

CONSIDERATIONS ON THE WATER SOURCE IN VIEW OF THE LOCATION OF A HYDROTECHNICAL CONSTRUCTION

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Abstract: The existence of a hydrotechnical construction changes the environment and the natural or artificial ecosystems. The biggest change on this average factor is pollution. The economic development, industrialization and increase of electricity production have as a consequence the increase of the used water volume and the modification of the physico-chemical indicators of the Jiu

KEY WORDS: hydrotechnical constructions, surface water, thermal stratification, dynamic interaction process

1. INTRODUCTION

The main changes in the natural bed of a water source by the location of hydrotechnical constructions are on the water quality.

The effects of the accumulation lake are felt from its development phase and can completely change the habitat in the exploitation phase. Thus we can consider that the influence on water quality is major.

2. EXPERIMENTAL PART

In the arrangement phase we have:

Leaks and decompositions. Minerals released from flooded soil and the decomposition of organic waste have important consequences on the

physical and chemical properties of water. The arrangement of the lake leads to thermal stratification of the water and the distribution of dissolved oxygen, which modifies the chemical properties of the water and sediments.

In the exploitation phase we have:

Accelerating the aging rate of the water mass and eutrophication, affecting various uses.

Thermal stratification which is the result of a dynamic interaction process, surface water heating and vertical mixing triggered by wind and waves. In general, stratification is determined by differences in water density, these being produced by: differences in temperature, salinity,

turbidity, sediment loading. Achieving a retention on the river sector generates phenomena that change the properties and chemistry of the waters.

The filling of the lake and the stagnation of water in the lake change the nutrients of the water and the degree of mineralization.

A high content of dissolved oxygen in water is very important for active life, and in the case of a low oxygen content it is possible to release toxic substances due to chemical

reactions. The dissolved oxygen content is very low due to the high consumption of flooded vegetation, and the situation improves after the third year of operation. [2]

The main sources of nutrients come from tributary flows. Downstream water quality depends directly on water intakes, flow regime, watercourse recovery capacity, climatic phenomena. Physico-chemical indicators of the water source on the section of the river sector, table 1.

<i>Nr. Crt.</i>	<i>Indicators</i>	<i>U.M.</i>	<i>Flows May 2017</i>	<i>Flows August 2017</i>	<i>Flows September 2017</i>
1	Suspended matter	mg/l	28	22	25
2	Turbidity		21,46	23,8	15,6
3	Water / air temperature		11/19	25/32	20/24
4	Dissolved oxygen	mg/l	8,5	8,2	8,3
5	Conductivity	µS/cm	155,6	169	221
6	pH	upH	7,6	7,5	7,7
7	Alklinity	mmol/l	1,6	1,6	1,6
8	N-NH ₄	mgN/l	0,08	0,09	0,095
9	N-NO ₂	mgN/l	0,047	0,05	0,046
10	N-NO ₃	mgN/l	1.02	0,9	1.01
11	N _{tot}	mgN/l	5,6	5,6	5.6
12	P-PO ₄	mgP/l	0,051	0,46	0,051
13	Chloride	mg/l	8,508	8,531	8,353
14	Sulphates	mg/l	24,4	25,1	25,5
15	Bicarbonațe	mg/l	64,66	65,6	97,6
16	Saturațion	%	93	89,5	87
17	CCOCr	mg/l	10	10	10
18	CBO ₅	mg/l	3	2,4	2,4

The changes on the Jiu River are significant and consist in the modification of the physico-chemical indicators of the river sector. Accumulation lakes only influence the processes of decomposition of pollutants and treatment. The self-cleaning process is slowed down due to poor aeration. Suspended dyes change the transparency of the aquatic environment. The chlorophyll action is diminished and the tendency to install anaerobic conditions is created. The main pollutant of water is

solid suspensions. The trend of solid suspensions is declining due to the cessation of mining activities, sedimentation and the construction of accumulation dams on Jiu. The evolution of the suspension indicators on the river sector is presented in graph 2

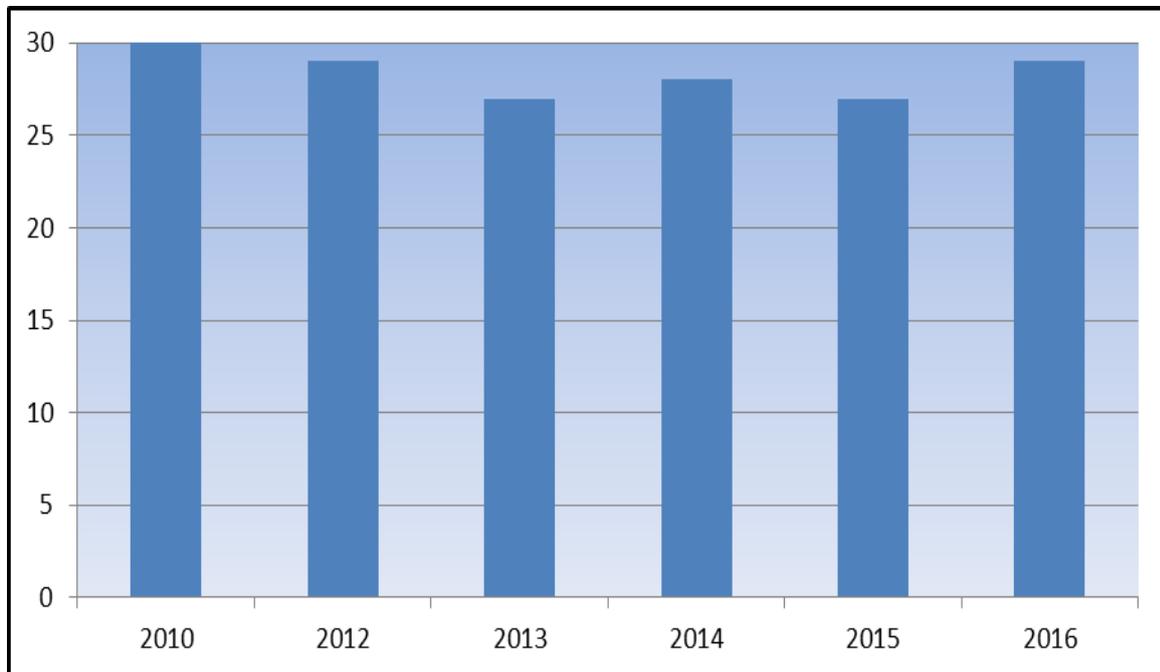


Figure 2 The evolution of solid suspensions on the river sector

The suspension indicator shows that in the last years on the river sector the allowed limit value, of 35 mg / dm³, is not exceeded.

The evolution of the dissolved oxygen concentration on the river sector is shown in the graph

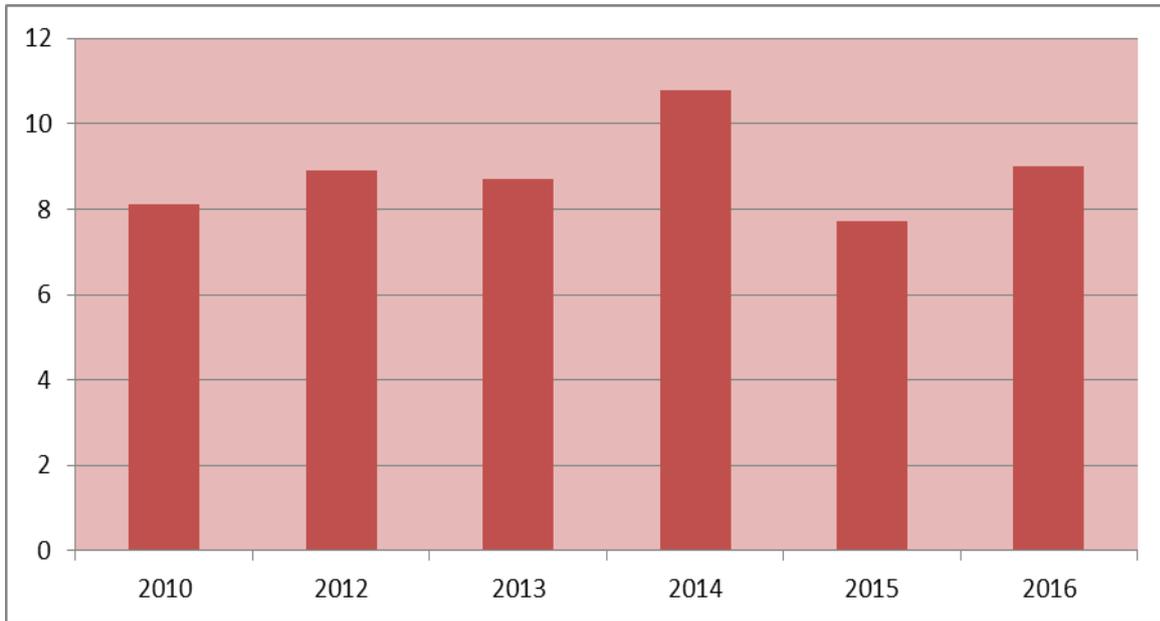


Figure 3. The evolution of solid suspensions on the river sector

The dissolved oxygen indicator shows that in the last years on the river sector the allowed limit value of 7 mg O₂ / dm³, corresponds to the surface waters of quality a-II a.

The evolution of pH on the river sector is presented in graph 4.

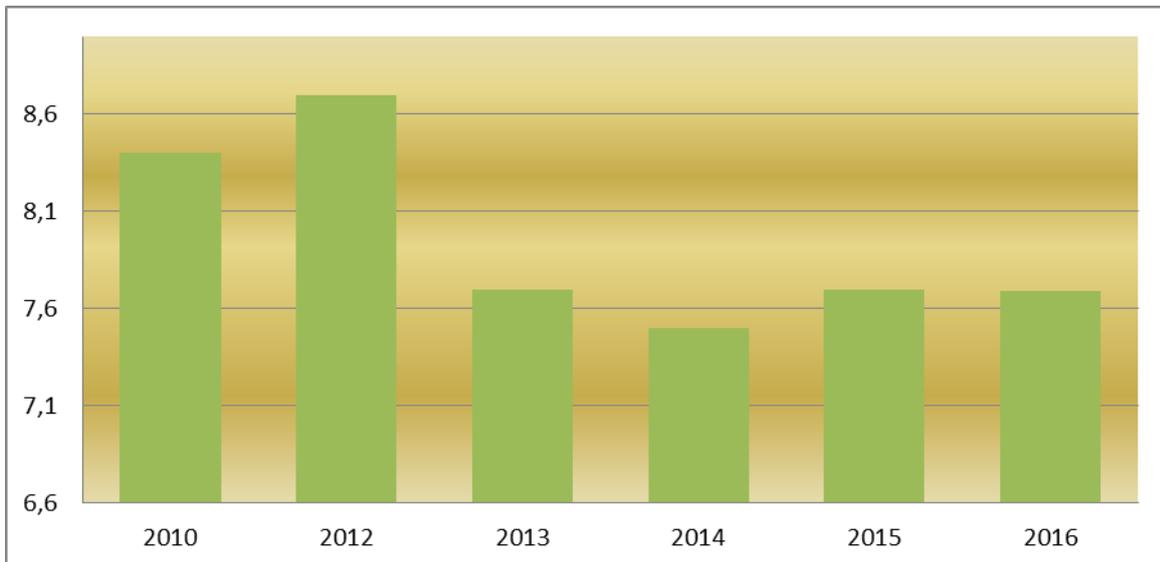


Figure 4. The evolution of pH on the river sector

CONCLUSIONS

The existence of a hydrotechnical construction changes the environment and the natural or artificial ecosystems. The biggest change on this average factor is pollution. Economic development, industrialization and increase in electricity production have as a consequence the increase of the used water volume and the modification of the physico-chemical indicators of the Jiu water.

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