15th SYMPOSIUM WITH INTERNATIONAL PARTICIPATION
KOPAČKI RIT: PAST, PRESENT, FUTURE 2026

MONITORING KEMIJSKOG STANJA POVRŠINSKIH VODA U PARKU PRIRODE KOPAČKI RIT TIJEKOM 2025. GODINE
MONITORING THE CHEMICAL STATE OF SURFACE WATERS IN THE KOPAČKI RIT NATURE PARK DURING 2025

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Introduction

Chemical status is assessed in relation to chemical status indicators in accordance with the water environment quality standards prescribed by the Regulation on Water Quality Standards (OG No. 96/2019, 20/2023 and 50/23-corrigendum).
The chemical status of a surface water body is determined based on the average annual concentration (AAC) and maximum annual concentration (MAC) of the indicators of priority and other pollutants from Annex 5.B. to the mentioned Regulation.
A surface water body is classified based on the results of the assessment of quality elements into chemical status categories, namely a) good chemical status or b) good chemical status not achieved.

Study site

Kopački rit represents one of the largest and most preserved and pristine floodplains in Europe (Map 1). Location at the confluence of the Drava and the Danube and the specific flooding regime of the Danube, which forms a unique phenomenon – the inner delta, have enabled high biological diversity. The importance of preserving Kopački rit has been recognized at the national and international level.

Table 1. Set of parameters and sampling frequency during 2025

Set of parameters	Parameters	Sampling frequency
Physico-chemical	Salinity	9 times a year
Metals	cadmium	9 times a year
	lead	9 times a year
	nickel	9 times a year
	mercury	9 times a year
Pesticides	atrazine	9 times a year
	deethylatrazine	9 times a year
	S-metolachlor	9 times a year
	metolachlor OXA	9 times a year
	metolachlor ESA	9 times a year

Table 2. Assessment of chemical status regarding the tested metals at all monitoring locations, in accordance with the applicable Regulation on Water Quality Standards (Official Gazette Nos. 96/2019, 20/2023, and 50/23 – corrigendum).

2025		lead and lead compounds		mercury and mercury compounds		nickel and nickel compounds		cadmium and cadmium compounds		Assessment of chemical status regarding the tested metals
Water Environment Quality Standard (WEQS)		1,2 µg/l	14 µg/l	/	0,07 µg/l	4 µg/l	34 µg/l	0,25 µg/l	1,5 µg/l	
Sampling station		AAC	MAC	AAC	MAC	AAC	MAC	AAC	MAC	
1	**Kanal Čarna most**	0,39	0,63	0,34	0,91	1,03	3,81	<0,02	0,02	Good chemical status has not been achieved
2	**Crpna stanica Tikveš**	0,45	0,98	1,43	4,77	1,24	3,24	<0,02	0,038	Good chemical status has not been achieved
3	**Kanal Podunavlje most**	0,32	0,65	0,32	0,89	0,98	2,81	<0,02	<0,02	Good chemical status has not been achieved
4	**Crpna stanica Podunavlje**	0,33	0,80	2,76	13,60	1,75	5,32	<0,02	0,03	Good chemical status has not been achieved
5	**Dunav - ušće kanala Petreš u Dunav**	0,40	0,76	1,76	7,95	0,99	2,00	<0,02	0,032	Good chemical status has not been achieved
6	**Kopačko jezero**	0,41	0,77	1,64	3,57	1,63	2,44	0,11	0,73	Good chemical status has not been achieved
7	**Kanal Hulovo**	0,40	0,76	1,18	2,89	1,34	2,45	<0,02	0,03	Good chemical status has not been achieved
8	**Kanal Zlatna Greda**	0,44	0,86	0,56	1,35	1,97	4,00	<0,02	<0,02	Good chemical status has not been achieved
9	**Vemeljski Dunavac Tikveš - kompa**	0,33	0,69	0,52	1,25	1,34	2,77	<0,02	0,03	Good chemical status has not been achieved

Research goals

The main goal of this research is to evaluate the chemical status of surface water bodies in the area of Kopački rit Nature park through analysis of selected parameters.

According to the service specification, commissioned by Croatian Waters, from the list of priority substances and other pollutants for surface waters (Annex 5.A. to the Regulation), the following indicators were analysed: lead and lead compounds, mercury and mercury compounds, nickel and nickel compounds, cadmium and cadmium compounds, and atrazine. In addition to the above indicators, according to the project terms of reference, pesticides that are not listed in the currently valid Regulation were also analysed: desethyl atrazine, S-metolachlor, metolachlor ESA, metolachlor OXA, and salinity as the main physicochemical indicator (Table 1).

Materials and Methods

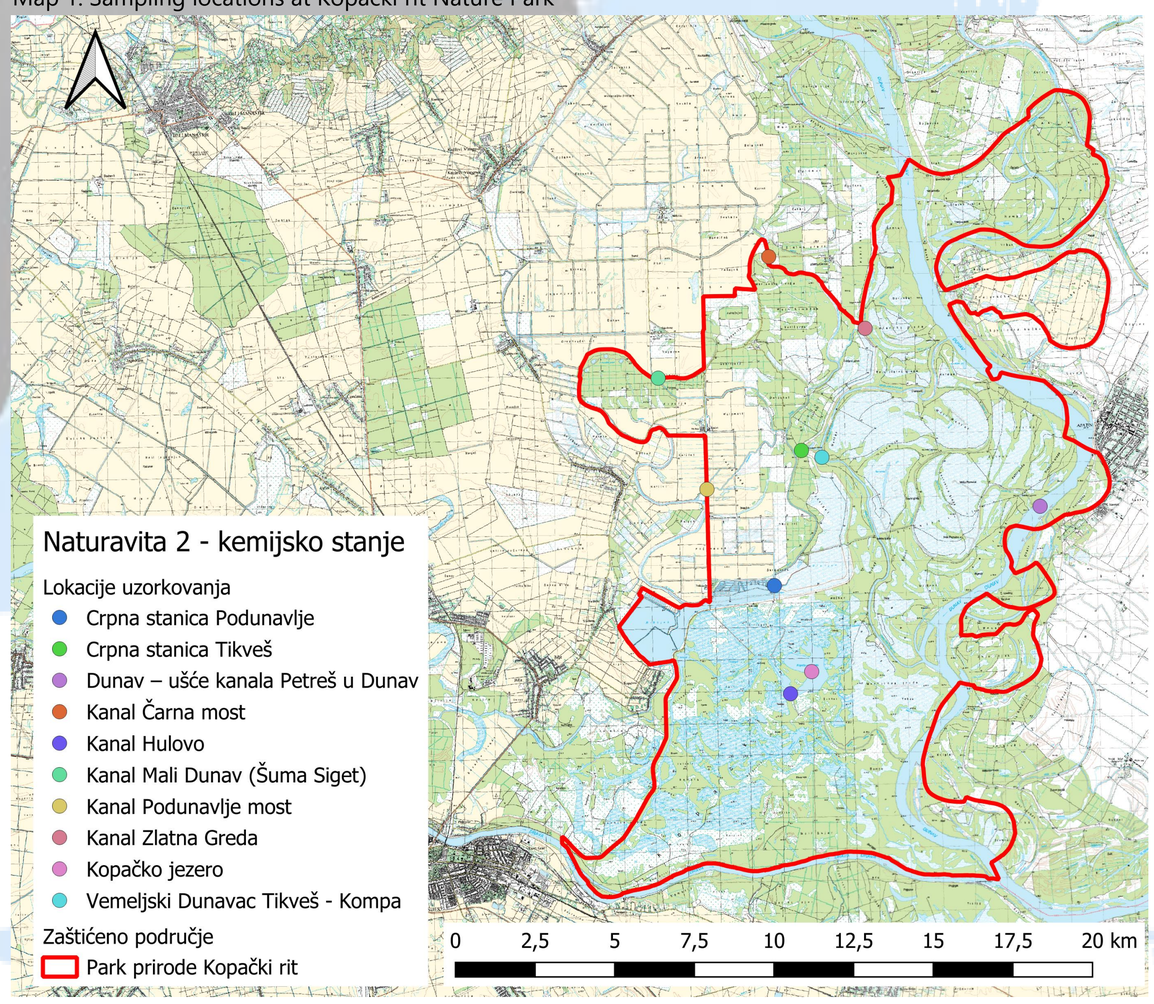
The research was conducted at a total of 10 locations in the Kopački rit Nature Park area through nine sampling cycles from April to December 2025 (Table 3). At all measuring stations, good chemical status was achieved with regard to the indicators lead and its compounds, nickel and its compounds, and cadmium and its compounds.

With regard to mercury and its compounds, good chemical status was not achieved at any measuring station. AAC for mercury ranged from 0.32 µg/l (Canal Podunavlje bridge) to 2.76 µg/l (Pump station Podunavlje), and MAC from 0.89 µg/l (Canal Podunavlje bridge) to 13.6 µg/l (Pump station Podunavlje). Regarding the atrazine parameter, a good chemical condition was achieved at all measuring stations.

Table 3. Sampling calendar

Sampling station	1st sampling	2nd sampling	3rd sampling	4th sampling	5th sampling	6th sampling	7th sampling	8th sampling	9th sampling
	April	May	June	July	August	September	October	November	December
Kanal Čarna most	29.4.2025.	23.5.2025.	17.6.2025.	18.7.2025.	22.08.2025.	19.9.2025.	17.10.2025.	20.11.2025.	12.12.2025.
Crpna stanica Tikveš	29.4.2025.	23.5.2025.	17.6.2025.	18.7.2025.	22.08.2025.	19.9.2025.	17.10.2025.	20.11.2025.	12.12.2025.
Kanal Podunavlje most	29.4.2025.	23.5.2025.	17.6.2025.	18.7.2025.	22.08.2025.	19.9.2025.	17.10.2025.	20.11.2025.	12.12.2025.
Crpna stanica Podunavlje	29.4.2025.	23.5.2025.	17.6.2025.	18.7.2025.	22.08.2025.	19.9.2025.	17.10.2025.	20.11.2025.	12.12.2025.
Dunav - ušće Petreškog kanala u Dunav	30.4.2025.	21.5.2025.	18.6.2025.	16.7.2025.	20.8.2025.	17.9.2025.	15.10.2025.	19.11.2025.	19.12.2025.
Kopačko jezero	29.4.2025.	22.5.2025.	18.6.2025.	17.7.2025.	21.8.2025.	18.9.2025.	16.10.2025.	not sampled – low water level	17.12.2025.
Kanal Hulovo	29.4.2025.	22.5.2025.	18.6.2025.	17.7.2025.	21.8.2025.	18.9.2025.	16.10.2025.	not sampled – low water level	17.12.2025.
Kanal Mali Dunav (šuma Siget)	29.4.2025.	23.5.2025.	17.6.2025.	18.7.2025.	22.08.2025.	19.9.2025.	17.10.2025.	20.11.2025.	12.12.2025.
Kanal Zlatna Greda	29.4.2025.	23.5.2025.	17.6.2025.	18.7.2025.	22.08.2025.	19.9.2025.	17.10.2025.	20.11.2025.	12.12.2025.
Vemeljski Dunavac Tikveš- Kompa	29.4.2025.	23.5.2025.	17.6.2025.	18.7.2025.	22.08.2025.	19.9.2025.	17.10.2025.	20.11.2025.	12.12.2025.

Map 1. Sampling locations at Kopački rit Nature Park



Results and Conclusion

In conclusion, at none of the stations where the heavy metals were tested, a good chemical status was not achieved due to the elevated concentration of mercury and its compounds (Table 3). It is necessary to continue to monitor the chemical status in order to determine the multi-year dynamics and the presence of targeted parameters, especially negative trends in the concentration of mercury in the environment.

References

- Regulation on Water Quality Standards (OG No. 96/2019, 20/2023 and 50/23-corrigendum)
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy