Для переробки вовни використовується обладнання спеціального призначення. Після сортування кожна партія проходить кілька етапів: прання, хімчистка, подрібнення або різання, розпушування, тощо [3].

Вторсировина може бути використана у якості наповнювача для ковдр, м'яких меблів, одягу, прокладки утеплювача для підлог у будівництві, а також для виробництва нетканих матеріалів, у яких волокна різними способами кріпляться до основи.

Слід також відмітити, що додатковим елементом забезпечення задовільного стану екологічної безпеки при переробці вовни є забезпечення умов праці робітників, зокрема, засобами індивідуального захисту для попередження потрапляння часток вовни в носоглотку та легені працюючих.

Таким чином, промислова переробка вовни є важливим елементом екологічної та національної безпеки держави, що потребує пильної уваги з питань дотримання умов переробки та повного використання сировини в технологічних циклах, в тому числі, і як вторинної сировини.

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INVESTIGATION OF NITRATE CONTENT IN SURFACE WATER OBJECT

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The problem of assessing water quality at the present stage is important and of paramount importance. It occupies a central place in water protection activities. The ecological problem of protection of the hydrosphere at the economic and man-made

level has a significant impact on the ecological condition of surface water bodies. This requires monitoring research using modern interactive online cartographic resources. Large administrative and territorial units of the industrialized countries of the world, in particular Ukraine, are enough to obtain a holistic picture of the current ecological condition. Environmental monitoring is used even if the industrial potential gradually decreases [1]. The main component of such monitoring is the process of obtaining the necessary initial data (for example, the results of analysis of surface water samples).

In Ukraine, almost 80% of the population is supplied with drinking water from surface sources. Within Ukraine, the Psel River flows in Sumy and Poltava regions. It is part of the Dnieper river basin (it is a left tributary of the Dnieper river). The length of the Psel River, which flows through the territory of Ukraine is 502 km, and the total length is 717 km.

In wastewater, which contains a large amount of organic matter, blue-green and brown algae, phytoplankton, and biological oxygen demand increase rapidly. As a result, anaerobic processes begin to predominate in the reservoir. They determine eutrophication (increase in biological productivity during the accumulation of nutrients under the influence of anthropogenic or natural factors) [2].

The State Agency of Water Resources (SAWR) of Ukraine has launched an interactive map "Monitoring and environmental assessment of water resources of Ukraine." On the map it is possible to track the data of monitoring of surface water bodies for a certain period of time on indicators such as nitrates, nitrites, phosphates, ammonium ions, sulfates. Based on the monitoring data of the SAWR of Ukraine, an analysis of changes in the ecological status of the main indicators of the Psel River for 2012 – 2020 was conducted. The analysis was conducted on the basis of 6 water sampling posts in the Psel River (Figure 1): 1) 528 km, Krasnopil district; 2) 480 km, the village of Velika Chernetchina; 3) 444 km, the village of Chervone, below the city of Sumy; 4) 405 km, the village of Bishkin; 5) 350 km, the village of Kaminne, the border of Sumy and Poltava regions; 6) 172 km, Velyka Bagachka urban-type settlement.

The content of nitrates and nitrites is an indicator of the chemical composition of natural water (table 1). It is used in environmental assessment. This information is also needed when deciding on the balance of nutrients, the relationship between the life processes of aquatic organisms and the chemical composition of water. Nitrates enter water bodies during the decomposition of animal and plant proteins by microorganisms, when ammonium compounds are released. They are oxidized to nitrites and nitrates in contact with air. The consequence of nitrate consumption is the formation of methemoglobin.

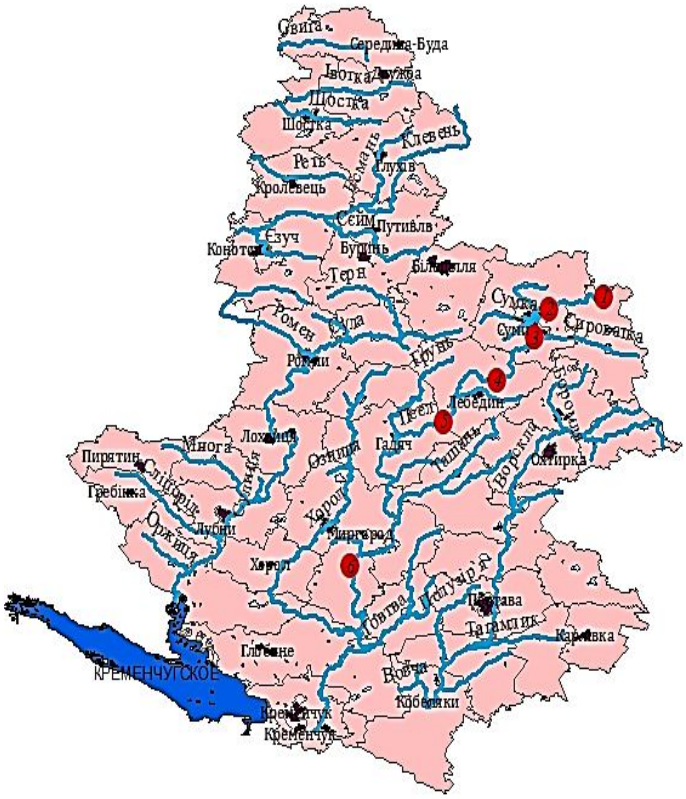

Fig. 1 Schematic layout of 6 checkpoints of water intake, according to which the study was conducted (the names are given in the original language)

The transport of oxygen to human tissues is disturbed. In the future there is a violation of the nervous system. Excess nitrate content also leads to disorders of the pancreas and thyroid glands, cancer, heart failure, kidney disease, cardiovascular disease.

Table 1 – NO_3^-, mmol/dm^3 at Psel river water intake posts

Years / posts	П 1	П 2	П 3	П 4	П 5	П 6
2012	0.0251	0.0365	0.0442	0.0247	0.0215	0.0335
2013	0.0398	0.0742	0.0718	0.0887	0.0690	0.0381
2014	0.0451	0.0548	0.0542	0.0567	0.0494	0.0243
2015	0.0269	0.0496	0.0386	0.0449	0.0580	0.0365
2016	0.0360	0.0421	0.0629	0.0684	0.0621	0.0335
2017	0.0594	0.0919	0.0942	0.0641	0.0727	0.0328
2018	0.0199	0.0220	0.0396	0.0235	0.0229	0.0267
2019	0.0175	0.0413	0.0536	0.0438	0.0494	0.0338
2020	0.0432	0.0419	0.0425	0.0507	0.0480	0.0242

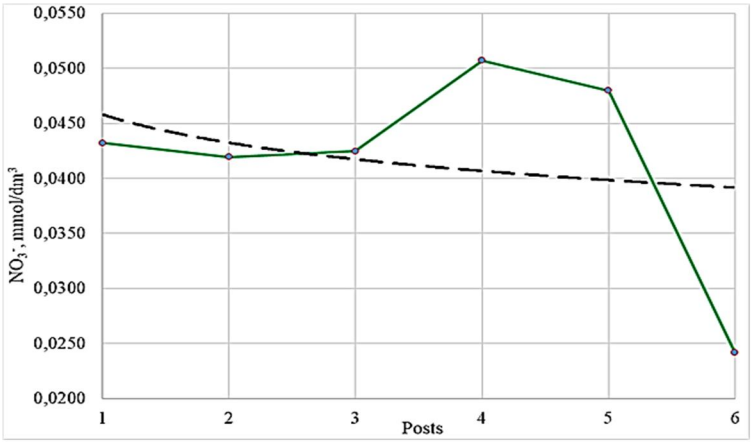

Fig. 2 Total content of nitrate ions at Psel river water sampling points for 2020

Decreased nitrate concentrations (posts 5 – 6) may be related to their consumption by phytoplankton. This should lead to increased turbidity and BSC of the water.

Failure to comply with environmental requirements leads to pollution of surface and groundwater. This is manifested in the excessive use of agricultural and organic fertilizers, pesticides in agricultural production, in their unsatisfactory storage. This leads to acute nitrate poisoning, infectious diseases, and sometimes death.

One of the reasons for the entry of nitrates into surface water bodies (Figure 2) is the leaching of fertilizers from fields and gardens. The increased concentration of nitrites indicates the intensity of decomposition of organic matter, and the delay of oxidation of NO_2^- to NO_3^-. This indicates contamination of the reservoir. Nitrates and nitrites enter the water from the effluents of industrial and agricultural enterprises. Developed agriculture also pollutes the environment, including surface water bodies, with mineral fertilizers. They contain pollutants. It also stimulates the growth of phytoplankton and blue-green algae. Unfortunately, it is not possible to confirm or refute this assumption, because there is no data on how turbidity and biological oxygen demand in water change at these observation posts.

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