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RENEWABLE WATER RESOURCES OF NORTHEASTERN MACROSLOPES OF EASTERN CARPATHIANS AND THEIR QUALITY

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Ukrainian Carpathian mountains have a dense network of rivers. Water resources of the Northeast slope of the Northeast Carpathians account for 10% of the total in Ukraine. Volumes of receipt and consumption of natural water show a decreasing trend in Ukraine since 1990, except for the last few years. However, the importance of renewable natural resources is increasing, as quality of surface waters continues to deteriorate.

The purpose of the article – to analyze the causes of quality deterioration and sustainability of water resources of the Northeast slope of the Eastern Carpathians in order to find measures to reduce their negative impact.

The upper basins Tismenitsya, Sivka, Dniester, Oper, Slavka, Worona, Chechva, Seret, Prut, Limnytsya and White Cheremosh were an experimental watershed. We investigated the value of the soil and surface waterways content by dissection of the annual runoff hydrograph. We investigated the impact of the balance method for river flow, such as comparing the transformed economic activity with the natural flow. We used the landscape and hydrological principle when assessing whether the transition from a point on the watershed in comparison to the whole of its area. We made a comparative analysis of the flow conditions of the Northeast slope of the Eastern Carpathians based study reporting material for State Hydrometeorology Committee.

The largest share of water resources is concentrated in the upper part of the river basins. There are more than 900 thousand m3 of water per square kilometer in an average year water content area. Water resources are 2,94 $km^3 \cdot km^{-2}$ in the upper basin of the Dniester. 2,63 $km^3 \cdot km^{-2}$ of water, or 90% of runoff flowing from the mountain catchments of the basin (area 4794 km^2). The volume of river water in the basin of the Prut (leakage to Chernivtsi) is 85,4%.

There are 25–35 peaks raising the water level in the rivers of the Carpathians in an average year. They account for most of the spring and summer. Flooding occurs in the Carpathian rivers in spring (late February – early March in the mountains is late by about 15 days), when the snow melts. The rivers of the Carpathians are full of water during floods. We observe the maximum levels in the mid and late March. Spring tide supplemented rain floods frequently. High water levels in rivers remain in place until the end of April or early May. The general elevation of the water level reaches 3-4 m or more in that time.

Floods in the Carpathians are a regular feature of the hydrologic regime, flood large areas, causing nature, economy and population huge losses. They were repeated every 10–15 years earlier. Now floods are repeated three or four years.

Carpathian rivers carry a great job with devastating torrential rains and sustained. Then the formed surface runoff, which river water removal of products of soil erosion in the form of suspended particles. The average annual runoff of suspended particles is 1–2,5 $t \cdot ha^{-1}$, in the mountains of 2,5–5 $t \cdot ha^{-1}$ and more at the foot of the mountains.

For example, the Prut river makes a total of 1 million tons of soil and river Dniester – up to 2 million tons per year.

According to our calculations, the water makes 677,2 tons of soil from the main basin of the northeast slope of the year eastern Carpathians annually. Watercourses washed with 84,4% of the volume of soil in the warmer months. Watercourses render of 0,04 tons (cold season) to 0,54 tons of soil from 1 hectare (warm period) as a result of mechanical work of these catchments.

The average amount of oxygen is about 11 $mg \cdot L^{-1}$ in the rivers of the Eastern Carpathians. However, the average amount of oxygen is 5,8-8,0 $mg \cdot L^{-1}$ in the rivers Dniester and Tysmenytsia.

Northeast slope water is classified as contaminated or dirty for chemical parameters in most rivers of the northeast slope of the Eastern Carpathians. Analysis of surveillance data shows that the level of good quality water is lost. The natural background level or amount of dissolved mineral compounds is 190 $mg \cdot L^{-1}$ of nitrate nitrogen – 0,2–0,4 $mg \cdot L^{-1}$, 0,1–0,2 $mg \cdot L^{-1}$ ammonia, phosphorus – 0,013–0,031 $mg \cdot L^{-1}$. The current concentration of chemicals in drains exceeds the background during the year. In particular, excess nitrate nitrogen is 2–3, ammonia – 4–6, phosphorus – 3–5. Total mineralization in these conditions in 1,5–2,5 times higher than natural in the recent past.

We explored the close dependence of hydrochemical conditions of the rivers on the depth economic activity at watersheds. In addition, in some areas, communal and technological effluents pass by cleaning systems and natural barriers fall into bed and rapidly increase the salinity of the river water.

The volume of industrial, municipal and domestic wastewater in the slope is 12,8 million m^3. They dumped directly into the rivers. Only 44% of the water dropped corresponds to the category of regulatory net. Volume of 0,1 million m^3 (0,8%) contaminated wastewater enters the water bodies without treatment.

The current situation in the natural environment of the Eastern Carpathians makes it necessary to reproduce the natural forest cover of the mountains, to increase the share of natural landscapes and protected areas, limited arable farmland. Local self-government should pay special attention to prevent uncontrolled discharge of untreated municipal and industrial effluents into the rivers of the Eastern Carpathians.