



East Metro PFAS ground water contamination:

Technical and policy challenges in addressing PFAS in drinking water supplies

2023 Minnesota Ground Water Association Fall Conference

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Agenda

1. Minnesota's approach to PFAS in drinking water
2. 3M East Metro Settlement
3. Insights on addressing PFAS in Minnesota

Minnesota's Approach to PFAS in drinking water



Recent studies show because PFAS can transfer from a mother to her baby, nearly all babies are born with these chemicals in their body.

Overview of impacts

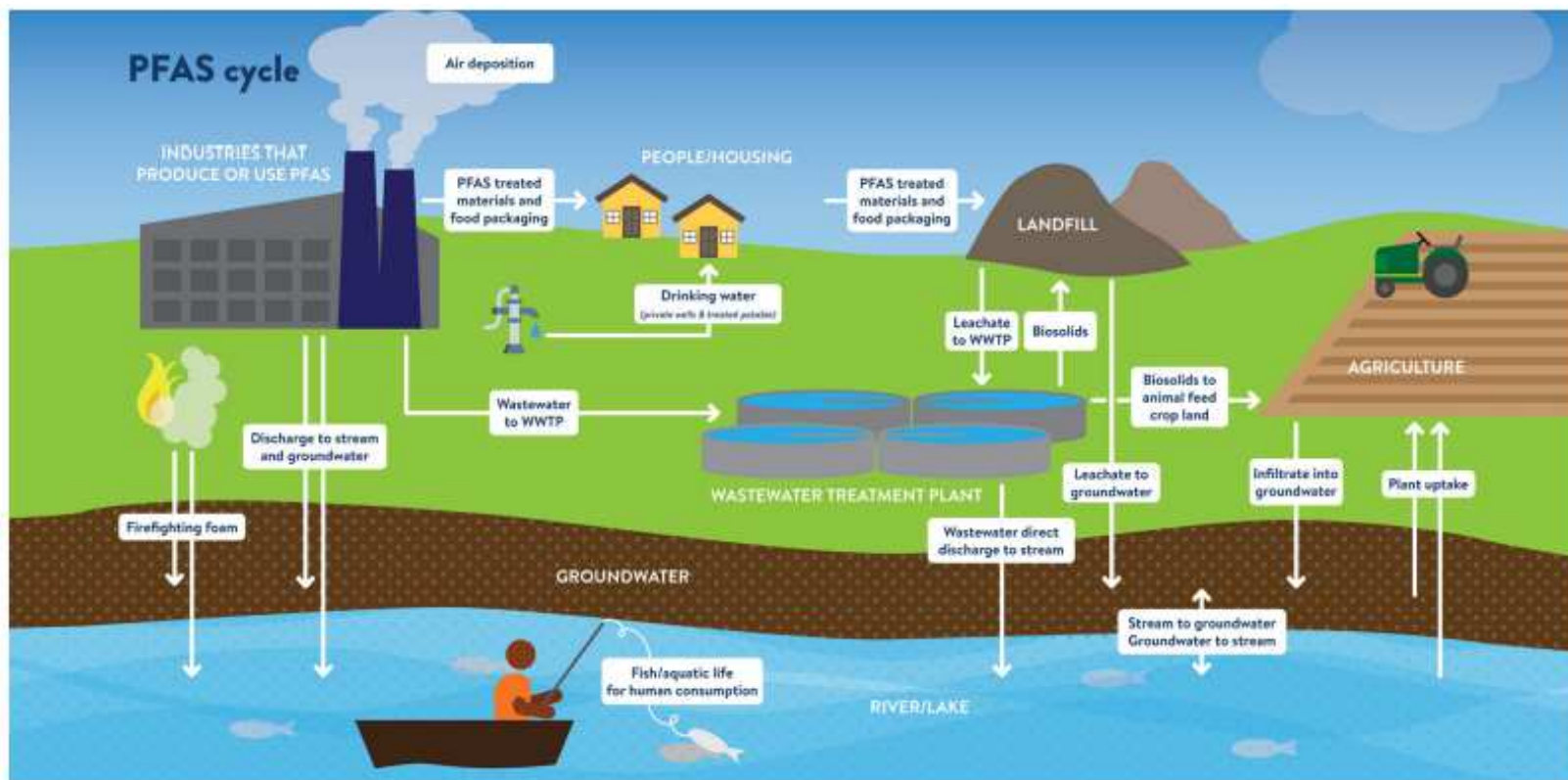
Sources of PFAS to humans

- releases to the air, which results in soil, surface water, and groundwater contamination.
- releases to surface water, which results in surface water, fish, sediment and potentially groundwater contamination.
- releases to soil, including during use of PFAS-containing fire-fighting foam, which results in soil, surface water, groundwater, and fish contamination.

Source: <https://www.pca.state.mn.us/pollutants-and-contaminants/pfas>

Overview of impacts

Sources of PFAS to humans



Source: <https://www.pca.state.mn.us/sites/default/files/p-gen1-22g.pdf>

Overview of impacts

Impacts from New Information

All values in ng/L (ppt)	MDH values		EPA draft MCL	EPA health-based water concentration
	HRL	HBV		
PFOS	300	15	4	--
PFOA	35	35	4	--
PFBA	7000	--	--	--
PFPeA	--	--	--	--
PFHxA	--	200	--	--
PFBS	7000	100	1.0	2000
PFHxS	--	47	(unitless)	9
HFPO-DA (GenX)	--	--	Hazard Index	10
PFNA	--	--		10

$$\text{MDH Health Risk Index} = \frac{\text{PFBS}}{100} + \frac{\text{PFBA}}{7000} + \frac{\text{PFHxS}}{47} + \frac{\text{PFHxA}}{200} + \frac{\text{PFOS}}{15} + \frac{\text{PFOA}}{35}$$

Note that if a well has a HRI > 1.0, MDH issues a health advisory.

$$\text{EPA Hazard Index} = \frac{\text{GenX}}{10} + \frac{\text{PFBS}}{2000} + \frac{\text{PFNA}}{10} + \frac{\text{PFHxS}}{9}$$

Minnesota Drinking Water Regulations

Public vs Private water supplies

Private Water Supplies



No testing requirements

- **Not regulated** SDWA, CWA, etc.
- Existing public health protection: MN Well Code, GW Protection Act, state and federal Superfund programs
- “Everywhere” yet no known source or investigation to provide test/treatment
- Voluntary engagement
- Major health equity challenges - Lack of access to certified lab testing; cost prohibitive, inadequate coverage of state

Public Water Supplies

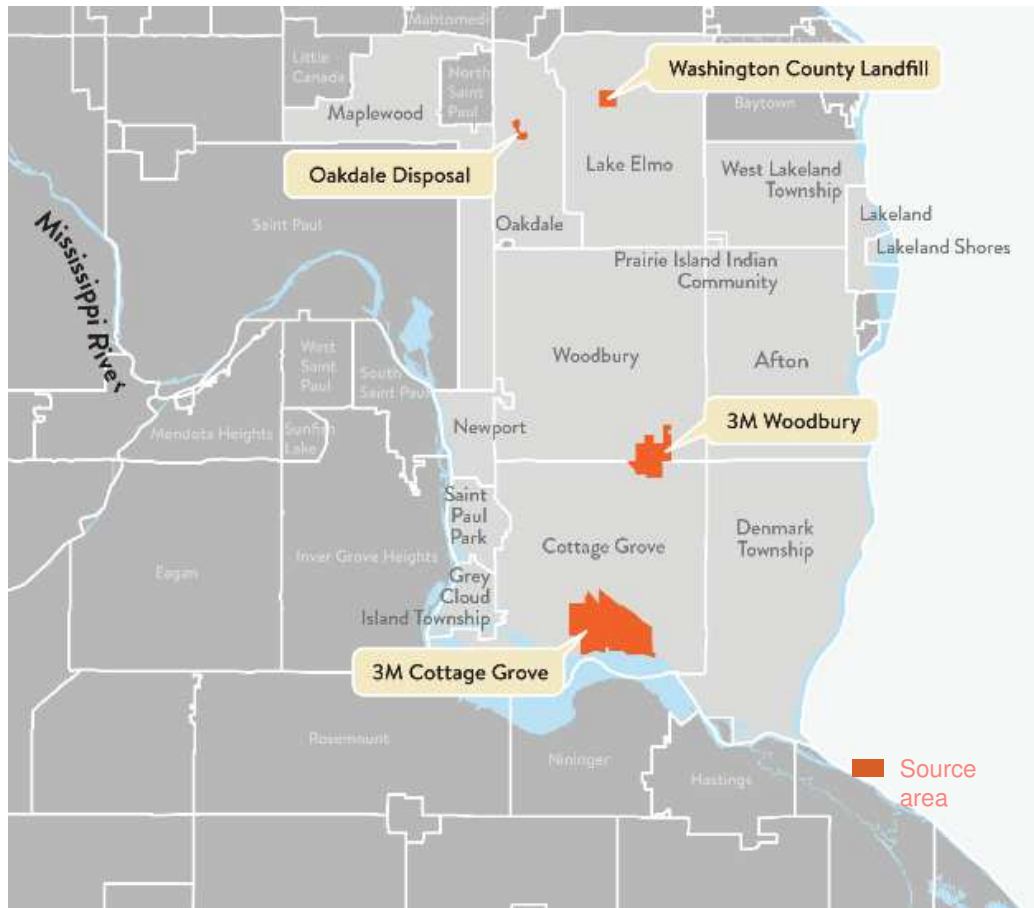


Required testing

- **Highly regulated** by SDWA, CWA, etc.
- Wellhead protection program
- Regular testing/monitoring conducted by MDH, CWS program
- Design oversight
- Treatment technologies review
- Can pursue investigation through State Superfund program

3M East Metro Settlement





Early 2000's PFAS were found in the eastern part of the Twin Cities, including drinking water supplies

February 2018 – State and 3M reached \$850 million NRDA settlement regarding PFAS releases in East Metro

Groundwater contamination covers over 150 square miles, affecting the drinking water supplies of over 174,000 Minnesotans

2007 Consent Order stays in place – when settlement funds are depleted, 3M's obligations return

PFAS in the East Metro

Slide materials used with permission from MPCA

2018 Settlement Overview

3M agreed to \$850 million grant to the State to be used for long-term drinking water solutions in the East Metropolitan Area.

Priority 1: *Enhance the quality, quantity and sustainability of the drinking water in the East Metropolitan Area (\$700 million).*

Priority 2: Enhance natural resources. Per the Settlement Agreement, \$20 million is dedicated for this priority.

Priority: Protect water, help communities

Collaborated with the Government-3M Working Group and the Citizen-Business Group to develop a set of specific goals.



Provide safe and sustainable drinking water to meet current and future needs under changing conditions, population, and health-based values.

Protect and improve groundwater quality

Protect and maintain groundwater quantity

Minimize long-term cost burdens for communities



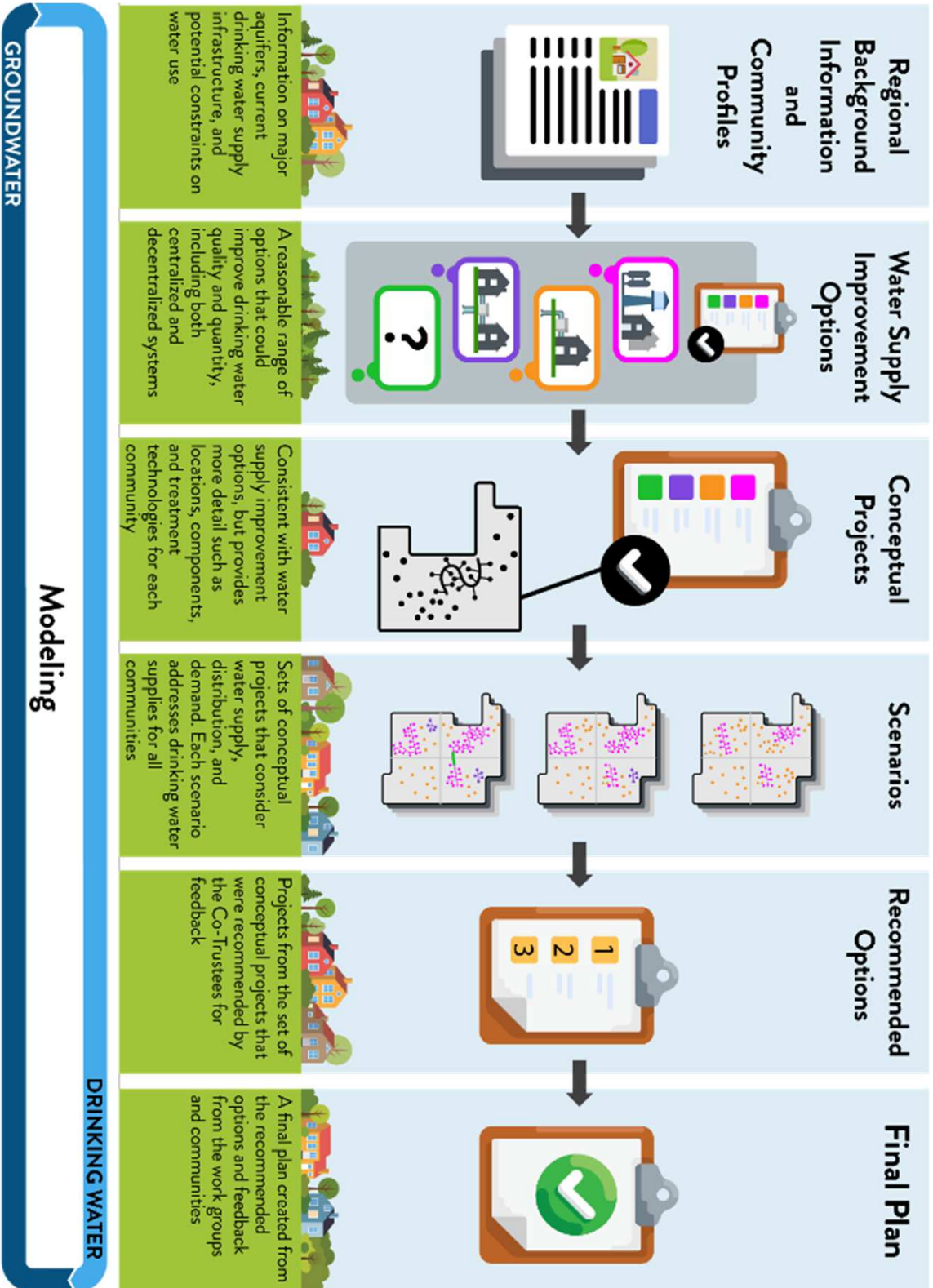
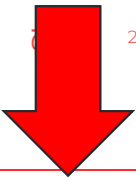
Final plan provides

6 new or expanded water treatment plants

33 treated municipal wells

296 homes connected to municipal water

Nearly **1,000** homes with whole home treatment systems



Slide materials used with permission from MPCA

Practical features of the Conceptual Plan/process

- Concepts within the plan
 - Neighborhood connection comparisons
 - O&M – private vs public
 - White Bear Lake – keeping options open
 - Treatment threshold
 - Funding design only for some components, not funding growth related wells
- Appendix F content:
 - small community cost comparison
 - Water treatment plant cost estimating
 - treatment technology comparison (although there are more out there now – ITRC, Barr, etc.)
- East Metro groundwater model
- Pilot Studies – treatment challenges

Inflation and other cost increases

Conceptual Plan assumed 3% annual inflation based on past trends and professional judgement; current inflation is higher at about 7%

Higher inflation, labor shortages, and supply chain issues have made cost harder to predict and are driving price increases

Material and equipment costs have increased by approximately 35% for water treatment and ductile iron, and over 100% for plastics and rubber from 2020 to 2022

Lessons learned

Successes

- Work groups
- Frequent, effective communication
- Engaging 1-on-1
- Community supported

Challenges

- Regional approach
- Future uncertainties
- Technical details on a *conceptual* plan
- Timeline

Insights on addressing PFAS in Minnesota



Minnesota's PFAS Blueprint

Management Strategy

- **Prevent.** Discover the most significant sources of PFAS in the environment. This information can help facilities switch to PFAS-free products, enact PFAS management plans, or install up-stream PFAS treatment and destruction systems.
- **Manage.** Gather data needed to develop PFAS minimization strategies to meaningfully reduce PFAS releases to the environment.
- **Clean up.** Discover PFAS-impacted areas to target risk reduction efforts, such as ensuring rapid investigation of potentially impacted drinking water systems or commonly used fisheries.

Challenges to addressing PFAS in MN

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Treatment Technologies



Inflation and other cost increases



Hazardous Substance & Disposal



Insights from the East Metro and beyond

- ❑ Inter-agency cooperation and stakeholder engagement
- ❑ Increasing sampling frequency for drinking water supplies
- ❑ Increase laboratory capacity
- ❑ Address gap in access to laboratories (physical and cost) for private well owners
- ❑ Alternative path forward for unknown or multiple RP situation
- ❑ Streamline public water supply treatment approval process
- ❑ Consider that sudden expected influx of demand for treatment, resources such as GAC will be overwhelmed.
- ❑ Consider when costs and State staffing and resource needs become too burdensome.

Website: 3msettlement.state.mn.us

GovDelivery: sign up for updates on website

Conceptual Plan + Resident's Guide

14 community pages

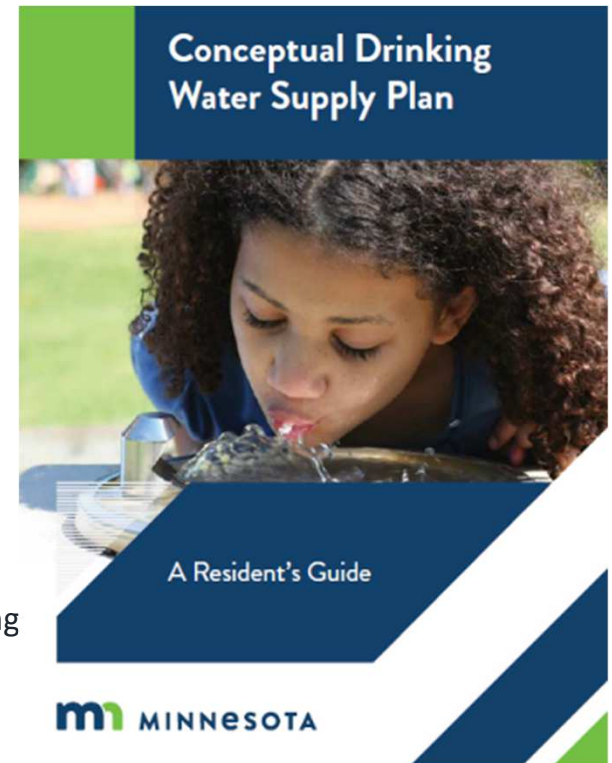
Interactive map for private well owners

Project-specific pages (more technical information)

Resident's Guide

Multi-page online "magazine" geared towards interested public explaining communities, and how we got here

Online information



Thank you



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WSP Experience and Services



Preliminary results on PFAS Destruction In Soil



Electro-oxidation: How to Sustainably Destroy PFAS In Water



Unlocking the PFAS Puzzle with Multiple Lines of Evidence



Helping Protect the Public and Environment from PFAS Impacts...



Airport PFAS Survey: Exploring New Human and Environmental...



PFAS Remediation at Multiple Locations at a North American...

<https://www.wsp.com/en-ca/services/pfas-management-investigation-and-treatment>

Questions?

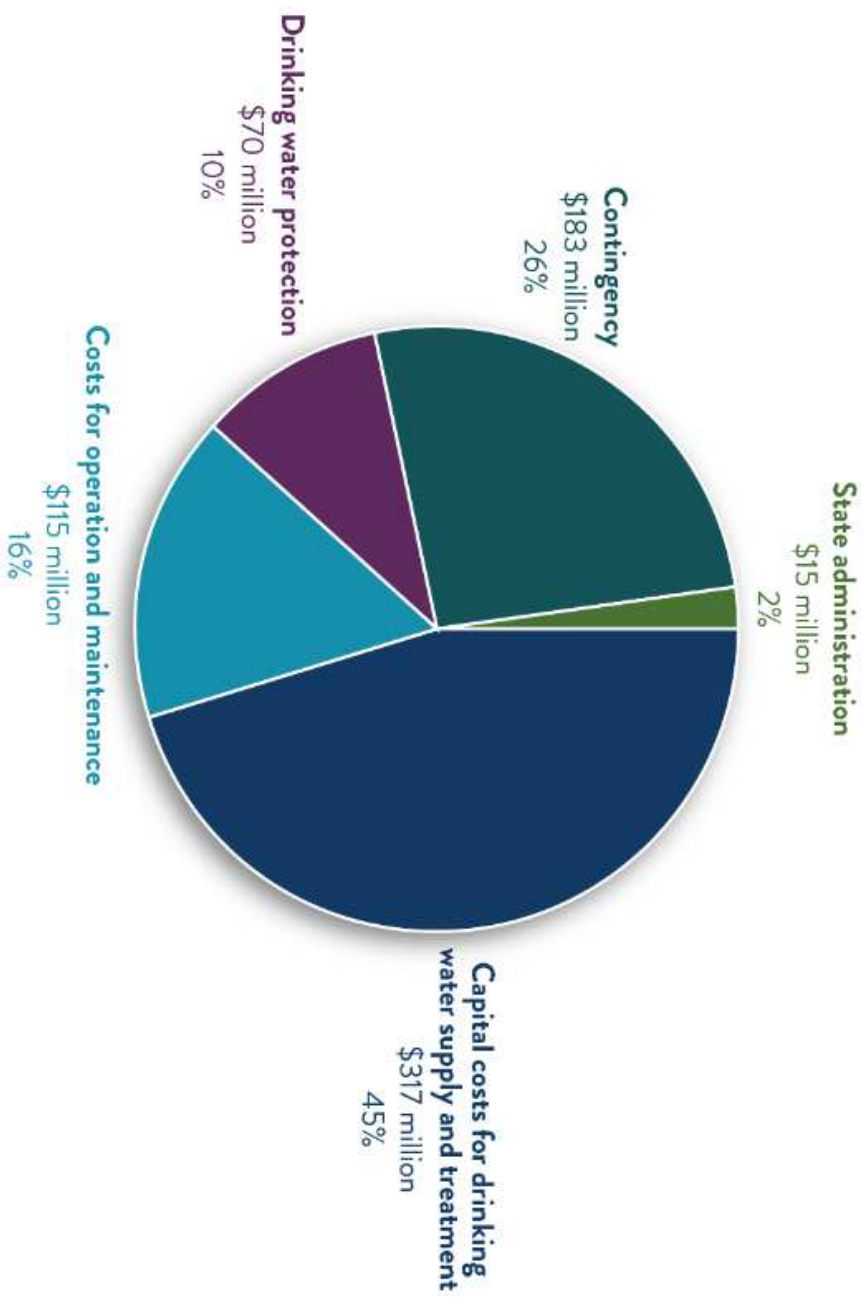


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Final plan





Drinking water well treatment costs

Transition from Settlement to Consent Order Funding



Challenges to addressing PFAS in MN

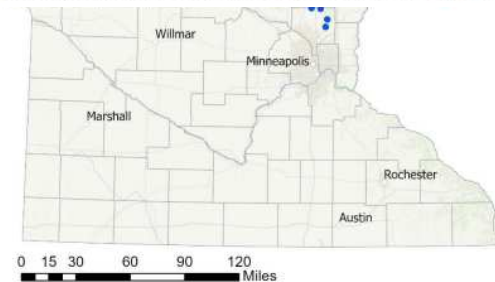
Baseline conditions

- Minnesota’s ambient groundwater network studies have shown that the baseline in groundwater is generally at reporting limits
- Drinking water criteria is also reaching levels at or below reporting limits.

Table 1. Summary of general conclusions for PFAS ambient background concentrations

Environmental media / Document section	Location	Ambient background concentrations	Comment
Groundwater	MN	Generally, below current ¹ laboratory reporting limits	Refer to the “Groundwater” section and Table 2
Air, precipitation, and surface water	MN and other locations	Air: inhalation is not likely to be a significant route of exposure to PFAS with existing inhalation guidance values Precipitation and surface water: generally, close to or below current ¹ laboratory reporting limits	Refer to the “Air, precipitation, and surface water” section PFAS do not readily break down in the environment, any deposition to aquatic and terrestrial environments leads to PFAS building up over time and could lead or contribute to water quality and ecosystem impairments.
Soil	MN and other locations	Appear to be below current (2023) MPCA PFAS soil reference values (SRVs)	Refer to the “Soil” section and Table 12

¹ – current as of the publication of this document. Reporting limits are likely to change and improve over time.



How will communities respond?

How will private well owners respond?

Source: PFAS Ambient background concentrations (tdr-g1-25)
<https://www.pca.state.mn.us/sites/default/files/tdr-g1-25.pdf>

Approaches for private and public water supplies

Private water supplies

- well owners can request to have their well sampled or pay for sampling themselves and will be issued a health advisory if testing shows their well exceeds guidance values
- domestic use well owners with a health advisory are provided information on either installing a whole-home treatment system (POETS) or getting connected to a public water supply if one is available
- Generally, costs are covered by the individual

Public water supplies

- the department of health routinely samples drinking water supplies in the East Metro and greater Minnesota to test for PFAS and also issues health advisories for public drinking water wells
- Various scenarios may occur when a public water supply well receives a health advisory, but usually:
 - the well is removed from service, or
 - the well is treated for PFAS.
- Generally, the cost is covered by the community as well as various funding options provided by the state.