For example, in the 2012 year of Kechut Artificial Reservoir V, Al, Cu, Cr, Mn and Se number of MPC increasing cases is 9, 5, 5, 4, 5 and 2 times, respectively. The amount of excess cases of MPC –

$$N = 30; \qquad \sum n \log_2 n = 73,3;$$

$$I = 73,3/30 = 2,44;$$

$$H = \log_2 30 - 2,44 = 4,9 - 2,44 = 2,46;$$

$$G = 2,46/2,44 = 1,0.$$

The total amount of the multiplicity of MPC exceedances –

$$M = \sum m = 14,1;$$

$$\log_2 M = 2,82;$$

$$AWQI = 1,008 + 0,282 = 1,290.$$

Entropic and Armenian water quality indexes for Kechut Artificial Reservoir

Year	EWQI	AWGI
2009	0,301	0,575
2010	0,530	0,885
2011	0,350	0,822
2012	1,008	1,290

Analysis of obtained data indicate that AWQI has liner dependence with EWQI:

$$AWQI = (0,410 \pm 0,112) + (0,882 \pm 0,183) \cdot EWQI;$$

$$R = 0,95956; N = 4$$

Thus, for the first time using AWQI the quality of Kechut Artificial Reservoir water evaluate. It was shown that the quality of water of the Reservoir from the first to the second class of pollution.

References

1. Simonyan A.G. Analysis of environmental status of the river Voghji with Armenian index of water quality // Proceedings of YSU, Series Cemistry and Biology. – 2016. – № 2. – P. 20–24.

2. Simonyan G.S. Assessment of hydrogeological systems in the light of information theory synergistic // Proceedings of the All-Russian scientific-practical conference. Environmental safety and Nature: Science, Innovation, upravlenie. – Mahachka-la: ALEPH, 2013. – P. 275–280.

3. Shannon C. Works on information theory and cybernetics. – M.: IL, 1963. – 830 p.

ANALYSIS OF ENVIRONMENTAL STATUS OF THE RIVERS SISIAN AND GORIS WITH ARMENIAN INDEX OF WATER QUALITY

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Water Contamination Index (WCI), Canadian Water Quality Index (CWQI) and Specific-combinatorial Water Quality Index (SCWQI) are used for evaluation surface water quality in Republic of Armenia. It must be noted, that most developed complex characteristics of water object in one way or another connected with the existing maximum permissible concentration (MPC). In the last years we suggest Entropic Water Quality Index (EWQI) and Armenian Water Quality Index (AWQI) for evaluation surface water quality [1]. The aim of presented paper is evaluation of Rivers Sisian and Goris by Armenian Water Quality Index.

River Sisian – right tributary of the Vorotan. The river is 33 km. On Sisian river located positions: number 103 – 0,5 km above the Arevis and number 104 – at the mouth of the river. River Goris leght tributary of the Vorotan. Goris is 29 km long. Two monitoring posts located on the river Goris: number 106 – 3,0 km above the city of Goris, number 107 – 1.5 km below the city of Goris. It was established that the water of the Rivers Sisian and Goris regularly exceeded the value of BOD_5 and concentrations of nitrite and ammonium ions, due to water pollution by domestic wastewater. It was shown that water of Rivers Sisian and Goris is also contaminated by some metals. Thus, in the river water is regularly increased MPC of copper, vanadium, aluminum, cobalt, manganese and selenium. For example, in the position № 107 of River Goris BOD_5, NH_4^+, NO_2^-, V, Cu, Al, Cr and Se number of MPC increasing cases is 4, 12, 12, 12, 11, 4, 5 and 1 times, respectively. The amount of excess cases of MPC –

$$N = 61; \qquad \sum n \log_2 n = 194,6;$$

$$I = 194,6/61 = 3,19;$$

$$H = \log_2 61 - 3,19 = 2,74, \; G = 2,74/3,19 = 0,86.$$

The total amount of the multiplicity of MPC exceedances –

$$M = \sum m = 39,2; \qquad \log_2 M = 5,37;$$

$$AWQI = 0,86 + 0,537 = 1,397.$$

Analysis of obtained data indicate that AWQI has liner dependence with WCI, SCWQI, EWQI and an inverse dependence with CWQI:

$$AWQI = (0,838 \pm 0,215) + (0,079 \pm 0,065) \cdot WCI;$$

$$R = 0,65178; \; N = 4;$$

$$AWQI = (0{,}229 \pm 0{,}554) + (0{,}514 \pm 0{,}340)\cdot SCWQI;$$

$$R = 0{,}73018; \quad N = 4;$$

$$AWQI = (0{,}225 \pm 0{,}154) + (1{,}290 \pm 0{,}232)\cdot EWQI;$$

$$R = 0{,}96899; \quad N = 4;$$

$$AWQI = (3{,}082 \pm 1{,}044) - (0{,}025 \pm 0{,}013)\cdot CWQI;$$

$$R = 0{,}81023; \quad N = 4.$$

Thus, for the first time using AWQI the quality of Rivers Sisian and Goris water evaluate. It was shown that from the source to the mouth of the river there is an increase in the value of the AWQI, which indicates the decline in the quality of water of the rivers from the first to the second class of pollution.

References

1. Simonyan A.G. Analysis of environmental status of the river Voghji with Armenian index of water quality // Proceedings of YSU, Series Cemistry and Biology. – 2016. – № 2. – P. 20–24.

WATER QUALITY ASSESSMENT "YEREVAN LAKE" ARTIFICIAL RESERVOIR

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In the last years we've suggested Entropic water guality index (EWQI) and Armenian water guality index (AWQI) for evaluation surface water quality [1].

Development of water quality assessment methods using conventional indicators comprehensively taking into account various properties of surface water is an important issue. It must be noted that most developed complex characteristics of water object in one way or another connected with the existing maximum permissible concentration (MPC). The aim of presented paper is evaluation of «Yerevan Lake» Artificial Reservoir by indexes of water quality. Five indexes of water quality (IWQ) which differ on structure, applicability and used approaches were used for this purpose. The Water Contamination Index (WCI), Canadian Water Quality Index (CWQI), Specific-combinatorial Water Quality Index (SCWQI), EWQI and AWQI.

The artificial reservoir «Yerevan Lake» is located on the south-west of Yerevan. It was built in the gorge of the river Hrazdan in 1963 –1966. The lake is situated at an altitude of 908 m above sea level, has an area of 0,65 km^2, average depth – 8 m, and the maximum – 18 m, water volume of approximately 5 million m^3 [2]. «Yerevan Lake» Artificial Reservoir has one monitoring post: number 112. It was shown that water of the reservoir is polluted by biogenic substances and heavy metals. Thus, in the Reservoir water is regularly increased MPC of copper, vanadium, aluminum, and selenium. For example, BOD_5, NH_4^+, NO_2^-, V, Cu, Al and Se number of MPC increasing cases is 6, 10, 12, 12, 10, 7 and 6 times respectively. The amount of excess cases of MPC –

$$N = 63; \quad \sum n\log_2 n = 203{,}04;$$

$$I = 203{,}04/63 = 3{,}22;$$

$$H = \log_2 63 - 3{,}22 = 2{,}75;$$

$$EWQI = H/I = 2{,}75/3{,}22 = 0{,}855.$$

The total amount of the multiplicity of MPC exceedances –

$$M = \sum m = 36{,}3; \quad \log_2 M = 5{,}18;$$

$$AWQI = EWQI + 0{,}1;$$

$$\log_2 M = 0{,}855 + 0{,}518 = 1{,}373.$$

Analysis of obtained data indicate that AWQI has liner dependence with WCI, SCWQI, EWQI and an inverse dependence with CWQI.

References

1. Simonyan A.G. Analysis of environmental status of the river Voghji with Armenian index of water quality // Proceedings of YSU, Series Cemistry and Biology. – 2016. – № 2. – P. 20–24.

2. Chilingaryan L.A., Mnatsakanyan B.P., Agababyan K.A., Tokmadzhyan O.V. Hydrography of rivers and lakes in Armenia. – Yerevan, 2002. – P. 44.

THE STUDY OF THE DIVERSITY OF SPECIES OF TREES AND SHRUBS ON THE SCHOOL № 45 IN ARKHANGELSK

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Objective. To create an electronic mini-encyclopedia of species of trees and shrubs growing in the school № 45 city of Arkhangelsk. In our city a lot of environmental problems: dustiness, high concentration of toxic emissions, noise levels in excess of the maximum allowable health norm, and others. In addressing these issues play huge role greenery. School № 45 is situated on Sadovaya Street, in the heart of Arkhangelsk in the vicinity of roads, buildings, market. On school grounds