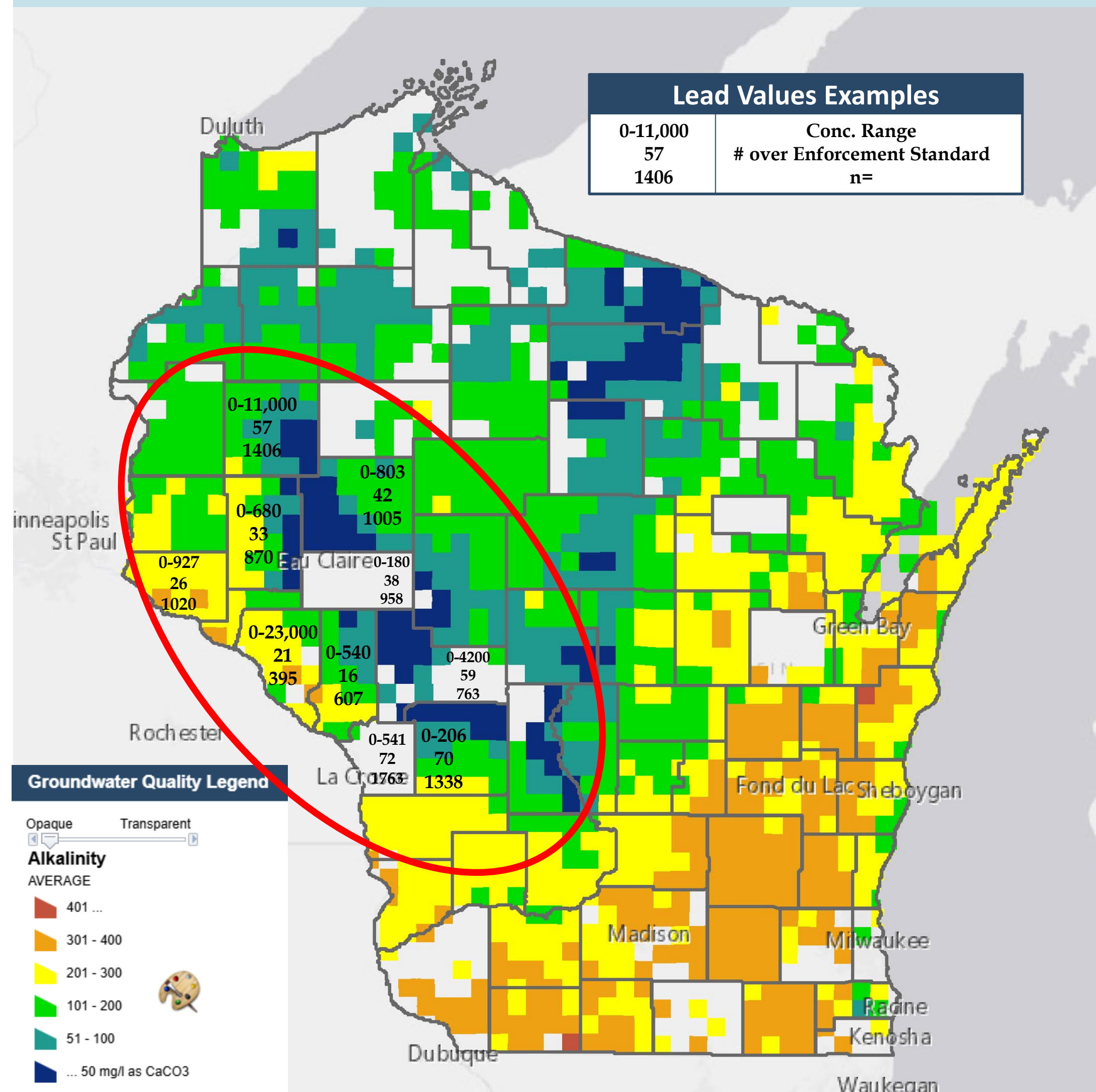


Metals in Western Wisconsin Aquifers: A Topic of Emerging Concern

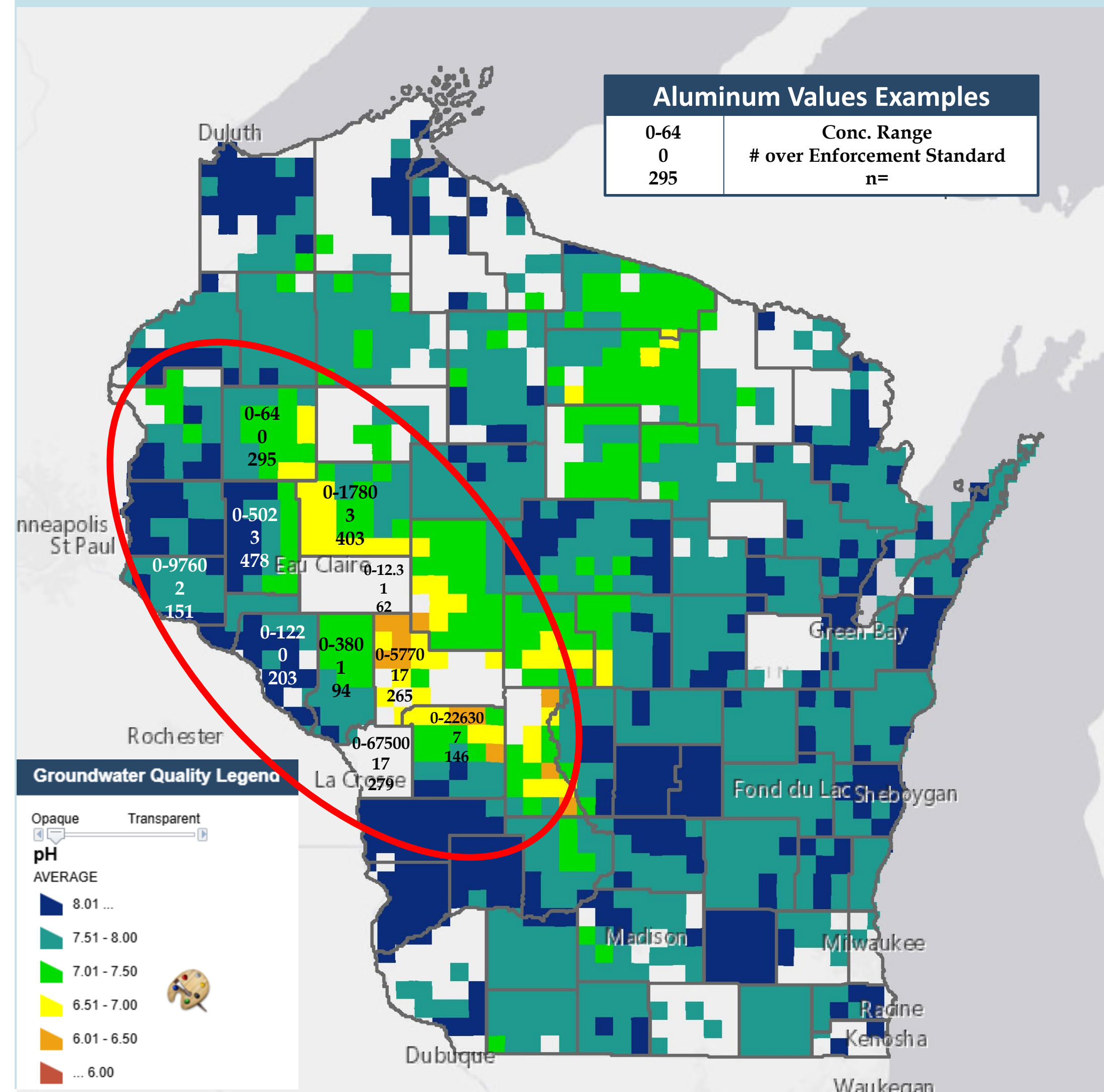


Dave Johnson and Ian Anderson

Alkalinity and Lead in Groundwater

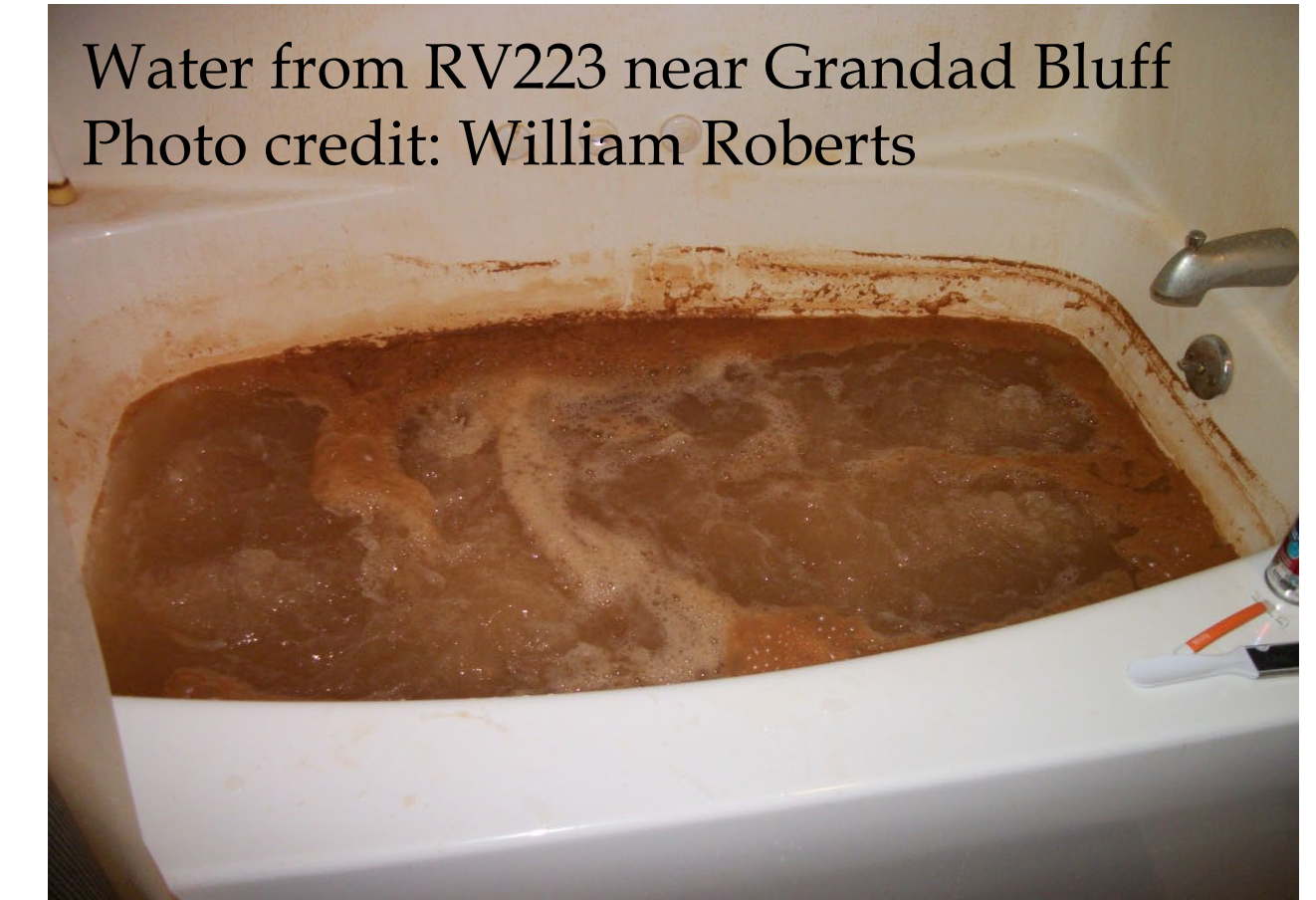
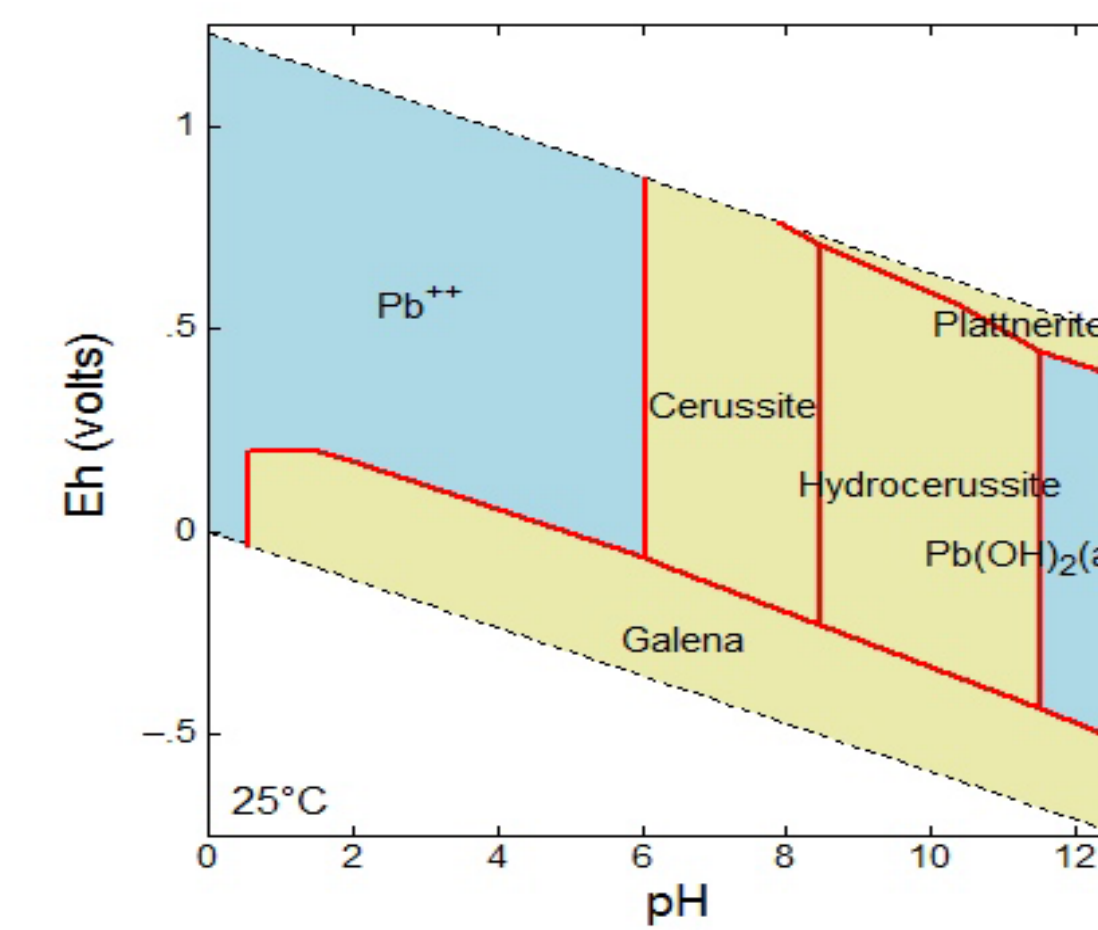


pH and Aluminum in Groundwater



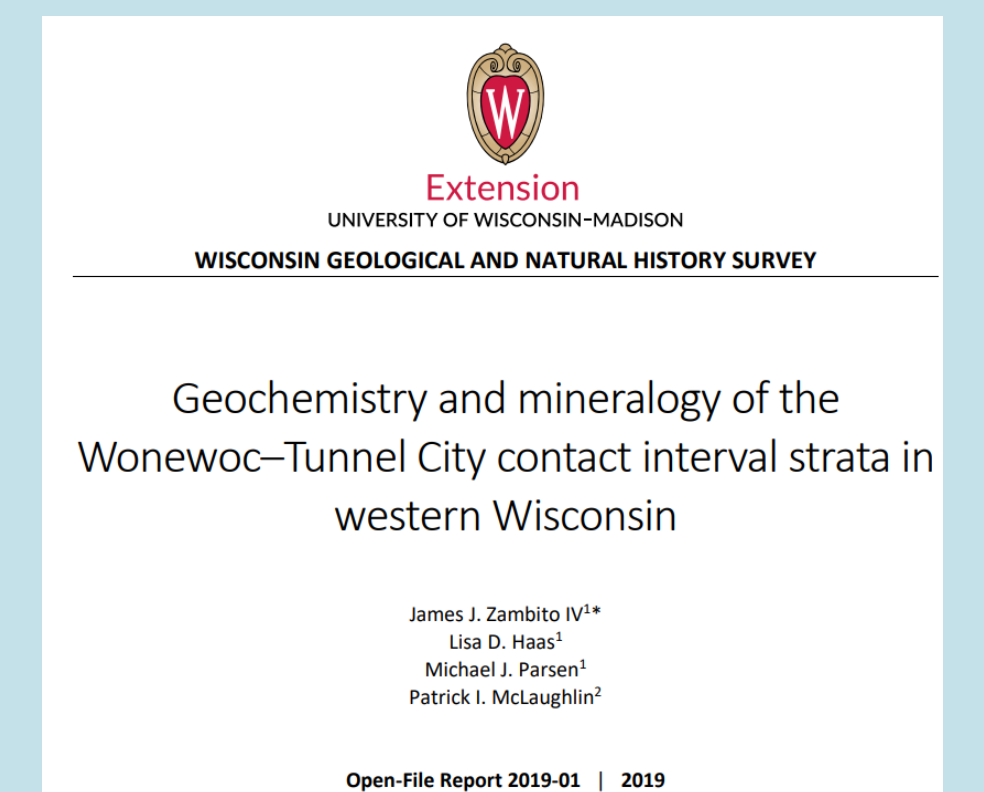
Geochemical Factors Affecting Solubility & Mobility

- pH
- Alkalinity
- Redox
- Mineral phase

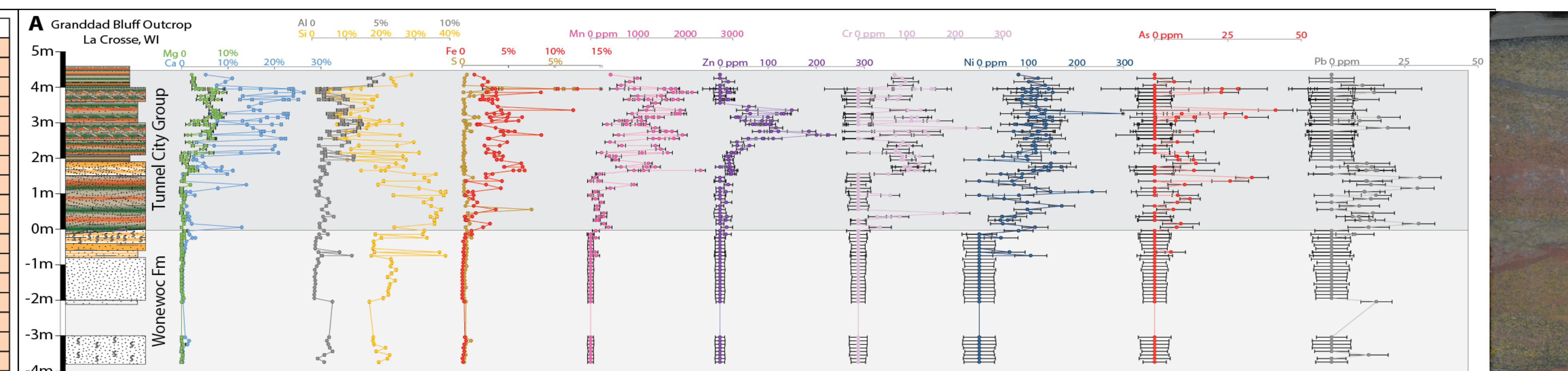


Ongoing Investigations

Jay Zambito - WGNHS
Bulk Rock geochemistry of core and cuttings using handheld XRF, and examination of potential oxidation fronts to understand sulfide mineral content and potential dissolution and transport mechanisms.

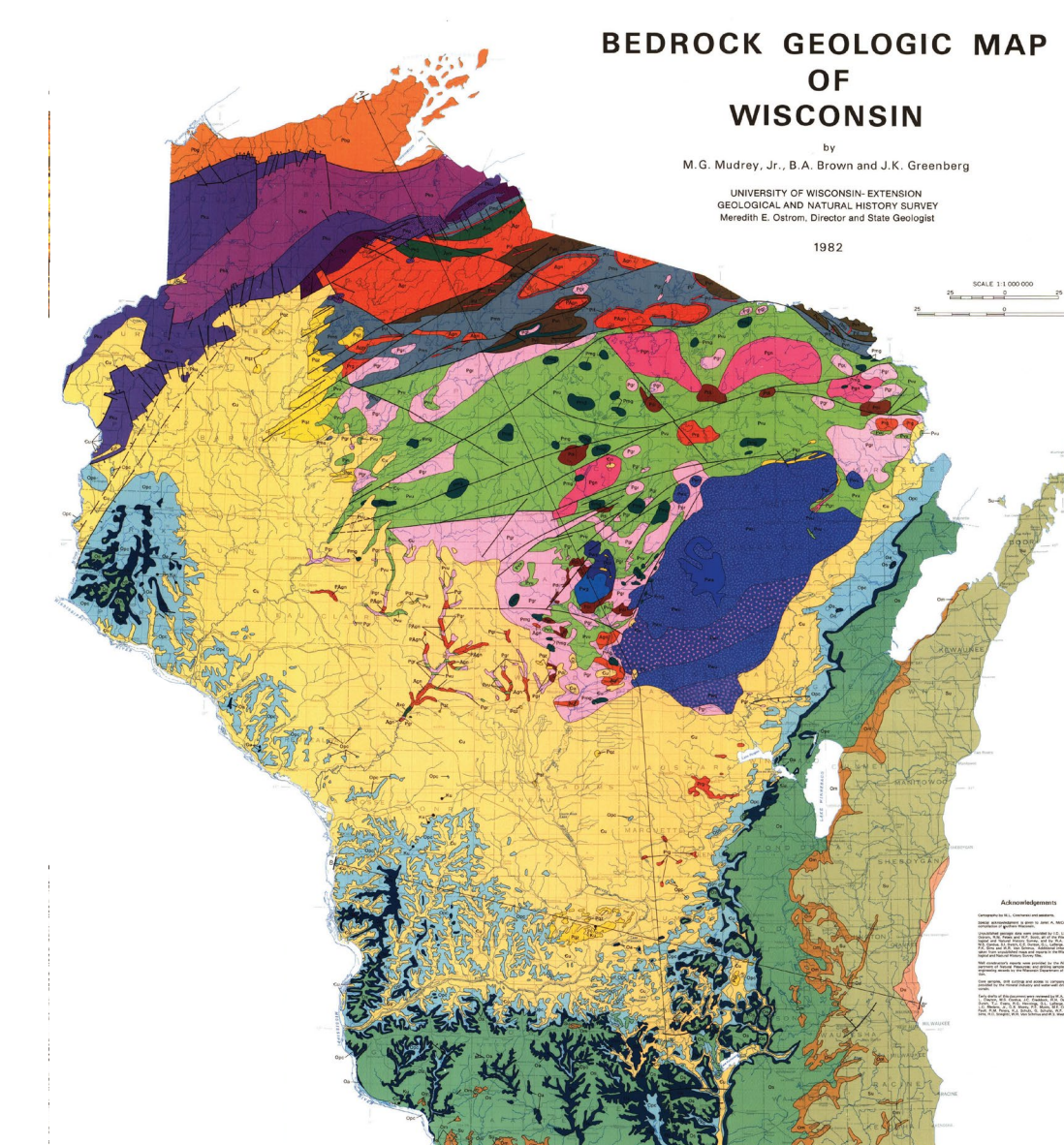


Municipality	Tomah	Bangor	Coon Valley	Stoddard	La Crosse	La Crosse	Advisory Level
WUWN	ST009	UN859	OH527	CQ196	RV223	GC657	
pH	4.6	6.97	4.7	4.5*	4.08	6.85	
Sulfate	1478.5	-	-	-	-	-	250 mg/L
Aluminum	22630	3220	23900	67300	23200	2320	200 ug/L
Arsenic	ND	ND	129	92	38	ND	10 ug/L
Cadmium	ND	2	1	5	5	ND	5 ug/L
Chromium	2.5	ND	77	220	56	1	100 ug/L
Cobalt	244.2	306	501	909	501	23	40 ug/L
Copper	307.5	1610	324	1290	511	16	1300 ug/L
Iron	39.19	53.6	218	672	376	24.3	0.3 mg/L
Lead	-	ND	109	80	47	ND	15 ug/L
Manganese	222.8	142	921	2980	897	56	50 ug/L
Molybdenum	ND	-	20	-	ND	ND	40 ug/L
Nickel	1232	419	771	1750	832	41	100 ug/L
Strontium	843.1	70	144	217	219	54	4000 ug/L
Vanadium	ND	5	69	239	56	1	30 ug/L
Zinc	574.6	385	52	4460	706	56	2000 ug/L



Factors That Are Currently Poorly Constrained

- Spatial Extent – Discrete or Continuous?
- Mineralization – Primary or Secondary?
- Activities – Which Contribute to Mobilization?
- Mineral phase – Dissolved or Sorbed?



Note: All Data are preliminary and subject to revision

DNR – Wastewater
In 2013, samples taken from process water ponds at industrial sand mining and processing facilities found low pH and elevated metals concentrations.

Acknowledgements

We would like to extend a heartfelt thank you to the people who have made this work possible: Adam Freihofer, Mary Ellen Vollbrecht, Steve Elmore, Roberta Walls, Mary Anne Lowndes and J. Brian Mahoney.

Special thanks to Jay Zambito and Kevin Masarik for permission to use their figures.