

Monitoring Per- and Polyfluoroalkyl Substances (PFAS) in Missouri's Public Drinking Water

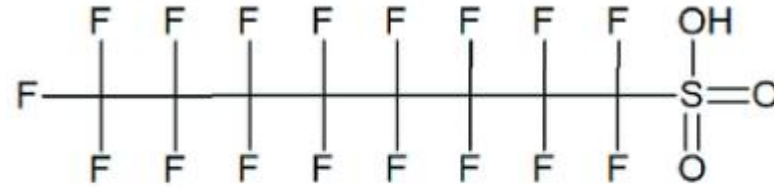
Brent Weis

Chemical Monitoring Coordinator

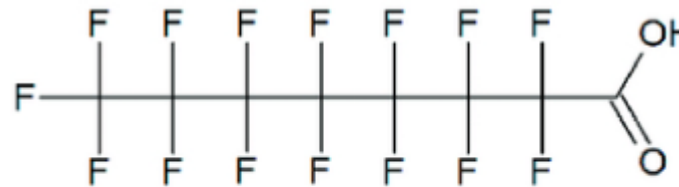
MO DNR Public Drinking Water Branch

What are PFAS?

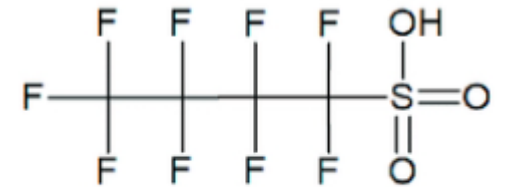
- A class of man-made chemicals
- There are thousands of PFAS compounds in use today.
- Characterized by chains of carbon (C) atoms surrounded by fluorine (F) atoms.
- C-F bonds are extremely stable and do not readily break down.



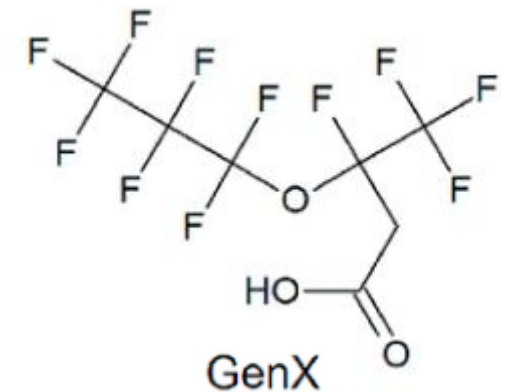
PFOS



PFOA



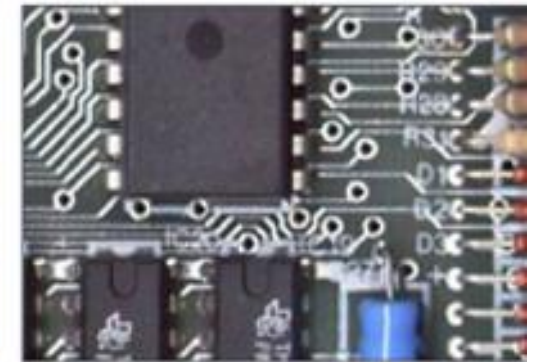
PFBS



GenX

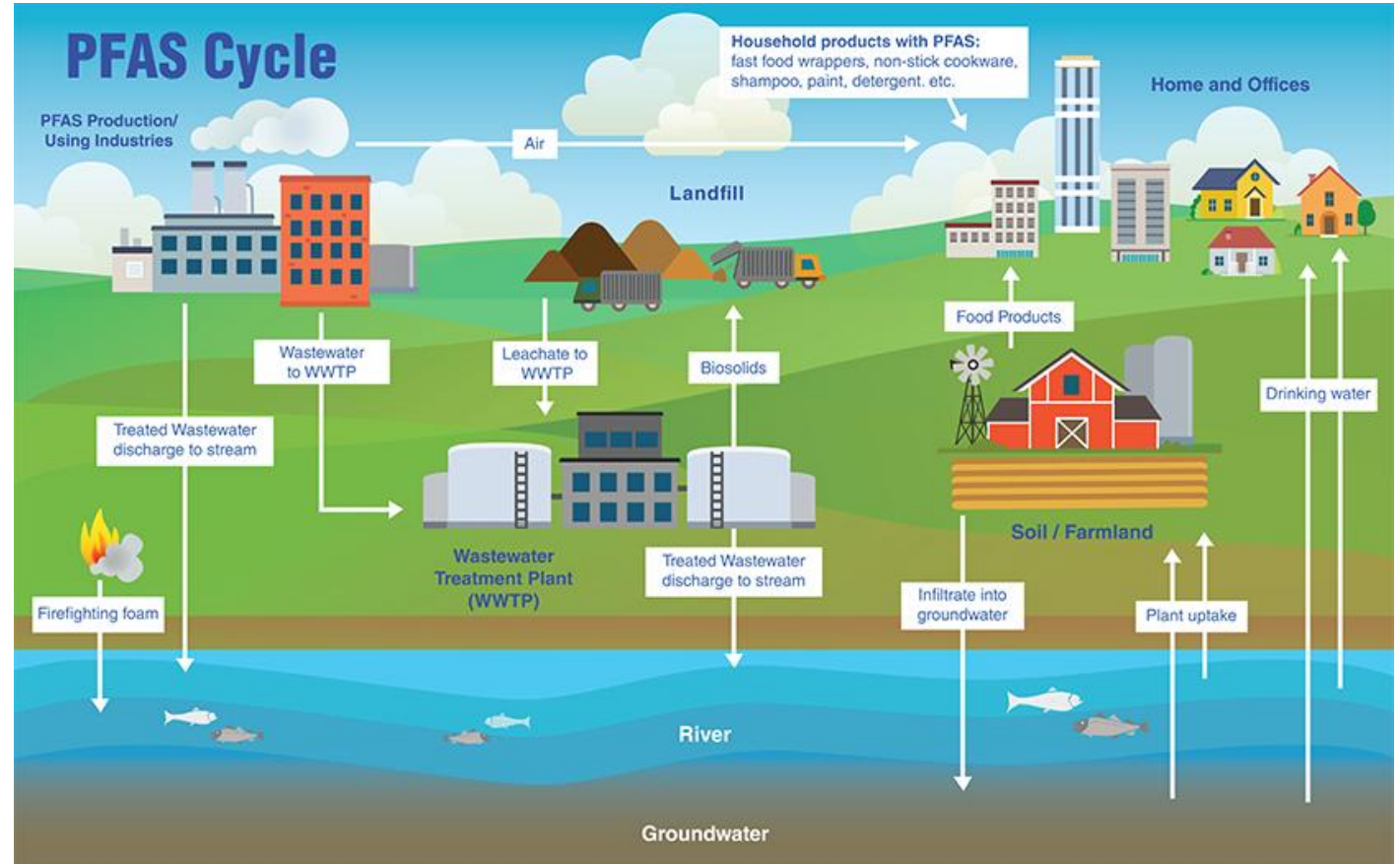
Common Uses for PFAS

- Consumer Products
 - Food contact surfaces such as cookware, pizza boxes, fast food wrappers, popcorn bags, etc.
 - Polishes, waxes, and paints.
 - Stain repellants for carpets, clothing, upholstered furniture, etc.
 - Personal Care Products
 - Cleaning Products
- Industrial Applications
 - Dust suppression for chrome plating
 - Electronics manufacturing
 - Oil and mining operations



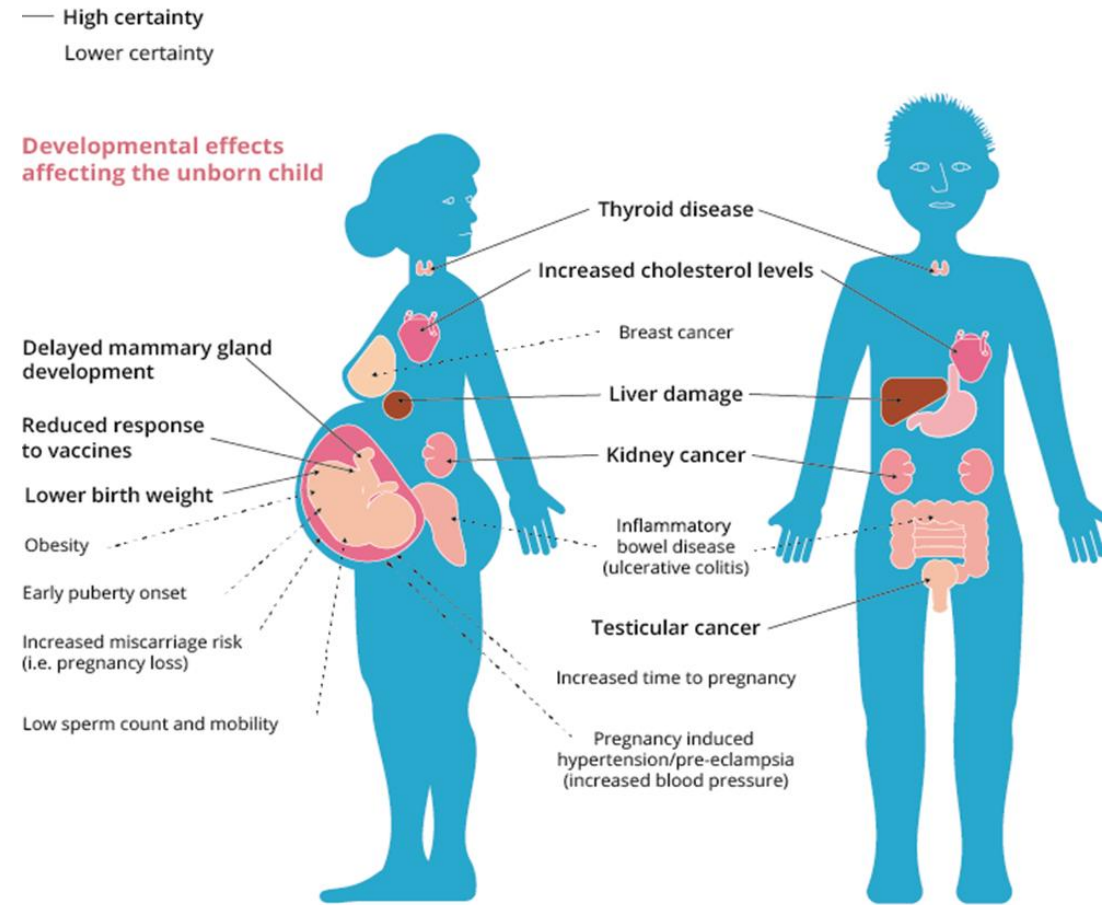
Common Sources of PFAS in the Environment

- Aqueous Film Forming Foam (AFFF)
- Releases from industrial facilities
 - Chrome plating and etching facilities
- Landfills and leachates from disposal of consumer and industrial products containing PFAS
- Wastewater treatment effluent and land application of biosolids.



What are the health effects of PFAS exposure?

- Most people have measurable levels of PFAS chemicals in their bodies
- High Cholesterol
- Increased Liver Enzymes
- Thyroid Disorder
- Inflammatory Bowel Disease
- Cancer
- Developmental Impacts on Children
- Detectable in blood, tissue, and breast milk.



PFAS NPDWR – Announced April 2024

Chemical	Maximum Contaminant Level Goal (MCLG)	Maximum Contaminant Level (MCL)
PFOA	0	4.0 ppt
PFOS	0	4.0 ppt
PFHxS	10 ppt	10 ppt
HFPO-DA (GenX chemicals)	10 ppt	10 ppt
PFNA	10 ppt	10 ppt
Mixture of two or more: PFHxS, PFNA, HFPO-DA, and PFBS	Hazard Index of 1	Hazard Index of 1

$$\text{Hazard Index (1 unitless)} = \left(\frac{[\text{HFPO-DA}_{\text{ppt}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFBS}_{\text{ppt}}]}{[2000 \text{ ppt}]} \right) + \left(\frac{[\text{PFNA}_{\text{ppt}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFHxS}_{\text{ppt}}]}{[10 \text{ ppt}]} \right)$$

PFAS NPDWR – May 2025 Revisions

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PFAS Rule Timeline for Public Water Systems

April 26, 2024

- EPA finalized the PFAS National Primary Drinking Water Regulation
- Initial Monitoring requirements of the rule begin

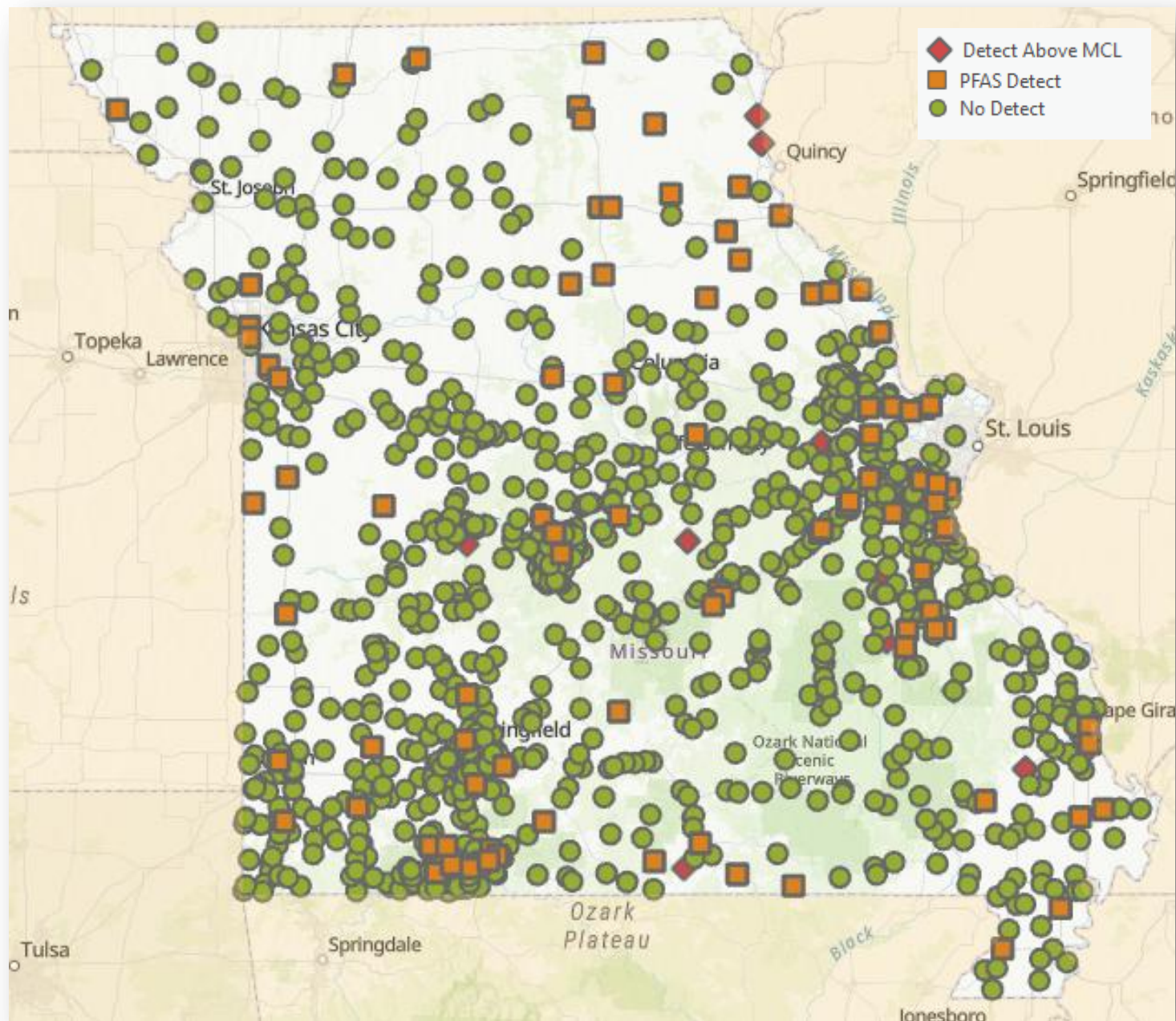
April 26, 2027

- Initial Monitoring must be completed and results posted in the Consumer Confidence Report (CCR)
- Compliance Monitoring begins and monitoring results must be included in CCR
- Public notice is required for monitoring violation

2031

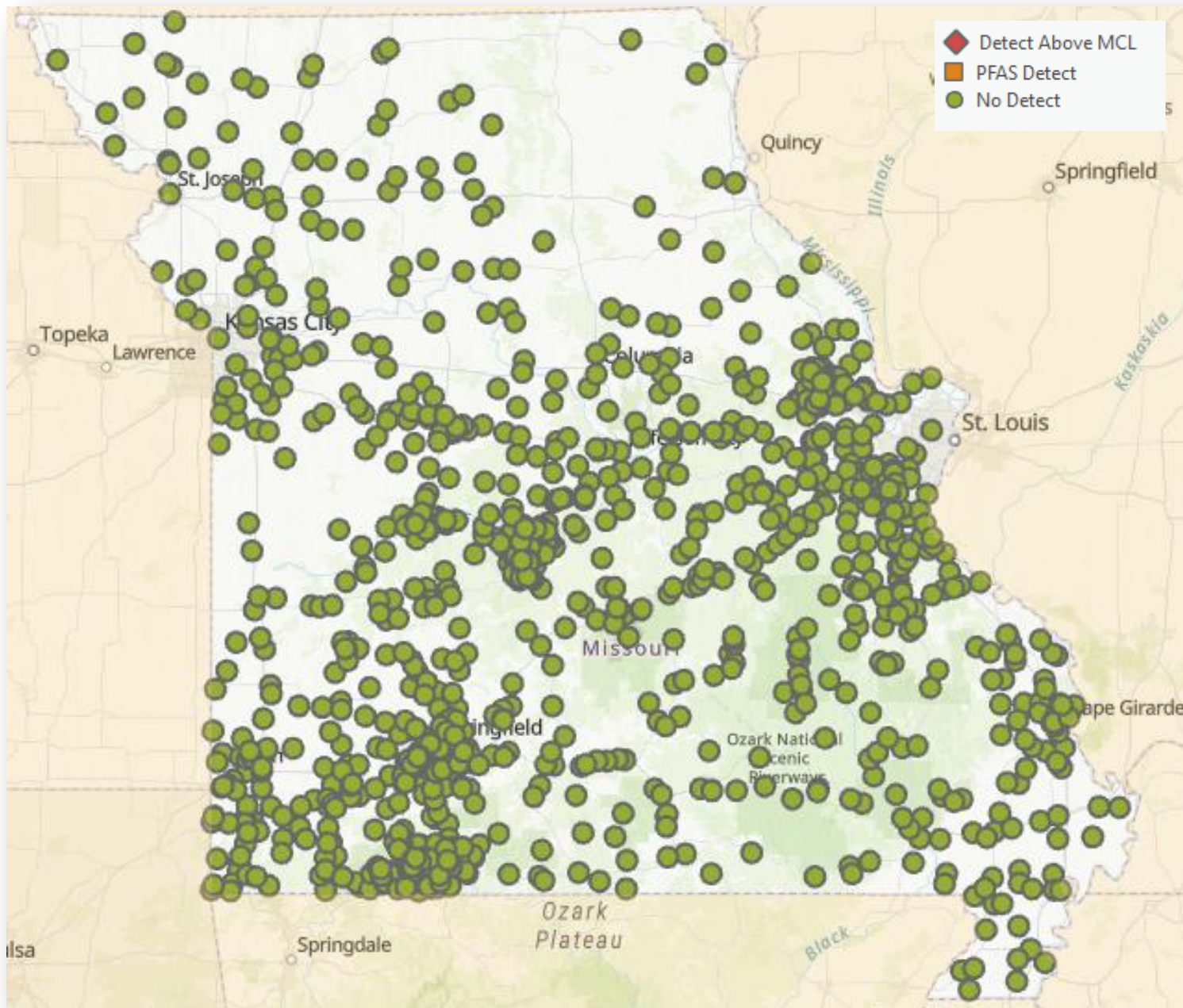
April 26, 2029

- Systems must comply with established Maximum Contaminant Levels (MCLs)
- Public Notice required for MCL violations



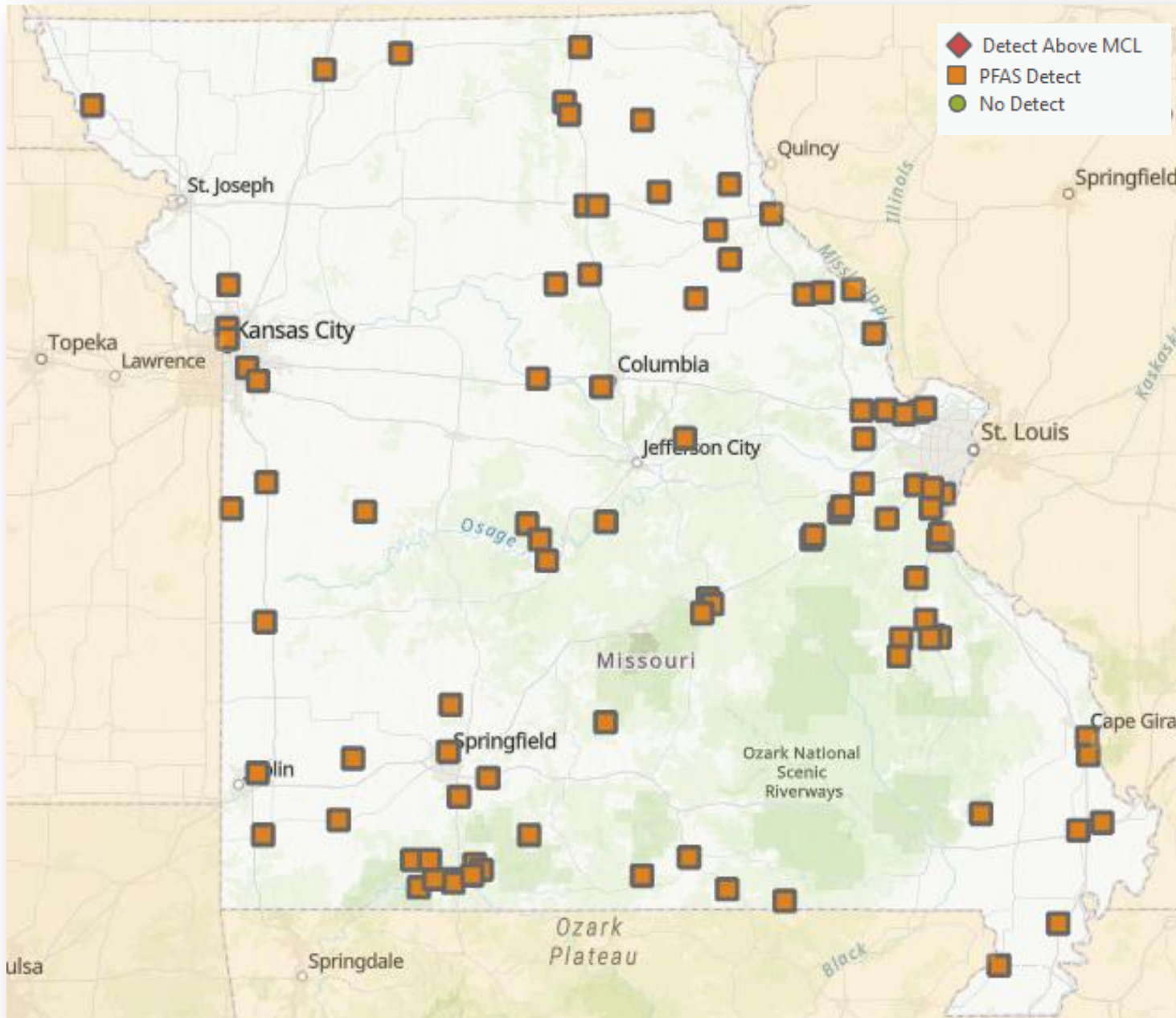
PFAS Initial Monitoring Efforts

Of the 1,334 water systems required to complete Initial Monitoring most have completed at least one round of sampling.



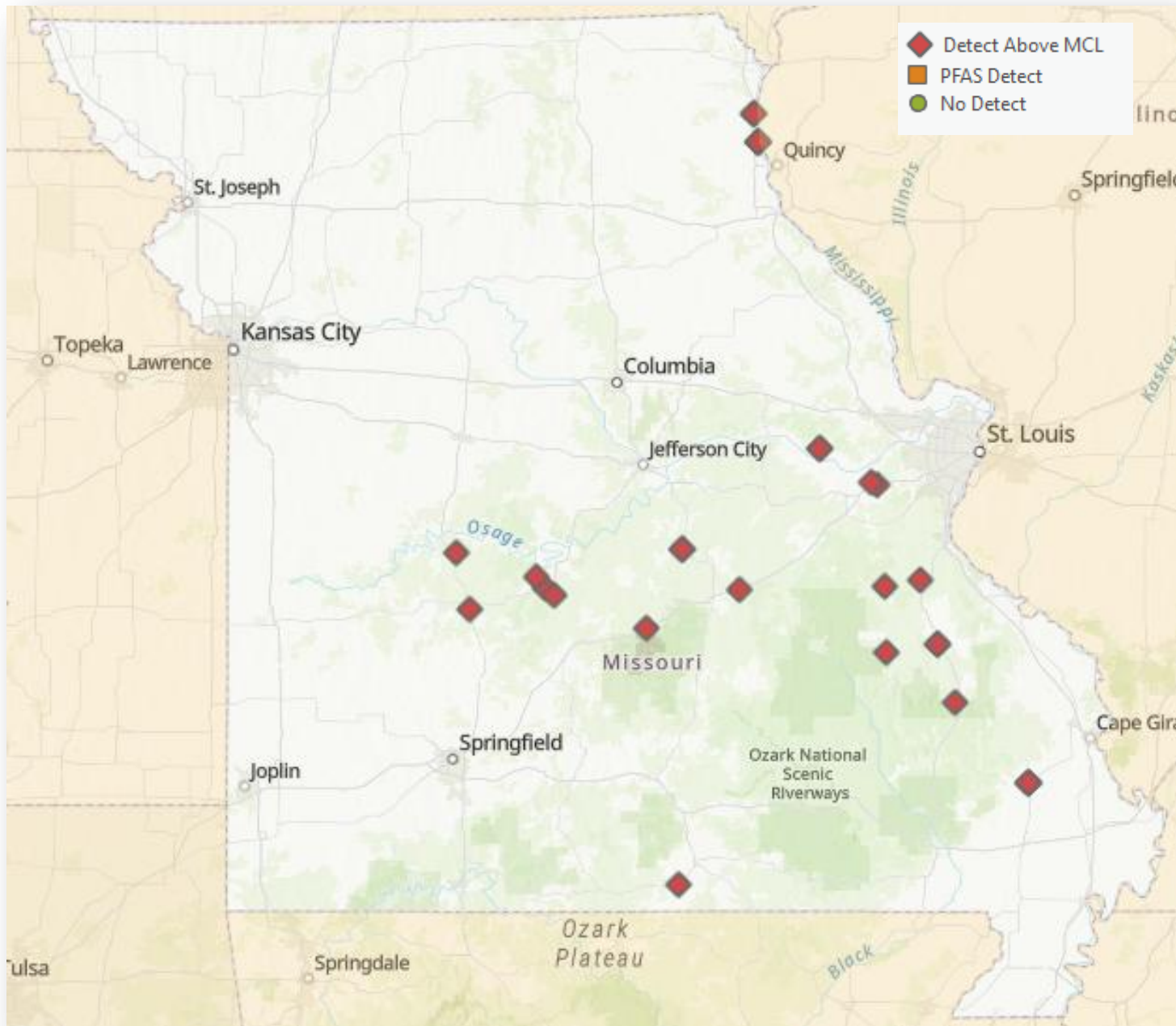
PFAS Initial Monitoring Efforts

Most systems have not had detections and will qualify for a reduced monitoring schedule starting in 2027.



PFAS Initial Monitoring Efforts

Based on current data
71 systems have
been confirmed to
have results that meet
or exceed the trigger
level of 2.0 ppt for
PFOA or PFOS.



PFAS Initial Monitoring Efforts

Based on current data
29 systems have
been confirmed to
have detects that
meet or exceed the
MCL of 4.0 ppt for
PFOA or PFOS.

Investigation

- Municipal PWS
 - St. Francois County
 - Community PWSs
 - Groundwater
 - Serves 18,217 customers

PFOA (ppt)	PFOS (ppt)	Unregulated PFAS Detects (ppt)
0	1.5 - 2.6	PFBS (0.96) PFPEA (1.5 -3.81)

Investigation

- Daycare Facility
 - St. Francois County
 - Non-Transient Non-Community PWS
 - Groundwater
 - Serves 25 students and staff.

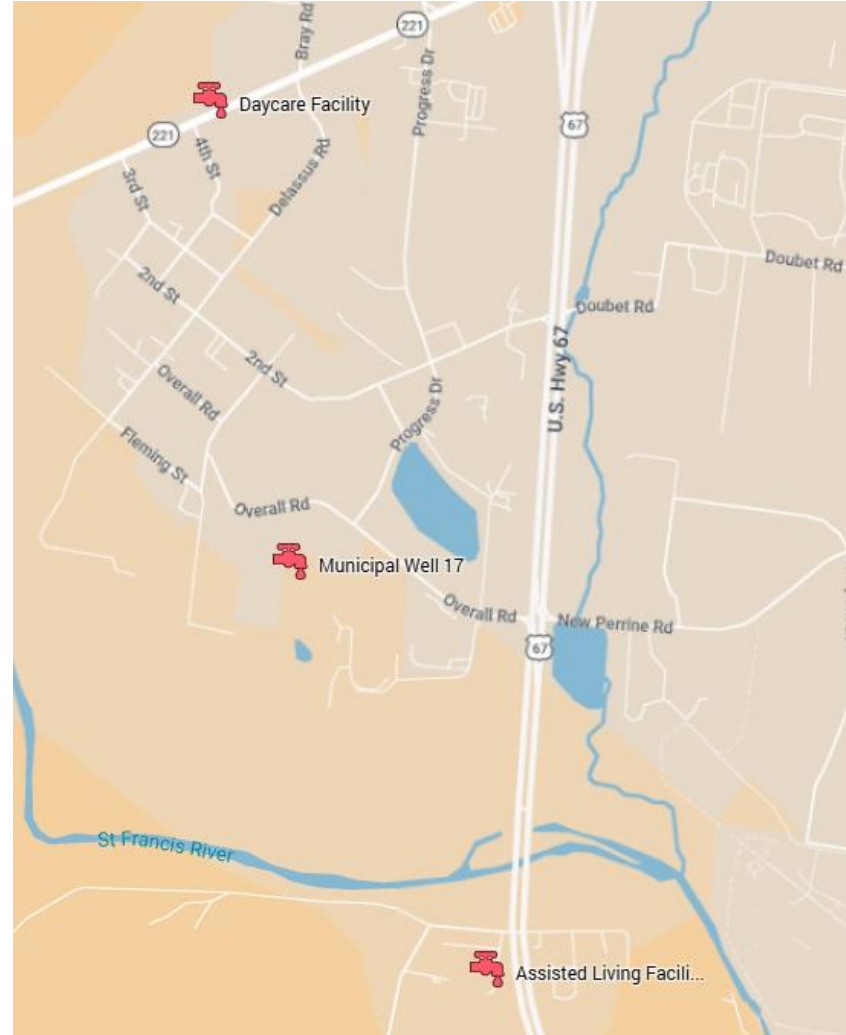
PFOA (ppt)	PFOS (ppt)	Unregulated PFAS Detects (ppt)
0	2.7 -3.7	PFBS (2.7 -3.4)

Investigation

- Assisted Living Facility
 - St. Francois County
 - Community PWS
 - Groundwater
 - Serves 75 residents and staff.

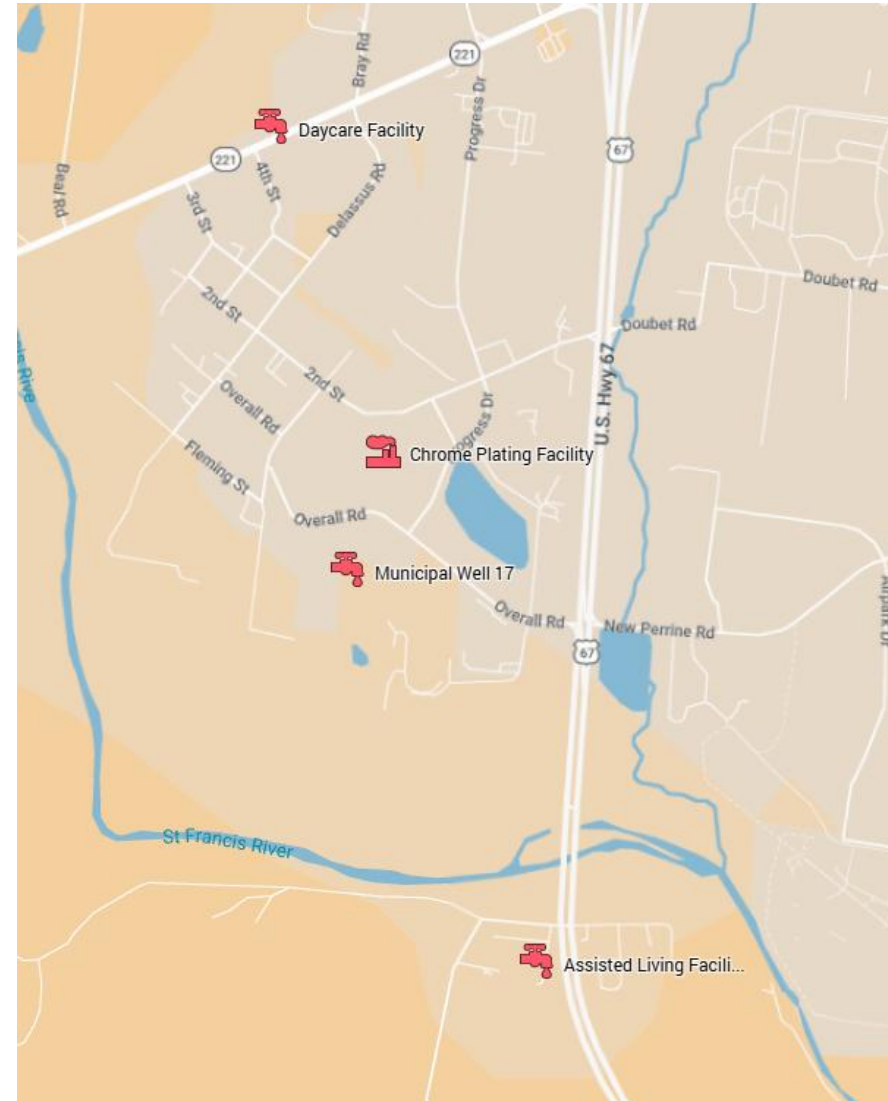
PFOA (ppt)	PFOS (ppt)	Unregulated PFAS Detects (ppt)
2.6 - 3.9	5.6 - 7.3	PFBS (4.5 -5.2) PFHPA (7.3 -11) PFHxS (2.1 - 2.8) PFHxA (14 - 23) PFBA (16) PFPEA (38)

Investigation



Suspected Source

- Chrome Plating Facility
 - Manufactures chrome plated parts for the automotive and commercial truck industries.
 - Began operations in 2000.
 - Known hexavalent chromium release.
 - Currently Participating in Brownfields Voluntary Cleanup Program



Follow Up Investigation

- Discussions with facility revealed they had used PFOS as a wetting agent from 2005 - 2015.
- Additional sampling identified:
 - A neighboring steel manufacturer had high levels of PFAS in their well.
 - 50+ domestic wells sampled and homes provided bottled water.
- Chrome Plating Facility investigating potential for city water main extension to serve impacted neighborhoods.

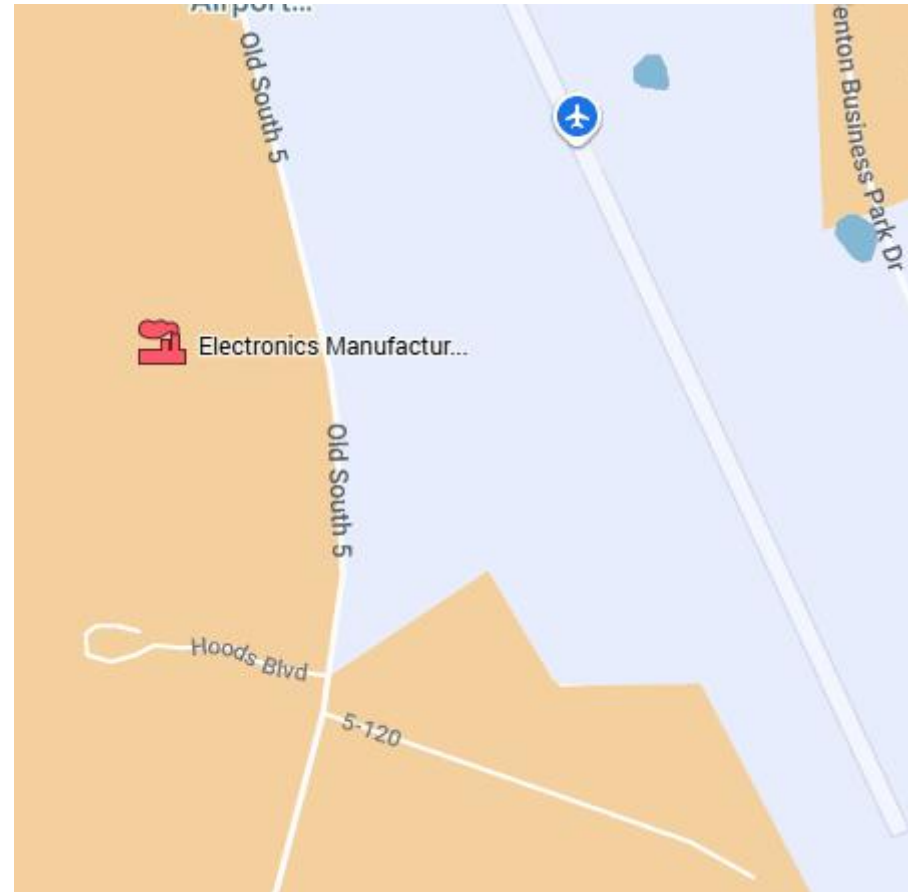


Investigation

- Electronic Equipment Manufacturer
 - Camden County
 - Non-Transient Non-Community PWS
 - Groundwater
 - Serves approximately 100 staff
- Manufactures a variety of electronic equipment including printed circuit boards.

PFOA (ppt)	PFOS (ppt)	Unregulated PFAS Detects (ppt)
2.3 - 2.4	19 - 22	PFBS (8.8-11) PFHxS (40-50) PFHxA (6.9-7.7) PFBA (2.9) PFPEA (5.9) PFPEs (11)

Investigation



An Unexpected Source...

- Not all PFAS contamination originates from major industry.
- Nearly 1/3 of PWSs with PFOA or PFOS detects exceeding an MCL are associated with a single facility type.



PFAS Detections at Schools

Public Water System Name	County	PFOA Historical	PFOS Historical	Unregulated Detects
SOUTH FORK ELEMENTARY SCHOOL	HOWELL	2	9.3	
WARSAW R IX SOUTH ELEM	BENTON	3.4	9.1	PFBS, PFHxA, PFBA, PFPeA
ST JOACHIM CHURCH AND SCHOOL	WASHINGTON	4.9	7	PFHPA, PFHXA, PFBA, PFPEA
SOUTH CALLAWAY COUNTY R II SCHOOLS	CALLAWAY	3.8	4.8	PFHXS, PFHXA
MANES R V ELEMENTARY SCHOOL	WRIGHT	0	4.5	
BELLEVIEW ELEMENTARY SCHOOL	IRON	9.2	14	PFBS, PFHPA, PFNA, PFHXA, PFBA, PFPEA
HICKORY COUNTY R I SCHOOLS	HICKORY	10	14	PFHPA, PFHXA, PFBA, PFPEA
SUNRISE R IX ELEMENTARY SCHOOL	JEFFERSON	8.1	11	PFHPA, PFHXA, PFBA, PFPEA
ST IGNATIUS LOYOLA SCHOOL	WARREN	5.5	0	PFBS, PFHXA
PLAINVIEW ELEM SCHOOL	DOUGLAS	0	2.5	PFHXA
COLEMAN ELEMENTARY SCHOOL	FRANKLIN	0	2.3	PFHXS
OUR LADY OF THE SNOW SCHOOL	MILLER	0	2.2	PFHXA
ROBERTSVILLE ELEMENTARY SCHOOL	FRANKLIN	0	3	
STEELVILLE R III HIGH SCHOOL	CRAWFORD	2	0	
GASCONADE C 4 ELEMENTARY SCHOOL	LACLEDE	2.1	0	

PFOA / PFOS > MCL

PFAS DETECT < MCL

PFAS Detections at Schools

- Primarily located in rural areas.
- No obvious sources of PFAS contamination in the area.
- Most have been in operation for decades.
- Most impacted wells are older grandfathered wells not constructed to current design standards making them more susceptible to contamination.



Not Just a Missouri Problem...

'Forever chemicals' found in water at 10 Maryland schools, sparking health concerns

Schools across Maine confront unique challenges in ridding their water of 'forever chemicals'

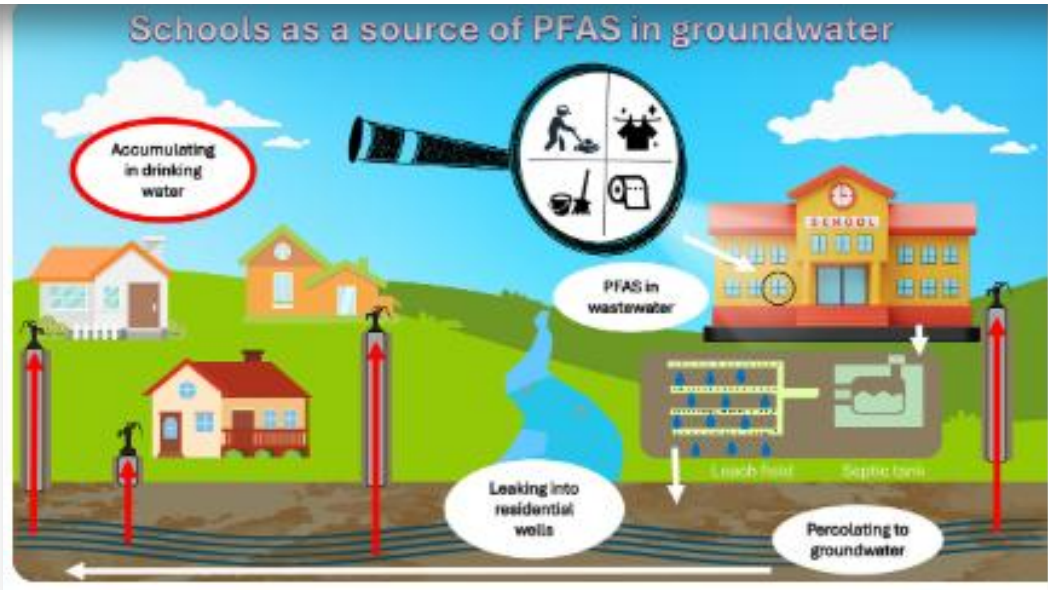
More than 30 Pa. schools detected toxic 'forever chemicals' in their drinking water that exceed EPA standard

For the first time, Pa. schools with on-site wells have been required to test drinking water for PFAS. Some rely on private wells because they are far away from public water.

ENVIRONMENT

New Research Charts PFAS Route From School to Drinking Water

December 9, 2024



Oregon water safety concerns rise with PFAS in rural school systems

Mark Rattner NonStop Local Digital Journalist Jan 29, 2026 Updated Feb 3, 2026

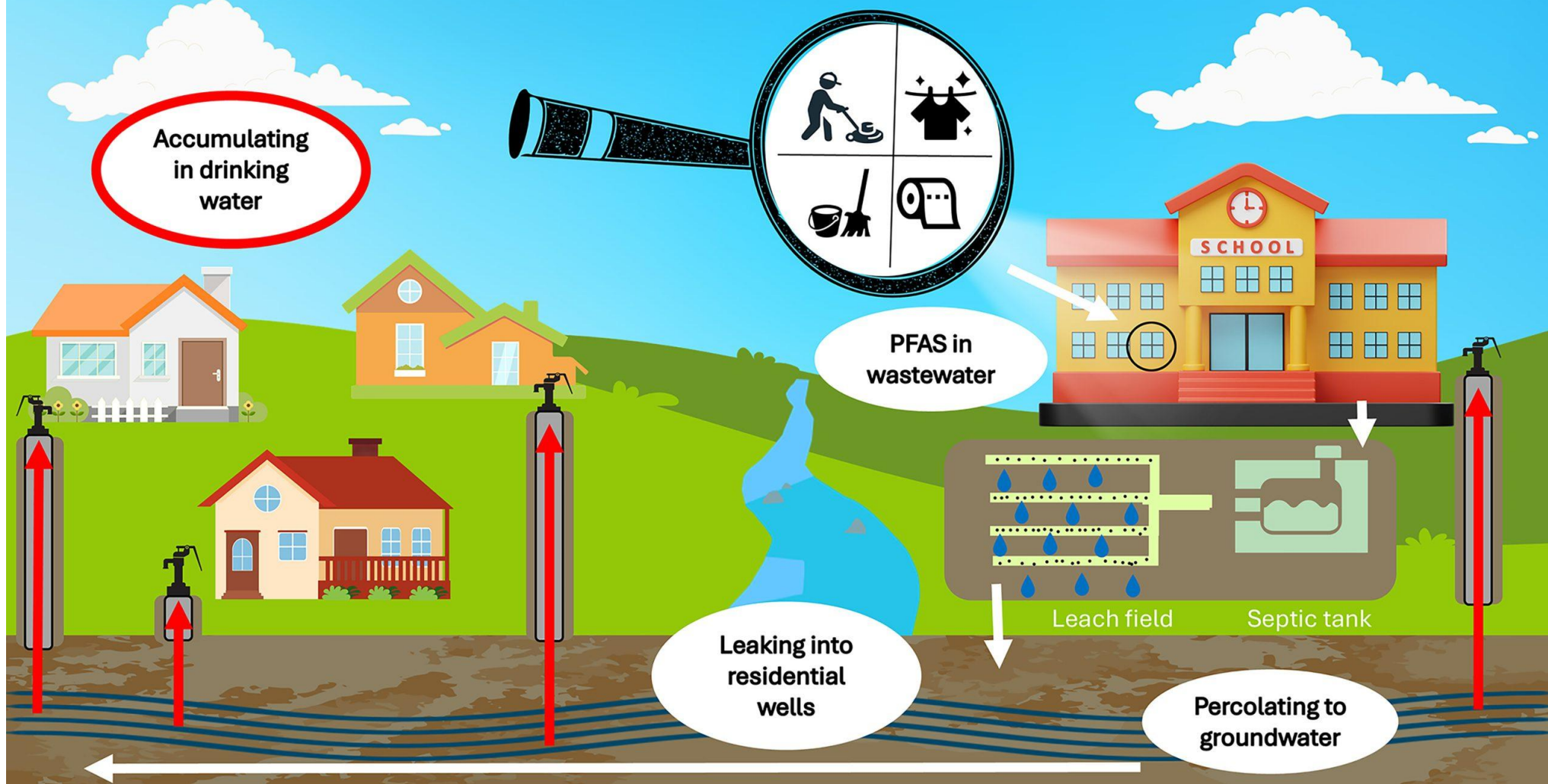
NEWS

With PFAS filter in place, Swift River School awaits water test results

by Domenic Poli Staff Writer November 3, 2023 Updated June 26, 2026



Schools as a source of PFAS in groundwater



Questions?

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