

Analysis of Concentration of Nutrients in Karašica River Surface Waters

Analiza koncentracije hranjivih tvari u površinskim vodama rijeke Karašice

Introduction

Karašica River (tributary of the Danube) is a 81 km long river located in Hungary and Croatia (Fig. 1), with catchment area of 910 km² [1]. Originating in Hungary (east of Pecs), it flows towards the south. It crosses the Hungarian-Croatian border near the village of Luč (Municipality of Petlovac, Osijek-Baranja County) and continues its flow in an eastward direction. Eventually, it flows into the Danube near Batina.

Since 1991, industrial pollution decreased notably throughout Croatia, so the aim of our study was to analyse Karašica River water quality parameters to determine whether water quality has changed because of it. For that purpose, concentration of nitrogen and phosphorus compounds in Karašica River surface waters was analysed.

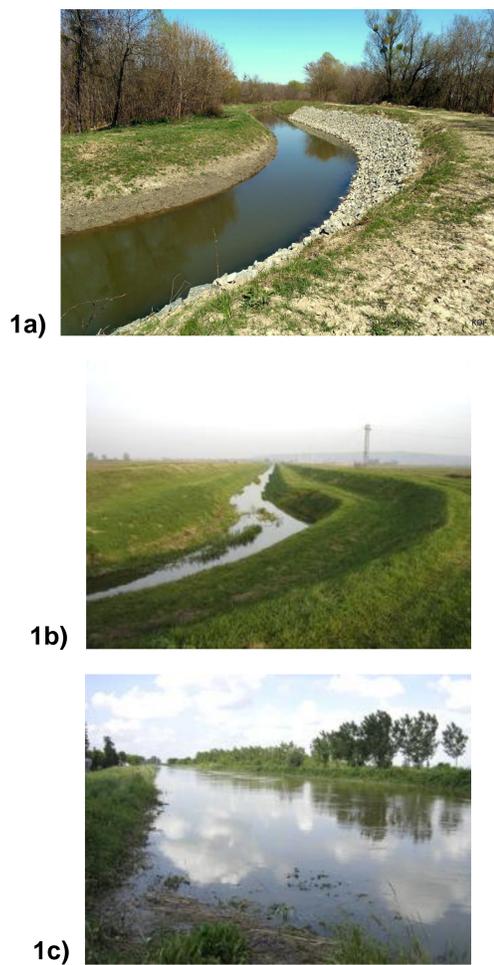


Figure 1. Karašica River: Hungarian part in 2016 (1a) [2], and Croatian Part at location Branjin Vrh in 2008 (1b) and in 2010 (1c) [3].

Methods

Samples were taken once a month over the period of five years (2014-2018, Hrvatske vode), and cover several locations along the river flow (Batina (21000), Branjin Vrh (21006), Draž (21217)). Analyzed chemical water quality parameters were concentration of nitrates, nitrites, total nitrogen, orthophosphates and total phosphorus (Fig. 2).

This is an area with developed food industry (agricultural production, viticulture, livestock farming, fishing) and also (until 1990-ties) some other types of industry.

References

- [1] B. Nadilo, *Građevinar* 66 (2014) 164.
- [2] <http://www.panoramio.com/photo/130433414>, 14/09/2020
- [3] <https://oaza-bm.hr/oaza>, 14/09/2020
- [4] Regulation on water quality, in Croatian. *Narodne novine* 2013/73.

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Results

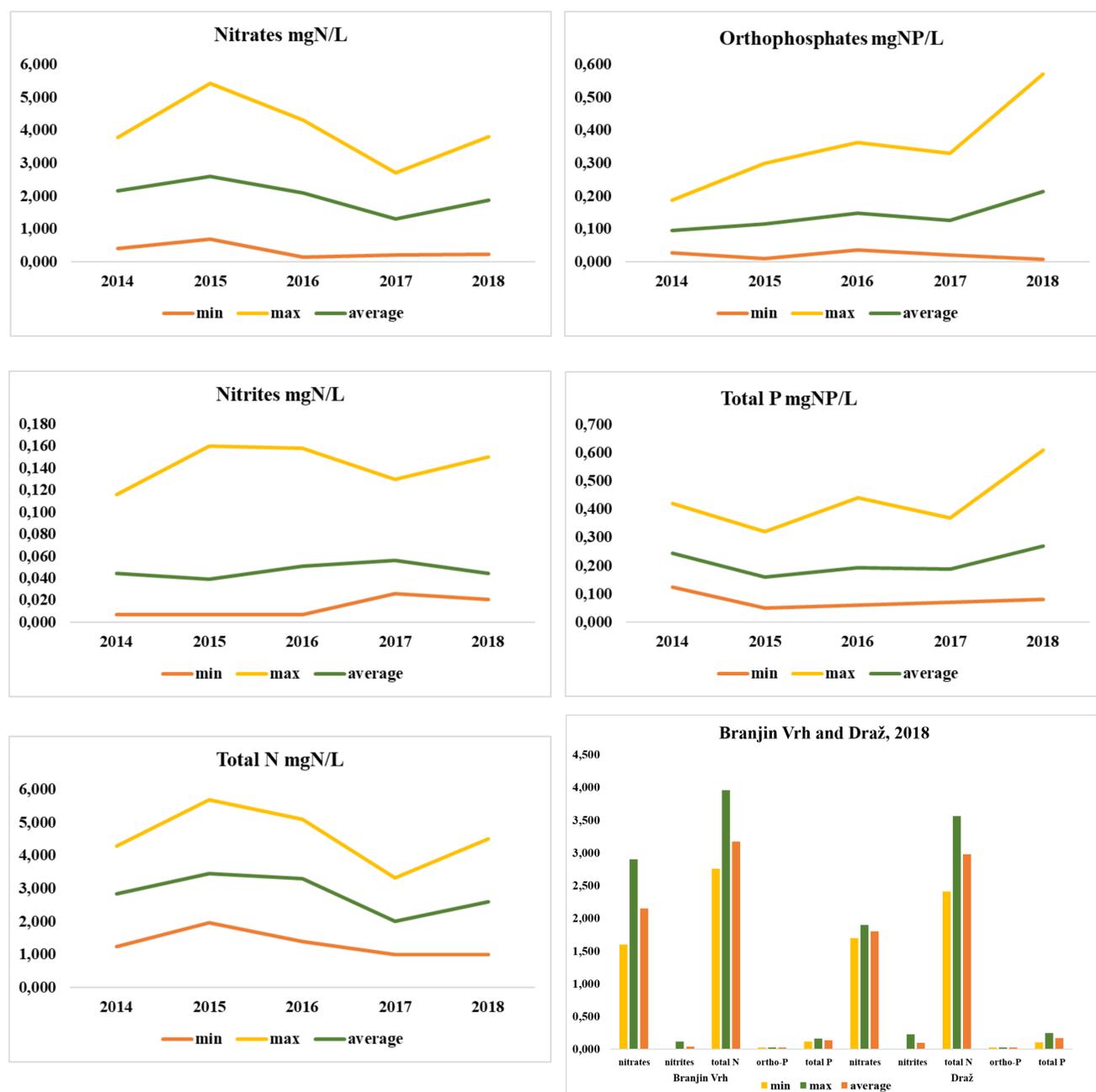


Figure 2. Minimum, maximum and average of annual concentration of nitrites, nitrates, total nitrogen, orthophosphates, and total phosphorus (expressed in mg/L) in Karašica River surface water.

Conclusions

During analysed period concentration of total nitrogen was within the range of 1.00–5.60 mg/L, concentration of nitrites was 0.007–0.16 mg/L, while concentration of nitrates was 0.15–5.42 mg/L, what is similar to the results obtained for the 2010-2015. period. Concentration of orthophosphates was within the range of 0.008–0.247 mg/L, and concentration of total phosphorus was 0.05–0.61 mg/L, what is higher compared to the previously analysed period.

Analysed nutrients show a decrease in value during 2016-2018, with lowest measured value of nitrites of 0.007 mg/L, nitrates 0.15 mg/L, total nitrogen 1.00 mg/L, orthophosphates 0.008 mg/L, and total phosphorus of 0.06 mg/L. According to current regulations in Croatia, based on chemical parameters surface water quality of Karašica River can be characterized as moderate. Further continuous monitoring of water quality is necessary in order to improve reliability of water quality categorization.