Publications were prepared based on the research results [2, 3, 11]. At the same time, the hydromorphological and hydroecological states of the studied streams and the prerequisites for their disappearance were studied.

In the northern part of Lviv there are three tributaries of the Poltva River: the Holoskivskyy, Zboivskyy, and Malekhivskyy (one of the sources of the Malekhivka River). The beginning of the watercourses are springs on the slopes of the northeastern exposure of Roztochia uplands, at the contact of uppercretaceous marls and neogene sands. The streams head in a southeasterly direction, to the valley of the Poltva River. Within Roztochia uplands, the watercourses have natural channels and drain eluvial-diluvial loess sandy loams and loams (up to 4 m) and eolian-diluvial sands on moraine deposits (2-4 m) [5].

The Holoskivskyy stream is the most abundant tributary of the Poltva River. The natural channel of the stream has been preserved along the Lviv–Bryukhovychi road, to Lake Stosyka. The length of the natural channel is about 1 km, and the rest is canalized. The stream has several sources in a deep ravine. Six sources feeding the stream have been identified. Valley is 50 m, the width of the channel is from 0.5 to 1.8 m, in the upper reaches - 0.9 m. The flow speed (June 12, 2024) was 0.5 m/s. The maximum depth of the channel in the upper reaches is 0.08 m, and the average depth is 0.067 m. The water flow is 0.03 m³/s. The bottom of the riverbed is muddy, the thickness of the bottom sediments is insignificant, mainly composed of sands and sandy loams. Sandy deposits are characteristic of the stream before it flows into Lake Stosyka. These are deposits of neogene sands of eolian-diluvial genesis carried

downstream. In the upper reaches, the watercourse is regulated and fills the lake. In front of the lake there is a wetland that functions as a bioplateau and maintains a stable supply of water. The lake and wetlands retain water through a thin layer of plastic sandy loam. Preservation of the wetland from further development is an essential factor in maintaining the filling of the reservoir and the quality of the water in the lake.

The headwaters of the Zboivsky stream begin at a pond, which today has become a swampy area overgrown with reeds. In the valley, next to the springs, another floodplain-type pond was recorded. From the sources to the confluence with the Poltva River, the stream is canalized. The dry riverbed was traced for 2 km. The stream valley is trapezoidal, up to 100 m wide. Within individual sections, the valley has clear boundaries with well-defined slopes, a escarpment, and swampy areas overgrown with reeds. In the area of Roztochia and Zahirna streets, there are drainage wells that indicate the stream bed. More than 50 years ago, the stream was full-flowing, there was a large pond in the upper reaches of the stream, and the depth of the stream reaches 50 cm. The complete canalization and drainage of the Zboivsky stream was carried out in the last 10-15 years, during the intensive development of the microdistrict.

The Malekhivsky stream begins on the slopes of the northeastern exposure of Roztochia, flows in a southeasterly direction, and flows into the Poltva River. In the upper reaches, the stream has a channel width of 1.2 m. Small floodplain-type ponds were identified. The length of the stream is 3.8 km. The bottom of the riverbed is covered with a layer of dense dark brown mud. The current speed was slow and was 0.1 m/s. The maximum depth of the riverbed is 0.08 m, the average depth is 0.04 m. The water flow in the stream was calculated, which is significantly lower than in the Holoskovsky stream and is 0.004 m³/s. The stream is undergoing significant transformational changes. The riverbed is mainly canalized, filled with household and construction waste and altered, resulting in a slowed flow rate and signs of eutrophication.

The results of the research confirmed that the Zboivsky stream, whose channel is completely canalized, has undergone the largest anthropogenic transformations. The Holoskovsky and Malekhivsky streams in the upper reaches have clearly defined channels, sufficient surface and underground supply, but they are also partially canalized. The Holoskovsky stream from its sources to its confluence with Lake Stosyka has a fast current and a high self-cleansing capacity, therefore there is an urgent need to clean and preserve this section of the channel. The Malekhivsky stream has a very slow flow and signs of degradation and eutrophication, which is causing it to dry up.

To restore the streams, it is necessary, guided by the requirements of the Water Code of Ukraine, to determine the boundaries of the coastal protection strips of watercourses and to remove them in nature; to ensure compliance with the management conditions in the strips, to clear the channels and strips from household and construction waste; to introduce a system of sewerage of private estates along the channels of the Holoskivskyi and Malekhivskyi streams; to obtain complete and systematic information about the quality of water in the streams, it is necessary to organize hydrochemical monitoring, since the relevant monitoring by the Department of Ecology and Natural Resources of the Lviv City Council is not currently carried out on the specified watercourses; to implement environmental and educational activities with local residents on the feasibility of preserving watercourses and raising their environmental awareness.

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