



What's in the water? DWP Special Sampling Projects

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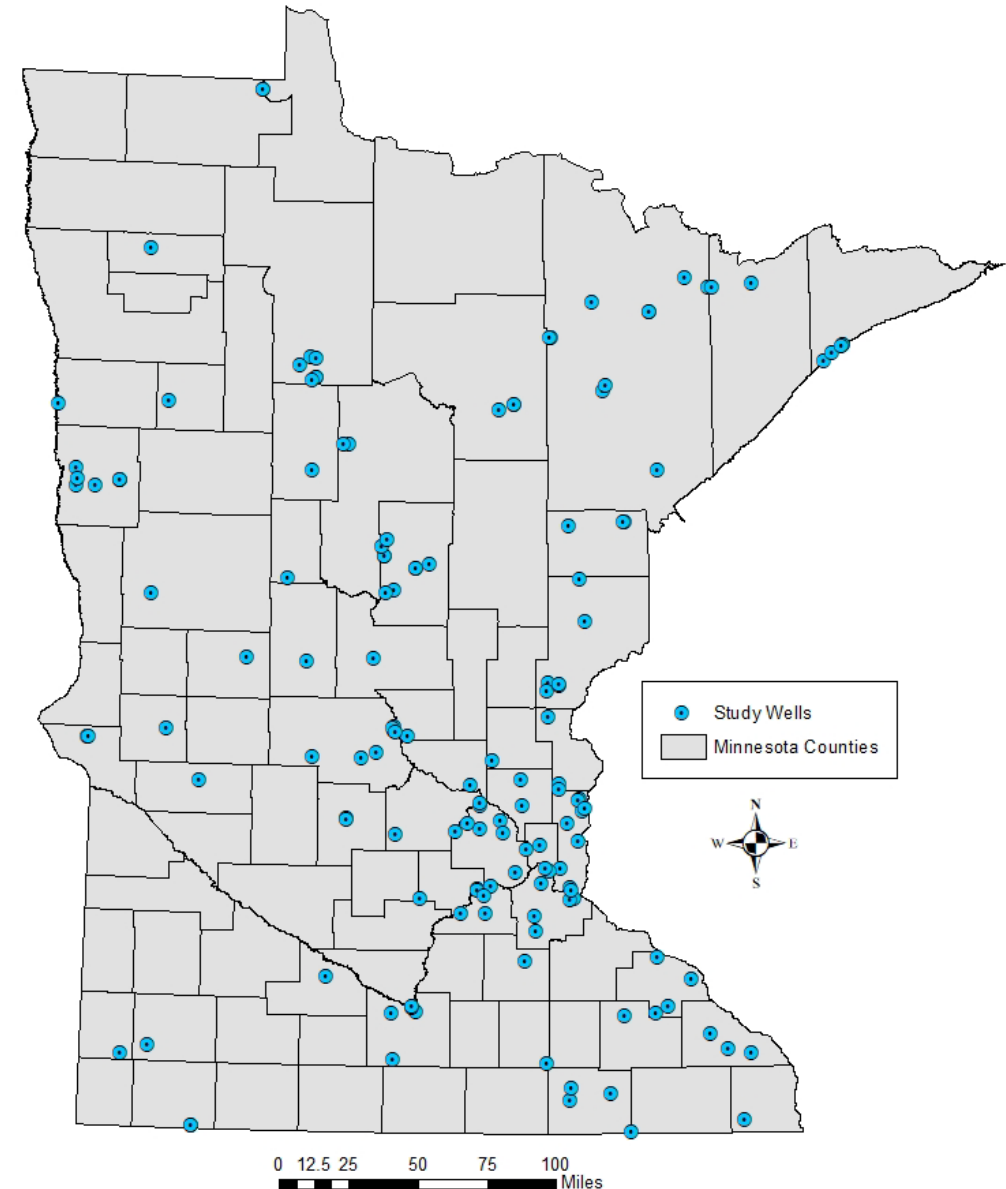
PROTECTING, MAINTAINING AND IMPROVING THE HEALTH OF ALL MINNESOTANS

1. Pathogen Project (aka, virus study)
2. Unregulated Contaminants Monitoring Project (UCMP)
3. Statewide PFAS
4. Drinking Water Ambient Monitoring Program (DWAMP)

Pathogen Project – first phase

Microbial Monitoring 2014-2016 (Virus Study)

- 145 Community & noncom wells
- Mostly year-round systems
- Bimonthly sampling
 - 117 wells for 1 year
 - 28 wells for 2 years
- Fecal pathogens and indicators
 - Human enteric viruses, others
 - *Salmonella*, *Bacteroides*, others
 - *Giardia* and *Cryptosporidium*



2014-2016 Monitoring data summary and observations

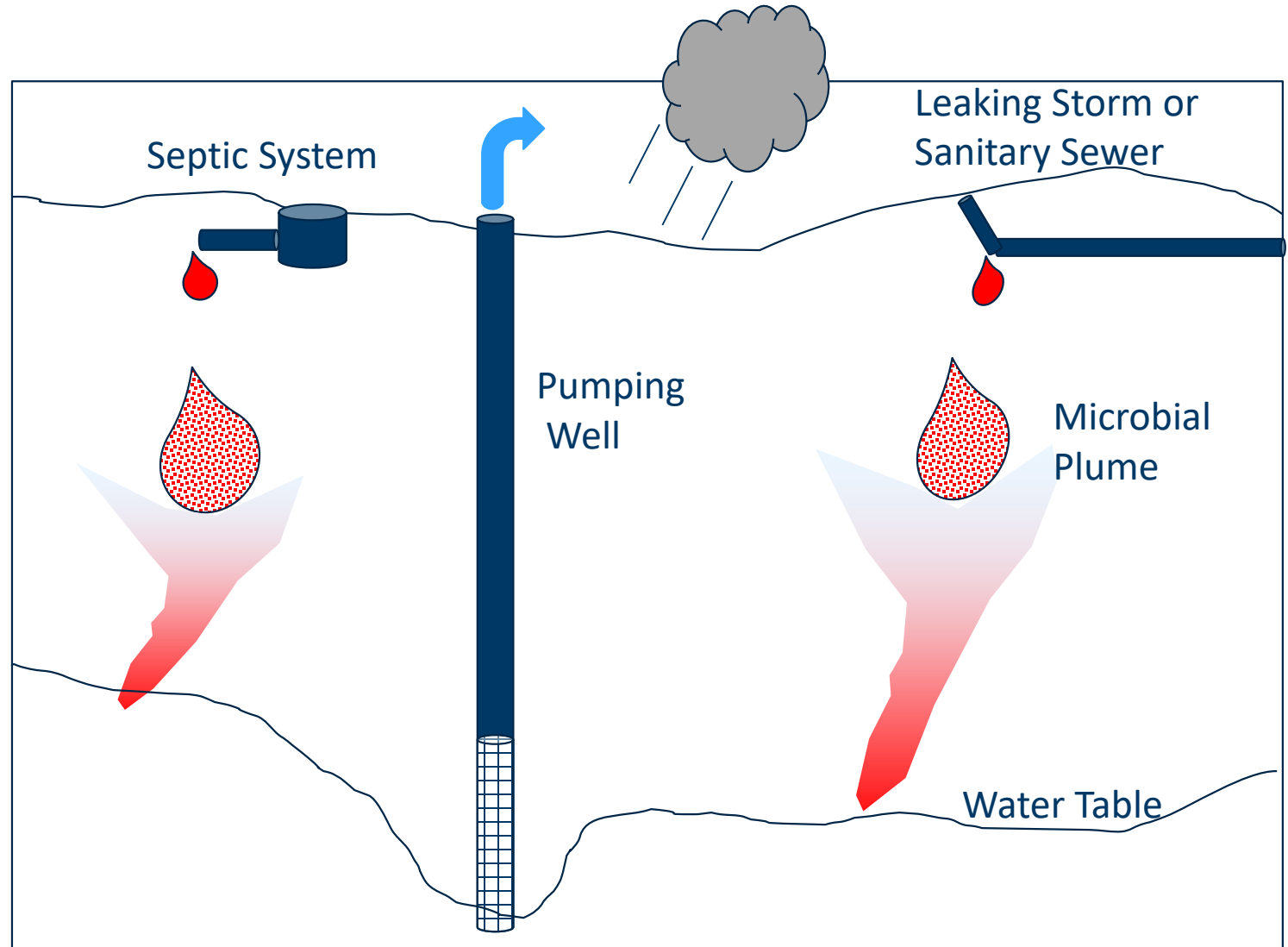
The Bad News

The Good News

- Intermittent detections
 - 6% of samples had human virus detection
 - 22% of samples had human pathogen detection
- Usually low concentrations
- Not all detections represent infectious organisms
- Not all infectious organisms result in illness

Conceptual Model for Rapid Microbial Transport

- Year-round discharge from septic systems and wastewater/stormwater leakage below the frost zone
- Microbes accumulate in the shallow subsurface during dry periods, but are pushed down during wet ones
- Rapid movement made possible by small, high-permeability features in the subsurface (gravel zones, fractures, macropores)
- Downward movement is accentuated by well pumping

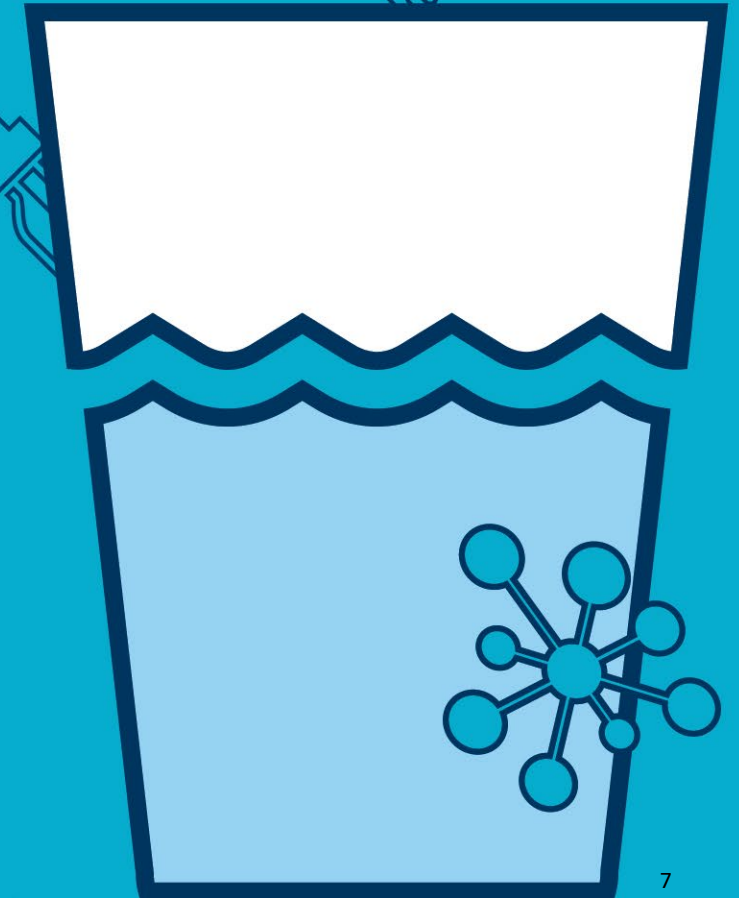


Pathogen Project – Current work

Project Component	Goals Addressed	Resulting Benefit
Statistical Analysis of 2014-2016 Results	Predicting pathogen occurrence	Properly categorizing sources by risk
Recharge-Event Monitoring at 4 Sites (USGS)	Better understanding of timing and duration of microbial threat from recharge events	Guidance to public water systems on how to ride out these events
Tracer Studies at 3 Sites (DNR)	Documentation of pathogen transport pathways and times of travel	Recommendation for enhanced well construction or setback distances for public wells in some settings

Unregulated Contaminants Monitoring Project (UCMP)

- Test for contaminants of emerging concern (CECs) in drinking water sources
- Identify any potential health concerns
- Compare results from source water and finished water
- Evaluate if results are different for drinking water sources that are geologically vulnerable to contamination



UCMP: Site Selection



**Water Quality
Indicators**



Land Use



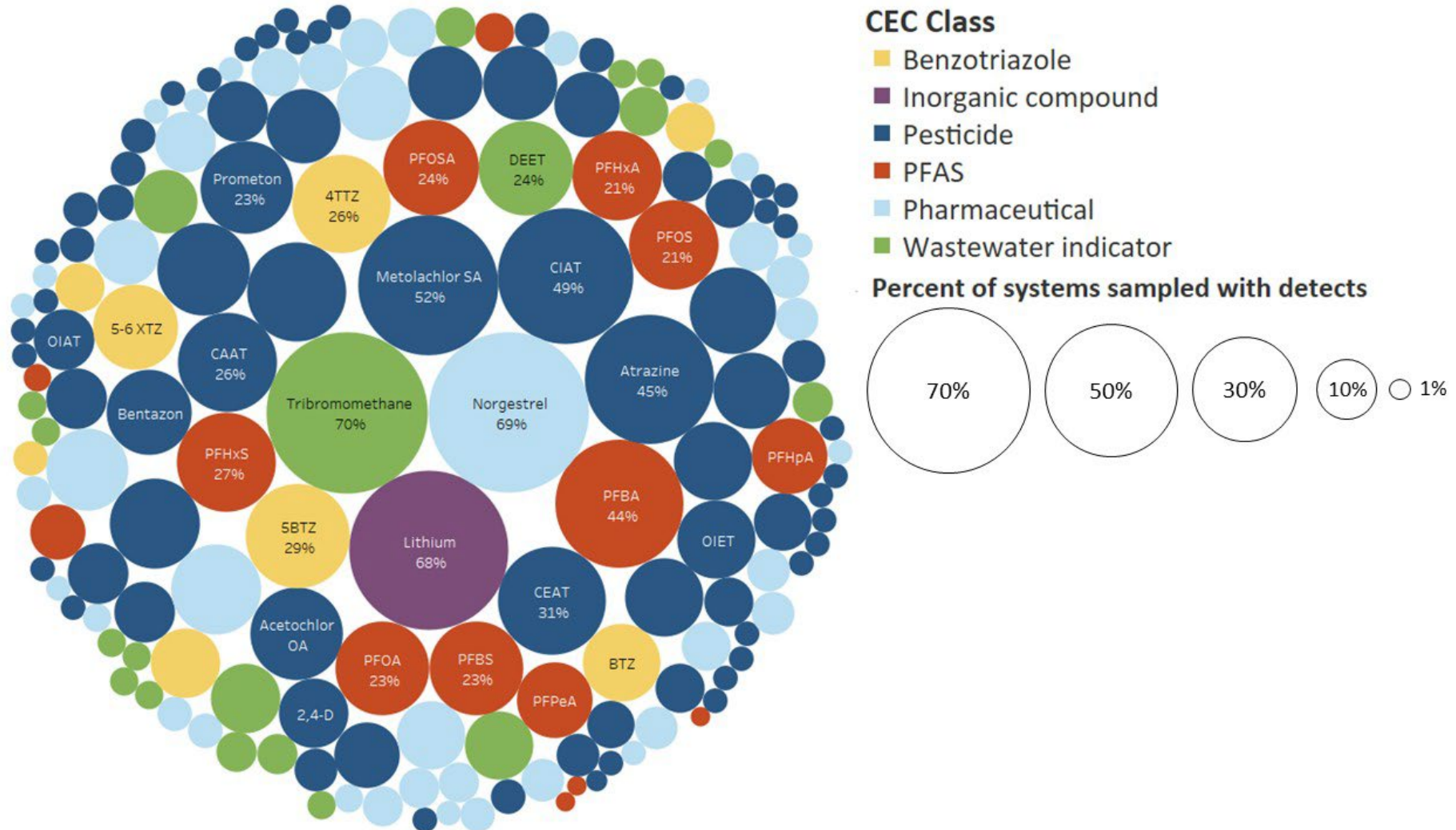
**Geographic
Considerations**

UCMP: Parameter Selection

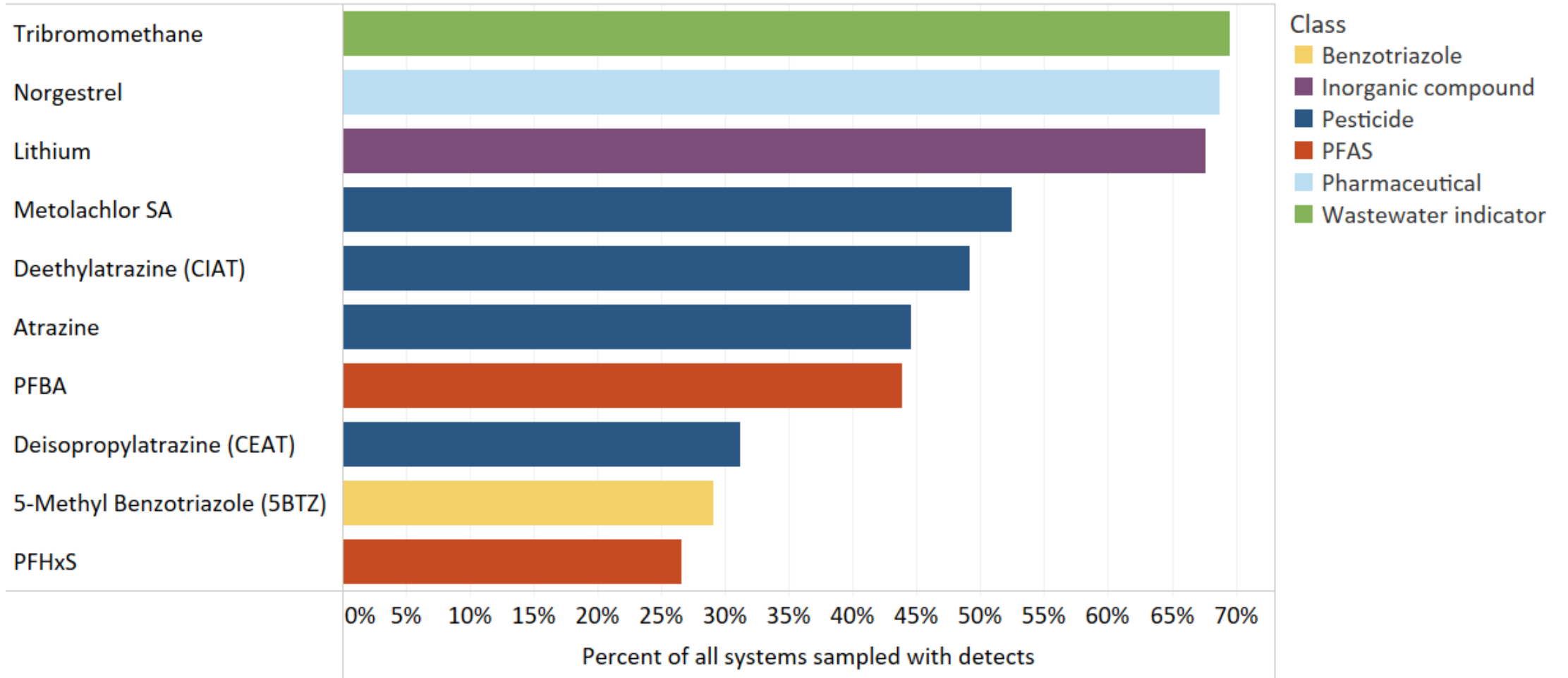
- Surface Water Systems: pharmaceuticals, pesticides, wastewater indicators, personal care products, alkyl phenols, benzotriazoles, hormones, PFAS, & illicit drugs
- Wastewater-Impacted Systems: pharmaceuticals, wastewater indicators, & PFAS
- Agriculture-Impacted Systems: pesticides & PFAS



UCMP: CECs detected at all sites, by class and relative frequency of detection



UCMP: Ten most frequently detected CECs



UCMP: CECs detected in at least 20% of samples



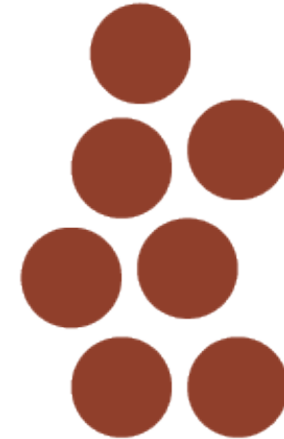
11 pesticides



1 inorganic compound



2 pharmaceuticals



7 PFAS



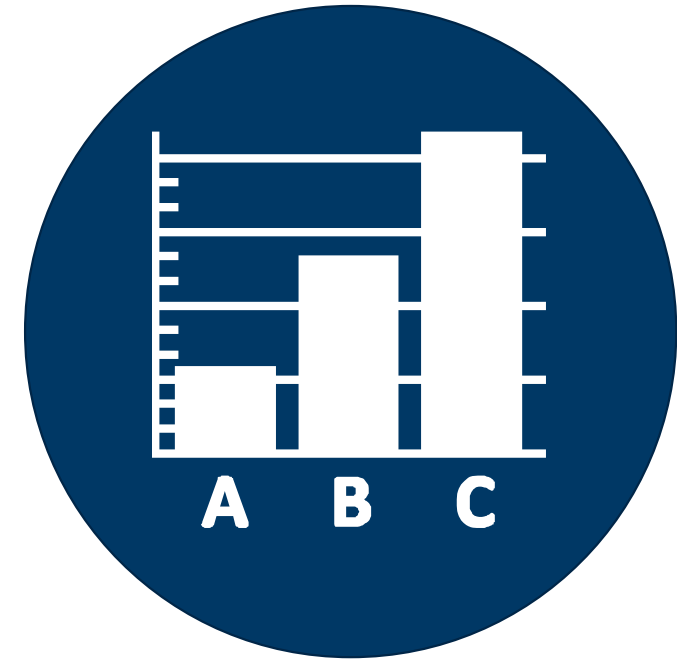
2 wastewater indicators



2 benzotriazoles

UCMP: Takeaways

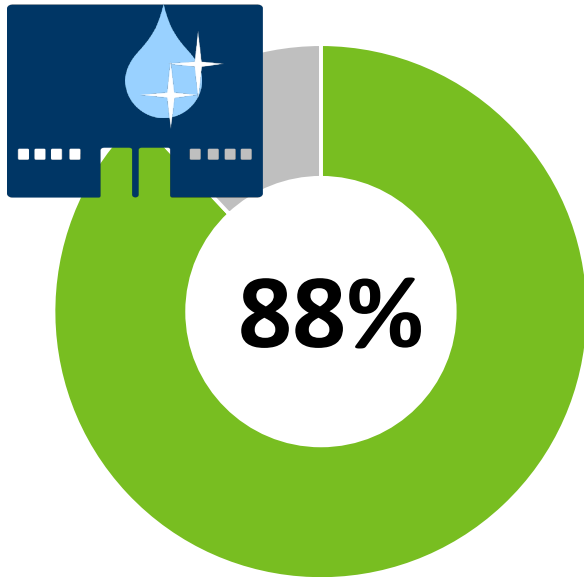
- Very few samples exceeded health-based guidance for CECs
- Only a fraction of the CECs analyzed for were detected
- Pesticides and PFAS were generally detected at a higher frequency than other CECs
- CEC concentrations were generally higher in vulnerable settings compared to nonvulnerable settings



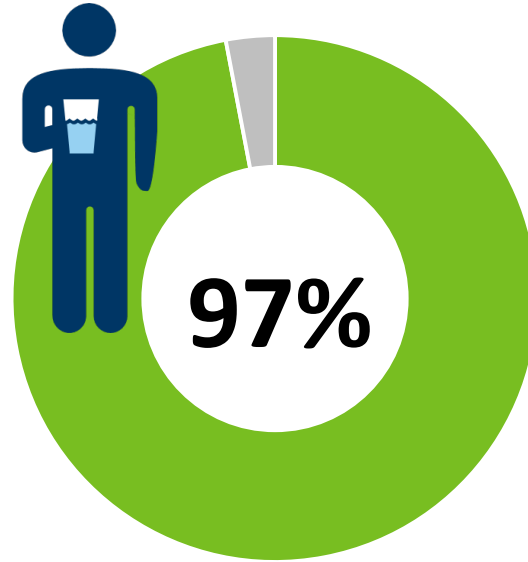
- Data analysis
 - Research questions:
 - Is there a significant difference between groundwater and surface water, source and finished water, agricultural and wastewater land uses, vulnerable and nonvulnerable geologic settings?
 - Human health risk
 - General chemistry assessment



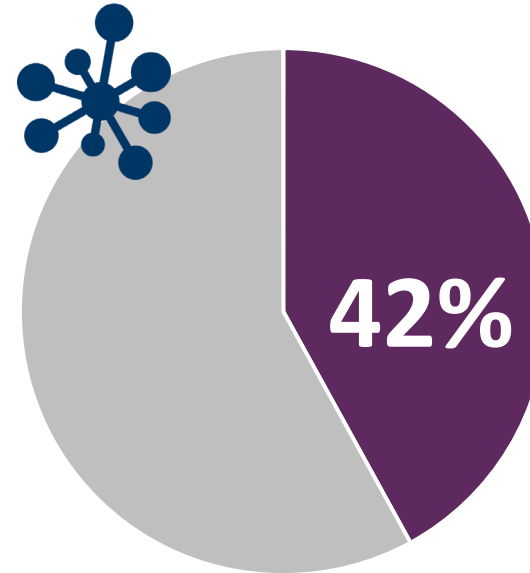
Testing PFAS in drinking water: status and preliminary results



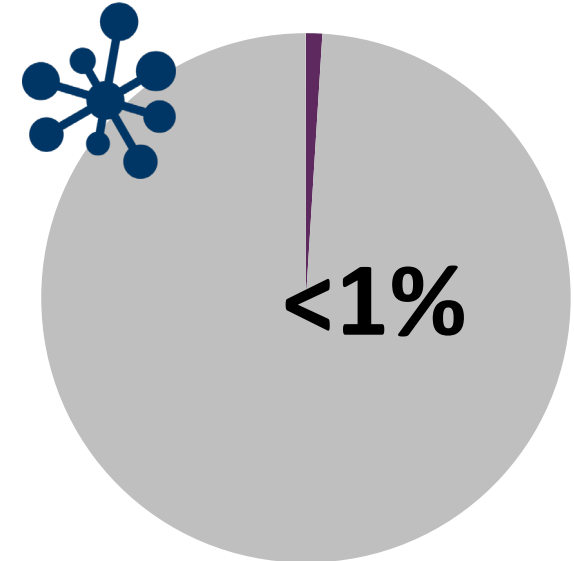
88% of community water systems tested or in progress (854)



97% of community water system customers covered under testing (4.4 million)

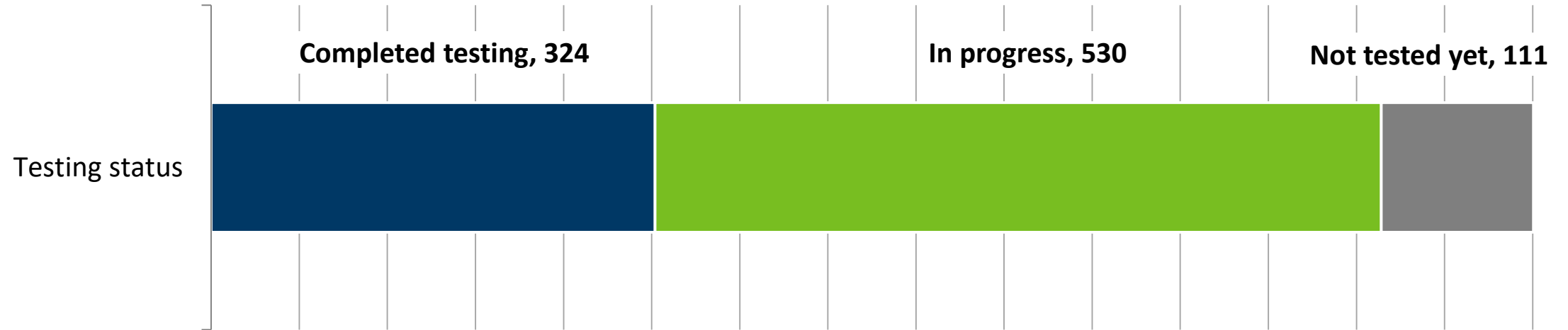


Roughly 42% of systems tested had a PFAS detection



<1% of systems tested have results above health guidance (5)

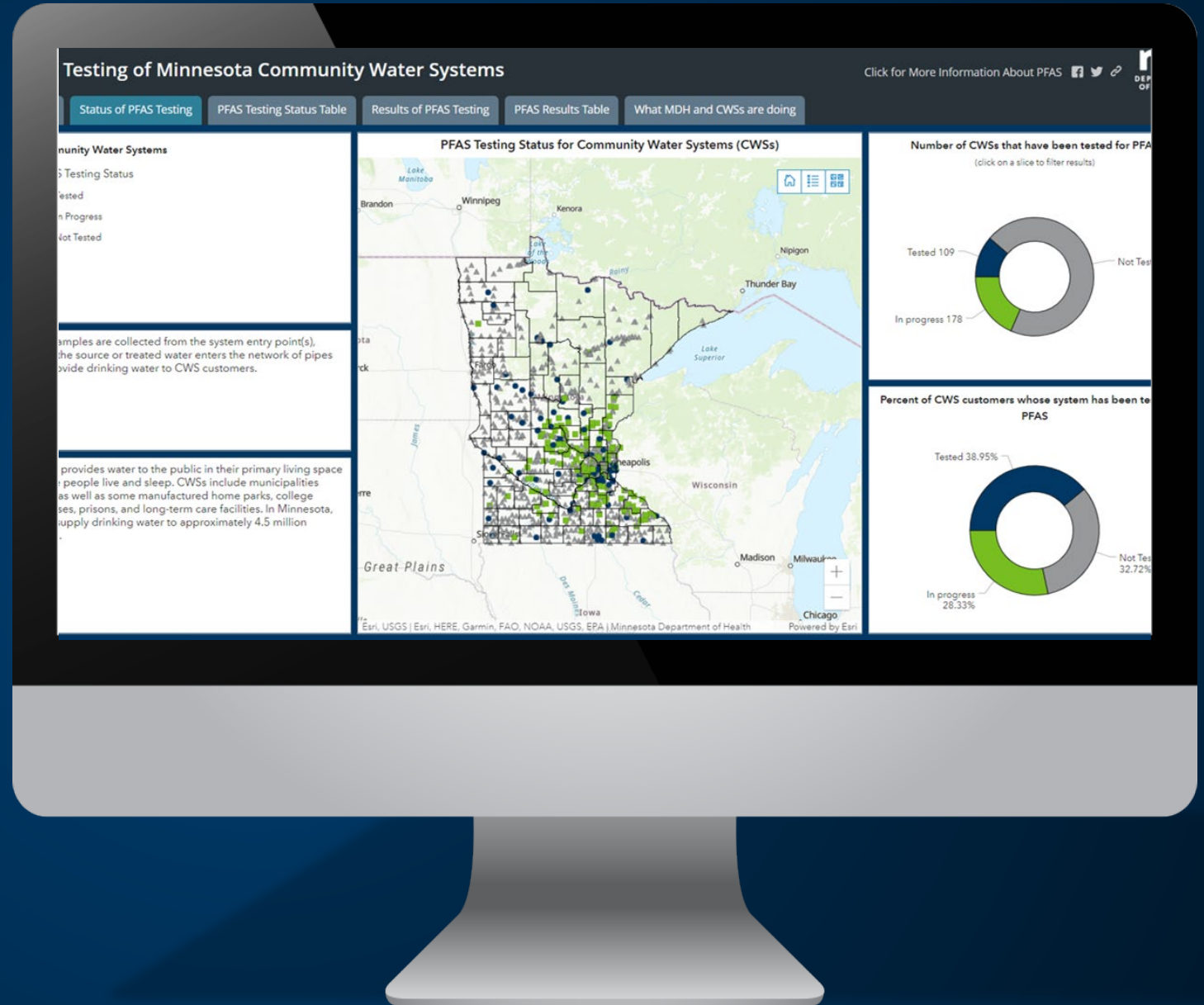
Statewide PFAS Sampling Summary



- MDH expects to have tested all systems by March 2023
- MDH will revisit systems and conduct follow-up sampling throughout spring/summer 2023

Interactive PFAS dashboard contains:

- Status of PFAS testing in drinking water
- PFAS testing results
- Health guidance
- Actions MDH and systems are taking



Drinking Water Ambient Monitoring Program (DWAMP)

The goal of drinking water ambient monitoring is to establish ongoing, permanent capacity to:

1. address concerns about public health exposure to CECs
2. support advanced decision making to secure long term water resource management, especially regarding drinking water sources

DWAMP Sampling Initiatives



**CEC Horizon
Scanning**



**Watershed-scale
Characterization**



**Follow up CEC
sampling**



DWAMP Timeline

Program launch in
July 2023

Sampling beginning
spring 2024

Thank you.

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