Incorporating Unregulated Contaminant Monitoring into Minnesota's Public Water Supply Program

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PROTECTING, MAINTAINING AND IMPROVING THE HEALTH OF ALL MINNESOTANS

Topics

1. Unregulated Contaminants Monitoring Project (UCMP)
2. Cyanazine degradate monitoring at public water systems
3. Statewide PFAS Testing Project
4. Drinking Water Ambient Monitoring Program (DWAMP)

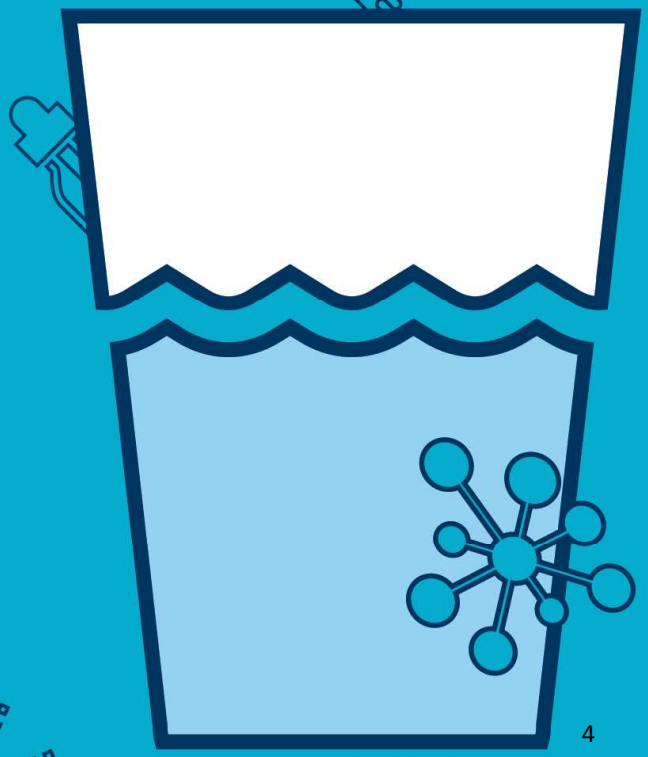
DEPARTMENT OF HEALTH

Unregulated Contaminants Monitoring Project (UCMP)

2019 - 2023

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



Unregulated Contaminants Monitoring Project: Site Selection

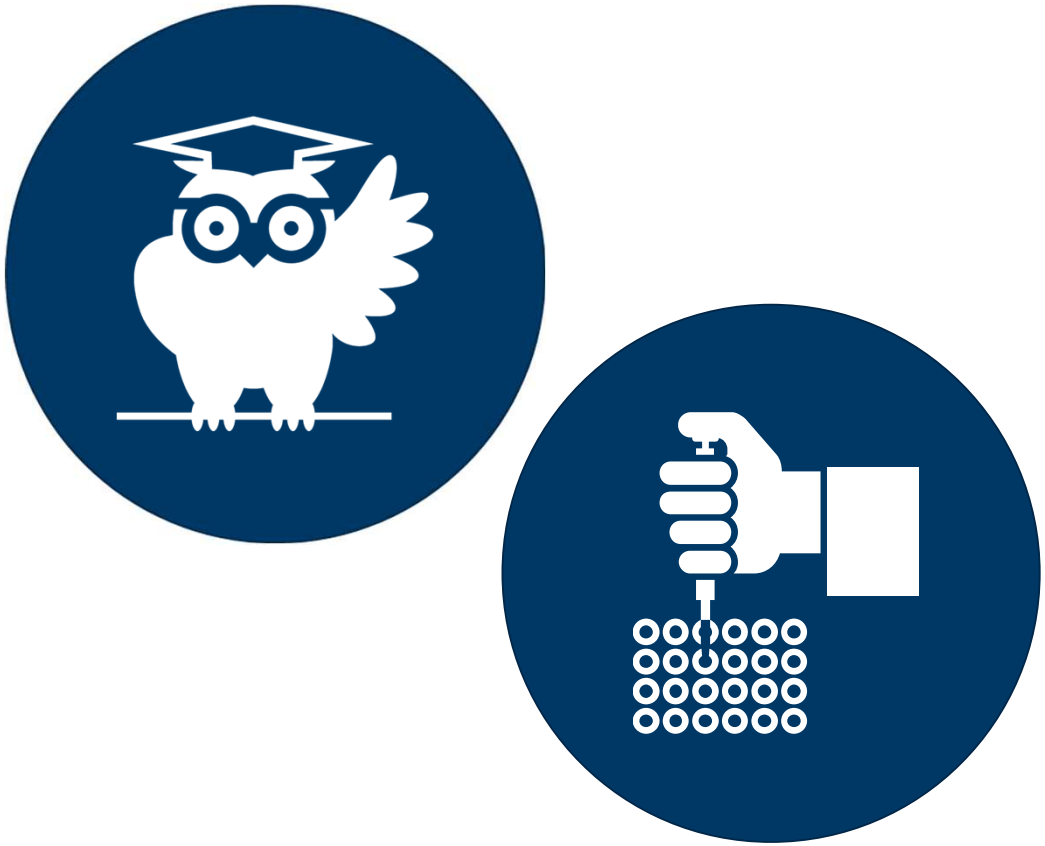
Water Quality Indicators

Land Use

Geographic Considerations

Unregulated Contaminants Monitoring Project: Parameter Selection

- Technical Advisory Team
- Previous studies and MN detections
- Several labs: MDH Public Health Lab, SGS AXYS, and USGS National Water Quality Lab



Unregulated Contaminants Monitoring Project: 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

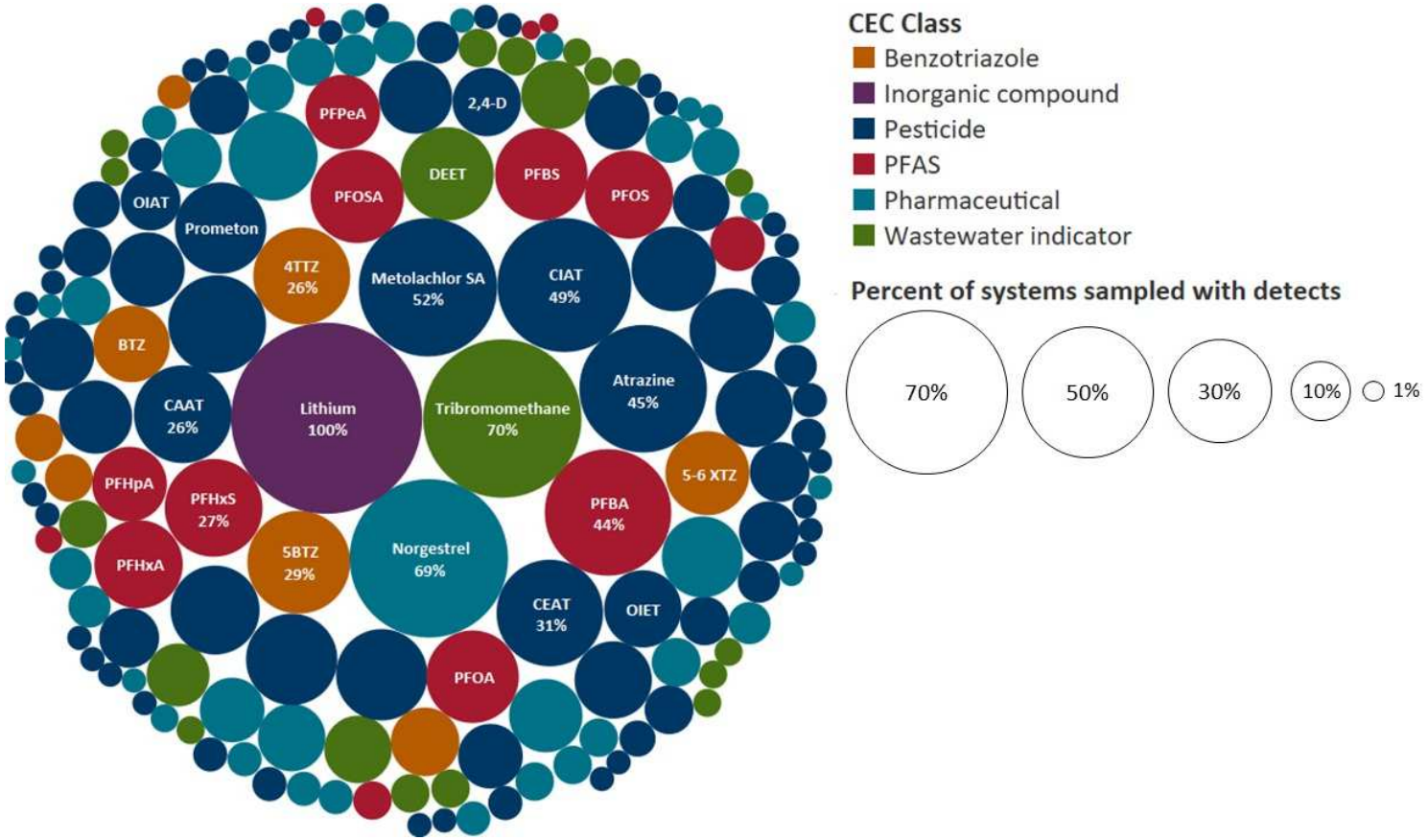
Unregulated Contaminants Monitoring Project: Phase 2

- Sampled for Phase 2 in 2021
  - Sampled agricultural network for PFAS and Total Cyanazine (cyanazine plus degradates)
  - Non-vulnerable well comparison for wastewater and agriculture networks

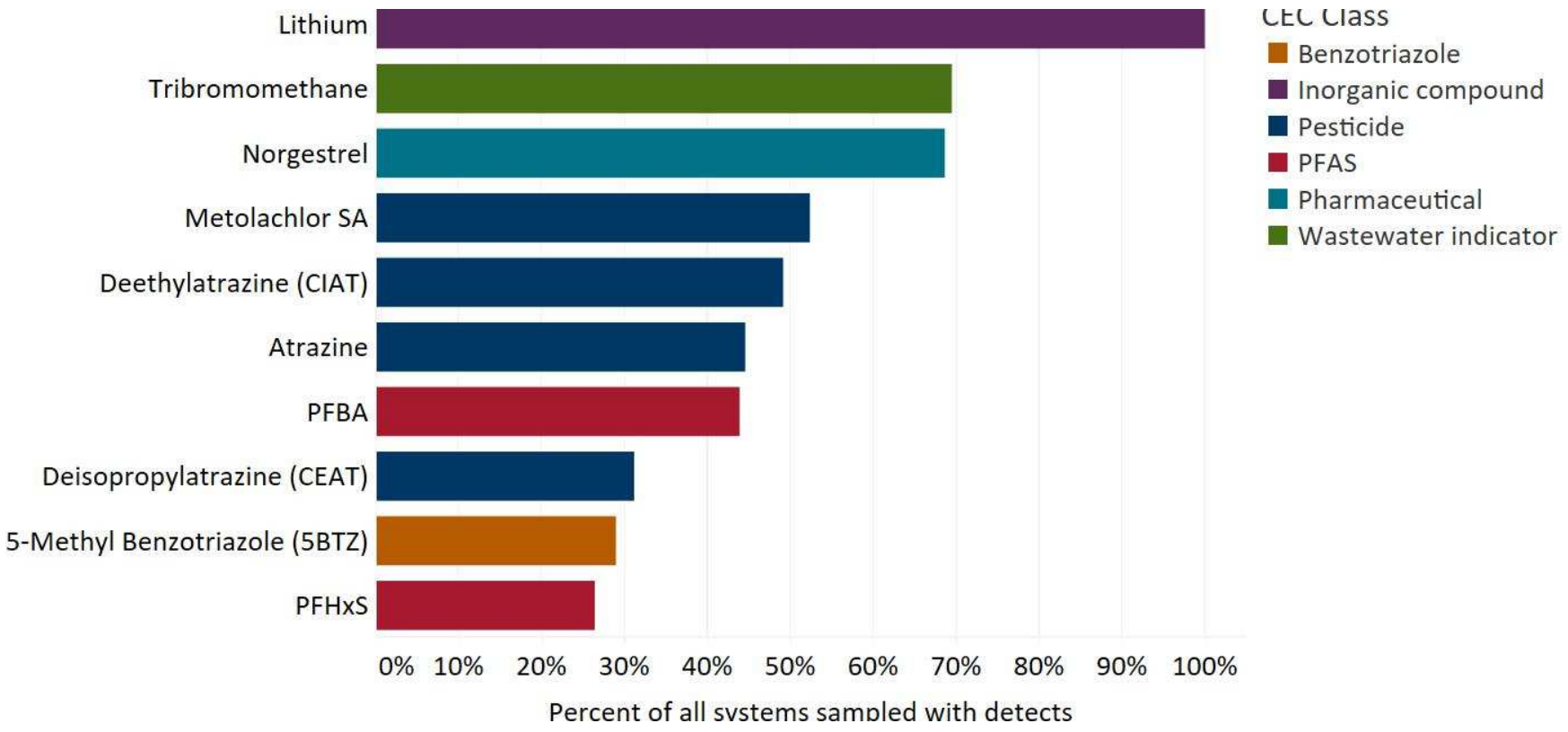
Unregulated Contaminants Sampling Project

- Two sampling staff, all samples taken in tandem for phase 1, one sampler for phase 2
- Phase 1: August 2019-November 2019
- Phase 2: September 2021-December 2021

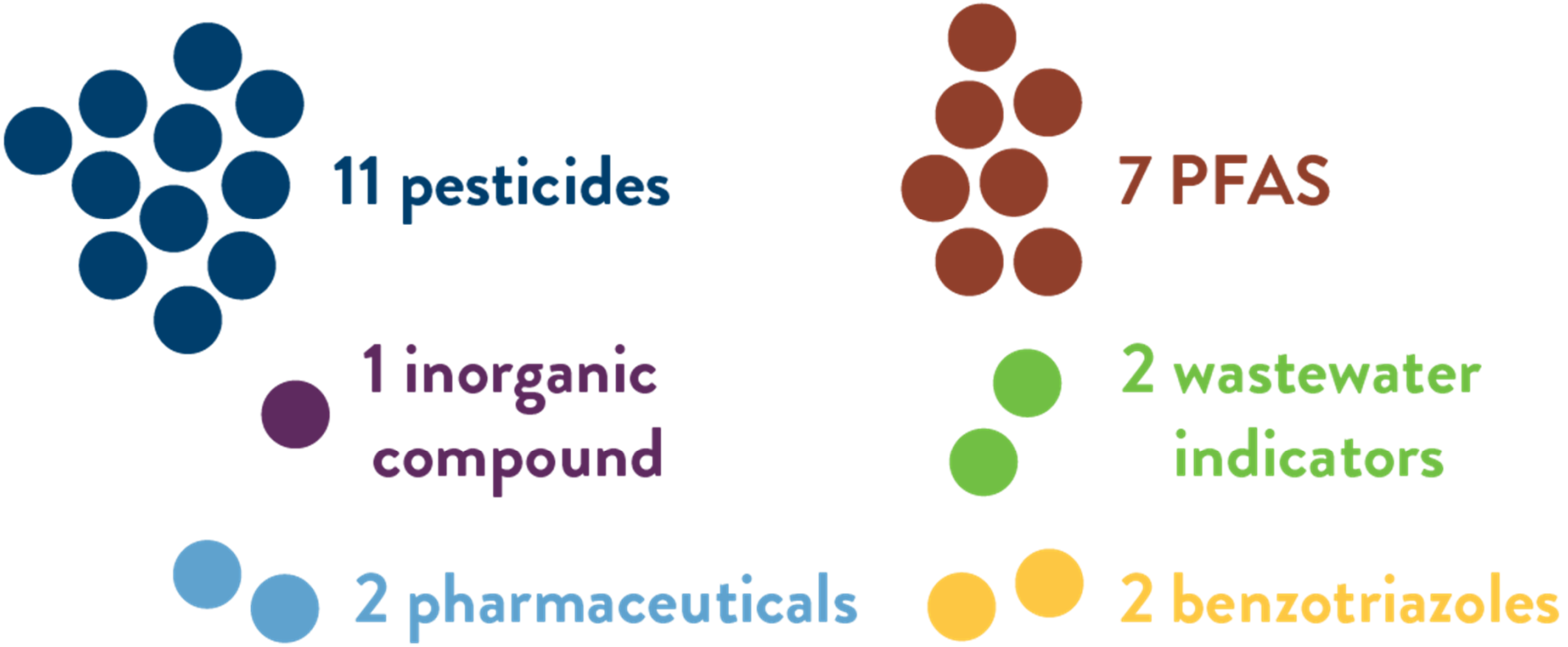
UCMP: CECs detected at all sites, by class and relative frequency of detection



UCMP: Ten most frequently detected CECs

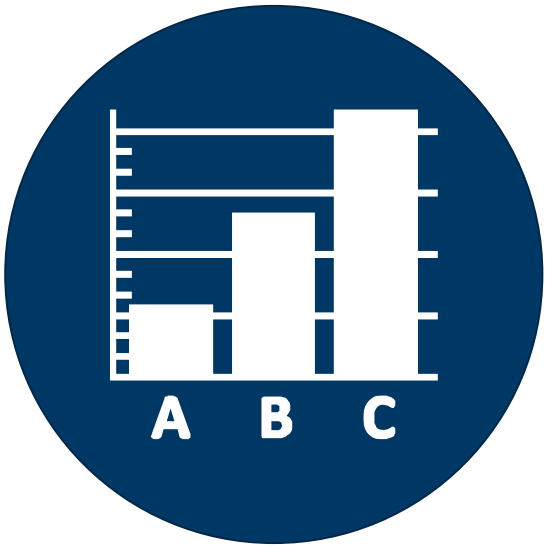


UCMP: CECs detected in at least 20% of samples



Unregulated Contaminants Monitoring Project: 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



Unregulated Contaminants Monitoring Project: Next Steps 2023-2025

- 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

Cyanazine Degradate Monitoring at Public Water Systems

2020 – Ongoing

Cyanazine and degradates

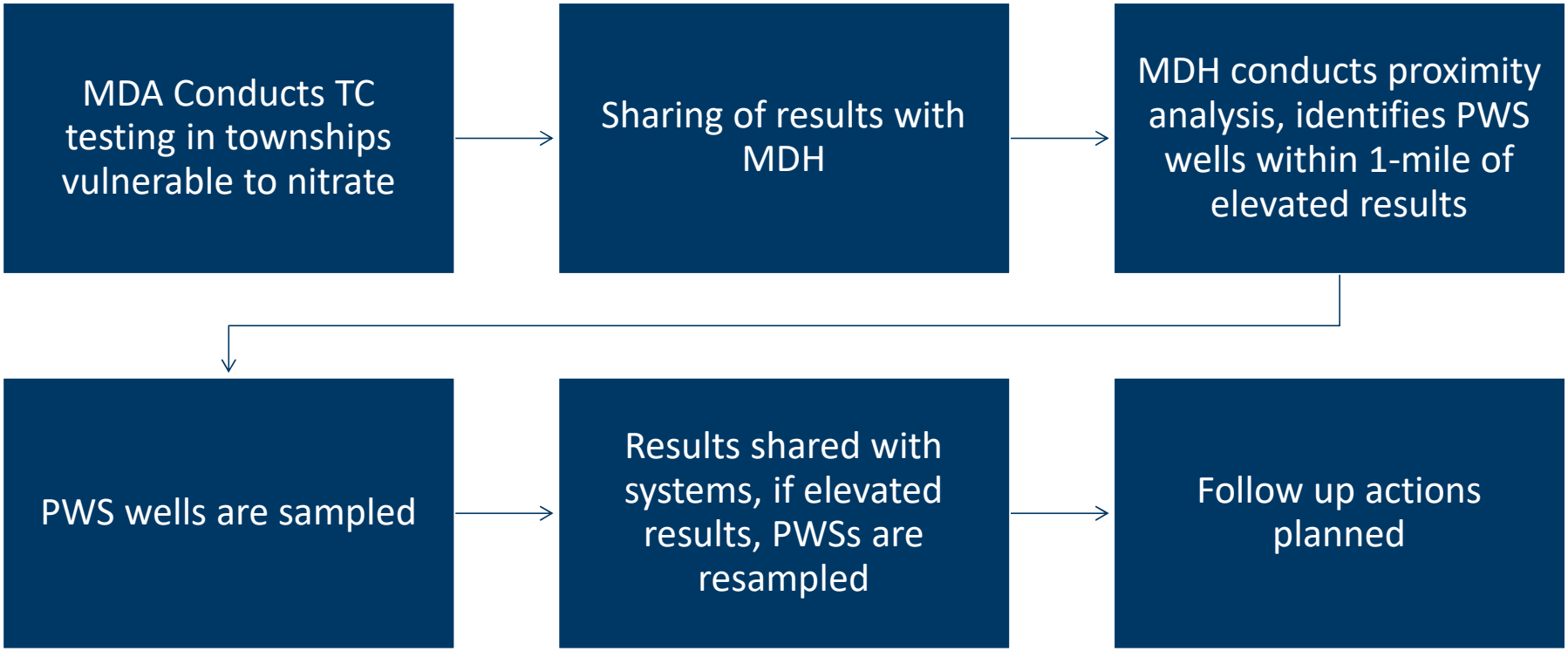
- Chlorotriazine herbicides
- Used in Minnesota from 1970's-1990's
- Exposure to degradates can induce neuroendocrine and/or renal effects

Cyanazine degradates and health-based guidance values

Cyanazine-specific Degradates	Degradates Common to both Cyanazine and Atrazine
Cyanazine acid (CAC)	Deethyldeisopropylatrazine (DACT, DEDI, DDA)
Cyanazine amide (CAM)	Deisopropylatrazine (DIA)
Deethylcyanazine acid (DCAC)	
Deethylcyanazine amide (DCAM)	
Deethylcyanazine (DEC)	

Total Cyanazine Health Risk Limits (HRLs)
Acute HRL = 3 µg/L
Short-term HRL = 3 µg/L
Subchronic HRL = 3 µg/L
Chronic HRL = 1 µg/L

Total Cyanazine Testing at MDH



Statewide PFAS Testing Project

2020 - 2023

MDH Statewide PFAS Testing Goals

1. Sample all community public water supplies by early 2023
    - Participation is voluntary
    - Include all entry points
2. Determine if any detections are above MDH guidance values

Statewide PFAS Testing Phase 1: June-Sep 2021

Sample all entry points at community water systems (100)

Funded through an EPA multipurpose grant

Included only systems nearby known sources or detections of PFAS in the environment, geologically vulnerable sources

Samples collected by contractors, EPA method 533

Statewide PFAS Monitoring Phase 1: Site Selection

AFFF Sites

Spray Irrigation

Closed Landfills

Statewide PFAS Testing Phase 2: Fall 2021-Spring 2022

Sample all entry points at community water systems (250)

Funded through an additional EPA multipurpose grant

Prioritize geologically vulnerable sources and large systems

Samples collected by contractors, EPA method 533

Statewide PFAS Testing Phase 3: July 2022 – Early 2023

Sample all remaining community water systems (500+)

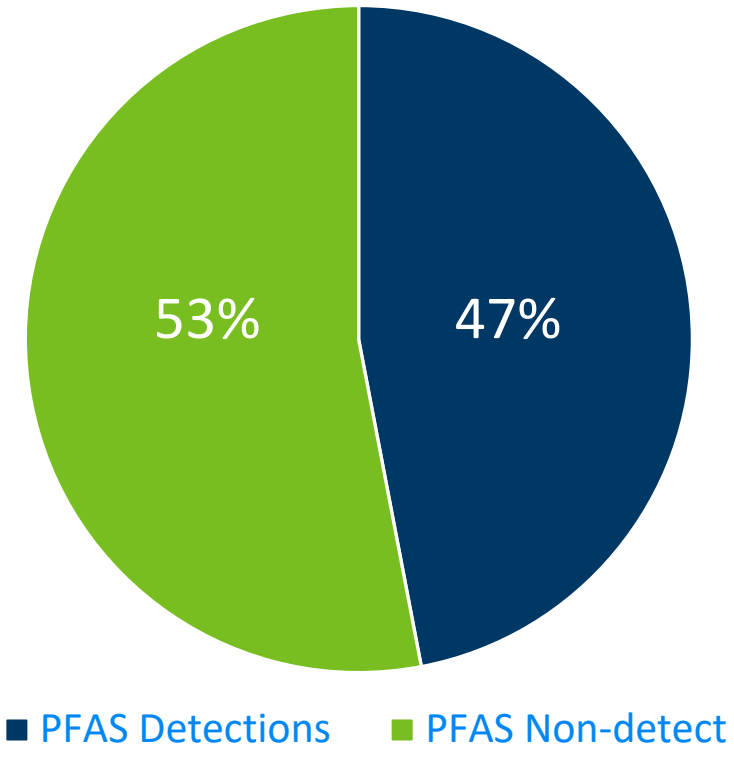
Funded through an additional EPA multipurpose grant and Clean Water Fund Appropriations

No more prioritization or sampling criteria

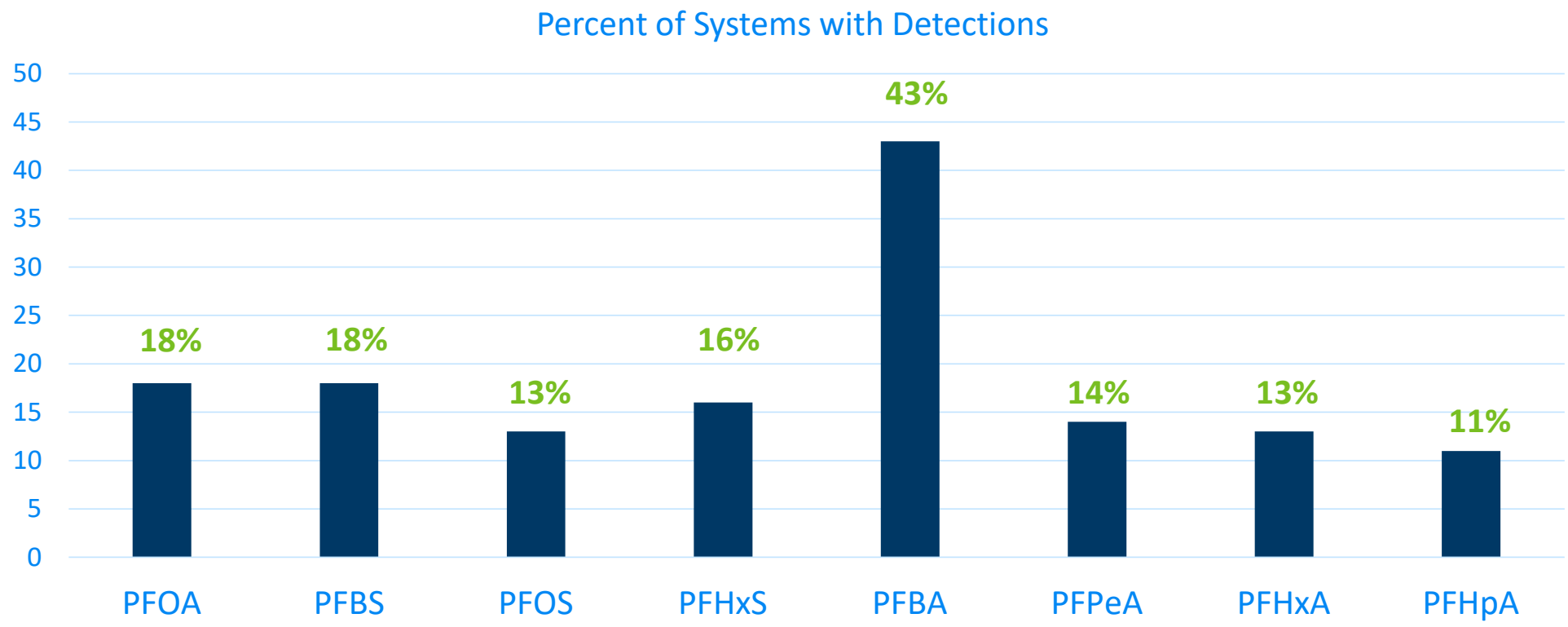
Samples collected by contractors, EPA method 533

Total Sampled Public Water Systems with PFAS Detections: All Phases

401 of 861 public water systems had at least one positive PFAS detection

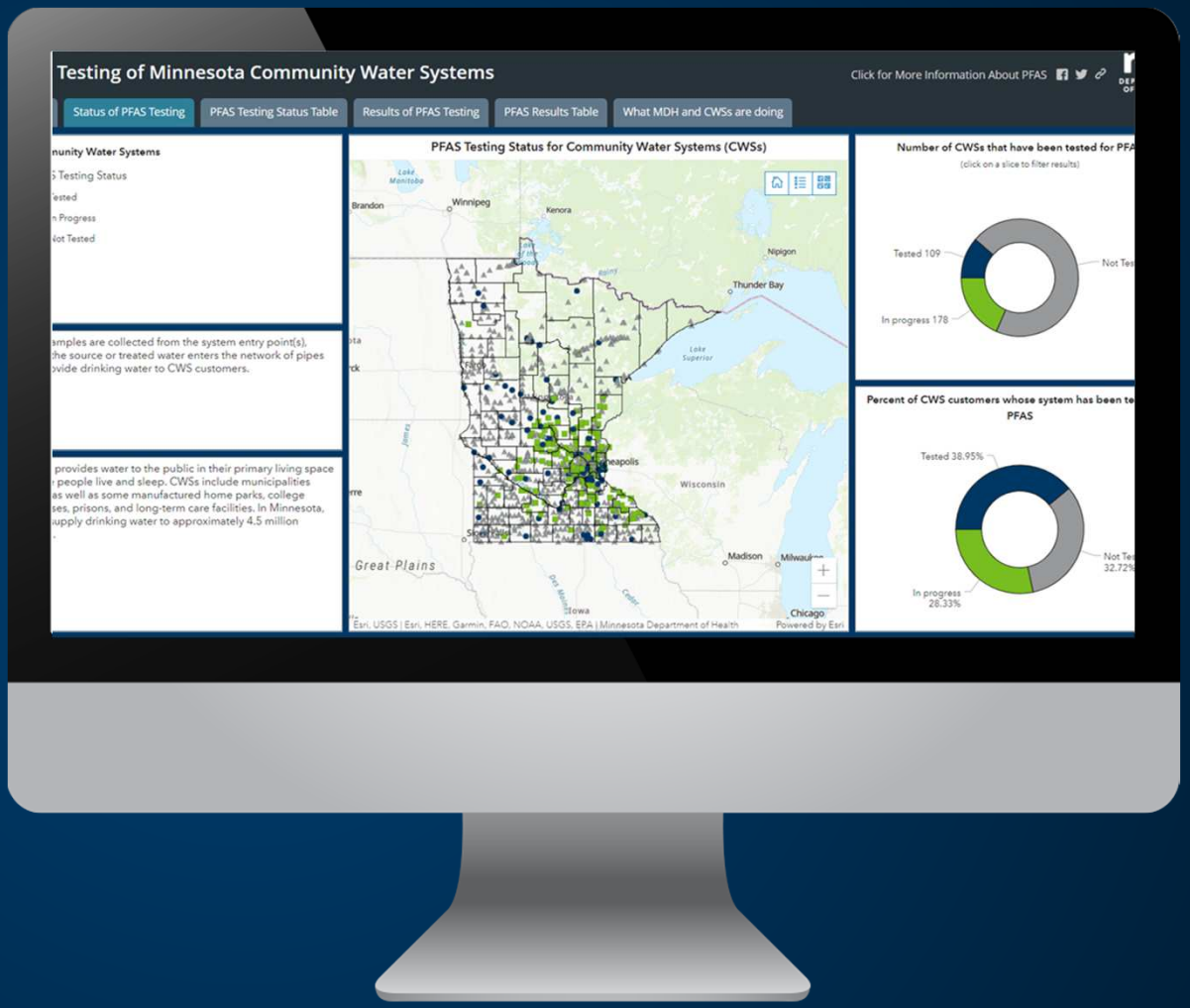


Statewide PFAS Project Most Widely Detected Compounds

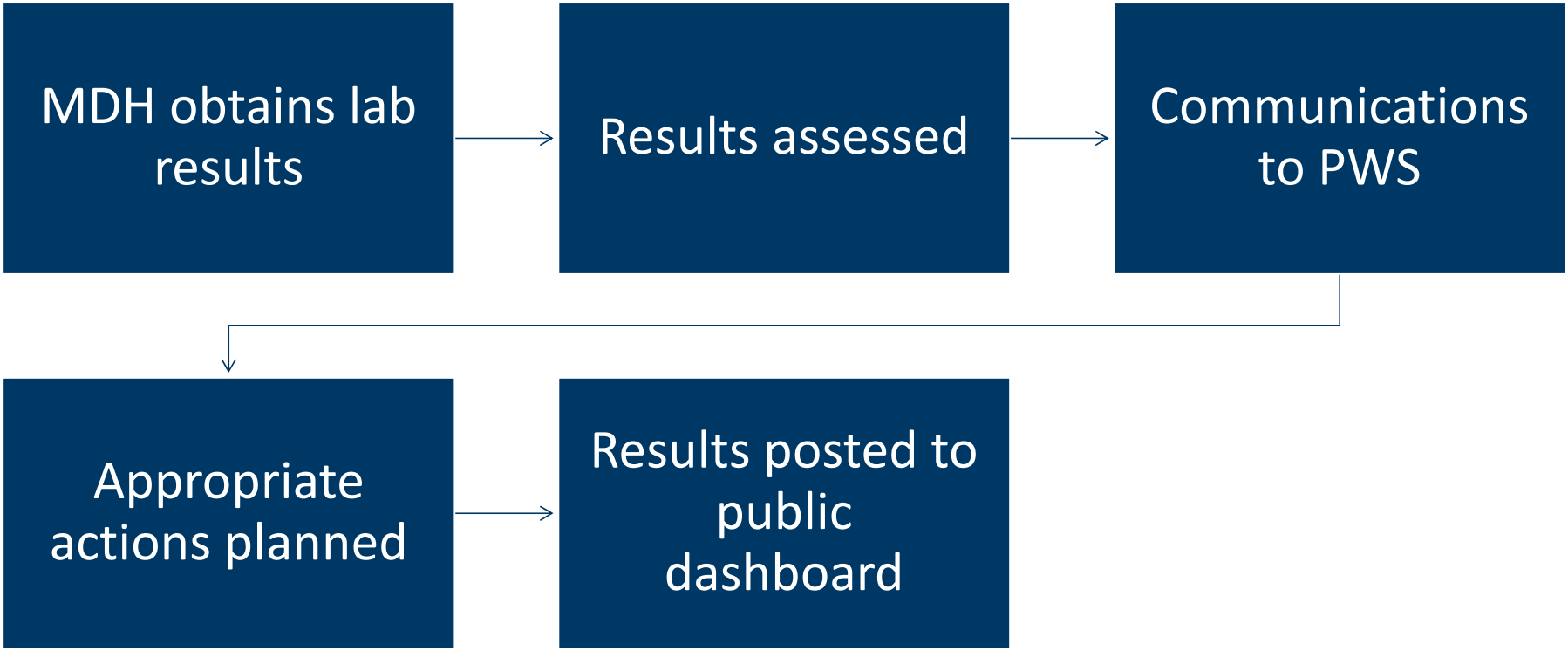


Interactive web dashboard

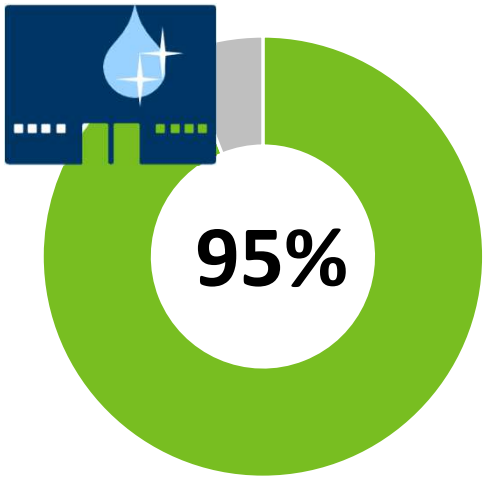
- Status of PFAS testing in drinking water
- PFAS testing results
- Health guidance
- Actions MDH and systems are taking
- [MDH Dashboard Landing Page]



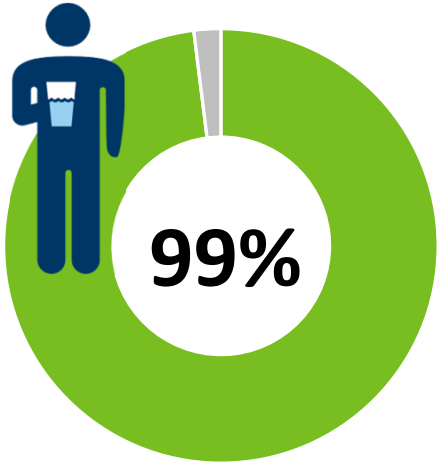
After the sampling – using the results



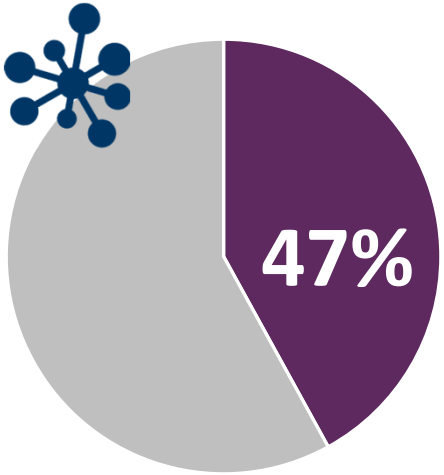
Testing PFAS in drinking water: status and preliminary results



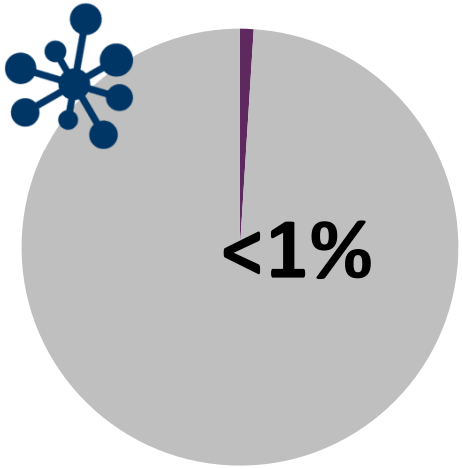
95% of community water systems tested or in progress (921)



99% of community water system customers covered under testing (4.5 million)



Roughly 47% of systems tested had a PFAS detection



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

EPA Draft MCLs for PFAS

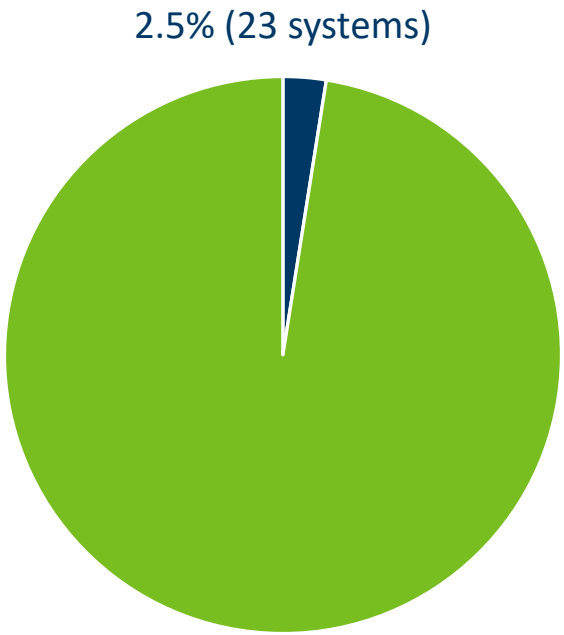
March 14 - EPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS compounds

Chemical	MDH HBV (ppt)	MCLG (ppt)	MCL (ppt)	PQL (ppt)
PFOA	35	0	4.0	4.0
PFOS	15	0	4.0	4.0
PFBS	100	Hazard Index = 1.0	Hazard Index = 1.0	3.0
PFHxS	47			3.0
PFNA	-			4.0
GenX	-			5.0

Practical Quantification Level (PQL) - the lowest analyte concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions

GenX = Hexafluoropropylene oxide dimer acid (HFPO-DA)

Systems above EPA draft MCLs



- Some systems have only one well exceeding draft MCLs
- MDH guidance is also expected to be lowered

Next Steps 2023-2025

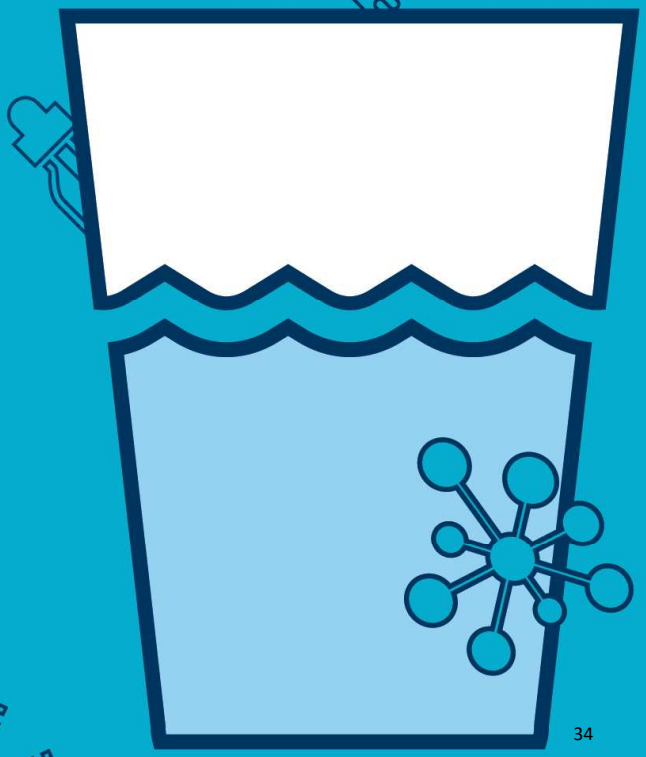
- Continue data analysis
- Assess variables potentially influencing PFAS at public water systems
  - Land use
  - Well characteristics

Drinking Water Ambient Monitoring Program (DWAMP)

2023 - Ongoing

Investigative Monitoring Projects in Drinking Water Protection

- Virus Study/Pathogen Project
- Unregulated Contaminants Monitoring Project (UCMP)
- Pesticide Sampling Project (2010 & 2015)
- Statewide PFAS Sampling Project
- General Chemistry Project
- UCMR
- Manganese
- Microplastics



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 Objectives

CEC Horizon Scanning

Follow up CEC sampling

Watershed-scale characterization

Surface water sampling

Objective #1: CEC Horizon Scanning

Ongoing monitoring for emerging contaminants primarily at an **established network** of **groundwater** and **surface water** sites at selected **community** and **non-community** public water systems.

- Proactive data collection, advanced notice of potential public health concerns, increased data for use in the development of health-based guidance values
- Established network of sites, flexibility to add additional sites if needed
- Annual meeting with stakeholder groups (MDA, MPCA, etc.) drive parameter selection

Objective #2: CEC Follow-up Sampling

Sampling for CECs at **community public water systems** where CECs have been detected **below 25% of health action levels** in previous monitoring.

- Thorough follow-up and confirmation sampling at systems with previous low-level detections, early identification and tracking of CECs at vulnerable systems
- One CEC or CEC group per year, rotate through active list (1, 4-dioxane, pesticides, pharmaceuticals, etc.)

Objective #3: Watershed-scale Characterization

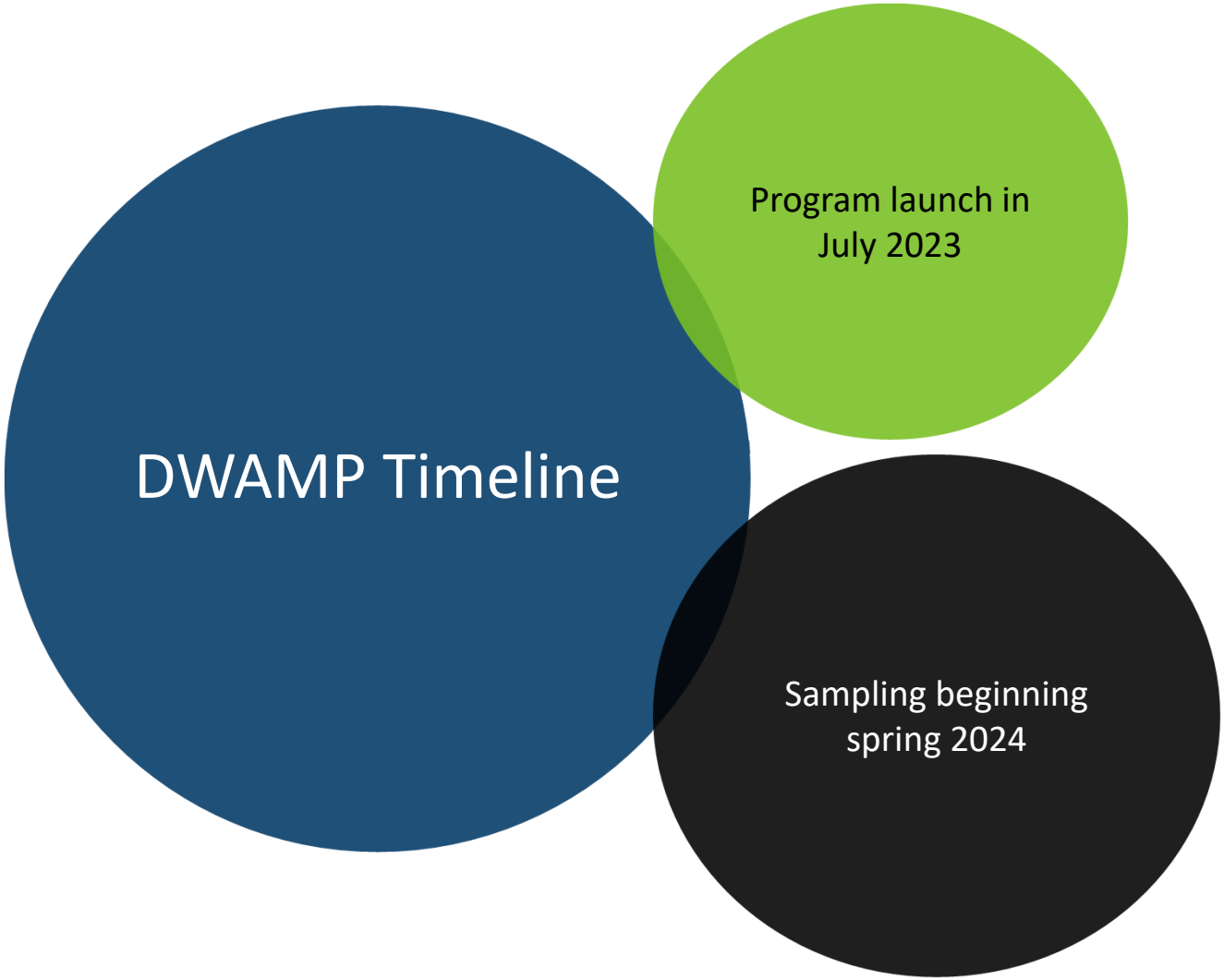
Sampling at a selected group of **noncommunity and private wells** within **target watersheds** to identify areas and aquifers that are **subject to recent recharge** and are vulnerable to contaminants at the ground surface.

- Data collection to fill gaps in existing monitoring programs, increased knowledge of vulnerable aquifers/regions at the watershed scale, data collected on private wells
- Watersheds selected at midpoint of 1W1P planning process
- Sample for PFAS, arsenic, nitrate, major cations/anions, bacteria, lead, and manganese

Objective #4: Surface Water Sampling

Sampling at **surface water bodies** that feed drinking water systems on a **seasonal basis** (3x per year) to collect data and monitor trends.

- More data on water quality at surface water systems
- Parameters will include phosphorus, nitrate, chloride, TSS, bacteria, and field parameters, additional if unique needs


DWAMP Timeline
Program launch in
July 2023
Sampling beginning
spring 2024

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Thank you!

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