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БИОЛОГИЧЕСКИ ФАКУЛТЕТ СОФИЙСКИ УНИВЕРСИТЕТ

RA N K I N G of priority pollutants in surface waters of Iskar River catchment as approach for optimization of pollution control

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INTRODUCTION

The determination of the ecological state and the assessment of the pollution in the surface water bodies of the Iskar river valley are of key social and economic importance due to the role of the hydroecosystem for the functioning of the technological water cycle of Sofia. The direct dependence of all elements in the cycle on water quality and the state of the ecosystem makes an adequate control of the degree of pollution and the risk of various pollutants extremely urgent. Prioritization/ranking of pollutants is an approach that facilitates the assessment process by providing information on the level of risk of the presence of each pollutant. In this approach, to the individual pollutants are given ranks/measures depending on the measured concentrations in water, taking into account the specific characteristics of the pollutant itself - ecotoxicological data, tendency for bioaccumulation and biomagnification.
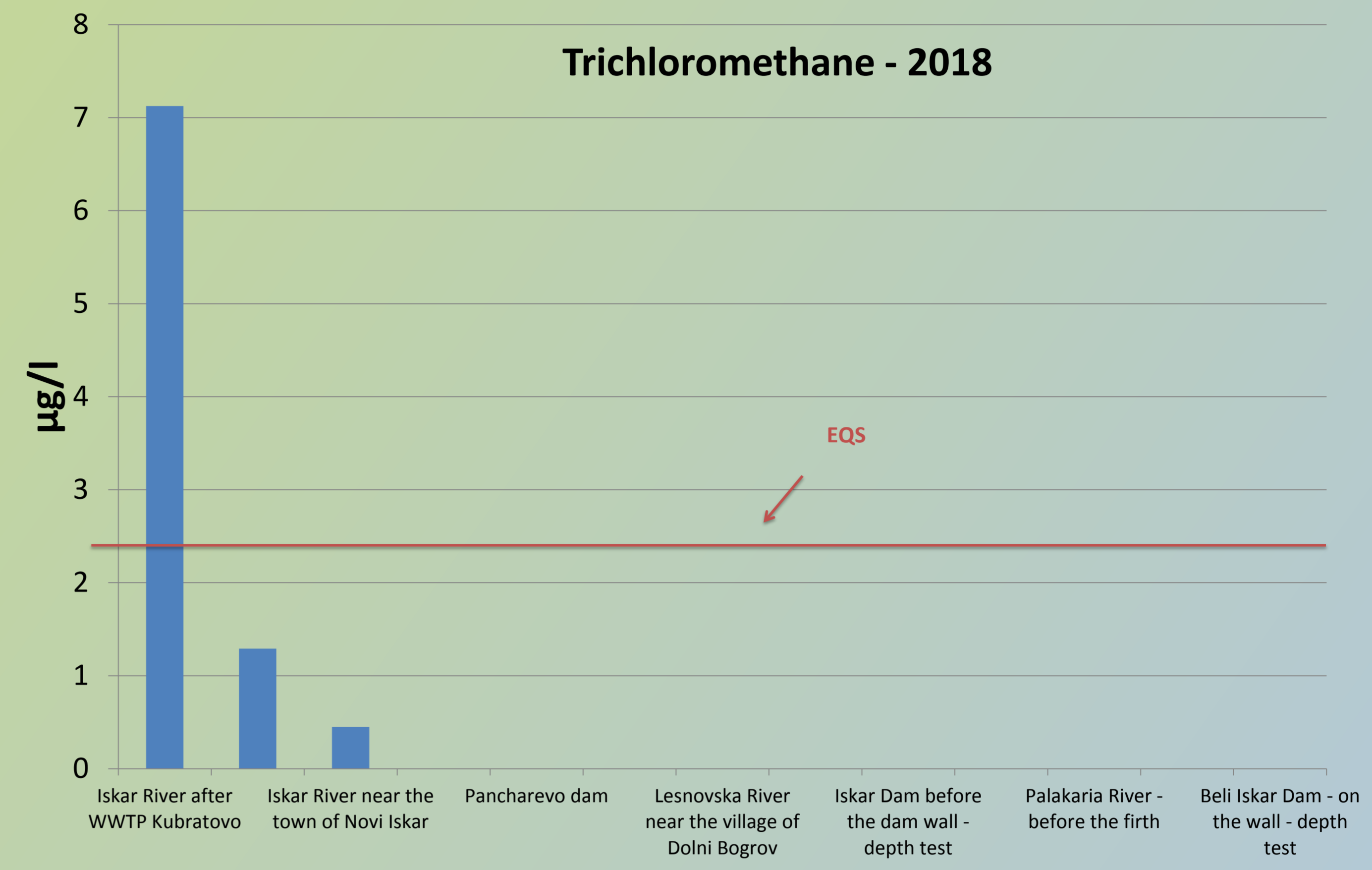
STUDY AREA

Fig. 1 Sampling sites along the Iskar River, included in the study

In the present study, a total of 13 points were selected, for which the data on the content of chemical pollutants in their surface waters were analyzed. The points were selected due to their direct importance for the functioning of the technological cycle of water in Sofia

RESULTS

For 2018 it is noticed that at almost all points of the upper reaches of Iskar the established EQS for lead are exceeded

Fig. 2 Content of priority pollutants in the Iskar valley - comparison of the annual average values with the environmental quality standards (EQS)

For 2018 it was established at three sampling sites, as in the one after WWTP Kubratovo, the concentration exceeds the EQS

Table 1. Ranking of pollutants and points according to the risk levels of the various priority pollutants for 2018.

Sites name 2018	Pb	Cd	Ni	Hg	Nonylphenols	Trichloro-methane
Iskar River after WWTP Kubratovo	0,00070	0	0,00044	0	0,00062	0,04750
Vladayska River near Kubratovo	0,00070	0	0,00053	0,00030	0	0,00861
Iskar River near the town of Novi Iskar	0,00070	0	0,00044	0,00036	0,00070	0,00300
Blato river at the firth, before flowing into the Iskar River	0,00070	0,00353	0,00029	0,00017	0	0
Pancharevo dam	0,00117	0	0,00022	0,00010	0	0
Kakach River / Bankenska / at the firth, before flowing into the Iskar River	0,00070	0	0,00022	0	0,00076	0
Lesnovska River near the village of Dolni Bogrov	0,00070	0	0,00022	0	0	0
Iskar dam	0,00063	0	0	0,00036	0	0
Iskar Dam before the dam wall - depth test	0,00049	0	0	0	0	0
Iskar River before Iskar Dam	0,00093	0	0,00022	0,00006	0	0
Palakaria River - before the firth	0,00082	0	0,00022	0,00009	0	0
Beli Iskar dam - on the wall	0,00140	0	0	0	0	0
Beli Iskar Dam - on the wall – depth sample	0,00140	0	0	0	0	0

The highest levels of risk in the Iskar valley are found for trichlormethane, lead and cadmium.
The highest values were registered for the organic pollutant, but with regard to lead there is a constant risk for all points.
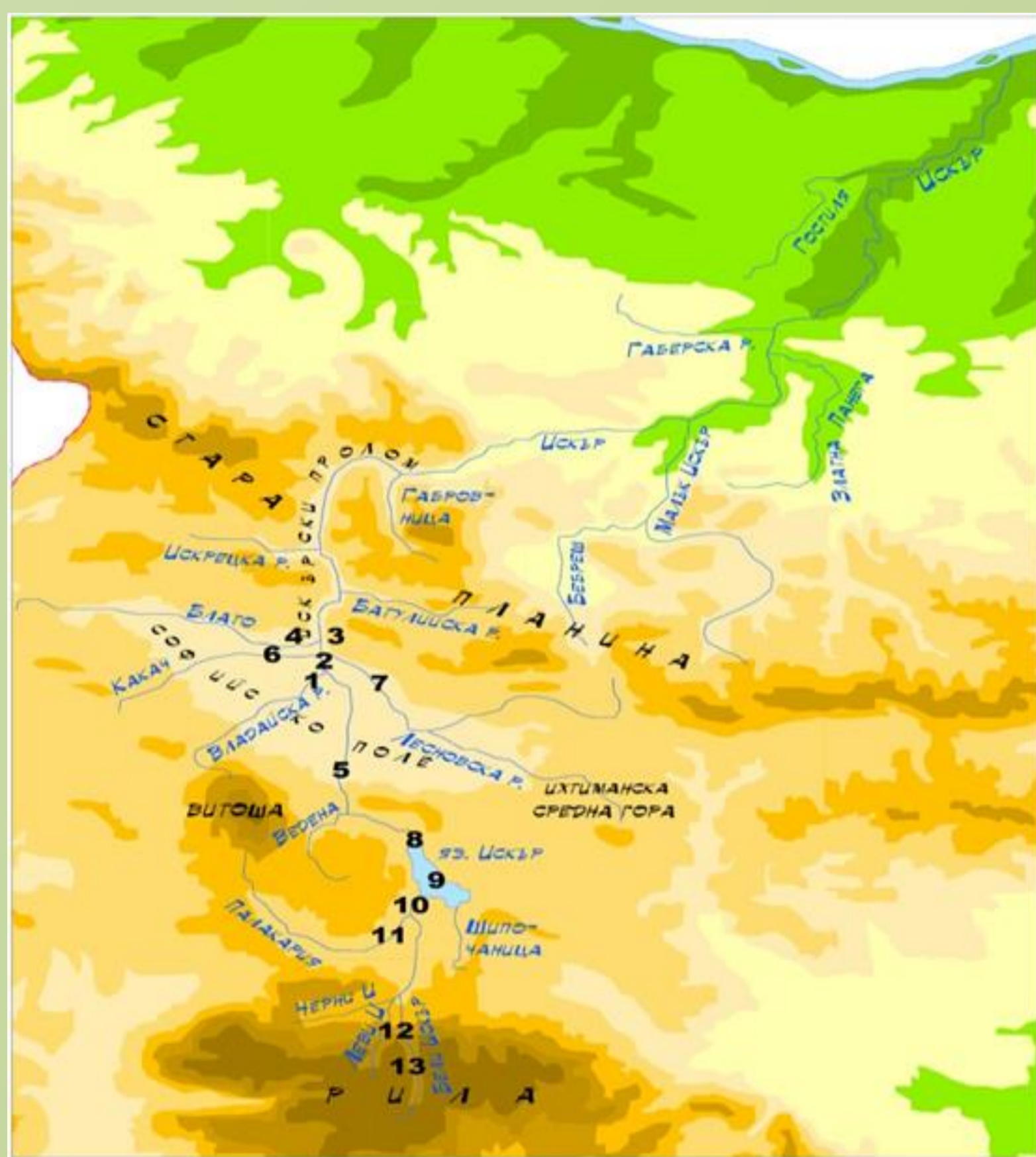
IN CONCLUSION

***In comparison with the environmental quality standards, an excess in terms of lead content was found in a number of points above and below Sofia.
***With regard to the organic pollutant trichlormethane, the EQS are not exceeded, except for a one-time exceedance in 2018 at the point after WWTP Kubratovo.
***The ranking of the priority pollutants defines as the pollutant with the highest level of risk, the trichlormethane at the point immediately after the discharge of the Kubratovo WWTP.
***However, at the catchment level, the identified levels of risk from the presence of lead in surface waters are the most significant and the lead content is the risk factor with the highest potential for damage to the ecosystem and human health.
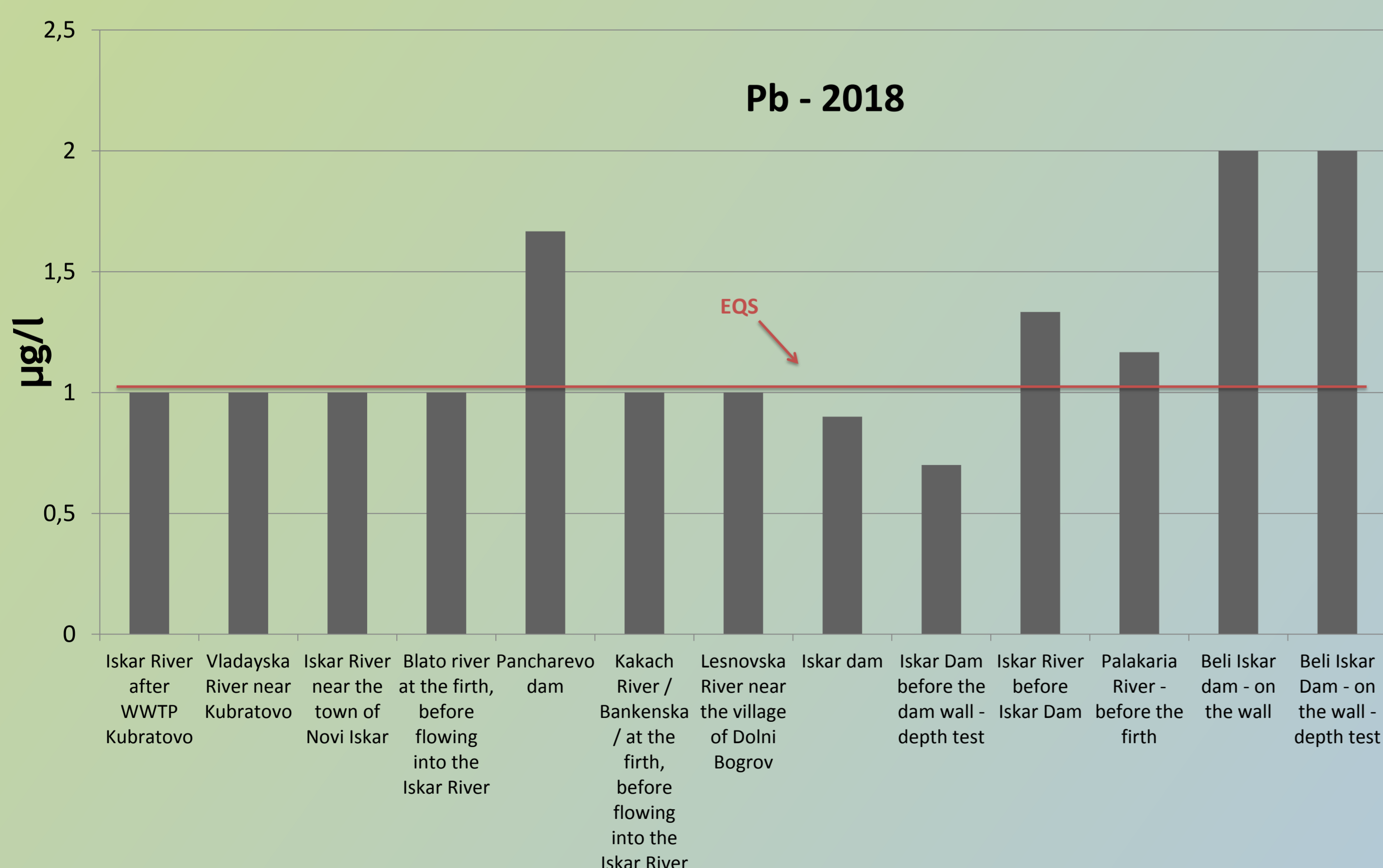
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