



PFAS In Minnesota & Impacts on East Metro Drinking Water

By: Alecia Jendro

PFAS and Minnesota

What Are PFAS?

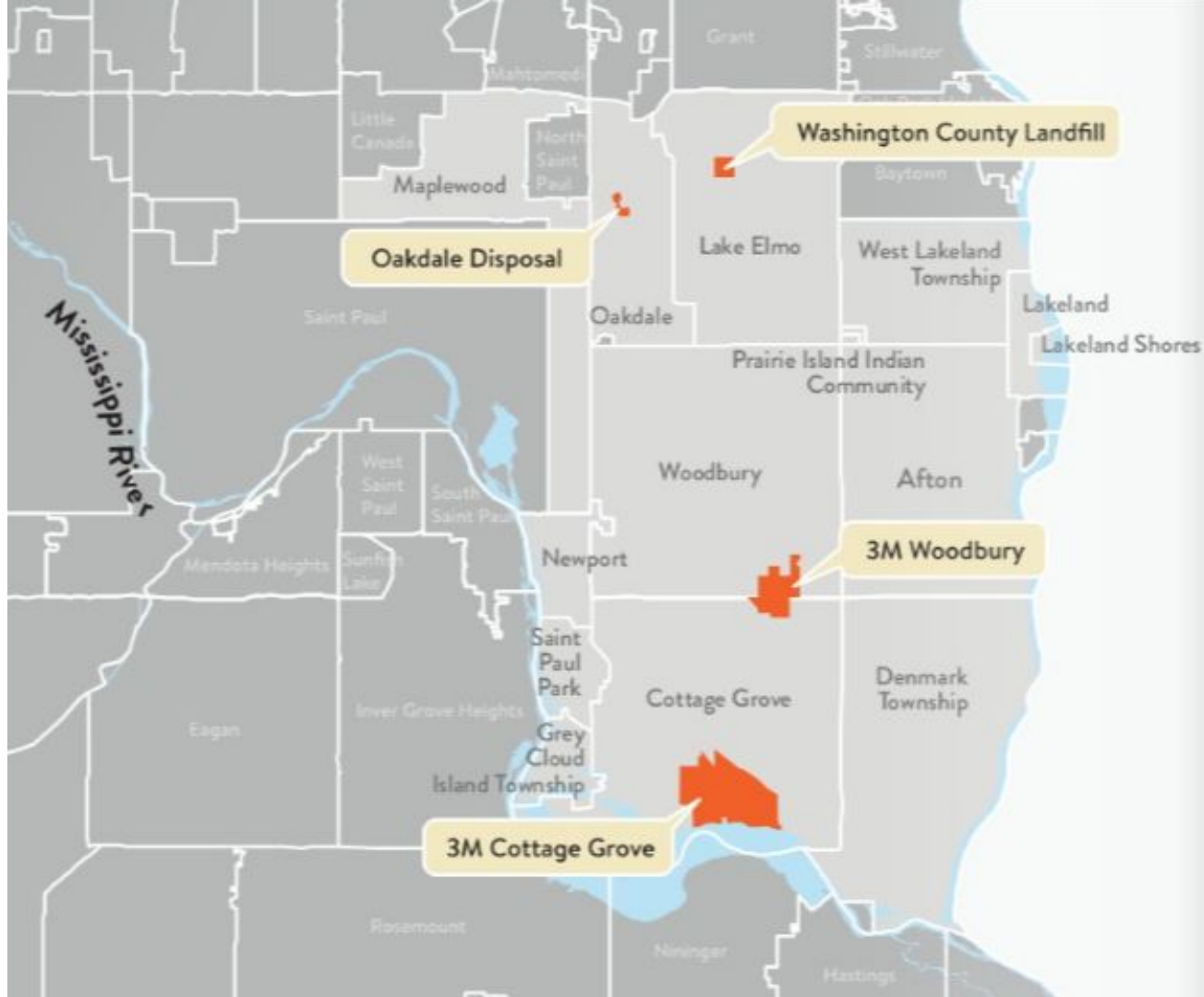
- An umbrella term for synthetically developed chemicals
 - Also known as Per- and polyfluoroalkyl substances
- PFAS are used to make products that resist heat, oil, stains, grease, and water
- Strong and virtually indestructible
- Some can persist in the environment for long periods of time
 - Bioaccumulation in animals and humans

Contamination in Minnesota

- 3M has been a main manufacturer globally
- Products containing PFAS were disposed of by 3M at 4 different sites in the East Metro Area
 - Allowed PFAS to contaminate areas and water sources surrounding disposal sites

Orange: Sites where 3M disposed of PFAS

Light Gray: Areas affected by PFAS pollution, polluted drinking water



Timeline of PFAS Introduction Into Minnesota

1950-
1970s

3M Disposes of PFAS at 4 disposal sites
Washington County Landfill,
Oakdale Disposal, 3M Woodbury,
3M Cottage Grove

Early
2000'
s

PFAS contamination in drinking water wells first identified in the East Metro

2007

Agreement between State and 3M requires 3M to investigate and take remedial actions to address release of PFAS from their disposal sites

2009

MPCA conducts Mississippi River study of PFCs in fish, insects, water, & sediment. Data from study used to calculate Fish Bioaccumulation Factors (BAFs) for water quality criteria development.

2021

Minnesota releases Conceptual Drinking Water Supply Plan detailing how settlement funds are being used to ensure safe and sustainable drinking water in East Metro now and in the future

2018

The State and 3M settle the lawsuit for \$850 million, with legal and other expenses paid, about \$720 million will be invested in drinking water and natural resource projects in East Metro area

2012

MPCA conducts follow up study of Mississippi River and finds lower PFOS levels in fish, leading to updated BAFS

2010

The State files a lawsuit against 3M for harm to natural resources as a result of PFAS released in East Metropolitan Area

How Were PFAS First Identified?

2002

- Investigations done by 3M at the 3M Cottage Grove Facility showed that two different types of PFAS (PFOA and PFOS) were detected at the site
- MPCA requested that the MDH come up with health based values for the two different types of PFAS identified at the site

2003-
2004

- PFAS detected in groundwater
- 3M discloses possible locations with PFAS-containing waste
- MDH Public Health Lab develops method to analyze water samples for PFAS
- Testing done on wells near Lake Elmo and Oakdale detected measurable amounts of PFAS

2005

- Construction begins in Oakdale to remove PFAS from two of Oakdale's most affected wells
- Private well sampling efforts expand
- 19 residences in Lake Elmo are provided with bottled water as a temporary solution by the MPCA followed by GCA installments due to the high amounts of PFAS detected

Environmental Impacts

- Since PFAS is an emerging contaminant, the research has been mainly focused on health impacts rather than environmental impacts
- Persists in the environment
- **Water**
 - Enters groundwater
 - Found to contaminate private and public drinking water wells
- **Soil**
 - Increased litter decomposition
 - Increases soil pH due to the acidity of PFAS
 - Reduced water-stable aggregates could impact soil structure
 - Decreases soil respiration and the microbial population living in the soil
- **Animals**
 - Fish are source of exposure for humans
 - Hatching success for tree swallow eggs went down when exposed to PFAS (Testing done in MN and WI)
 - Chicken egg pipping (initial cracking of egg by chick during hatching) reduction with exposure to PFAS
 - Increased liver weights in animals
 - Reduced growth in aquatic wildlife

Health Impacts

- Decreased fertility, increased high blood pressure in pregnant women
- Breast milk from mothers with PFAS in their blood and formula made with water containing PFAS can expose infants to PFAS
- Developmental effects or delays in children (low birth weight, accelerated puberty, bone variations, behavioral changes)
- Increased risk of cancer including prostate, kidney, testicular
- Increased chance of asthma and thyroid
- Liver damage, the toxicity of the chemical can result in cirrhosis, liver lesions, and impede normal liver functions.
- Kidney problems that can lead to kidney degeneration, kidney failure, interferes with overall kidney health and function
- Harms immune system causing humans to be susceptible to autoimmune disorders, blood disorders or abnormalities, and digestive problems
- Decreased vaccine response in children

Conceptual Drinking Water Supply Plan

- Prioritizes drinking water treatment, operation, maintenance and drinking water protection for public and private water systems.
- Provides safe, sustainable drinking water to the affected 14 East Metro communities now and in the future, as the plan uses 2040 water demand estimates to ensure infrastructure built today will serve East Metro in the future
- Each of the 14 affected communities received a specific project list based on their needs, community feedback and cost estimates
- Provides treatment for wells at or above 0.5 of the current Health Index
- Uses Granular Activated Carbon (GAC) treatment (large scale filters for community water treatment facilities and much smaller filters to treat water from private wells) to remove PFAS
 - As the contamination flows through the activated carbon, contaminants are absorbed from the water
- If living in priority sampling area, you can request for your well to be tested by filling out online form

The Plan



PFAS Health Index threshold at or above 0.5

- 1** Maplewood, West Lakeland Township, Afton, Grey Cloud Island Township, Denmark Township
 - Supply private wells with point of entry treatment systems (POETSs) - a whole home water filtration system - if over threshold

- 2** Cottage Grove
 - Treat 8 of 12 existing public wells
 - Replace 2 existing public wells with 1 new public well that will receive treatment
 - Add 2 new water treatment plants
 - Connect 156 homes
 - Supply other private wells with POETSs if over threshold

- 3** Lake Elmo
 - Supply drinking water from a combination of existing wells and new wells or an interconnect with Woodbury*
 - Connect 97 homes
 - Supply other private wells with POETSs if over threshold

- 4** Lakeland, Lakeland Shores
 - Connect 29 homes
 - Supply other private wells with POETSs if over threshold

- 5** Newport
 - One interconnect with Woodbury and one with Cottage Grove
 - Connect 3 homes
 - Supply other private wells with POETSs if over threshold

- 6** Oakdale
 - Treat 2 of 9 existing public wells and expand 1 water treatment plant
 - Replace 3 existing public wells with 3 new public wells that will receive treatment
 - Supply other private wells with POETSs if over threshold

- 7** Prairie Island Indian Community
 - Treat 1 existing public well
 - Add 1 new water treatment plant

- 8** Saint Paul Park
 - Treat 3 of 3 public wells
 - Add 1 new water treatment plant
 - Connect 6 homes
 - Supply other private wells with POETSs if over threshold

- 9** Woodbury
 - Treat 15 of 19 existing wells
 - Replace 1 existing public well with 1 new public well
 - Add 1 new water treatment plant
 - Connect 5 homes
 - Supply other private wells with POETSs if over threshold

**The Co-Trustees set aside sufficient capital funding for either an autonomous option (two wells within Lake Elmo's borders that likely will need treatment) or an interconnect between Woodbury and Lake Elmo, due to some uncertainty regarding their future water source.*

What Else Is The Government Doing?

Short Term Goals

- Minnesota has requested a federal fund for more testing to be done for PFAS particles in the air
 - The State is also compiling information on inhalation of PFAS toxicity
- Creating a plan for monitoring PFAS in groundwaters at active landfills
- Issuing guidance on the collection and disposal of PFAS-containing firefighting foam and wastewater
- More research on PFAS source identification at wastewater treatment facilities
- Remediation, clean up at sites with PFAS contamination

Long Term Goals

- Providing assistance to companies switching from PFAS-containing products
- Requiring labeling for PFAS-containing products
- Requiring mandatory air toxins for PFAS reporting from facilities

Conclusion

- PFAS are persistent chemicals that do not break down easily
- PFAS were introduced into Minnesota wildlife by PFAS-containing products disposed of by 3M
 - This caused for PFAS to be detected in groundwater and drinking water around the 4 disposal sites
- PFAS are an emerging contaminant so there is very little information on their impacts on the environment
- PFAS have many negative health impacts on humans
- The Conceptual Drinking Water Supply Plan uses settlement funds from the 3M and Minnesota lawsuit to provide clean and safe drinking water for the 14 affected communities affected by PFAS pollution in the East Metro
- The Minnesota government is planning to do more research on the impacts of PFAS on the environment (wildlife and air)
- The government is working towards stopping PFAS manufacturing and coming up with clean up measures

Resources

- [Protecting Lake Elmo's drinking water | Minnesota 3M PFAS Settlement](#)
- [Minnesota 3M PFAS Settlement](#)
- <https://online.fliphtml5.com/jdba/sgvr/#p=1>
- [History of Conceptual Plan | Minnesota 3M PFAS Settlement](#)
- [Health risks of widely used chemicals may be underestimated](#)
- [Our Current Understanding of the Human Health and Environmental Risks of PFAS | US EPA](#)
- [Can PFAS Be Removed From the Body? | Pintas & Mullins Law Firm](#)
- [Understanding PFAS in the Environment | US EPA](#)
- [Minnesota DNR to test deer tissue for 'forever chemicals' | MPR News](#)
- [Examining the effects of PFAS 'forever chemicals' on soil structure and function \(phys.org\)](#)
- [Study Reveals Soil Effects of PFAS | ATTRA | Sustainable Agriculture Project \(ncat.org\)](#)
- [Using Granular Activated Carbon \(GAC\) For Water Treatment and Industrial Wastewater Treatment - Fullerton, Santa Ana, Anaheim | Pure Effect, Inc.](#)
- [Exposure and Effects of Perfluoroalkyl Substances in Tree Swallows Nesting in Minnesota and Wisconsin, USA | SpringerLink](#)
- [Reducing PFAS in Drinking Water with Treatment Technologies | US EPA](#)
- [\[49+\] Minnesota Lakes Wallpaper on WallpaperSafari](#)
- [PFAS in the water and soil: Why should you care? \(americanbar.org\)](#)
- [History of MDH Activities - Per- and Polyfluoroalkyl Substances \(PFAS\) \(state.mn.us\)](#)
- [Minnesota's PFAS Blueprint | Minnesota Pollution Control Agency \(state.mn.us\)](#)
- [What is Minnesota doing about PFAS? | Minnesota Pollution Control Agency \(state.mn.us\)](#)

Bibliography