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SUMSOR RIVER IN THE SYRDARYA BASIN WATER MINERALIZATION AND HYDROECOLOGICAL SITUATION

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ANNOTATION

The article examines the hydro ecological status of inland watersheds, which focuses on the assessment of transboundary pollution of rivers in the region, the analysis of hydro chemical observations and changes in them. In the article, the Sumsor (Rezaksay) River of the Syrdarya river basin is selected as an object for analysis and analysis of river water salinity from the river basin observation stations, the level of household and industrial pollution; assessment of the level of contamination by hazardous radioactive and chemical substances; the prevalence of surface water pollution and the direction of pollution trends over time. Today, due to the rapid economic activity in the Uzbekistan part of the river basin, the operation of irrigation main canals and underground water reservoirs, intensive development of rock and gravel deposits, population growth and development, the high hydroecological situation in the development of new areas remains high.

KEYWORDS- *Water Resources, Transboundary pollution, Hydrochemistry, Hydro ecological situation, Surface water.*

INTRODUCTION

In recent decades, industrial development, intensification of agricultural production and population growth in Central Asia have caused many regional environmental problems. One of the most serious hydroecological problems in Central Asia is the preservation of surface water quality in the region's second largest waterway, the Syrdarya River [1]. Not only agriculture and internal pollution sources are concentrated in the river basins of the Ferghana Valley, but also industrial facilities (mining companies) are located on the territory of the Kyrgyz Republic. At present, the main pollutants found in surface water in the Fergana Valley are the wastes of these mines, which seriously threatens the water resources of the Syrdarya river basin [4].

GOALS AND OBJECTIVES

The main purpose of the work is to assess the hydroecological status of the water resources of the Syrdarya river basin, to study the current level of river pollution, to determine the results of hydrochemical observations and changes, to make conclusions and recommendations.

For the purpose, the Sumsor River (Rezaksay) was selected as an object and the environmental status of the river basin monitoring stations was analyzed by the mineralogical composition of river water, household and industrial wastewater pollution levels; assessment of the level of contamination by hazardous radioactive and chemical substances; tasks to study the prevalence of surface water pollution and the direction of pollution processes over time. The following key sources of pollution were taken into account when setting the target.

Sumsor is a polymetallic deposit in the river basin and operated from 1950 to 1978. Lead ore, tin and tungsten, copper, iron, arsenic, antimony, selenium and cadmium are the main ore deposits. On the sides of the river valley there are three garbage dumps filled with

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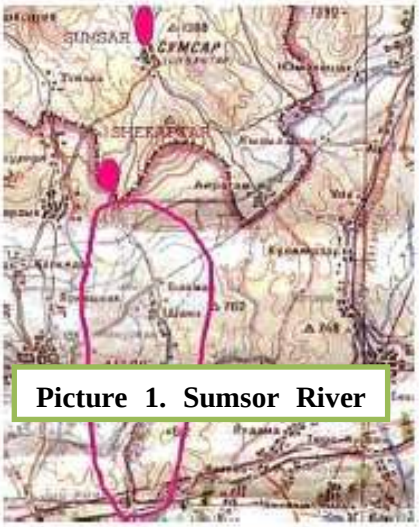
lead ore. Total emissions, according to some estimates, are 2.67 million m^3, others - 4.5 million tonnes, and waste area - 260,000 m^2. The basin was flooded in 1994 and 2017, tens of thousands of cubic meters of toxic waste fell into the river [2]. In addition, there are six remaining mines in the Shokaftar uranium mine, which operated from 1946 to 1957. Their total length is 76 square km and depth is 260 m, it was reported. Currently, the amount of radioactive waste in the basin is 60,000 m^2, according to various sources, from 330 to 700,000 m^3. These areas are occasionally washed away by river water and dispersed into the middle and lower reaches of the Sumsor River, causing contamination of the abiotic and biotic components of the environment [4].

Methods used. The analysis of hydrochemical substances in river basins and streams was used in field, base-experimental, natural geographical, comparison, statistical, geochemical, hydrochemical and experimental laboratory methods.

THE MAIN PART

The Sumsor River begins at the eastern slope of the Kugala Range in the highlands, up to 3700m high, like the Kokserak River. The area of the river at the top of the river with its broad, broad direction is called Kugalisoy. This river originates with the name Sumsor starting from the Ayirmasay tributary. Above the Kuklikkurgan village, this river flows out of the mountains into the canals. The natural stretches southward. Crossing the hills of Surson, it is called Rezaksay and is divided into three parts, pour to the Syrdarya. During the summer, the river flows downstream between Kuklik-Kurgan and Rezak villages. In the Sumsor River basin, sand and effusive rocks are predominant. The monitoring of river flow is carried out on the hydroposts of the upper watershed. The analysis shows that the Sumsor (Rezaksay) river basin is in the area of: strong cross-border pollution; Moderate transboundary pollution, mild transboundary pollution, and transboundary pollution with low impact are common [3].

The hydrochemical analysis of river water was used by the surveillance posts along the river length of Damabad, Baymak, Shayon, Chustnon, Namangan-Tashkent highway, downstream of Rezaksay reservoir and Chust, Seyrek canals. Measurement of river water pollutants in hydroposts was carried out in accordance with the criteria established in the "Index of Environmental and Natural Resources Act [4]. Evaluation of water quality According to the "Generalized List of Maximum Permissible Concentrations" and instructions for the use of hazardous substances in water for fishing ponds, 16 types of pollutants, including pH, hardness, chlorides, sulfates, ammonium ions, quantities of nitrites, sodium, potassium, petroleum products, lead, antimony, copper, mercury, zinc and iron (Table 1).



Picture 1. Sumsor River

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Table 1
Hydrochemical composition of Sumsor River water

Ingredients	1	2	3	PDK
pH	7,6	8,4	7	6,5
Hardness, mg-equ/l	6,8	9,4	8,4	7
Ammonium ion, mg/l	0,28	1,52	1,22	0,5
Nitrates, mg/l	0,11	0,12	0,05	0,08
Oil products,mg/l	0,056	0,088	0,086	0,05
Chlorides, mg/l	338	434	498	300
Sulfates, mg/l	249	301	356	100
Copper, mg/l	0,0038	0,0064	0,0046	0,001
Mercury, mg/l	0,0001	0,00008	0,00007	0,00001
Sweets, mg/l	0,014	0,024	0,016	0,01
Zinc, mg/l	0,012	0,015	0,012	0,01
Iron, mg/l	0,2	0,24	0,16	0,05

** The table is based on the results of the monitoring of the Environmental Assistance Project [4].*

The analysis shows that at the entrance to the region, sulfates in river waters contained 1,8 to 2,5 times, petroleum products from 1,1 to 1.6 times, copper 3,5-5,3 times, mercury 7,6-15,0 times, zinc increased by 1,3-1,5 times, iron by 2,8-4,0 times. The water hardness was changed to 1,2 mg equiv/*l.* One-time increase of nitrite in water was recorded 1.4 times. The mineralization of water with chlorides and ammonium ions corresponds to the norm. Comparing the values of phase 1 in the observed phase, it was found that the oil content was 1,9 times, copper 1,2 times, iron 1,1 times higher, and zinc 1,2 times lower. In the upper reaches of the river, the iron content is 1,8–4,0 times higher (Picture 2).

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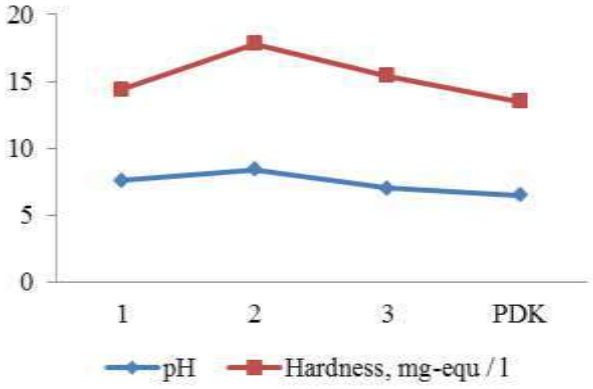

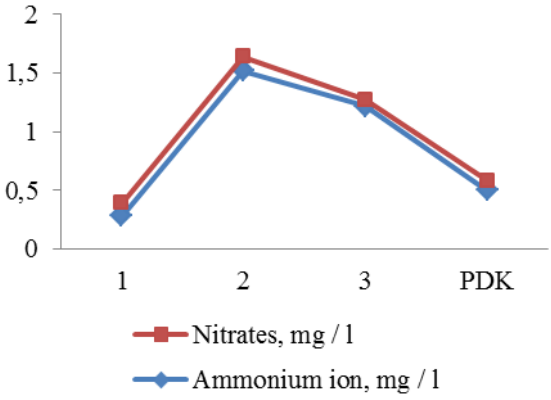

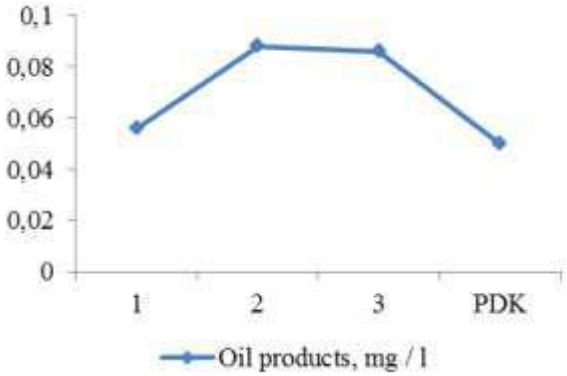

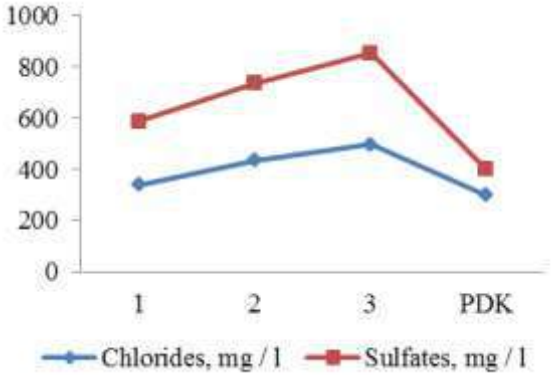

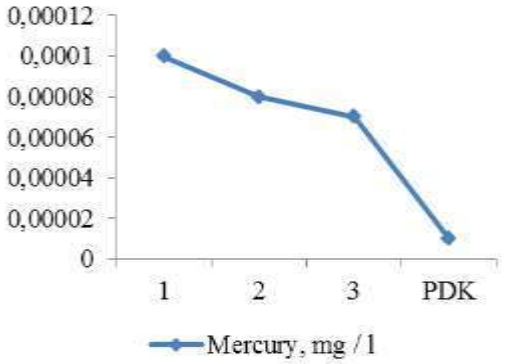

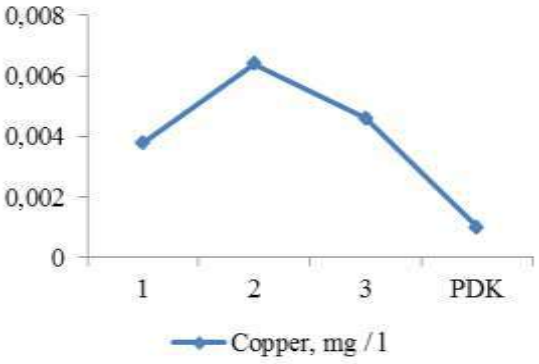

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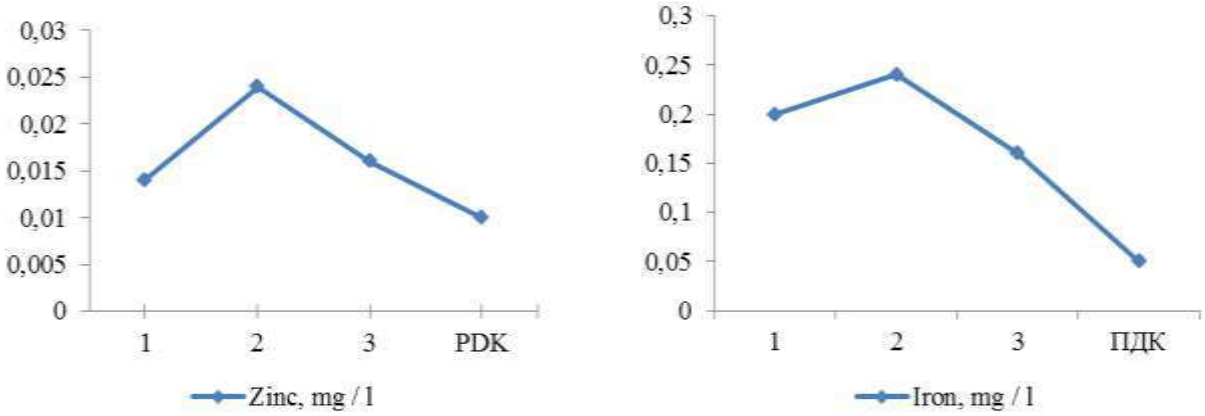

Picture 2. Dynamics of pollutants content in Sumsor (Rezaksay) river waters

At all monitoring stations in the river, high sulfate content was recorded at all stages of the study. In particular, the amount of sulfates was higher than the norm set in the Baimak, Shoyon, Chustnon and Rezaksay reservoirs. Almost all oil samples studied have small amounts of oil ranging from 0,0018 to 0,0100 mg / kg. The content of heavy metals and other controlled ingredients in the sediments does not exceed the established limits.

In the lower reaches of the river, the concentration of pollutants decreases and reaches the minimum values when it reaches the lowlands as a result of the spreading and absorption of pollutants in the lower reaches, and the addition of river water from other river valleys.

SUMMARY

1. Today, due to the rapid economic activity in the Uzbekistan part of the river basin, operation of irrigation main canals and groundwater pools, rapid development of rock and gravel deposits, population growth and the high hydroecological situation in the development of new areas remains.

2. Not only agricultural and internal sources of pollution are concentrated in the Sumsor (Rezaksay) river basin, but also industrial facilities (mining companies) are located on the territory of the Kyrgyz Republic. And today, the main pollutants found in the river flow are the waste of these mines.

3. The spring floods on the Reaksaksay (Sumsor) river basin showed that the most dangerous for the population. In addition, during this period there is a risk of toxic waste and erosion of mining waste and their distribution to the river.

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