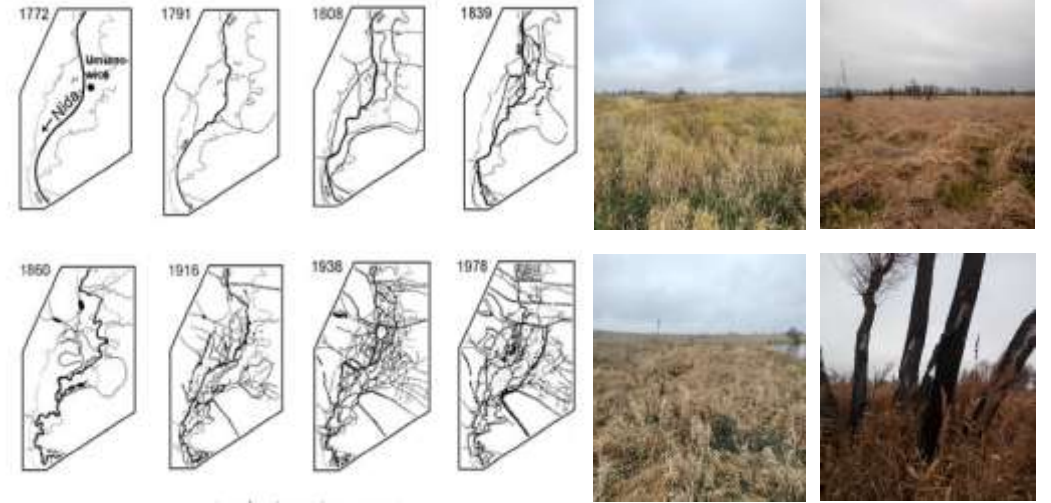
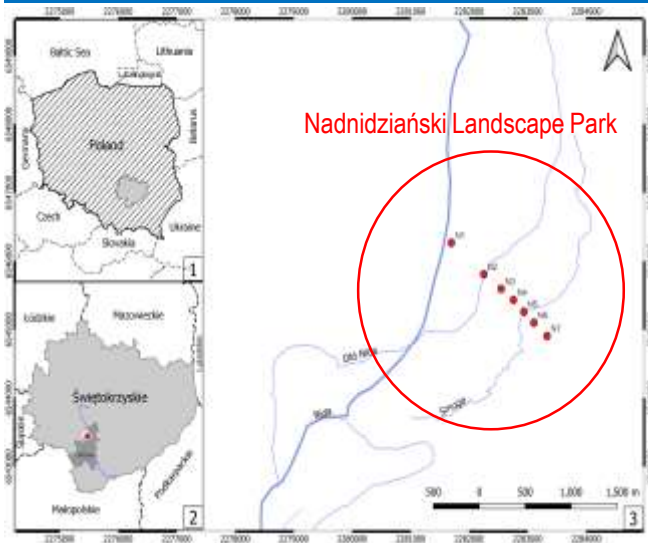


# Monthly changes in physicochemical parameters of the groundwater in Nida valley, Poland

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## Introduction



## Materials and methods

A total of 84 water samples were collected at 7 sampling sites during 12 months period from June 2021 to May 2022. Sampling frequency was once per month.

Physical parameters: temperature, dissolved oxygen (DO), electric conductivity (EC), pH, total dissolved solids (TDS)

Chemical parameters: total nitrogen (TN), total phosphorus (TP), chloride (Cl<sup>-</sup>), sulfate (SO<sub>4</sub><sup>2-</sup>), manganese (Mn), iron (Fe), zinc (Zn), cadmium (Cd), lead (Pb), copper (Cu) and chemical oxygen demand (COD)

	Objectives	Data and statistical analysis	Results
1	Assessment of groundwater quality	Comparison with regulations of MMEIN 2019 (Ministry of Marine Economy and Inland Navigation)	High values Mn, Fe were found over regulation
2	Assessment of changes in physicochemical properties of groundwater	Shapiro-Wilk test ( $\alpha = 0.05$ ), ANOVA test and Post-hoc Tukey test, Kruskal-Wallis test and Wilcoxon (Mann Whitney) test ( $\alpha = 0.05$ )	The significant difference between months for temperature, DO, pH, TN, TP, Cl <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , Zn, Cd and COD
3	Evaluation of relationship between physicochemical parameters of groundwater	Pearson correlation analysis ( $\alpha = 0.01$ and $0.05$ )	A very strong correlation was found between TN and Cl <sup>-</sup> , Mn and temperature, Mn and DO, Fe and pH, temperature and DO
4	Evaluation of relationship between sampling months through physicochemical parameters	Principal component analysis (PCA)	A strong dissimilarity between January and November, June and September, January and December and strong similarity between June, July and August

THANK YOU FOR YOUR ATTENTION!