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CONTAMINATED SITES 2022

SENEC, SLOVAK REPUBLIC, 12 – 14 OCTOBER 2022

*The activity has been implemented within the framework of national project
Information and providing advice on improving the quality of environment in Slovakia.
The project is cofinanced by Cohesion Fund of the EU under Operational programme Quality of Environment.*

Use of Information Systems and Survey Results of Contaminated Areas for the Purpose of Risk Assessment and Groundwater Status within the Meaning of the Water Framework Directive

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Contaminated sites within the Water Framework Directive

- Directive 2000/60/EC of the European Parliament and of the Council (Water Framework Directive - WFD) requires to identify the pressures to which the groundwater bodies are liable to be subject:
 - diffuse sources of pollution
 - point sources of pollution
- Each identified source of pollution (location where the pollutant is disposed of) poses a potential risk of groundwater contamination.
- WFD requires the adoption of specific measures to prevent and limit groundwater pollution.
- Characterization of the sources of pollution, the assessment of chemical status and the risk of not achieving environmental objectives are also required.
- River Basin Management Plan



Databases in Slovakia

- Databases of potential point sources of pollution relevant to groundwater

Database		Organisation	Legislation
PRTR	Slovak Pollutant Release and Transfer Register	SHMI	Regulation (EC) No 166/2006
IPPC	Information System of Integrated Pollution Prevention and Control	SEA	Directive 2010/75/EU
MAPP	Information System of Major-Accidents Prevention Policy	SEA	Directive 2012/18/EU (Seveso III)
	Information System of Prevention and Remedying of Environmental Damage	SEA	Directive 2004/35/CE
IMPS	Integrated monitoring of pollution sources	WRI	Directive 2000/60/EC (WFD)
POPs	Register of Locations with Possible Occurrence of Persistent Organic Pollutants	SEA	Regulation (EC) No 850/2004
EWM	Information System on Extractive Waste Management	SEA	Directive 2006/21/EC
IS CS	Information System of Contaminated Sites	SEA	
CWR	Central Water Register	SHMI	
	Old Mining Works and Recent Mining Works	SGIDŠ	
	Special Water Deterioration	SEI	
	Register of Landfills	SGIDŠ	
	Regional Waste Information System	SEA	
	List of Landfills (ME SR)	ME SR	
	Database of Wastewater Treatment Plants (WRI)	WRI	

SHMI – Slovak Hydrometeorological Institute, SEA – Slovak Environment Agency, SEI – Slovak Environmental Inspectorate, SGIDŠ – State Geological Institute of Dionýz Štúr, WRI – Water Research Institute



Databases in Slovakia

- Databases of potential point sources of pollution relevant to groundwater

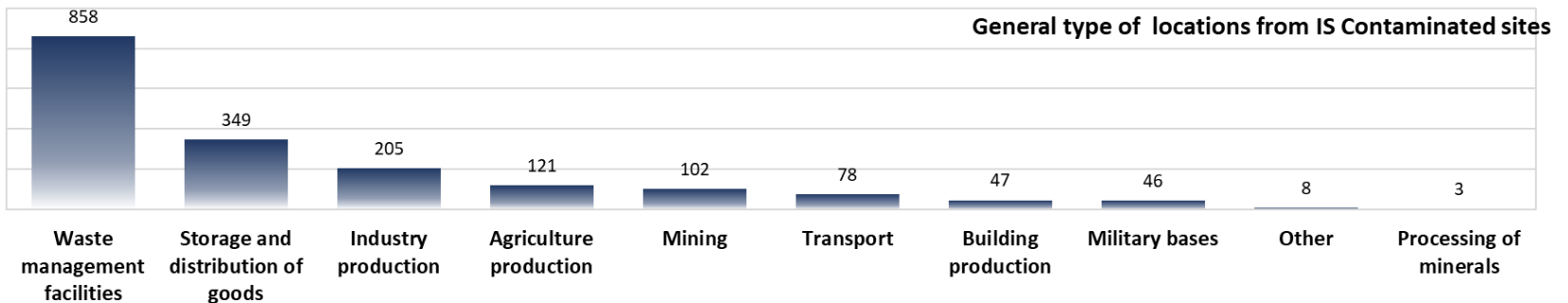
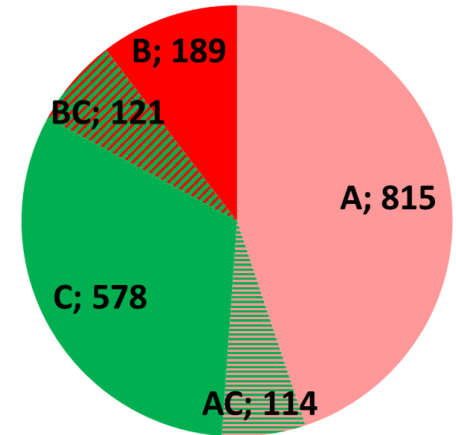
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Register of Contaminated Sites

- Information System of Contaminated Sites (IS CS)
- Slovak Environmental Agency
- November 2020 - 1817 locations divided into 3 parts:
 - Register part A - potential contaminated sites - 929
 - Register part B - (confirmed) contaminated sites - 310
 - Register part C - remediated and reclaimed sites - 813
- Municipal and industrial waste landfills
- Common contaminants in sites with very high potential impact on GW quality: non-polar extractable substances, chlorinated aliphatic hydrocarbons, metals (e. g. As, Cd, Sb)



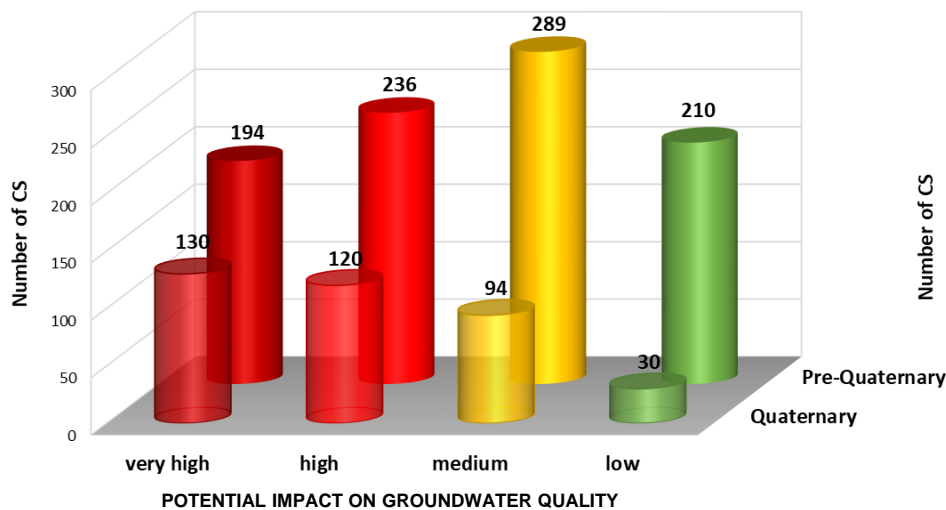
Assessment of Potential Impact of Contaminated Sites on Groundwater Quality

- Risk of spreading a contaminant into and via the groundwater (GW) – K1
- Groundwater vulnerability ~ geological and hydrogeological conditions, depth to GW, GW regime

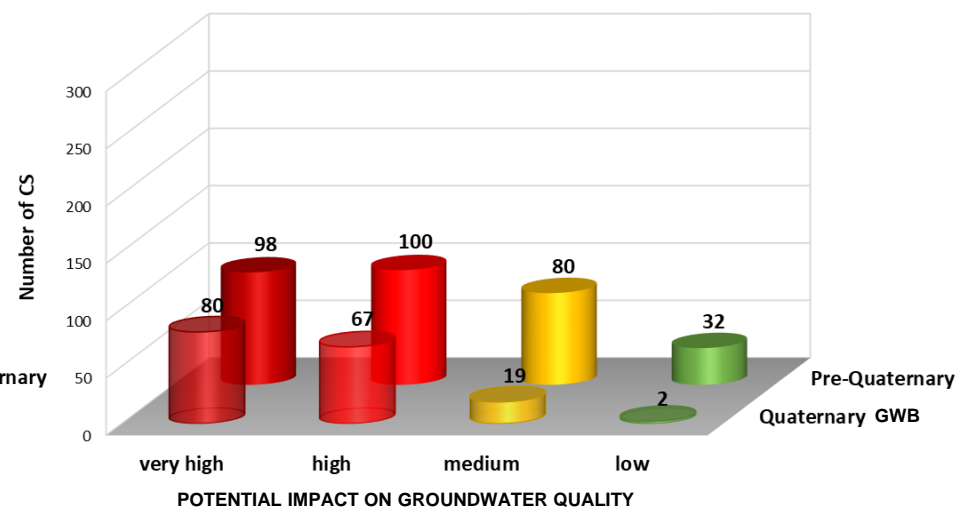
Risk of contamination K1	Groundwater vulnerability (natural protection)		
	1 - good	2 - moderate	3 - none or very low
1 - ($K1 < 20$)	2	3	4
2 - ($20 \leq K1 \leq 29$)	3	4	5
3 - ($30 \leq K1 \leq 39$)	4	5	6
4 - ($K1 \geq 40$)	5	6	7

Potential impact on groundwater quality	
2 - 3	low
4	medium
5	high
6 - 7	very high

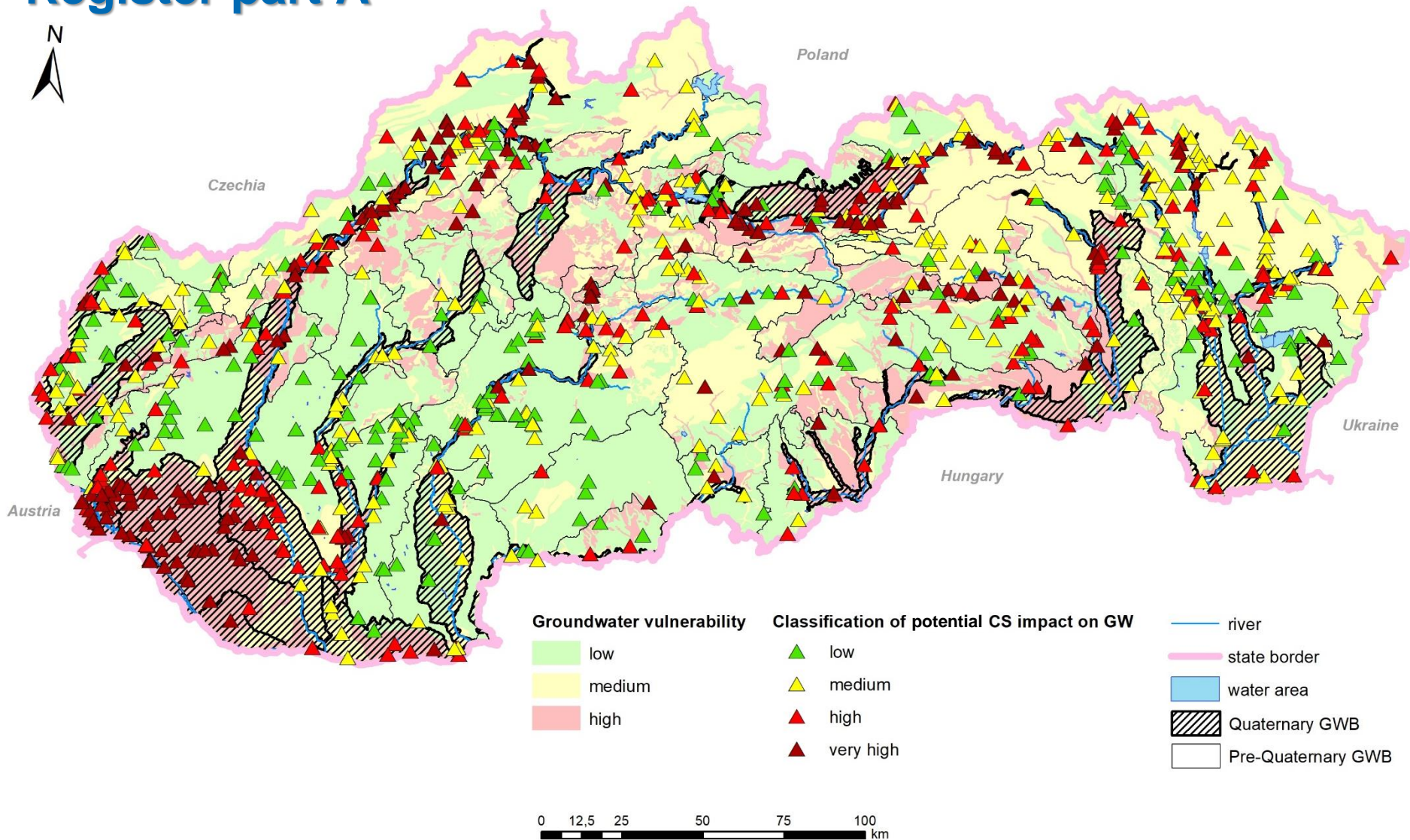
Potential contaminated sites



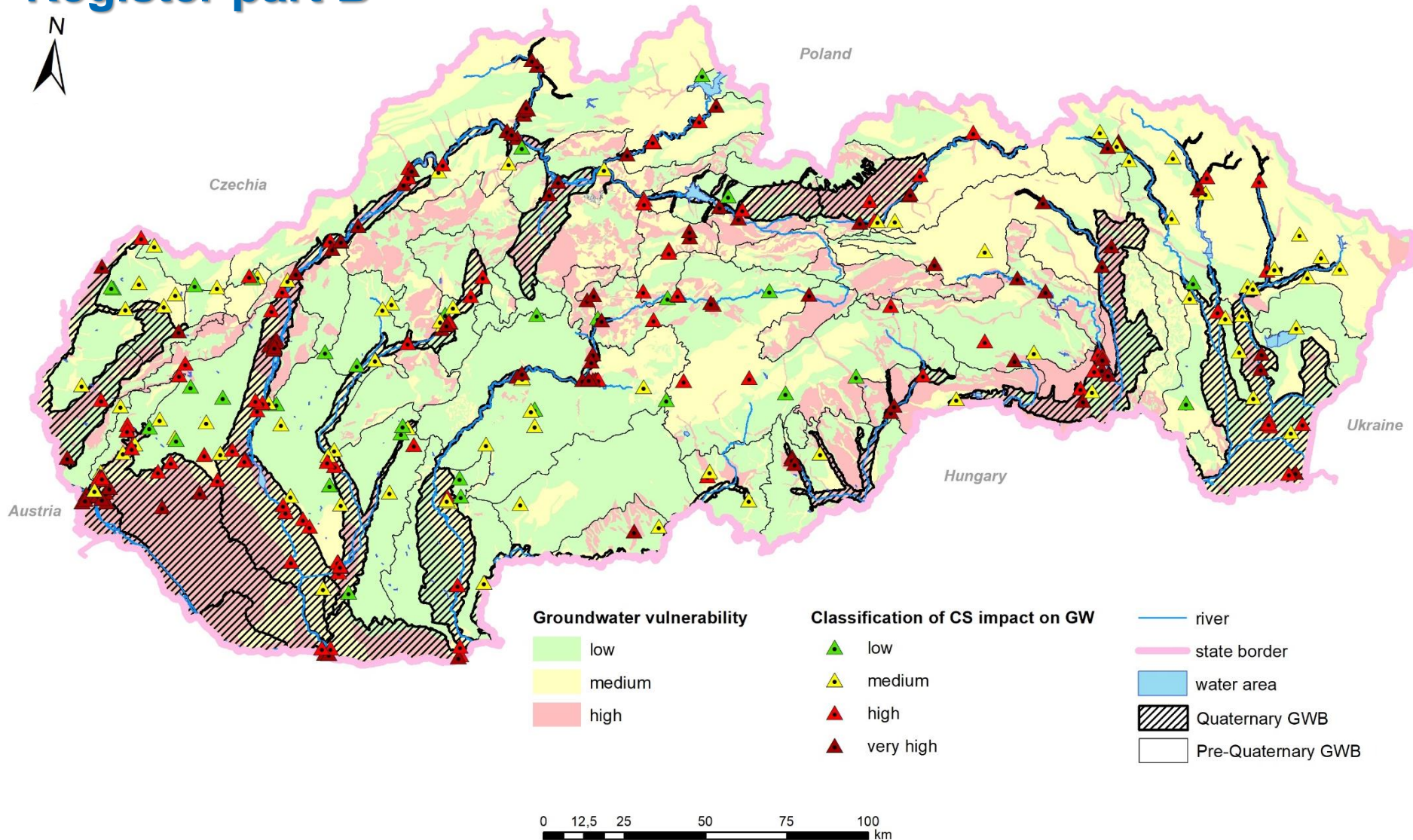
Contaminated sites



Localities with Potential Contaminated Sites – Register part A



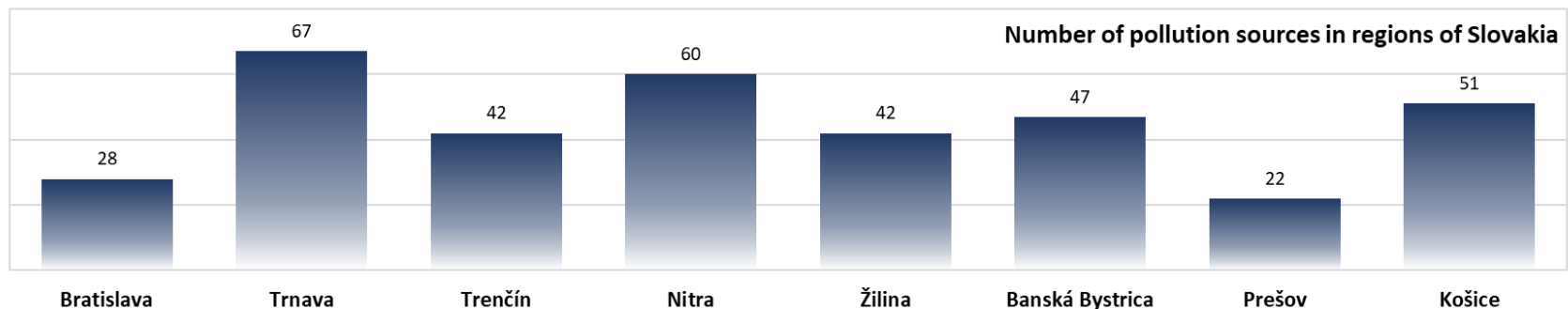
Localities with Contaminated Sites – Register part B



Database of Integrated Monitoring of Pollution Sources



- Water Research Institute
- Interconnected with Register of Contaminated Sites
- Obligation to monitor the impact on groundwater
- Voluntariness to report the monitoring results to the database
- June 2022 – data from 2 322 monitoring objects from 359 localities of 159 owners
- industrial enterprises, waste dumps, tailing ponds, old environmental burdens, ect.
- Common contaminants in pollution sources with very high potential impact on GW quality - nitrogen compounds, metals or polycyclic aromatic hydrocarbons

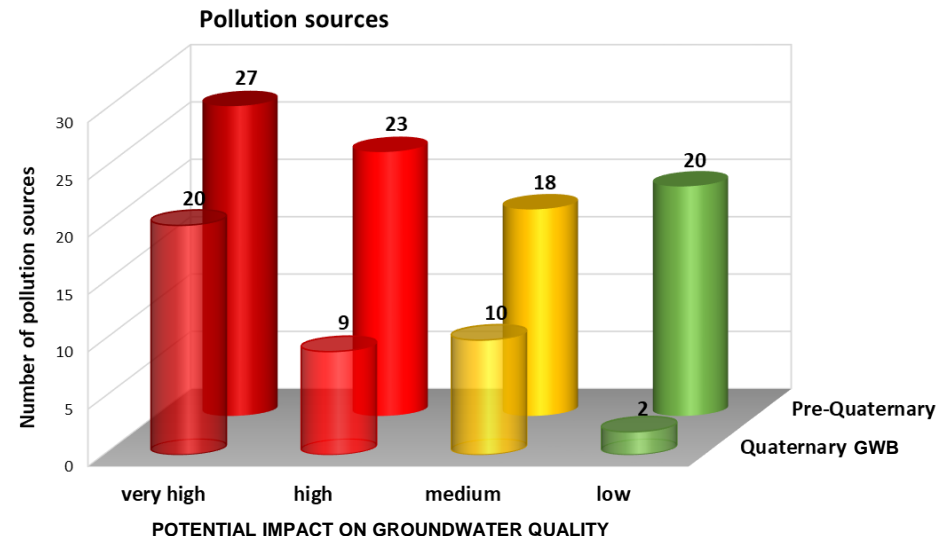


Assessment of Potential Impact of Pollution Sources on Groundwater Quality

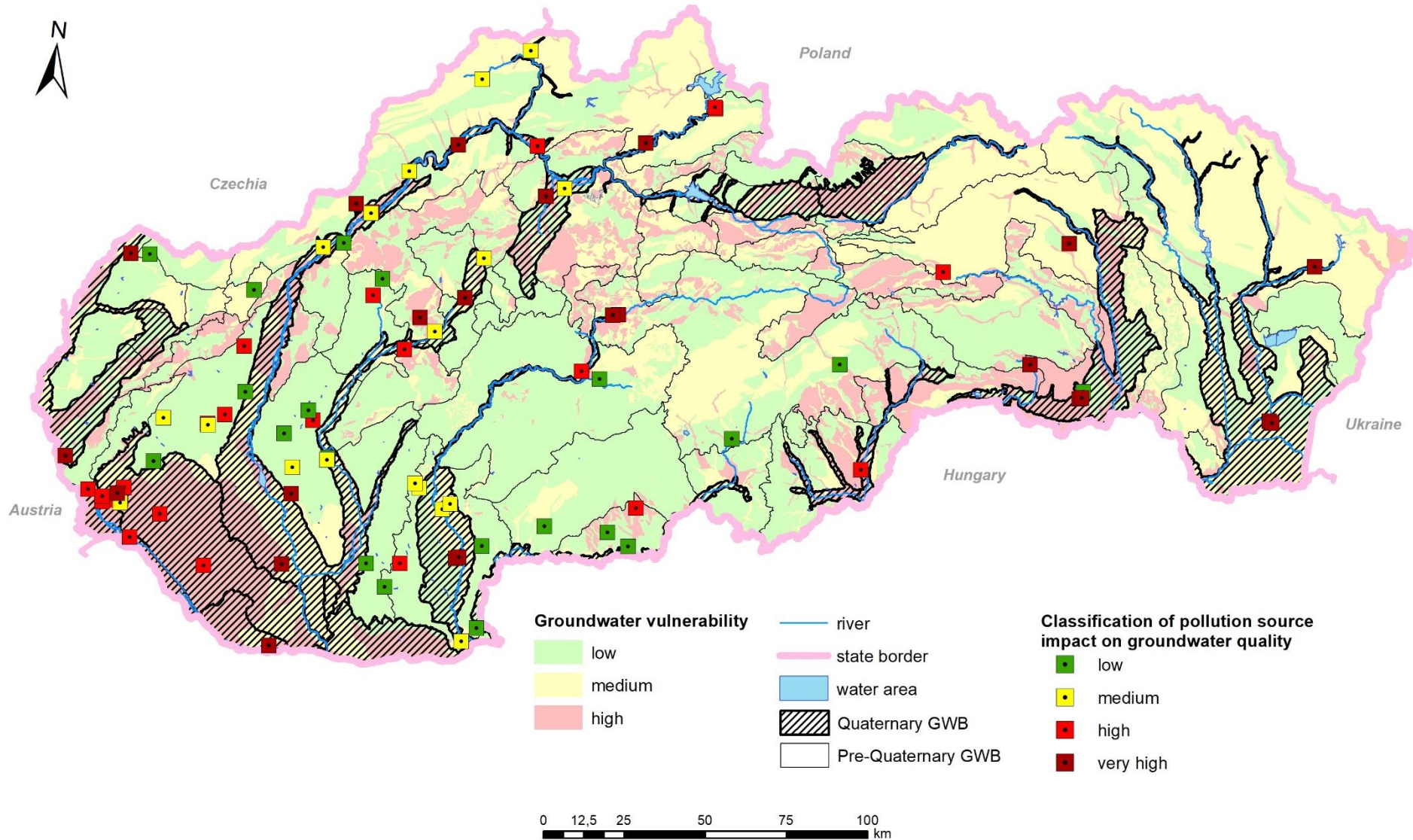
- Risk of spreading a contamination into the groundwater – RK
 - Comparison of the average concentration of the contaminant (2007 - 2018) to limits
 - Evolution of the contaminant concentration in time
 - Expert assessment

Risk of contamination RK	Groundwater vulnerability (natural protection)			Potential impact on groundwater quality	
	1 - good	2 - moderate	3 - none or very low		
1	2	3	4	2 - 3	low
2	3	4	5	4	medium
3	4	5	6	5	high
4	5	6	7	6 - 7	very high

- Limits
 - Quality standard for groundwater
Directive 2006/118/EC
 - Threshold values
Government Regulation No. 282/2010
 - Indication and intervention criteria
Directive of ME SR No. 1/2015-7

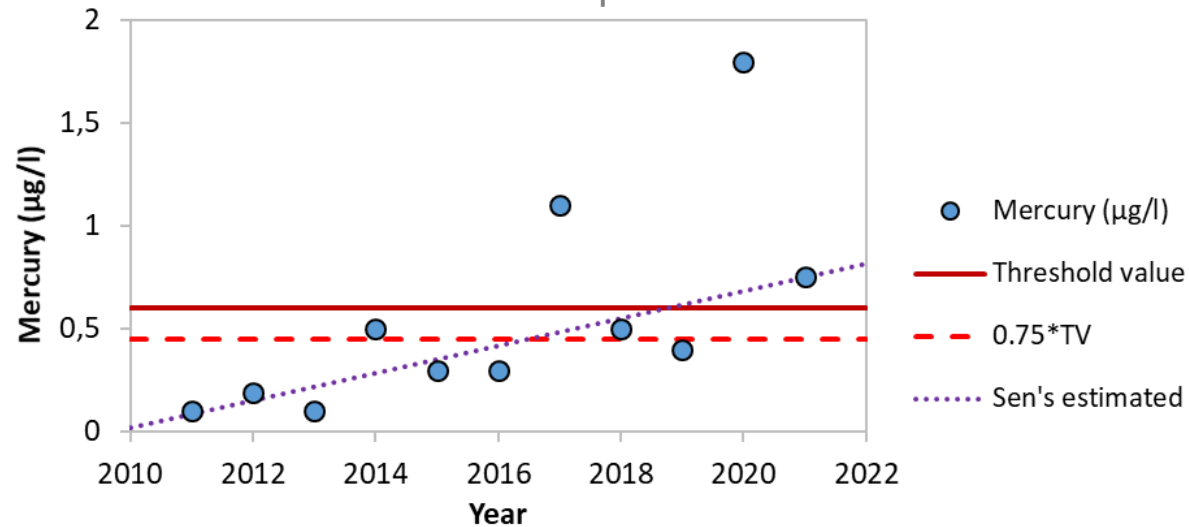


Pollution Sources from databases of IMPS

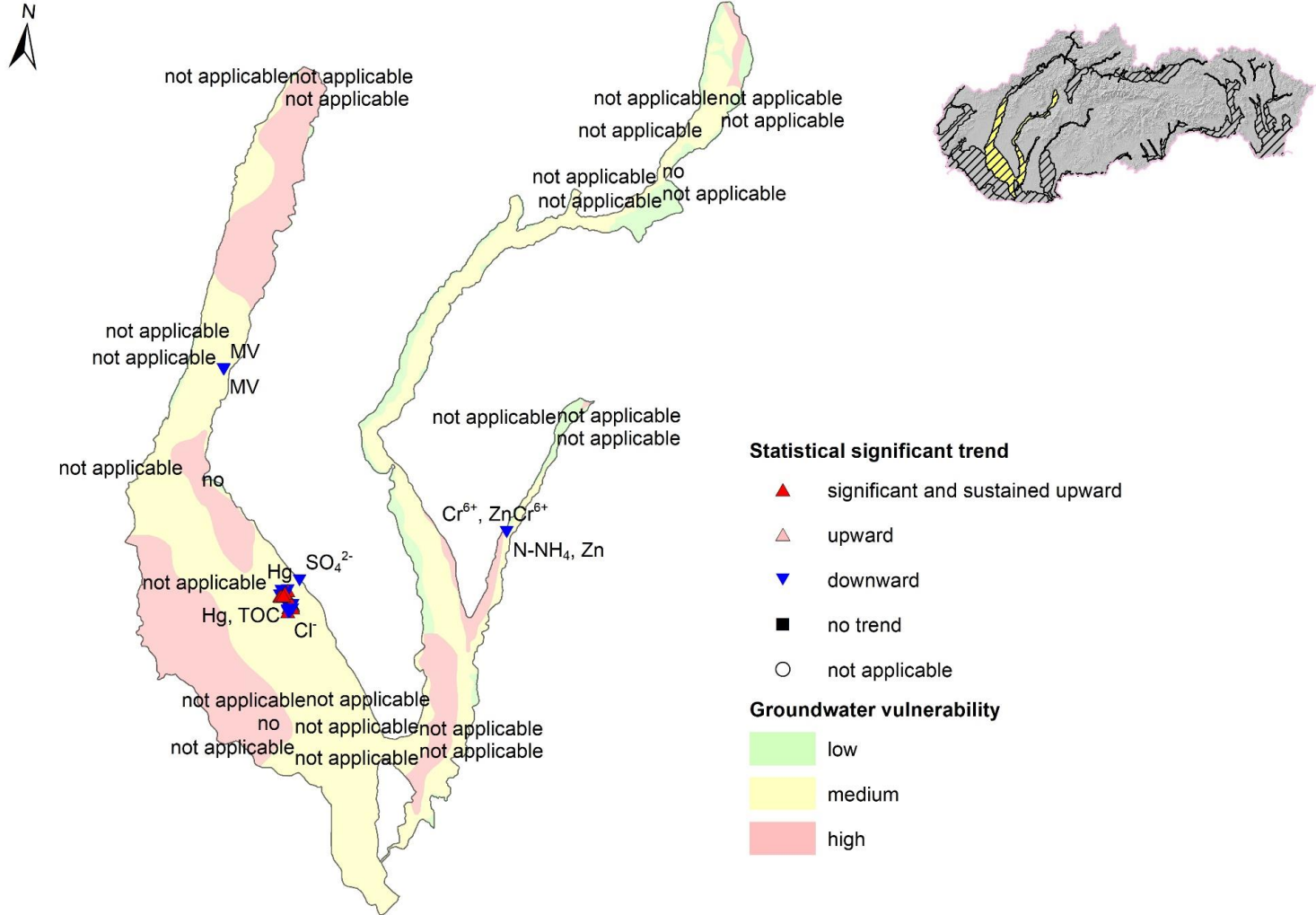


Trend Assessment in pollution sources

- Next cycle of River Basin Management Plan
- Time range: 2011 - 2022
- Time series: average year concentration of contaminant
- Mann-Kendall test and linear regression test
- Criteria for time series:
 - Minimal length of time series - 6 years
 - Last value in time series from the year 2020
 - Gap in the time series must not exceed 1 year
 - Percentage of censored data below limit of quantification must not exceed 50%

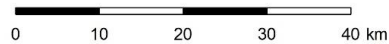


Trend Assessment in pollution sources



Zdroj administratívnych hraníc ZBGIS[®], Úrad geodézie, kartografie a katastra Slovenskej republiky

Spracoval Výskumný ústav vodného hospodárstva, 2020
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Summary

- The Assessment of potential impact of point sources of pollution on groundwater quality was made from [Information system of contaminated sites](#) and database of [Integrated monitoring of pollution sources](#)
- Point sources of pollution did not cause the groundwater quality deterioration of groundwater bodies as a whole, but rather only local contamination of groundwater
- Measures to prevent and limit groundwater pollution from contaminated sites:
- Remediation in accordance with State Remediation Program of Contaminated Sites (SRPCS)
- Research and monitoring of priority contaminated sites in accordance with SRPCS
- Elaborate risk analysis of priority contaminated sites



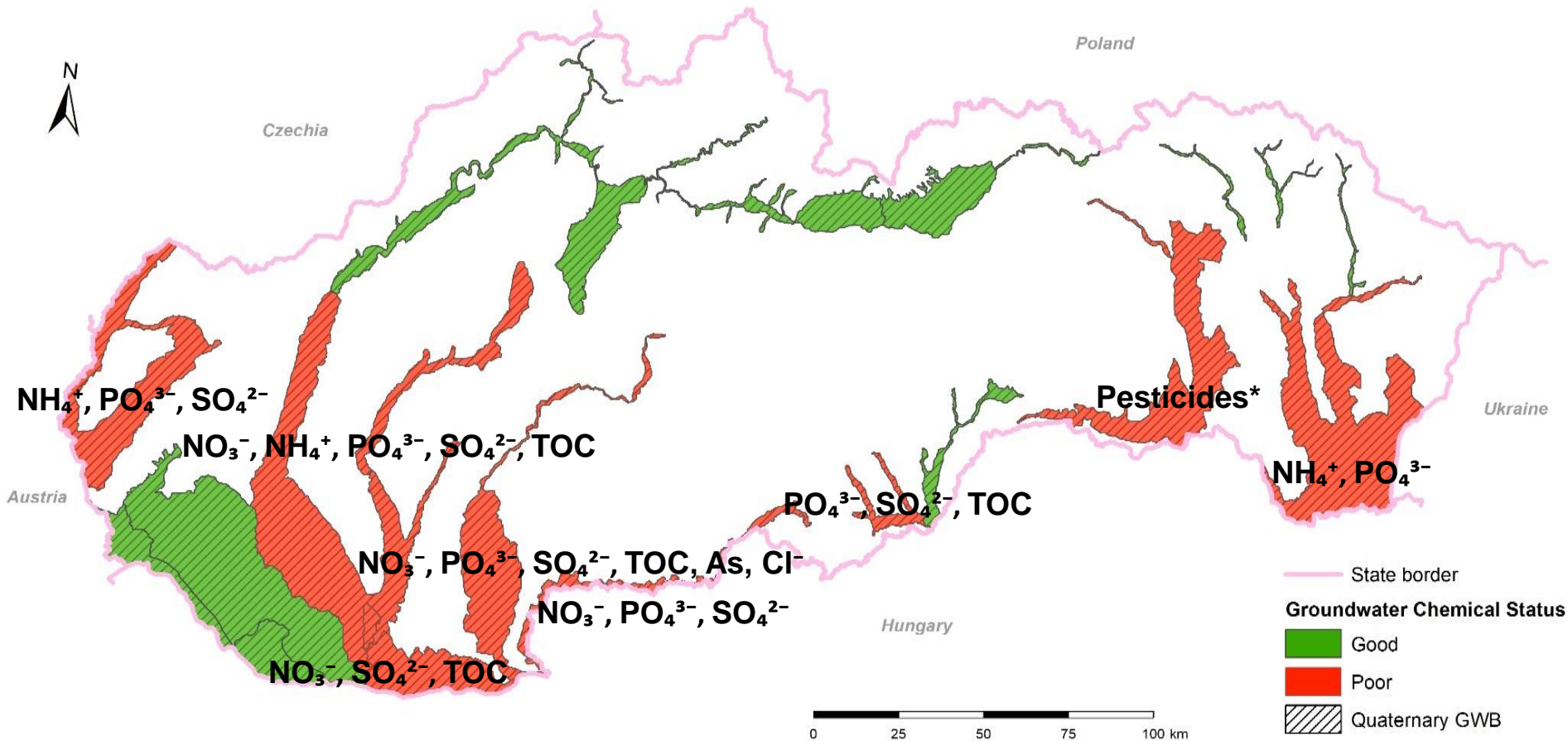


Thank you for your attention

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Chemical Status of Quaternary Groundwater Bodies



* atrazine, desethylatrazine, metazachlor, alachlor ESA

Chemical Status of Pre-Quaternary Groundwater Bodies

