



Original paper

The quality of the surface water in 6 North – West Region

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Abstract

The aim of the knowledge of the surface water quality in the area is to deliver the basic elements with the aim of estimating the stage and evolution of the quality of the water resources. Physico – chemical, biological and bacteriological analyzes for the main lakes from the 6 North – West Region were performed with the aim of realizing a classification of the surface waters by the quality classes and degree of trophic traits. A characterization of the studied lakes by the quality classes. In overall, the water quality in 6 North – West Region is within the superior quality classes.

Keywords: surface waters, quality classes, indices of quality, trophic traits

1. Introduction

The human activities exert important quantitative and qualitative pressure on the water resources. Thus, the analysis of this component of the ambient environment is necessary in order to supply the water resources for the next generations, with the respect of the principle of the sustainable development. The hydrographic network of the 6 North - West Region, which includes the counties of Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu Mare and Sălaj is dominated by the hydrographic basins of the rivers Someș, Crișuri, Crasna, Barcău, Turu, Tisa and Aries. The aim of the knowledge of the surface waters quality from the area, as specific.

activity, systematically developed, is to supply the basic elements for estimating the stage and evolution of the water resources quality. The potential of the surface water resources that can be used in 6 North – West Region, is presented in fig. 1.

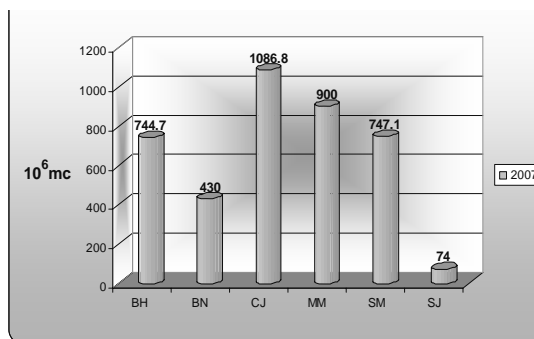


Figure 1. The water resources that can be technically used (10⁶m³) in 6 N – V Region

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2. Material and method

The characterization of the surface running waters is performed through the interpretation of the synthesis data by each element of system structure, comprising the significant water structures from the hydrographic basin network, resulting quality categories by 3 groups of indicators:

- physico - chemical
- biological
- bacteriological.

The synthesis values are obtained by computing the share average with the debite of the concentrations determined in harvesting campaigns, by each indicator in each surveillance section. The resulted values are compared with admissible limit thresholds, specified in STAS 4706/1988. This STAS regulates the quality categories and technical conditions for surface waters.

Based on the share of the different constituents in forming the water quality state, the overall water quality in surveillance area is estimated. The water quality is established both by main groups of chemical indicators (oxygen regimen, degree of mineral presence and specific toxic substances) and assembly of all indicators.

The water status is monitored through the statistical quality water indicators, and their evolution in time, by estimating the quality reported to volumes and lengths of river sections, different pollution aspects and measures of fighting against pollution.

3. Results and discussions

The activity of knowledge of water quality was developed within the territorial unities of water management from:

- Water Office Someș - Tisa,
- Water Office Crișuri
- Water Office Mures

part of the National Administration "Romanian Waters".

They supplied the harvesting of the water samples from control sections situated in surface waters, lakes, ground waters and pollution sources. They determined the physico - chemical and biological quality indicators through present normative (STAS).

The data processing was performed through the comparison of the value with certitude threshold of 90% (10% for dissolved oxygen) for quality indicators determined according to the stipulations of the "Normative concerning the

reference objects for classification of the surface waters quality" approved by the Order no. 1146/10.12.2002.

The water quality was estimated based on the share of different constituents in forming the quality state, by determining the indicators from the main groups and based on this, framing into classes of quality:

- C1 – Thermic regimen and acidification,
- C2 – Oxygen regimen,
- C3 – Nutrients,
- C4 – Salinity,
- C5 – Specific toxic pollutants of natural origin
- C6 – Organic toxic substances,
- A – Biological analyzes,
- D – Microbiological analyzes.

Analyzing the water quality from physico - chemical point of view at the level of the North - West Development Region, we find that in almost all control sections, according to the Order 1146/2002, the physical indicators frame in the limits of the I – III quality classes.

The exception was recorded in the rivers located in the county of Maramures which are within the limits of I - V quality classes, due to the sections located upstream the moving of the waters proceeded from the mining and metallurgic industries located within the Someș basine:

- Someș - Cicârlău,
- Lăpuș - Bușag,
- Căvnic - Copalnic,
- Săsar aval Baia Mare,
- Firiza upstream confluence with Săsar
- Ilba upstream confluence with Someș.

In order to monitorize the water quality of the lakes and degree of trophic status, analyzes were performed in 6 North - West Region. They were performed with the aim of quantitative determinations of the quality indicators according to present standards stipulated by the Romanian legislation.

According to the Report concerning the status of the environmental factors in 6 North - West Region in 2007, the trophic stage of the lakes, established based on the values of the indicators concerning the process of eutrophization and hygienic and sanitary status of the lakes from the 6 North - West Region are presented in tables 1 and 2.

The analyze of these results shows that the state of the natural and accumulation lakes from the 6 North - West Region is good, majority indicating low and middle levels of trophic status, being included in oligotroph and mezotroph categories.

Table 1. The quality of the main lakes reported with the trophic status degree

Lake name	Values for nutrients		The phyto-planktonic biomass Maximum in fotic area (mg/l)	Chlorophyll „a” (mg. m ⁻³)	Final framing
	P total mg P/l	N mineral mg N/l			
Tileagd (BH)	0.0439	0.396	6.7	13.51	eutroph
Drăgan (CJ)	0.027	0.411	4.15	4.73	mezotroph
Leșu (BH)	0.0284	0.369	5.73	6.21	mezotroph
Crestur (BH)	0.6663	0.545	7.03	34.1	mezotroph
Fegernic (BH)	0.17	0.321	9.31	208.24	hipertroph
Firiza (MM)	-	-	1.51	13.6	oligo-mezotroph
Mogoșa (MM)	-	-	-	6.25	oligo-mezotroph
Buhăescu (MM)	-	-	-	1.53	ultraoligotroph
Călinești-Oaș (SM)	0.041 - 0.092		1.08 - 2.93	3.6 - 16.6	mezo-eutroph
Acumularea Vârșolt (SJ)	-	-	-	-	mezotroph

Table 2. The trophic and hygienic – sanitary stage of the lakes from the 6 North - West Region

County	Lake	Trophic stage	Hygienic – sanitary status
BIHOR	Tileag	eutroph	good
	Drăgan	mezotroph	good
	Leșu	mezotroph	good
	Crestur	mezotroph	good
	Fegernic	hipertroph	good
BISTRIȚA NĂSAUD	Colibița	oligotroph	good
	Budurleni	eutroph	good
MARAMUREȘ	Firiza	oligo-mezotroph	good
	Mogoșa	oligo-mezotroph	v. good
	Buhăescu	ultraoligotroph	v. good
SATU MARE	Călinești-Oaș	mezo-eutroph	v. good
SĂLAJ	Vârșolt	mezotroph	good

4. Conclusions

The water quality in systematically monitored sections, recorded recurrently improvements or worsening, function of the way of functioning of the existent depuration stations, the lack of them in some cases, volume of the removed used waters, flows of the removed used waters. In overall, the water quality in 6 North – West region is within superior quality classes.

In some cases, the water quality is determining influenced by the removing of the mining waters not correspondingly removed or even not depurated, and waters resulted from the activities of preparing non ferrous ore or non ferrous metallurgy, specific activities for the 6 North-West Region.

In order to maintain the surface water quality by river sections and for quality improving by sections submitted to antropic pressure, the following measures must be taken:

- Satisfying the water requirements at source for both urban and rural population;
- Improvement and development of the water supplying and canalization infrastructure;
- Improvement of the quality of the water resources

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