CONCERNS FOR THE IMPACT OF THE MINING PLANTS ON THE WATER QUALITY OF BISTRIŢA RIVER

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Abstract

This paper presents the results of the monitoring water quality on Bistrita River, affluent of Siret River.Water is an important element for life and development of human communities.For a more accurate assessment of the Bistriţa River water quality there is required a monitoring and a physico – chemical verification of the indicators not to exceed the quality standards. The chemical composition of water resulting from mining operations varies depending on the nature of the terrain they cross. Contaminated water is characterized in particular by the presence of metal ions arising from the deterioration of polymetallic sulfides, heavy metals. Mining is an important risk factor on water quality. The closing of mines in the upper sector of the Bistriţa River did not lead to eliminating sources of pollution, which is now a source of pollution and water quality are retained. Water undergoes a substantial reduction from its initial value due to its self-purification capacity. Water samples used in this paper were taken from monitoring sections Bărnar, Bărnărel - Crucera, Cârlibaba and Argestru. For these samples were measured several water quality parameters to meet water needs in agriculture. Analysis of these parameters of water quality is to achieve "good status" of water, as required by the Framework Directive, which has the following objectives: ensuring source water deficit areas, rehabilitation of centralized water and sewer towns and cities, improving water quality, protection of aquatic ecosystems, land and wetlands, flood and drought risk reduction, soil erosion and degradation torrent, potential water use in agriculture.

Key words: water quality monitoring, water pollution, pollution sources

The main rivers are the Siret river basin of the Siret River tributaries right to collect all the water on the eastern side of the Carpathians rivers namely Suceava, Moldova, Bistrita, Trotuş, Putna and Ramnicu Sărat and Buzău River (Agenţia pentru Protecţia Mediului Suceava, 1991 - 2003).

Of the total pollution accidents occurring in the river Siret, 26.1% were recorded on Bistriţa River and its tributaries.

The pollutants affecting water quality in most cases the rates were petroleum products, organic substances, heavy metals, cyanides, detergents, ash, iron, copper, zinc, manganese, derived from these mines.

Analyses have shown time-a negative impact on river water quality Bistriţa. Closing the mines has led to the elimination of pollution sources, the effect produced in the past and now it remains today.

RISK FACTORS

The main source of pollution of the Bistriţa River is mines mining, they raised a number of pressing issues affecting the environmental factors.

Water quality is greatly influenced by former mining activities, which are insufficiently treated, and in some cases, even untreated.

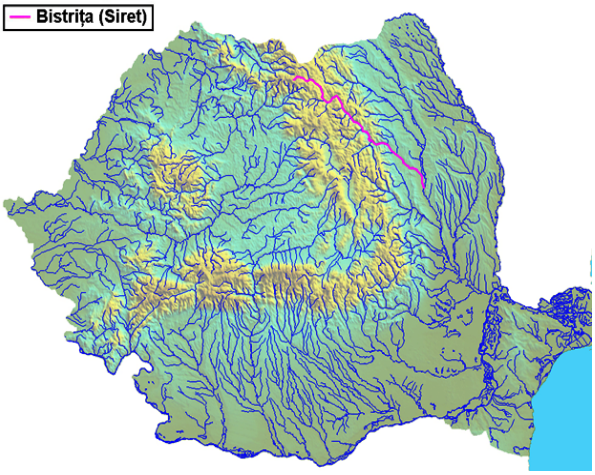

Figure 1 **Bistriţa River**

Water pollution is reduced substantially from its initial value due to its self-purification capacity.

Treated or untreated wastewater, after evacuation processes are subjected to physical, chemical and biological processes leading to water

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self-purification of receptor. This is because in some areas affected by pollution from mines, streams have low flow rates (Luca M., 2004).

The chemical composition of water resulting from mining operations varies depending on the nature of the terrain they cross. Contaminated water is characterized in particular by the presence of metal ions arising from the deterioration of polymetallic sulfides, heavy metals.

Figure 2 **Dump derived from shooting**

Water pollution is achieved in several ways: mine drainage water (slightly acidic water), discharge to surface waters, pollution of surface material from waste dumps, water washing by precipitation, infiltration of the operation in underground aquifers, loss of fuel or lubricants from equipment equipped with internal combustion engines, sawdust resulting from cutting the material used to reinforce galleries (www.apesiret.uvp.ro.).

THE ANALYSIS OF THE STATE PARAMETERS OF WATER QUALITY MONITORING SECTIONS IN THE BISTRIŢA RIVER BĂRNAR, BĂRNĂREL - CRUCERA, ARGESTRU, CÂRLIBABA 2010

After monitoring the river water quality was determined concentaţia Bistriţa ammonium, nitrate, nitrite, chlorine, sulphates, calcium, sodium, iron and nitrogen in the control Bărnar, Bărnărel - Crucea, Argeşu and Cârlibaba. (www.fia.usv.ro.)

The Siret River Basin area, monitored by measurements in 2010, the calcium content of the river Bistrita / Bărnar was 44.61 mg / l (Fig. 3).

In terms of sulfur content of the water analyzed by the Bistriţa River / Bărnărel - Cross indicates that the amount of sulfur ions is 30.11 mg / l (Fig. 4).

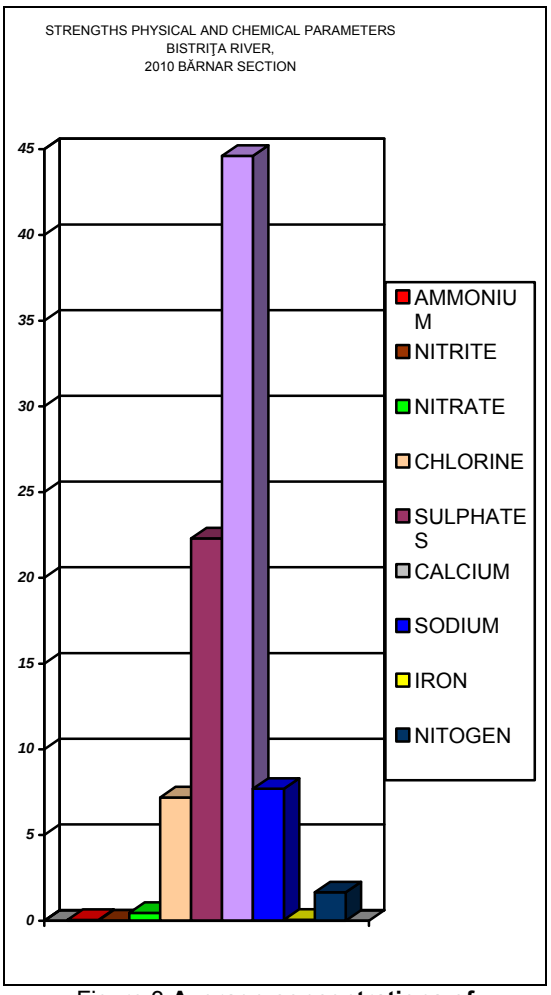

Figure 3 **Average concentrations of physical - chemical in 2010, Bistriţa River section Bărnar**

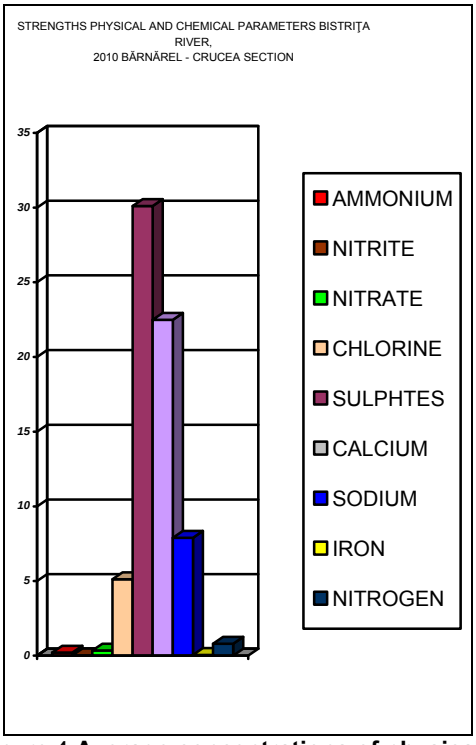

Figure 4 **Average concentrations of physical - chemical in 2010, Bistriţa River section Bărnărel – Crucea**

Calcium ion loading in water monitoring section analyzed the Bistriţa River / Argeşu is 44.53 mg / l (fig. 5).

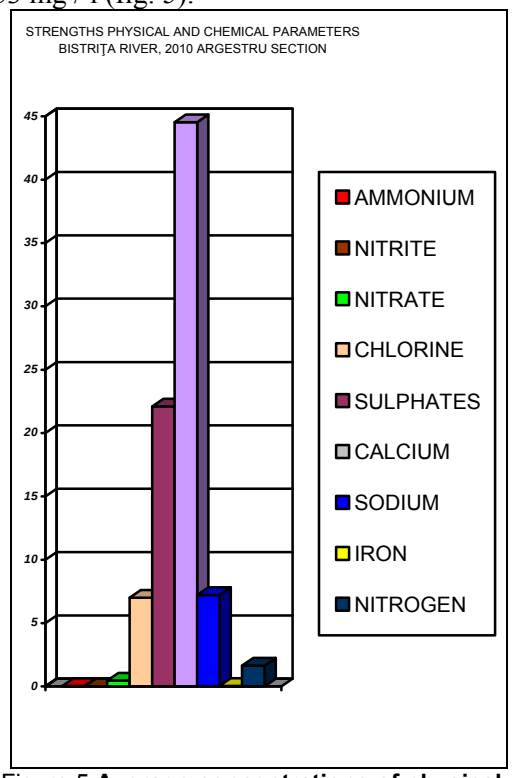

Figure 5 **Average concentrations of physical - chemical in 2010, Bistriţa River section Argestru**

Concentration of calcium ions in water samples is relatively constant over the River area Bistriţa / Cârlibaba, with an average of 44.67 mg / l (Fig. 6).

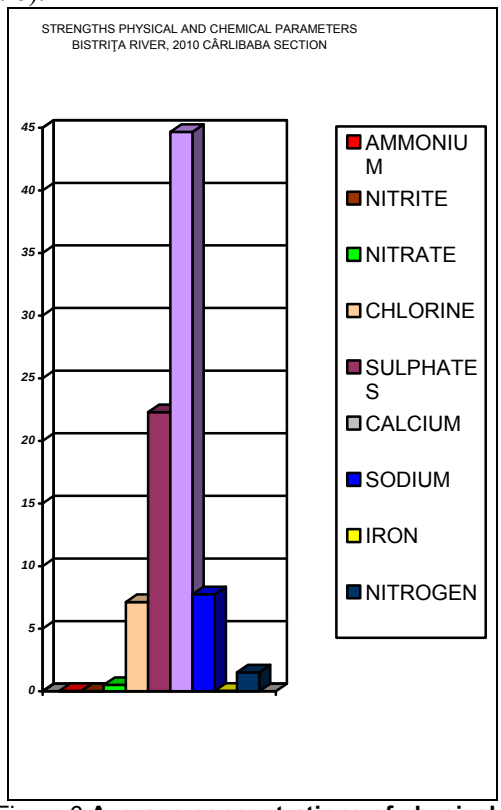

Figure 6 **Average concentrations of physical - chemical in 2010, Bistriţa River section Cârlibaba**

CONCLUSIONS

Concentrations of chemical and physical parameters present in the Bistriţa River water are in varying amounts and adversely affect water.

There is ammonium, nitrite, nitrate, chlorine, sulphates, calcium, sodium, iron, nitogen. In terms of ion content in setting state water quality leads to the Siret River water quality classification as "moderate" class. Siret river water quality under the State of Environment Report in 2010 in Suceava County, Siret River Basin water quality was classified as a mediocre level 2, 3 and 4 according to Regulation 2000/60/EC.

Romanian Waters National Administration report at country level states that Siret basin has the lowest value on the cleanliness (C%) of the longest River basins in Romania (119 km).

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BIBLIOGRAPHY

Atkinson, T.C. Davis, P.M., 2000 - *Logitudinal dispersion in natural channales. Experimental results from the River Severn, UK*, Hydrology and Earth System Sciences, Vol. 4, No.3.

Bica, I., 2002 - *Protecţia mediului. Politici şi instrumente.*, HGA, Bucureşti.

Borica, D., 2005 – *Aspecte privind complexitatea proceselor de poluare a mediului acvatic.,*Curierul de fizică, Anul XVI, Editura Horia Hulubei.

Ciornău, R., 2000, coordonator – *Ecologie şi protecţia mediului.*, Editura Economică, Bucureşti.

Cojocaru, I., 1995 – *Surse, procese şi produse de poluare.*, Editura Junimea, Iaşi.

Lam, Lau, Y., Krishnappan, B.G. 1981 – *Modeling transverse mixing in natural streams.*, Journal of the Hydraulic Division, ASCE, vol.107 HY2.

Luca, M., 2004 – *Consideraţii privind fenomenul de poluare indus de haldele de steril miniere.* Internaţional conference “Disaster and Polluation Monitoring”, Iaşi, Gh. Asachi, Tehnical University.

Luca, M., Mănescu, A., 2010 – *Considerations on the evolution of the Siret Rriver quality in the Huţani monitoring section*.Bulletin of the Polytechnic Instituite, Iaşi Tomul LVI(LX), Fasc.4,2010, pg. 63-70.

Luca, M., Bălan, R., Mănescu, A., 2011 – *Monitoring the pollution of groundwater in the area of industrial waste.* Conferinţa „ Aerul şi apa componente ale mediului”, Babeş-Bolyai University, Faculty of Geography,_Cluj-Napoca, University Press Publishing Cluj, ISSN: 2067-743X, pg. 30-37.

Mănescu, A., Luca, M., 2011 – *Considerations on the evolution of the Şomuzu Mare river quality in the Dolheşti monitoring section.* Conferinţa „ Aerul şi apa componente ale mediului", Babeş-Bolyai University, Faculty of Geography, Cluj-Napoca, University Press Publishing Cluj, ISSN: 2067-743X, pg. 292-230.

Mănescu, S., Cucu, M., Diaconescu, M.L., 1994 – *Chimia sanitară a mediului.* Editura Bucureşti.

Popescu, L.G., Popescu, D.A., 2007 - *Impactul exploatărilor miniere de mangandin zona Dadu – Iacobeni nord-vestul judeţului Suceava, nordul Carpaţilor Orientali asupra mediului* ANALELE Universităţii „Ştefan cel Mare" Suceava SECŢIUNEA GEOGRAFIE ANUL XVI – 2007, pg. 203 – 214.

***** -** *www.apesiret.uvp.ro; www.fia.usv.ro*.

*****, 1991 -** *Anuar privind calitatea mediului în judeţul Suceava 1991 – 2003*, Agenţia pentru Protecţia Mediului Suceav**a**.