



# Monitoring and Analysis of Neonicotinoid Insecticides in Wisconsin Groundwater: Distribution, Trends, and Influential Factors

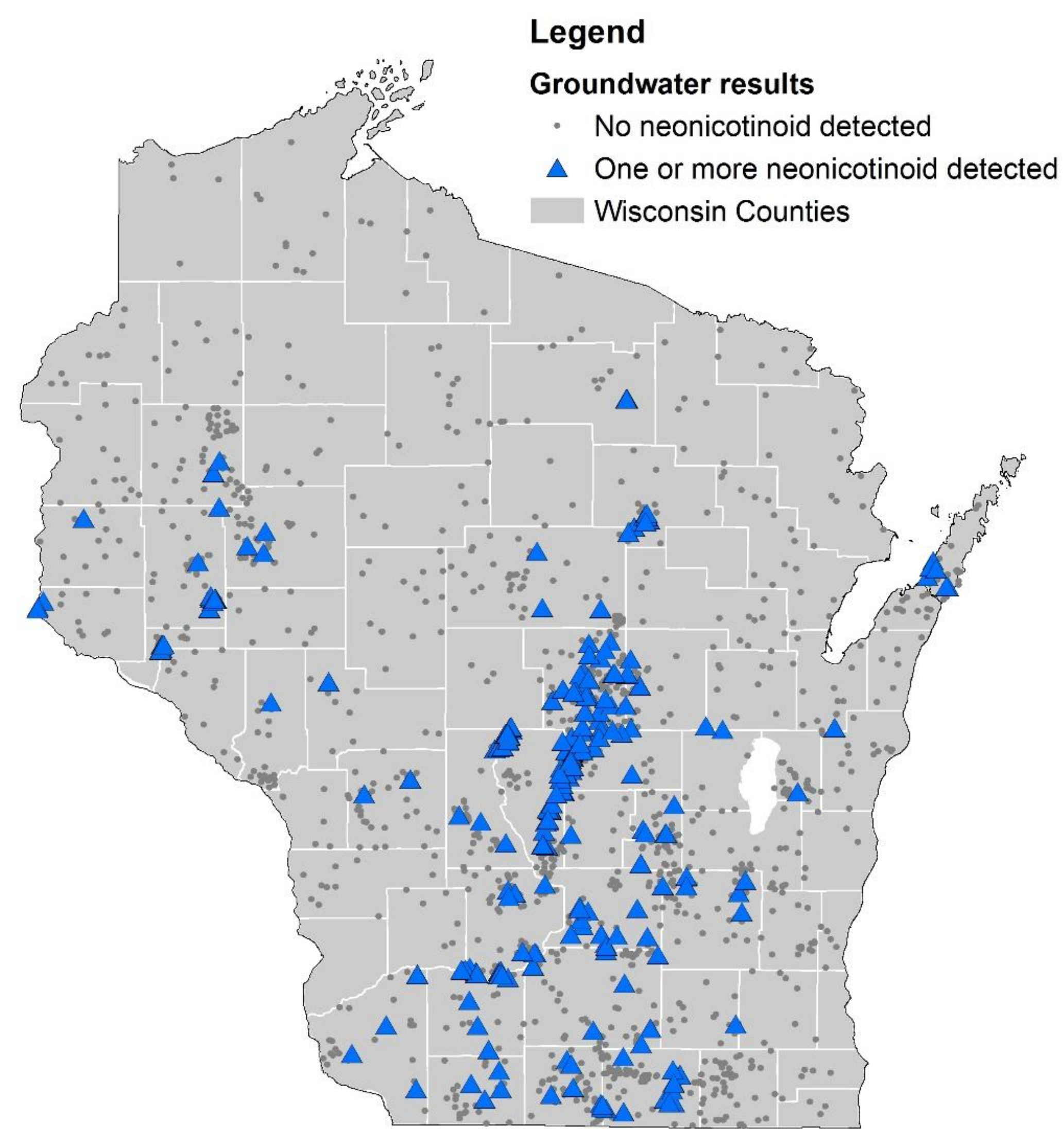
Brockschmidt S.<sup>1</sup>, Potrykus K.<sup>1</sup>, Romano C.<sup>2</sup>, Cook C.<sup>1</sup>, McColloch M.<sup>1</sup>, Blanchard D.<sup>1</sup>, Engelhardt A.<sup>1</sup>, Gramse M.<sup>1</sup>, Kelley G.<sup>1</sup>

<sup>1</sup> Wisconsin Department of Agriculture, Trade, and Consumer Protection; <sup>2</sup> Wisconsin Department of Natural Resources

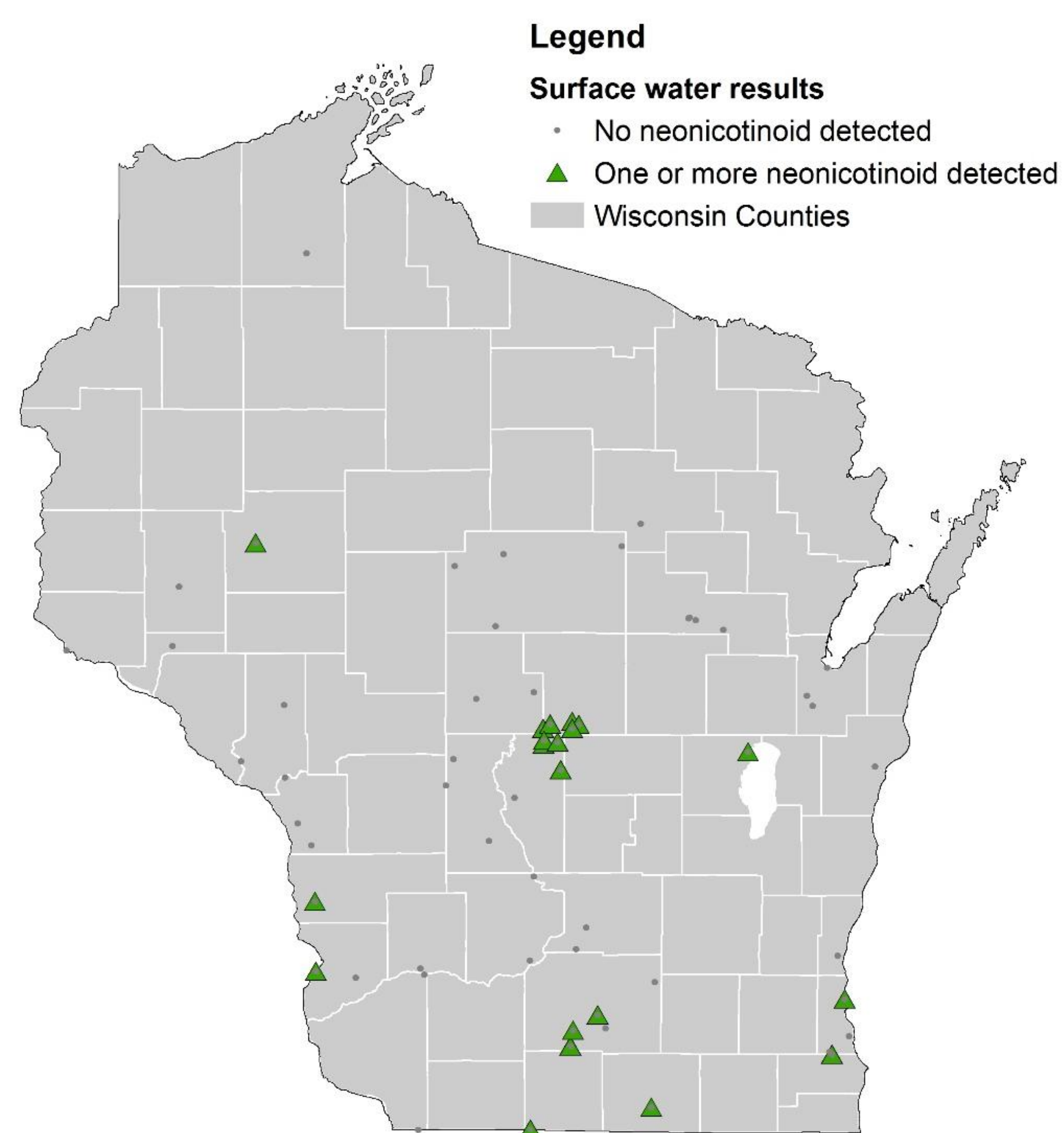
## Groundwater and Surface Water Sampling

- Determine which pesticides are found in the environment through multiple sampling programs
- Determine whether pesticide concentrations exceed groundwater/surface water benchmarks

### Neonic Groundwater Sampling (2011 – 2023):

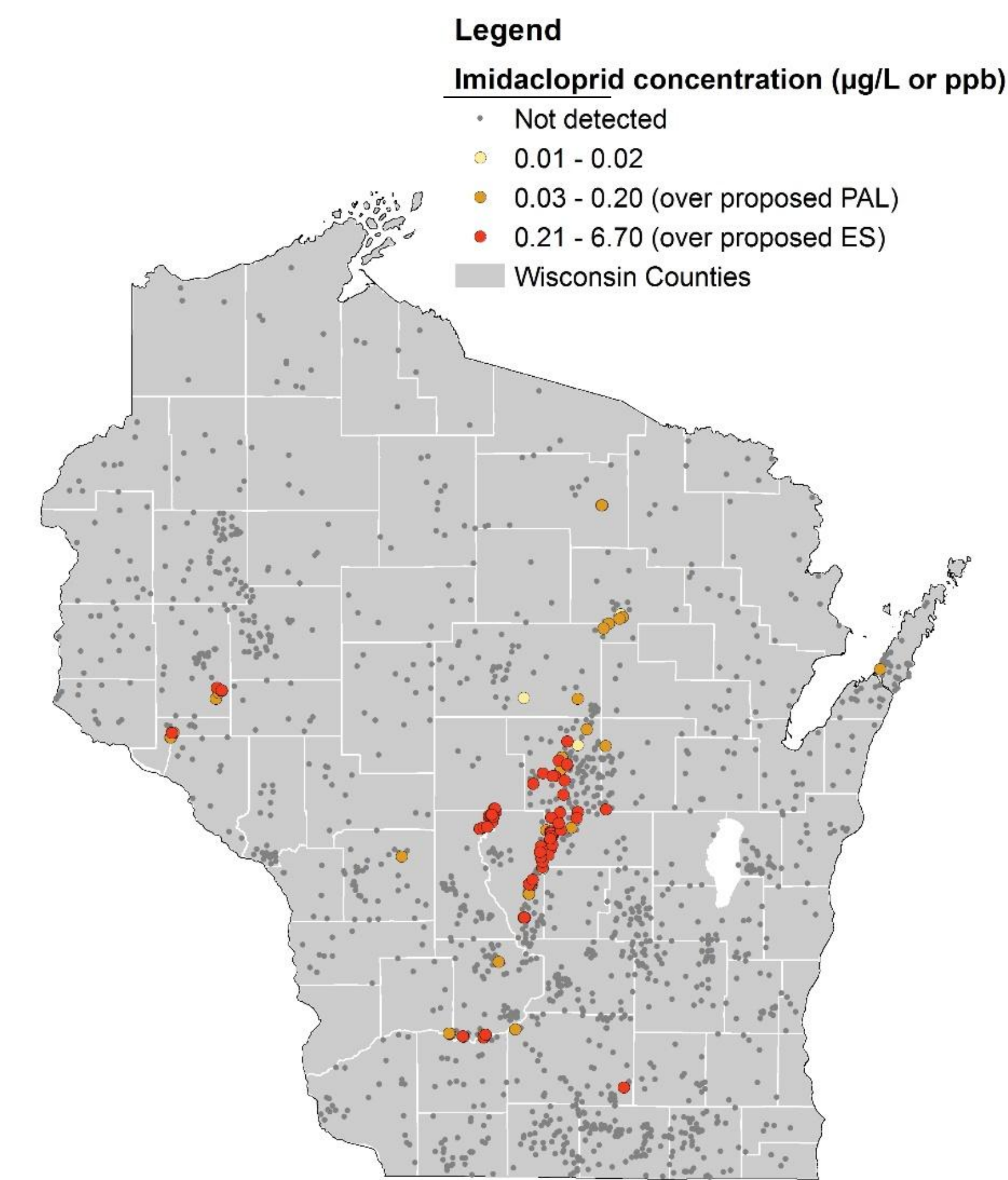


### Neonic Surface Water Sampling (2011 – 2023):



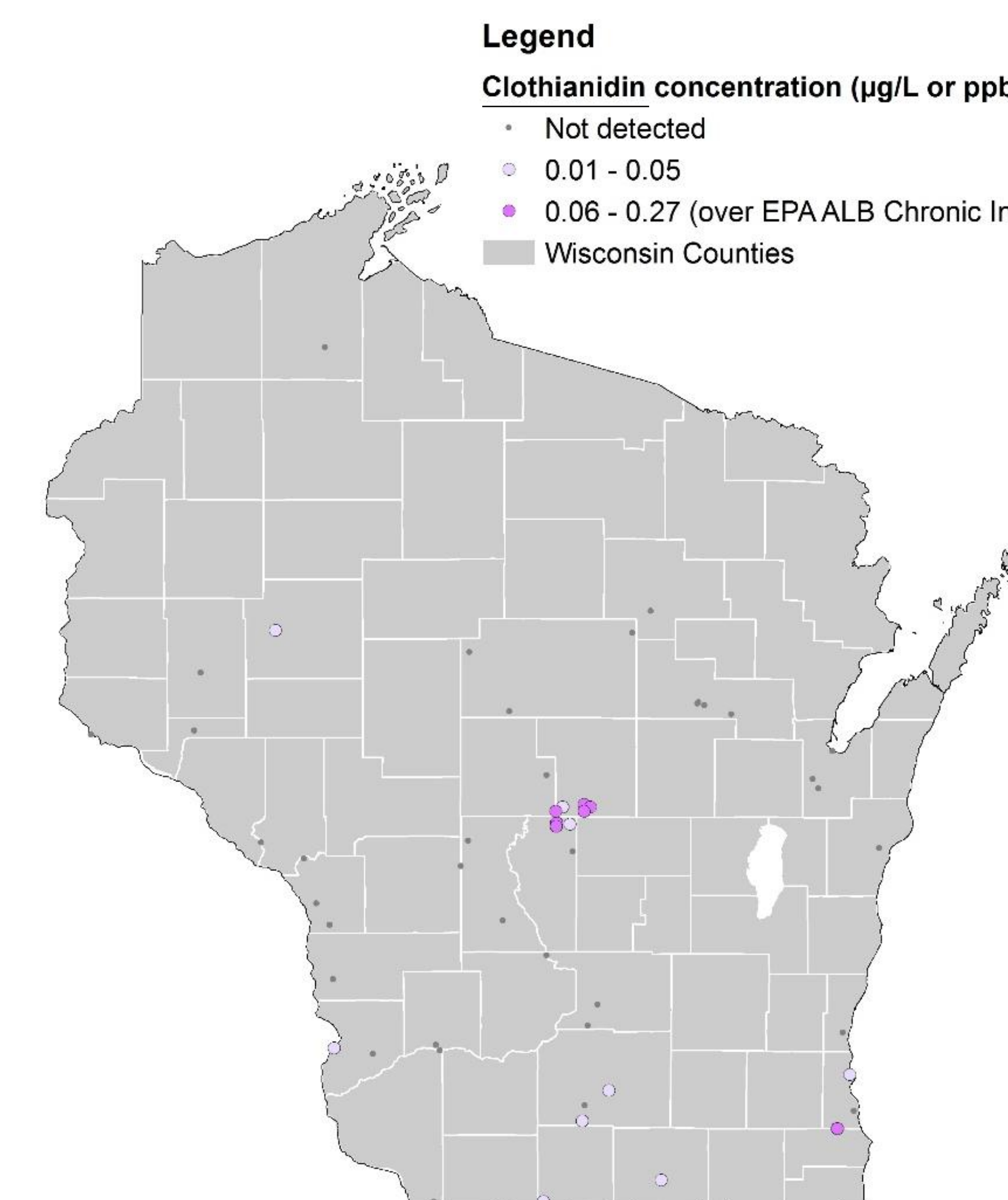
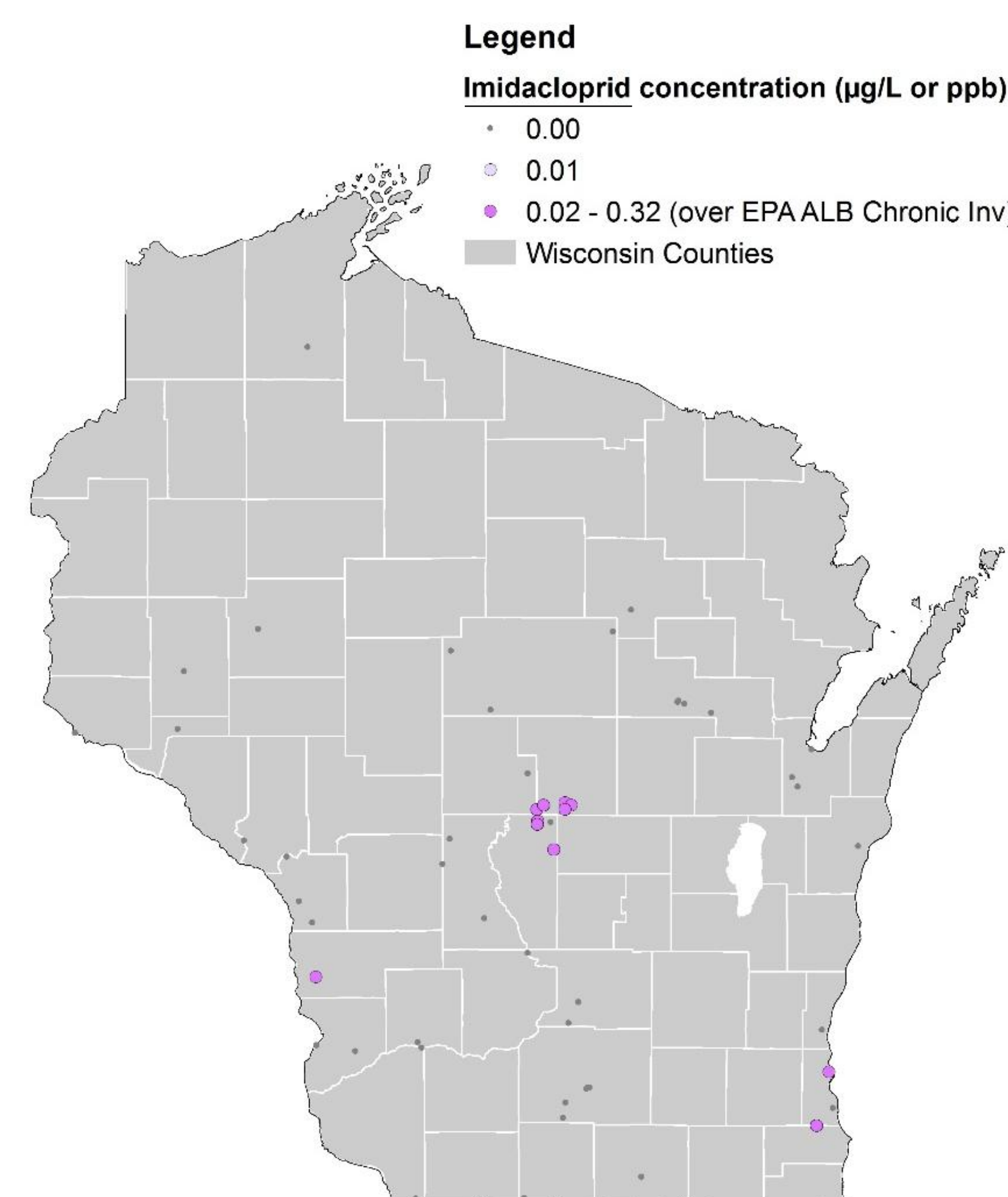
## Neonicotinoid Water Quality Benchmark Exceedances

GROUNDWATER	Compound	Proposed 2019 Wisconsin Preventive Action Limit		Proposed 2019 Enforcement Standard or Wisconsin Department of Health Services (DHS) Health Advisory Level	
		Benchmark concentration (µg/L or ppb)	Exceedance rate (2011 – 2023)	Benchmark concentration (µg/L or ppb)	Exceedance rate (2011 – 2023)
	Clothianidin	200	0%	1000	0%
	Imidacloprid	0.02	17%	0.2	9%
	Thiamethoxam	12	0%	120	0%



SURFACE WATER	Compound	U.S. Environmental Protection Agency (EPA) Aquatic Life Benchmarks (ALBs) For Freshwater Invertebrates*			
		Chronic		Acute	
		Benchmark concentration (µg/L or ppb)	Exceedance rate (2011 – 2023)	Benchmark concentration (µg/L or ppb)	Exceedance rate (2011 – 2023)
	Clothianidin	0.05	1%	11	0%
	Imidacloprid	0.01	8%	0.385	0%
	Thiamethoxam	0.74	0%	17.5	0%

\*EPA has published ALB's for freshwater vertebrates, but DATCP did not detect any exceedances of these benchmarks during 2011 – 2023 sampling



## Conclusions

- Neonicotinoids have been detected in surface water and groundwater across Wisconsin.
- Clothianidin, imidacloprid, and thiamethoxam are the most frequently detected neonicotinoids, with a higher incidence in groundwater compared to surface water.
- Imidacloprid is the sole compound exceeding the Wisconsin Department of Health Services health advisory level in groundwater, with exceedances primarily in the Central Sands, Lower WI River Valley, and Western Wisconsin.
- Both clothianidin and imidacloprid exceed EPA's chronic aquatic life benchmarks for invertebrates in surface water, with exceedances found in Central Sands, Western, and Southeastern Wisconsin.



Check out our groundwater and surface water reports!

More questions? Reach out to the DATCP Environmental Quality Unit at: [datcpgw@wi.gov](mailto:datcpgw@wi.gov)