

**AECOM**



**IDENTIFY. RESOLVE.**



# PFAS PathFinder

**Know Your Inputs. Control Your Residuals.**

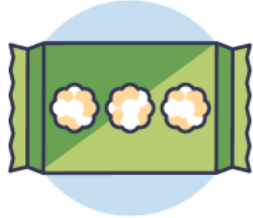
Presented by

Moha Ateia, Ph.D.

Delivering a better world



**FIREFIGHTING FOAMS**



**MICROWAVE POPCORN BAGS**



**WATER RESISTANT CLOTHING**



**PAINT**



**STAIN RESISTANT PRODUCT**



**PERSONAL CARE PRODUCTS**

# PRODUCTS THAT CONTAIN PFAS



**COSMETICS**



**NON-STICK COOKWARE**



**FAST FOOD PACKAGING**



**STAIN RESISTANT FURNITURE**



**PHOTOGRAPHY**



**PESTICIDES**

# HEALTH RISKS OF PFAS

**ELEVATED CHOLESTEROL**

**THYROID PROBLEMS**

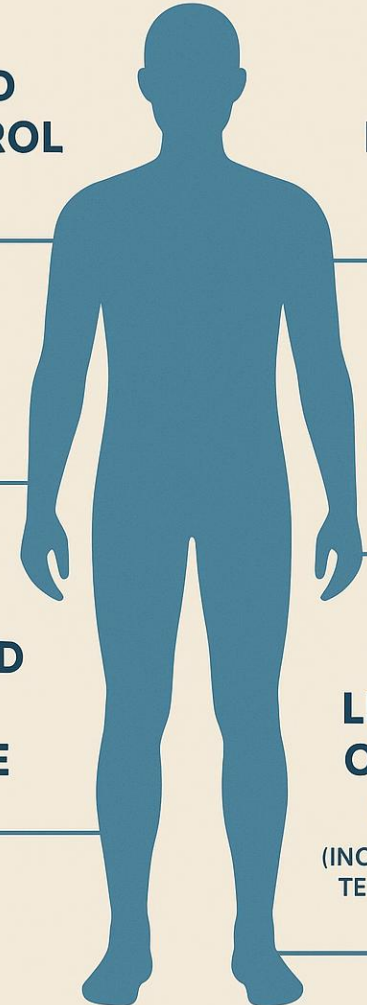
**LIVER DAMAGE**

**HORMONAL IMBALANCES**

**WEAKENED IMMUNE RESPONSE**

**HIGHER LIKELIHOOD OF CERTAIN CANCERS**

(INCLUDING KIDNEY AND TESTICULAR CANCER)

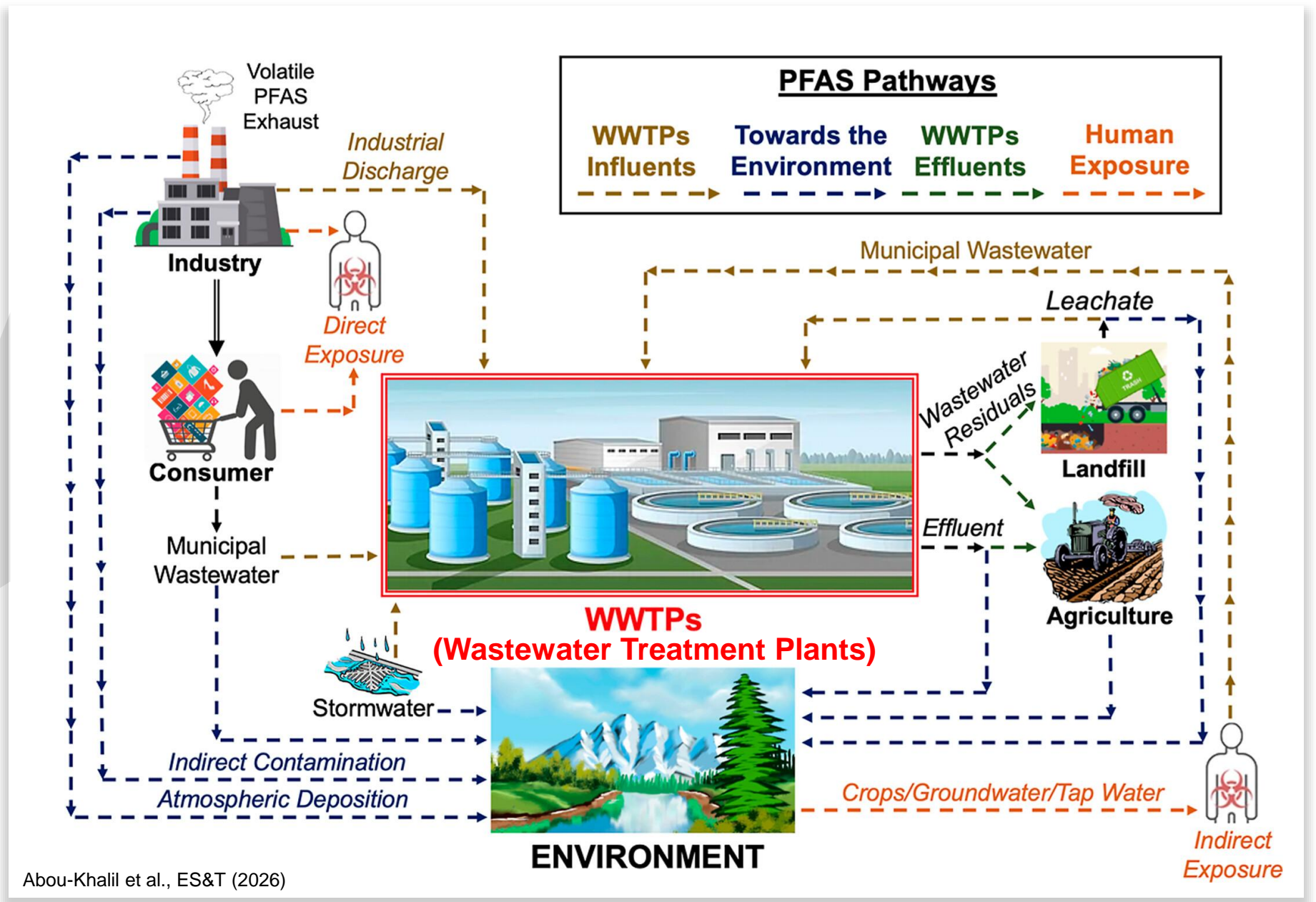


# PFAS Fate and Transport

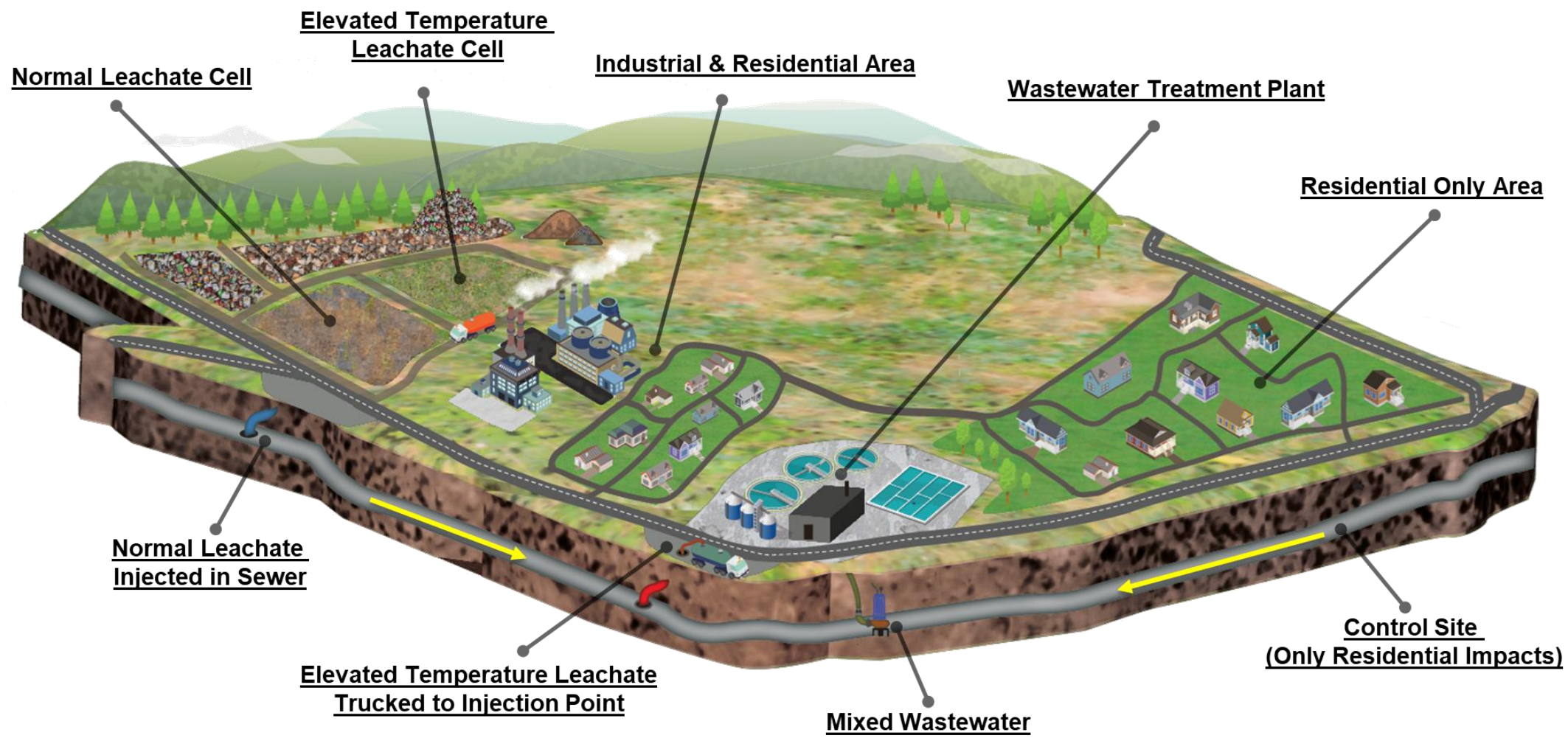
Behaviour of chemicals in the environment: physical, chemical, and biological processes influence distribution in media, and migration



# PFAS Impacts On & From WWTPs



To **Control Your Residuals**,  
You need to **Know Your Inputs**.

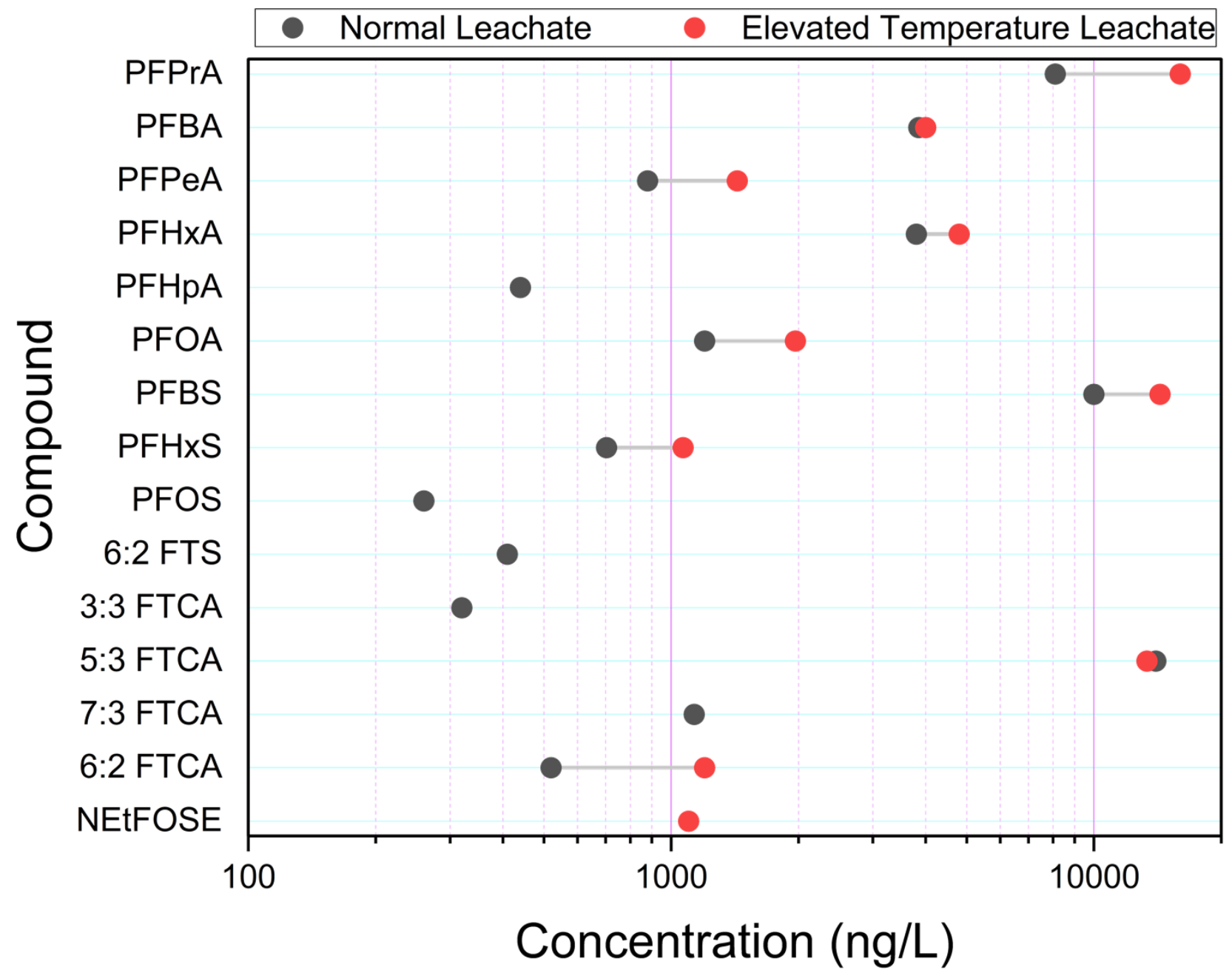


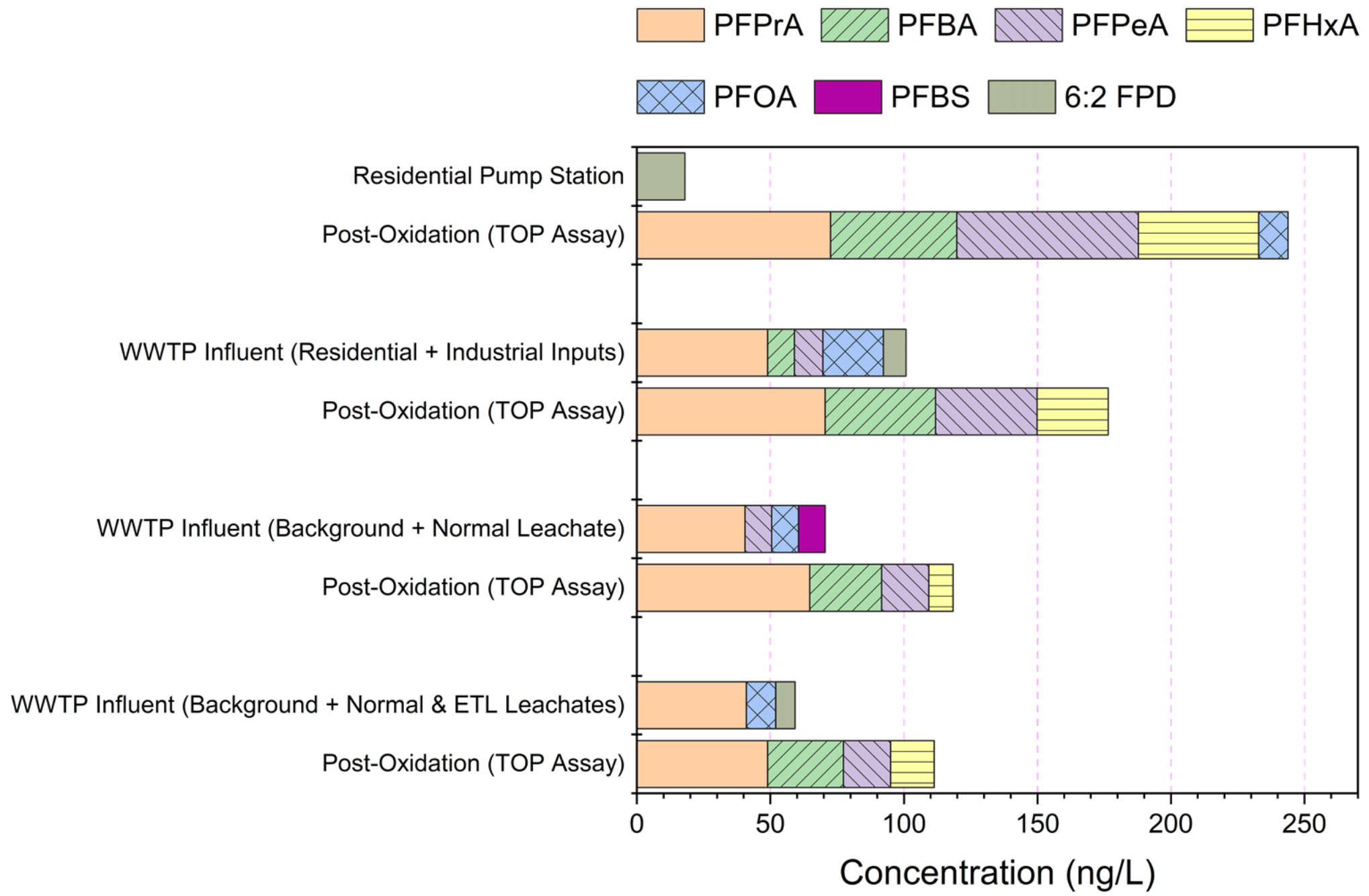
Basic Water Quality Parameters



- 70 Targeted PFAS
- TOP Assay Analysis
- FTOHs
- AOF Analysis

# Targeted PFAS Analysis

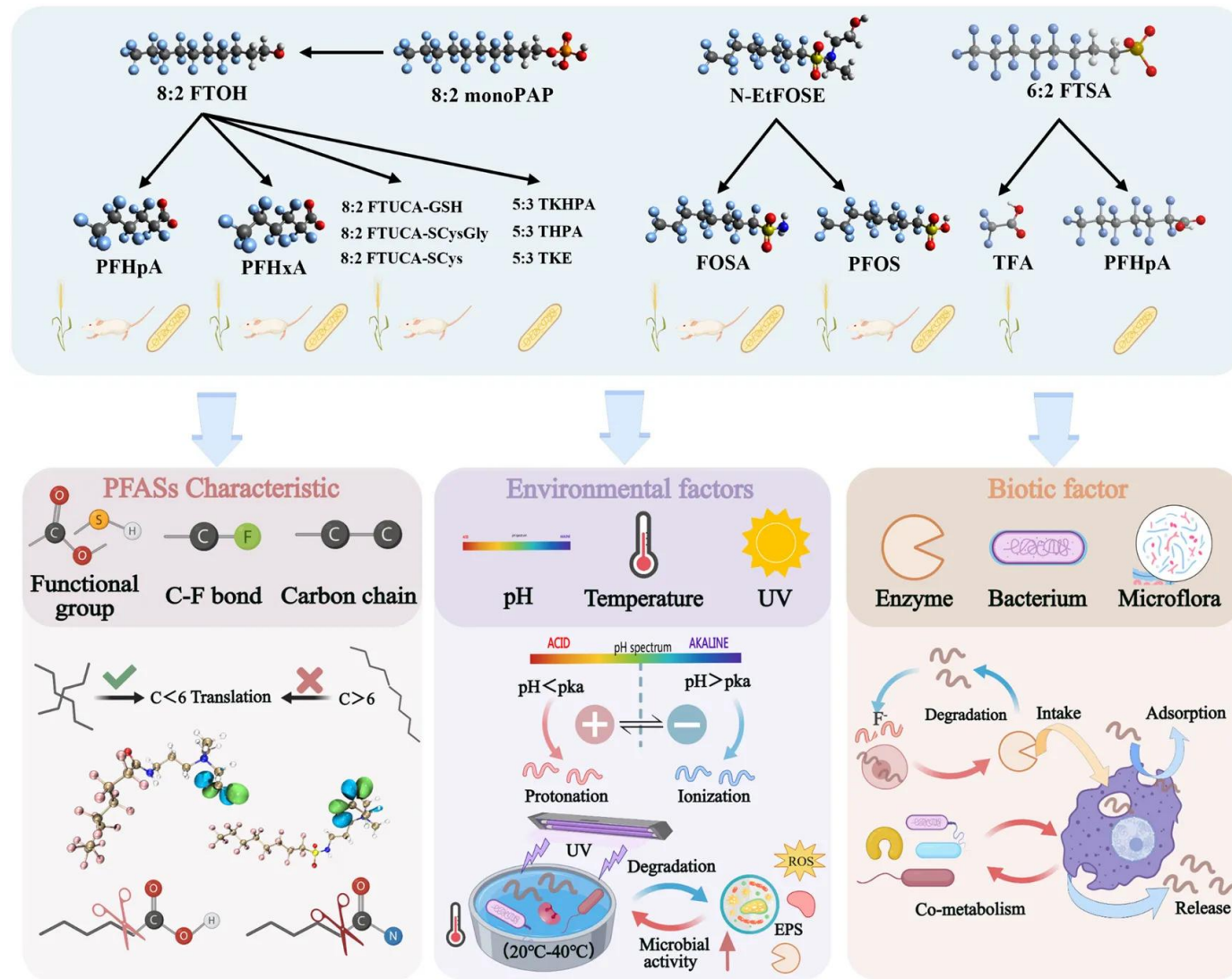




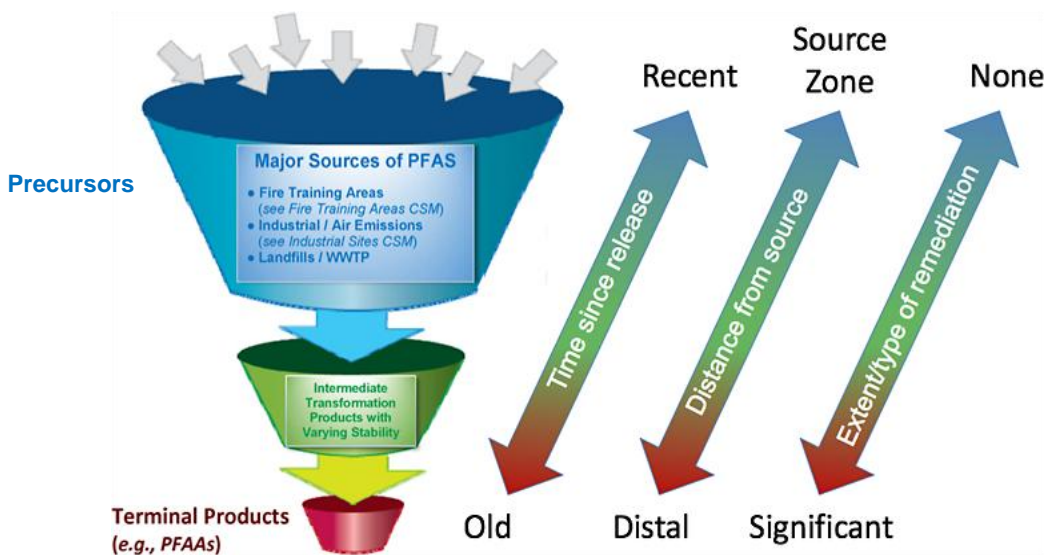
# Precursor Transformation

- Dependent on parent compound chemistry and environmental biotic and/or abiotic factors. One-to-many relationship
- Source chemistry and manufacturing process can be indicative of general precursor presence. For example, AFFF by electrochemical fluorination (i.e. PFOS) or fluorotelomerization (i.e. 6:2 FTS)

## Transformation Pathways



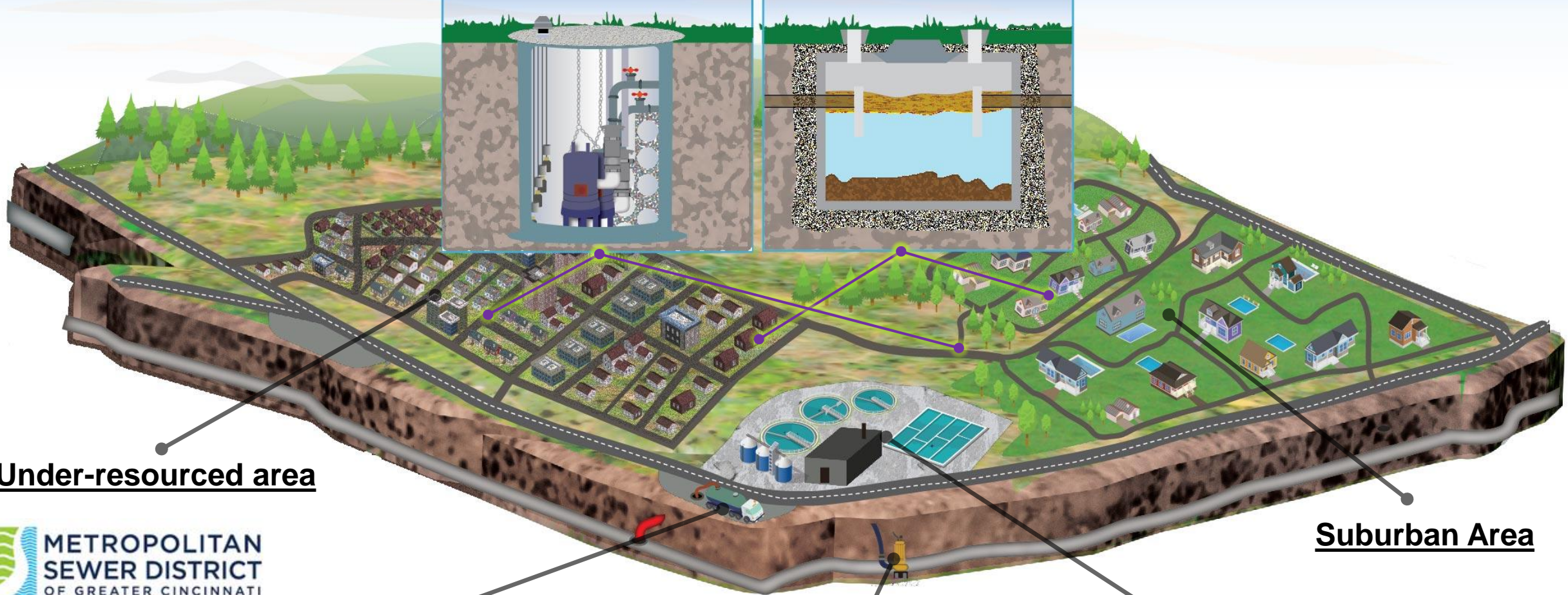
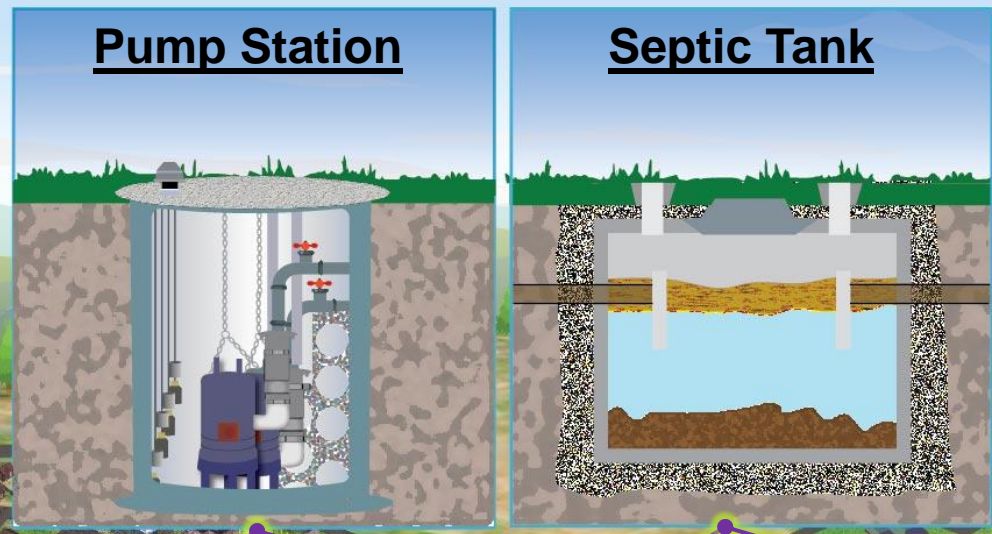
## Field Observations



Source: Chen and Guo, 2025. | ITRC, 2021.

Total Number of Pump Stations: 89  
Number of Targeted Pump Stations: 12  
Yearly generated volume:  $\sim 9.7 \times 10^9$  Liters

Total Number of Septic Tanks: 20,000 <sup>10</sup>  
Number of Targeted Septic Tanks: 17  
Yearly generated volume:  $\sim 5.3 \times 10^6$  Liters



Under-resourced area

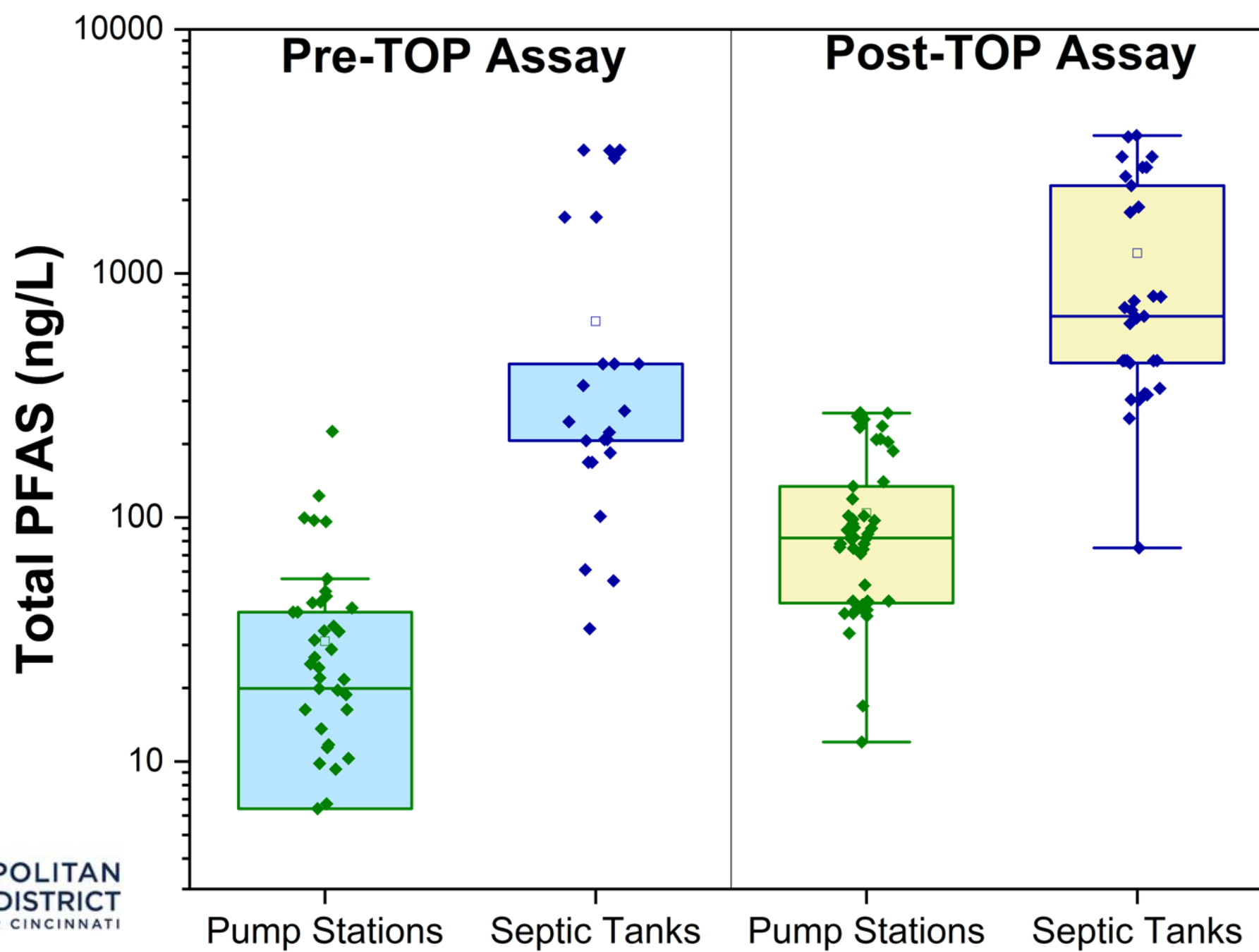
Suburban Area

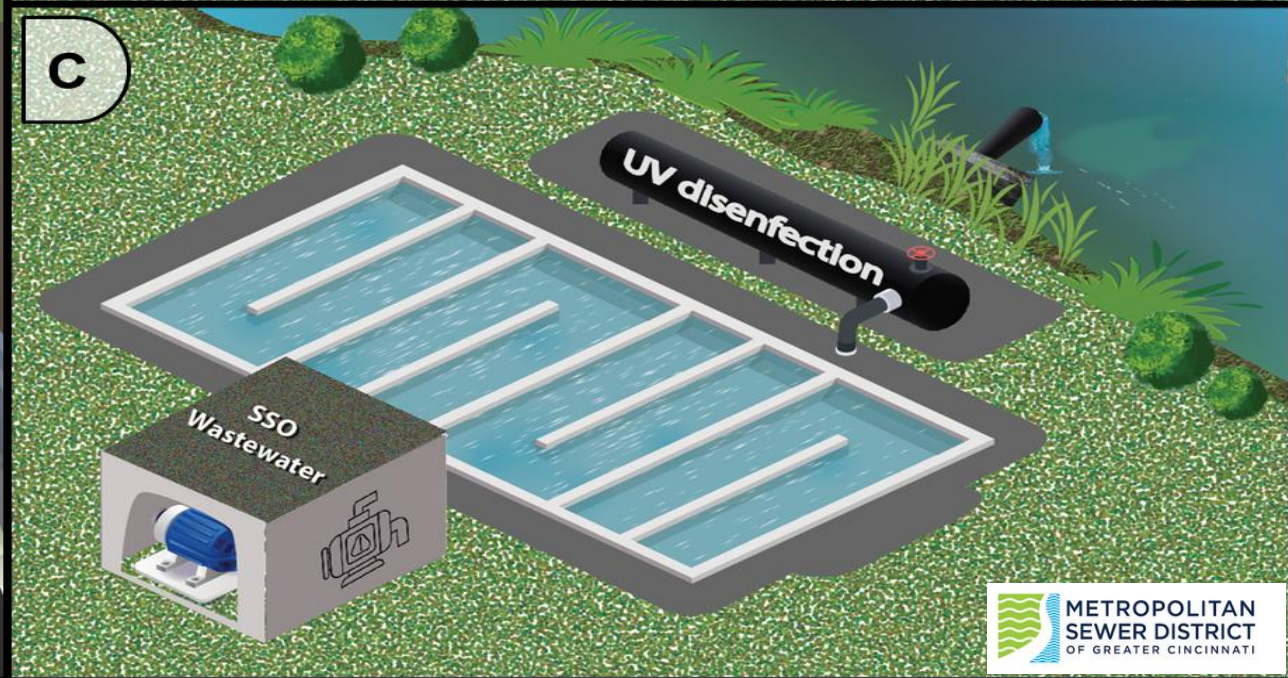
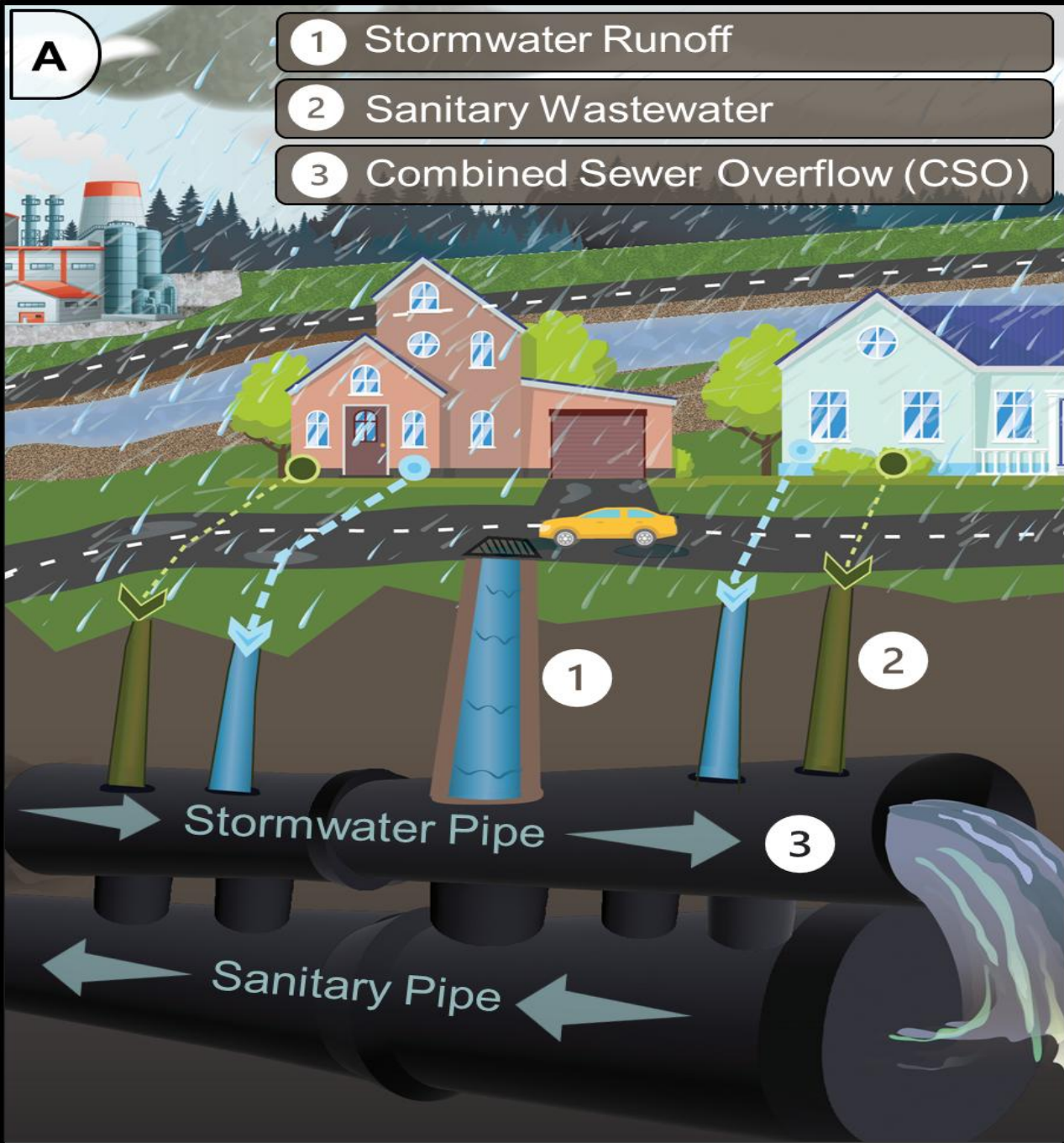
Septic Wastewater  
Trucked to Injection Point

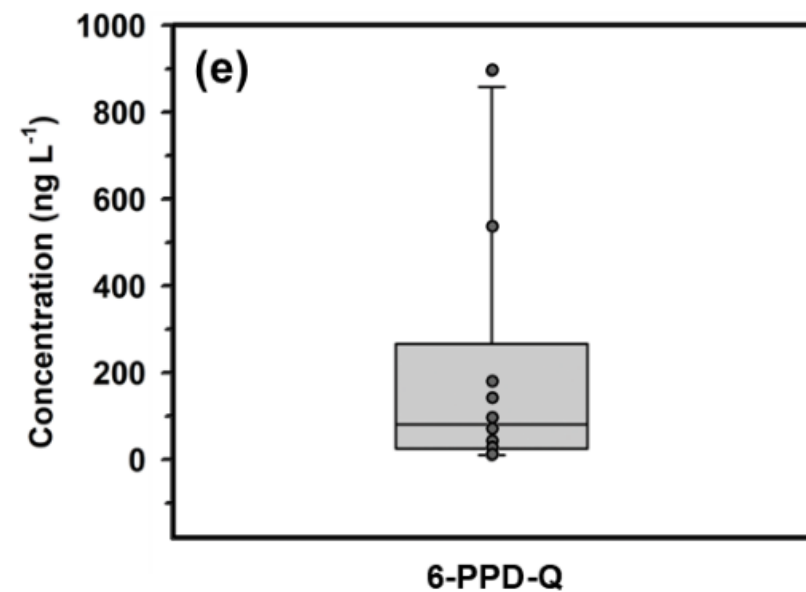
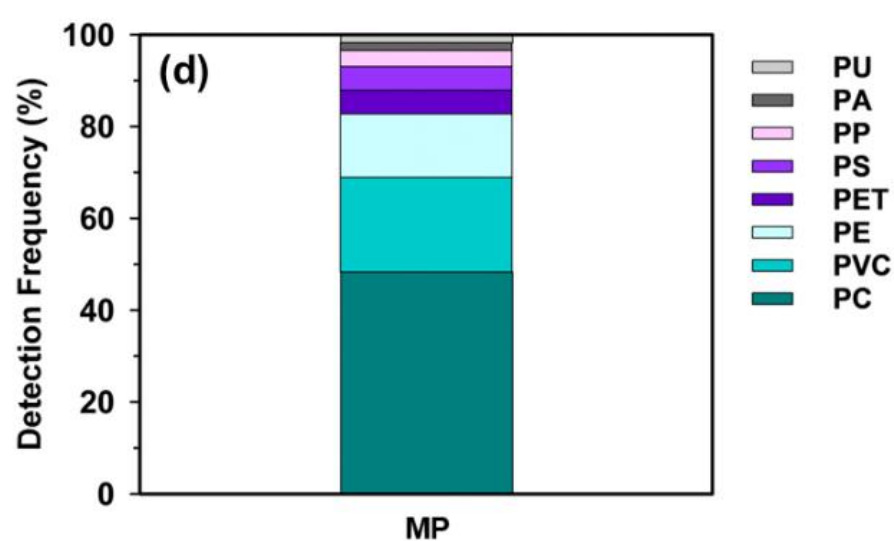
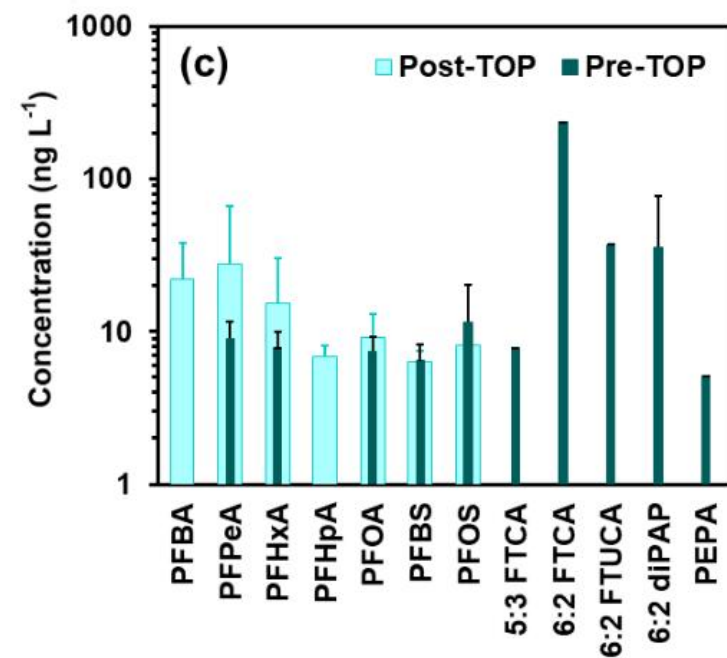
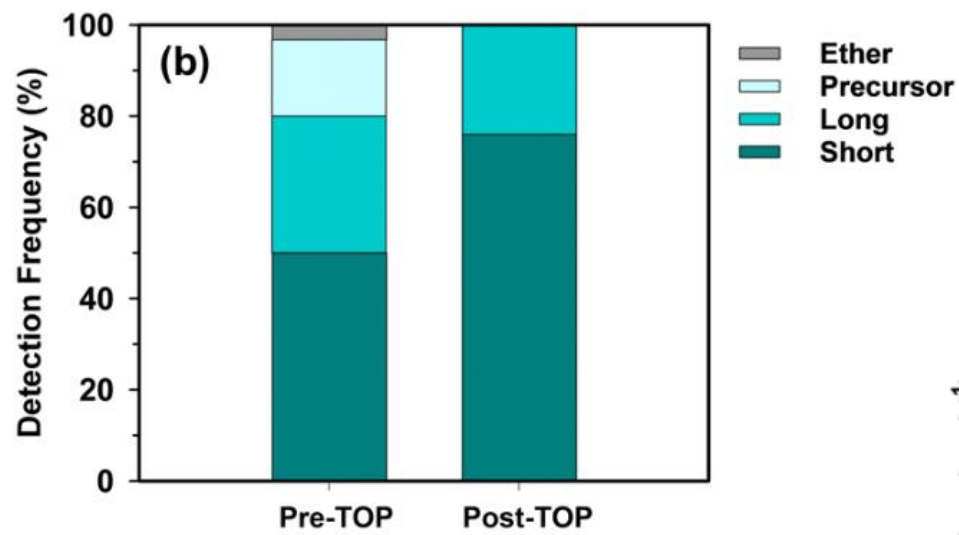
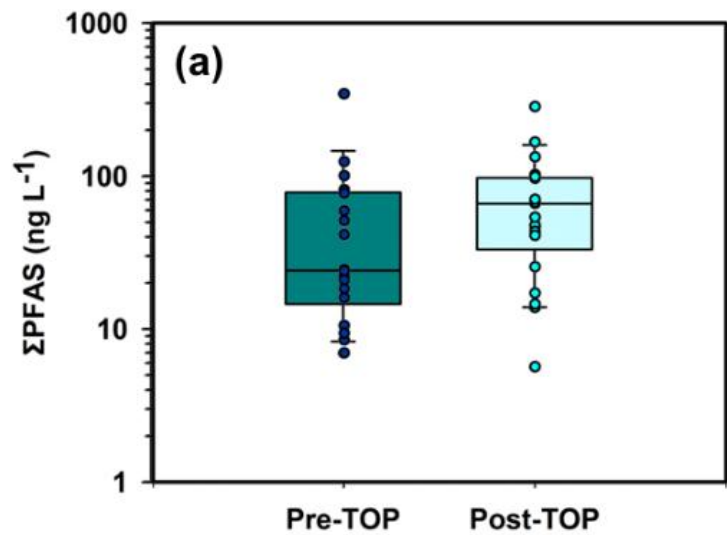
Wastewater Treatment Plant

Mixed Wastewater





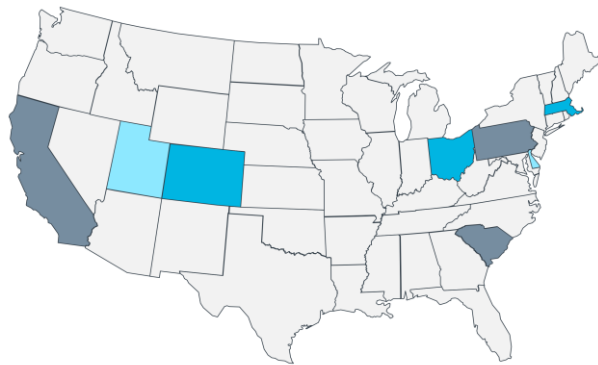




# Project Examples

## Michigan, AECOM, and California Studies

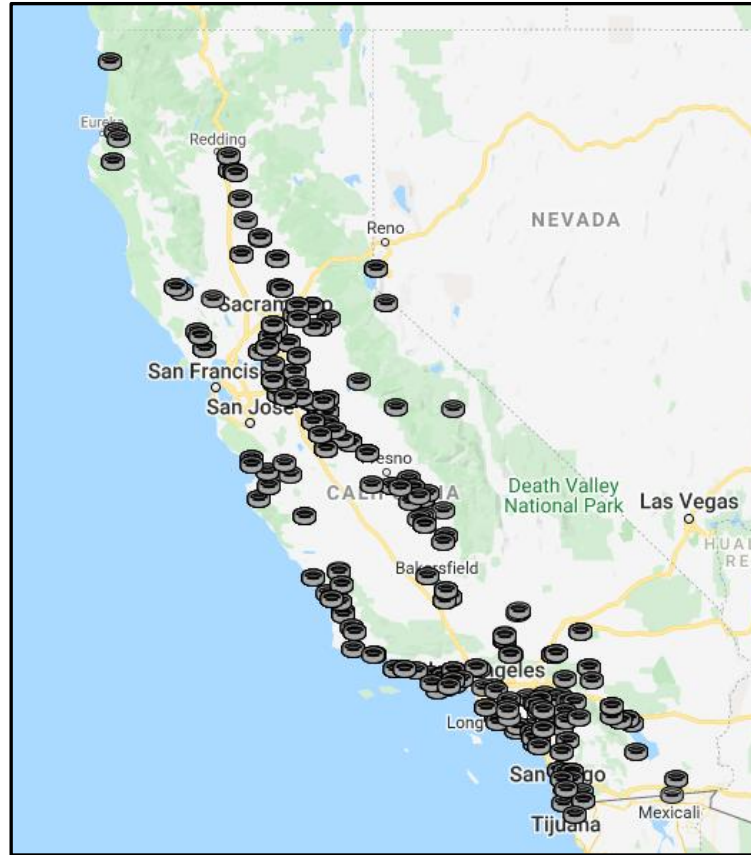
- **AECOM Study – 2021**
  - 19 WWTPs
- **California Study – 2021**
  - 180 WWTPs
  - 1 MGD dry weather design
- **Michigan Study - 2018**
  - 42 WWTP
  - 20 largest (10-930 MGD)
  - 22 various treatment processes (0.2-9 MGD)



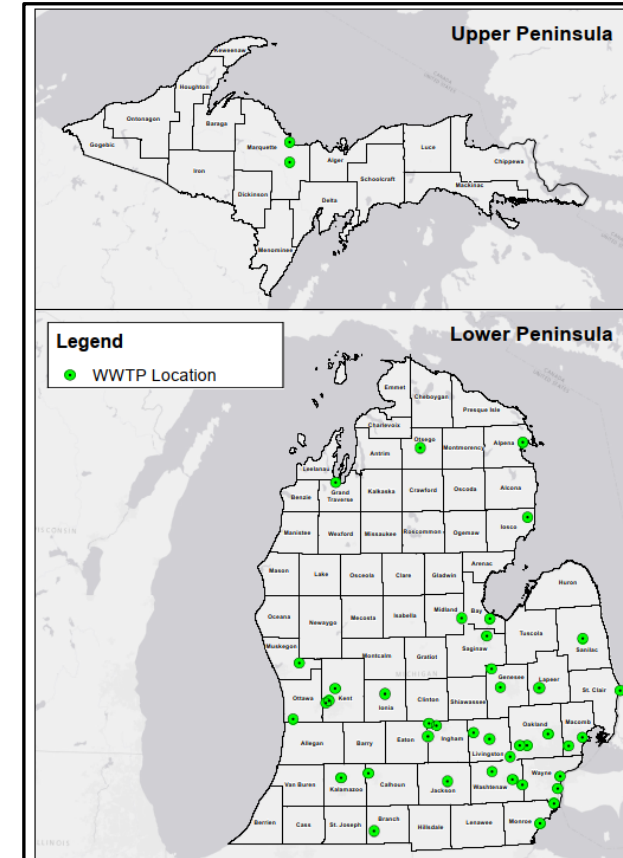
**Number of Participants (19 total in 8 states)**

■ 1 participant ■ 2 participants ■ 3+ participants

### California WWTPs



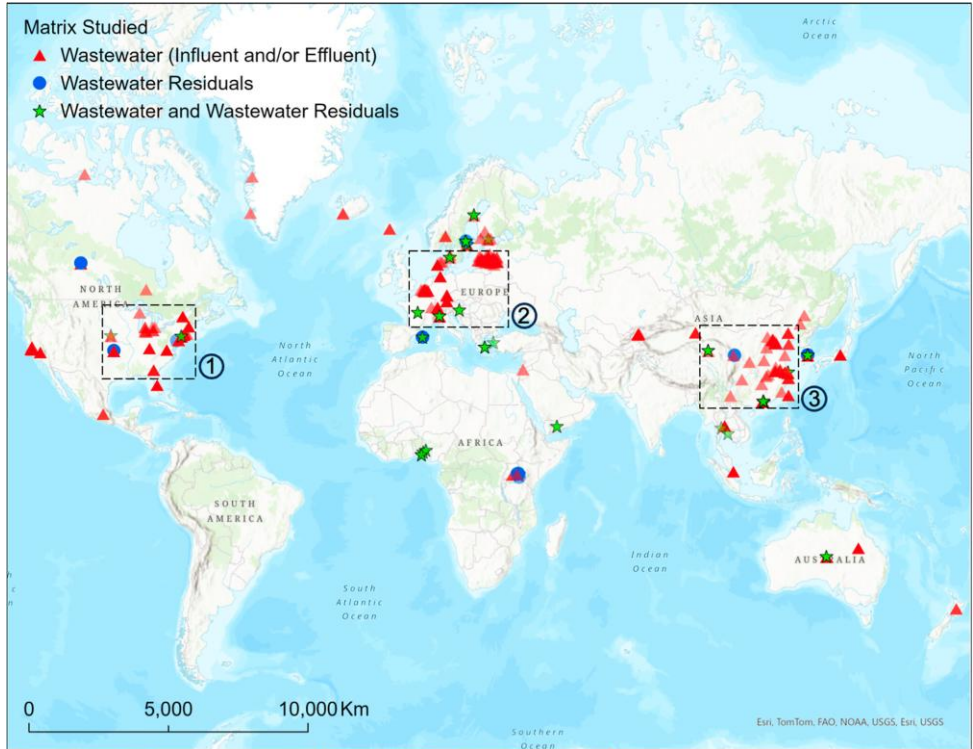
### Michigan WWTPs



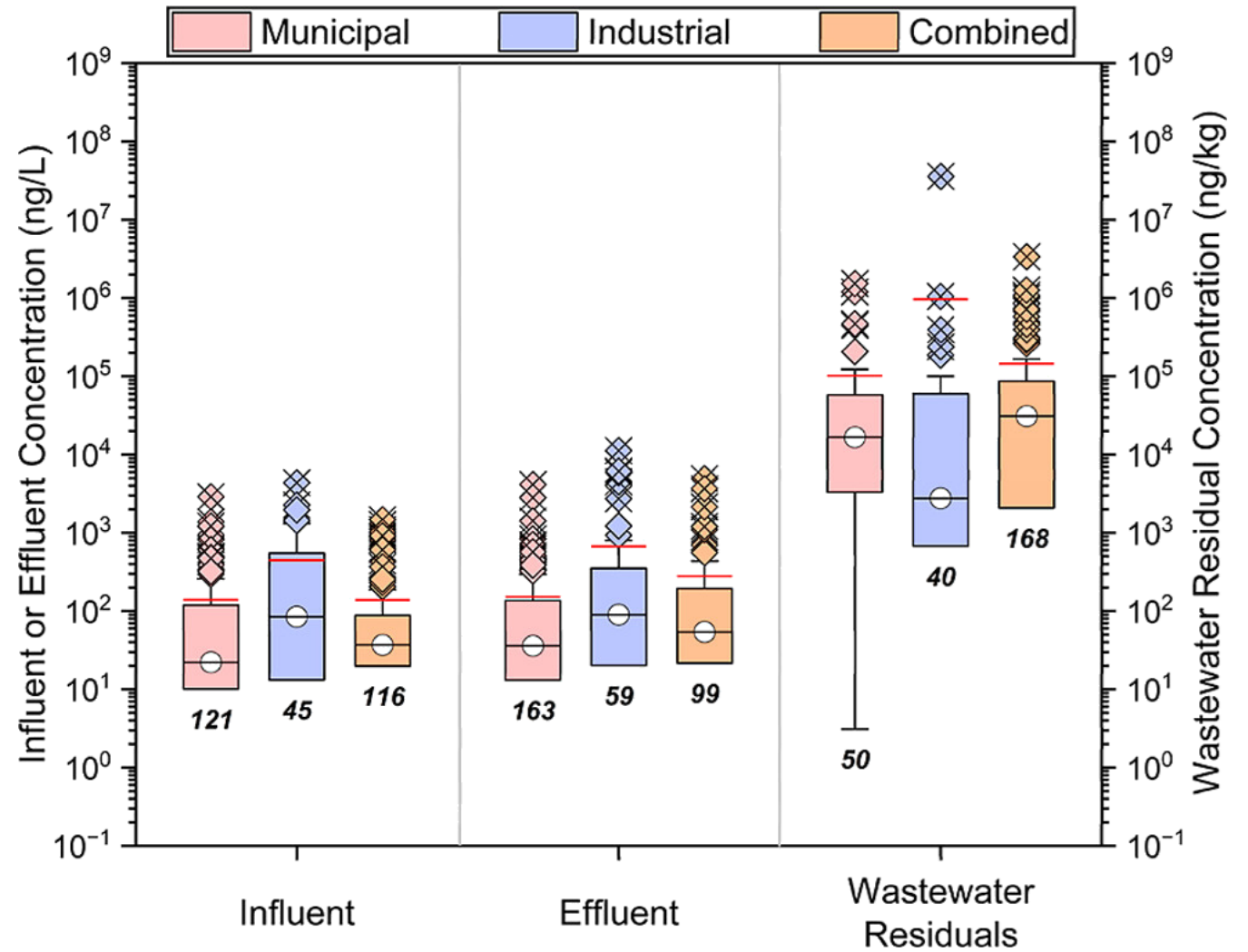
[https://www.michigan.gov/documents/egle/wrd-pfas-initiatives-statewide-full-report\\_722902\\_7.pdf](https://www.michigan.gov/documents/egle/wrd-pfas-initiatives-statewide-full-report_722902_7.pdf)

<https://www.waterboards.ca.gov/pfas/>

# Global PFAS Occurrence Data in WWTPs



Abou-Khalil et al., ES&T (2026)

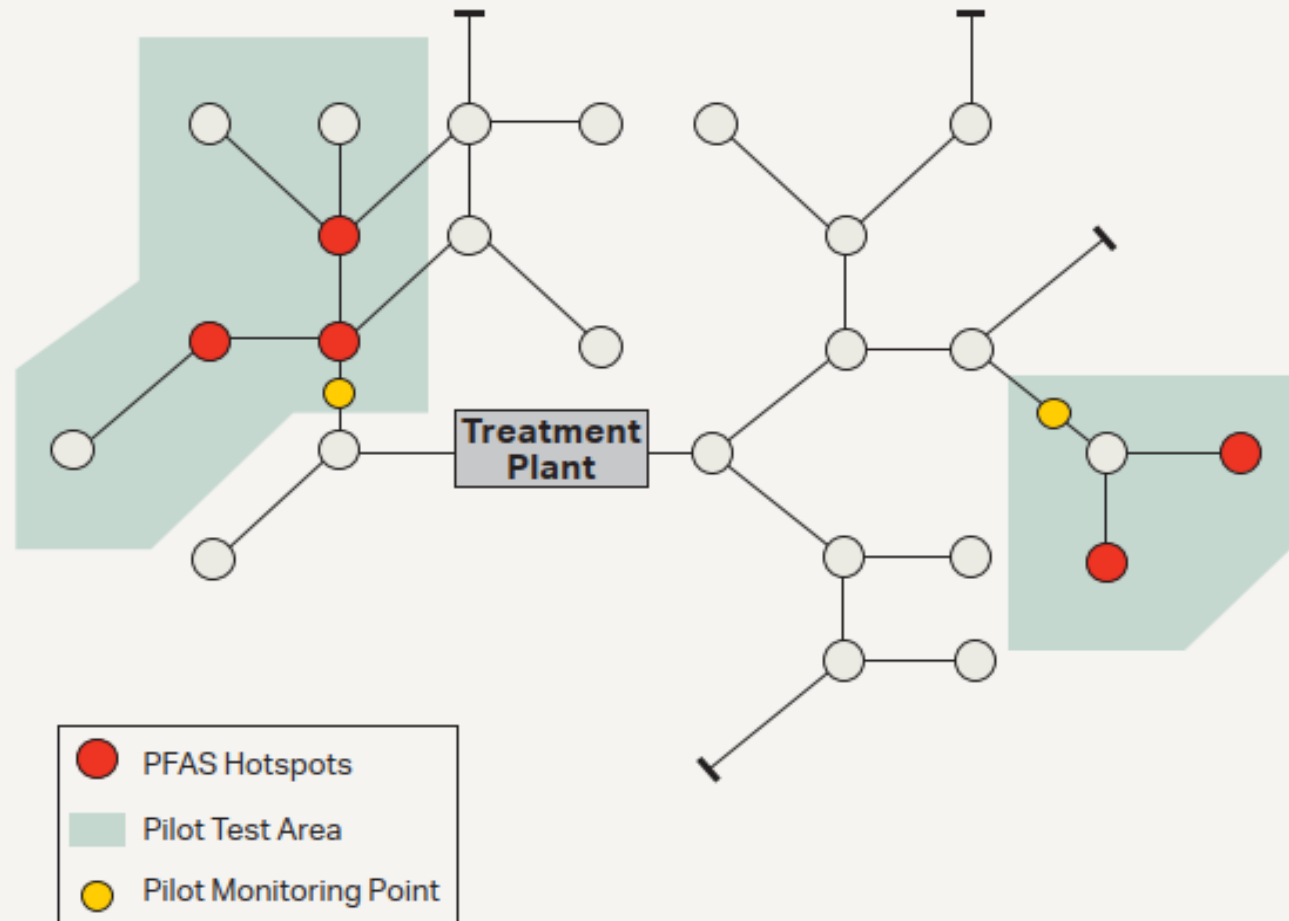


Concentration of PFOS + PFOA in influent and effluent streams and wastewater residuals by wastewater type.

# PFAS Pathfinder

Mapping, Source Evaluation, and Mass Flux in Water Networks

Our teams deliver actionable PFAS source control strategies, combining best-in-class technology with decades of PFAS experience.





## The Challenge

Utilities face rising PFAS risks that treatment alone cannot solve. Without knowing **where PFAS enter their system**, utilities face escalating costs, regulatory risks, and limited ability to reduce PFAS at the source.



**PFAS Source Category**

- No | Low
- No | Medium
- No | High
- Yes | Low
- Yes | Medium
- Yes | High

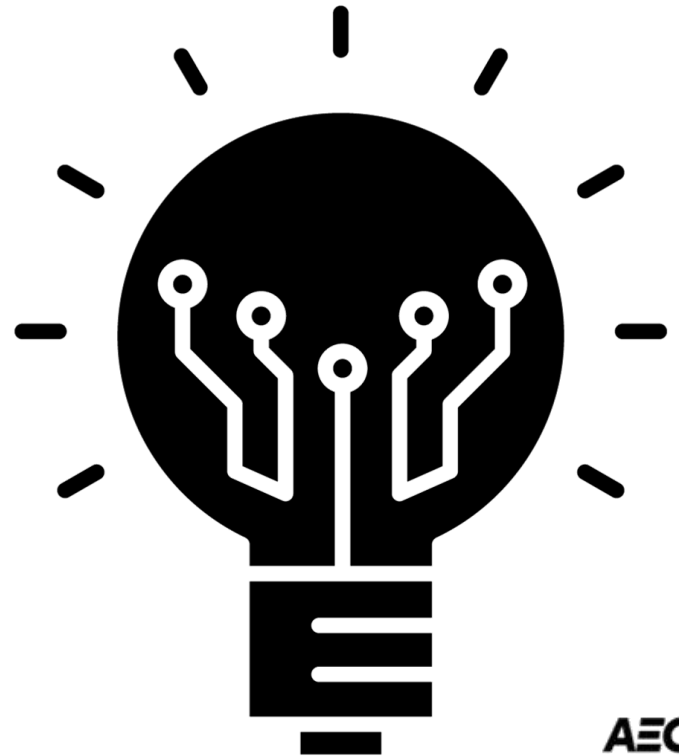


**PFAS Potential Sources**

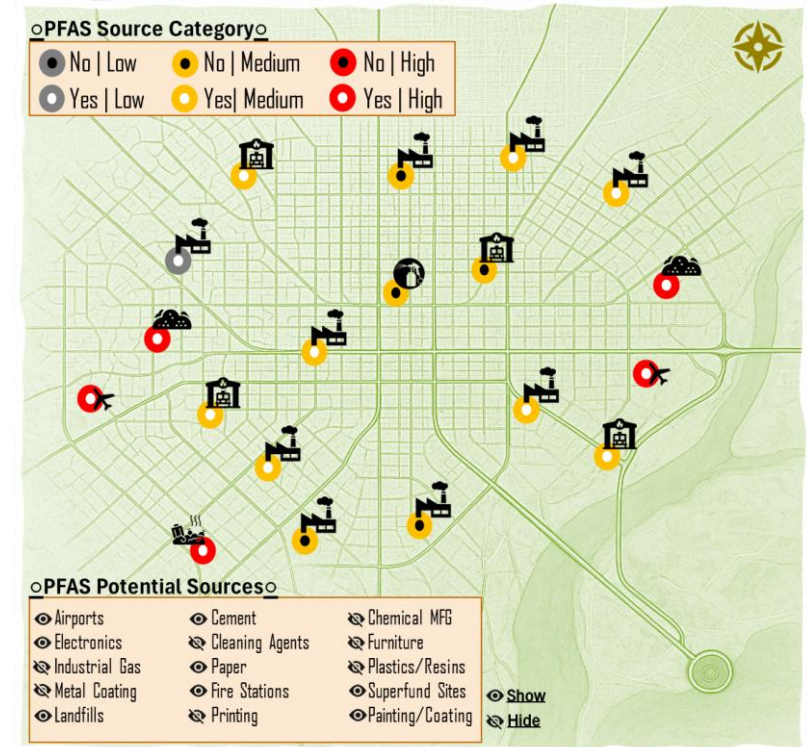
- |  |   |  |  |
|--|---|--|--|
| <input checked="" type="checkbox"/> Airports       | <input checked="" type="checkbox"/> Cement          | <input checked="" type="checkbox"/> Chemical MFG     | <input checked="" type="checkbox"/> Show |
| <input checked="" type="checkbox"/> Electronics    | <input checked="" type="checkbox"/> Cleaning Agents | <input checked="" type="checkbox"/> Furniture        | <input checked="" type="checkbox"/> Hide |
| <input checked="" type="checkbox"/> Industrial Gas | <input checked="" type="checkbox"/> Paper           | <input checked="" type="checkbox"/> Plastics/Resins  |  |
| <input checked="" type="checkbox"/> Metal Coating  | <input checked="" type="checkbox"/> Fire Stations   | <input checked="" type="checkbox"/> Superfund Sites  |  |
| <input checked="" type="checkbox"/> Landfills      | <input checked="" type="checkbox"/> Printing        | <input checked="" type="checkbox"/> Painting/Coating |  |

# Our Solution

We deliver **PFAS Source Evaluation Services** that combine watershed and sewershed analysis into a single, integrated framework.



# PFAS PathFinder



## PFAS Partitioning

- ✓ Track how PFAS move through treatment steps (liquid, solids, air).
- ✓ Understand fate in effluent, biosolids, and residual streams.

## Effluent Risk Evaluation

- ✓ Assess likelihood of effluent exceeding current or anticipated PFAS limits.
- ✓ Identify options for effluent polishing or blending strategies.

## Decision Support

- ✓ Provide utilities with scenario-based evaluations of compliance, costs, and long-term risk.
- ✓ Support selection of practical, defensible strategies for effluent and solids.

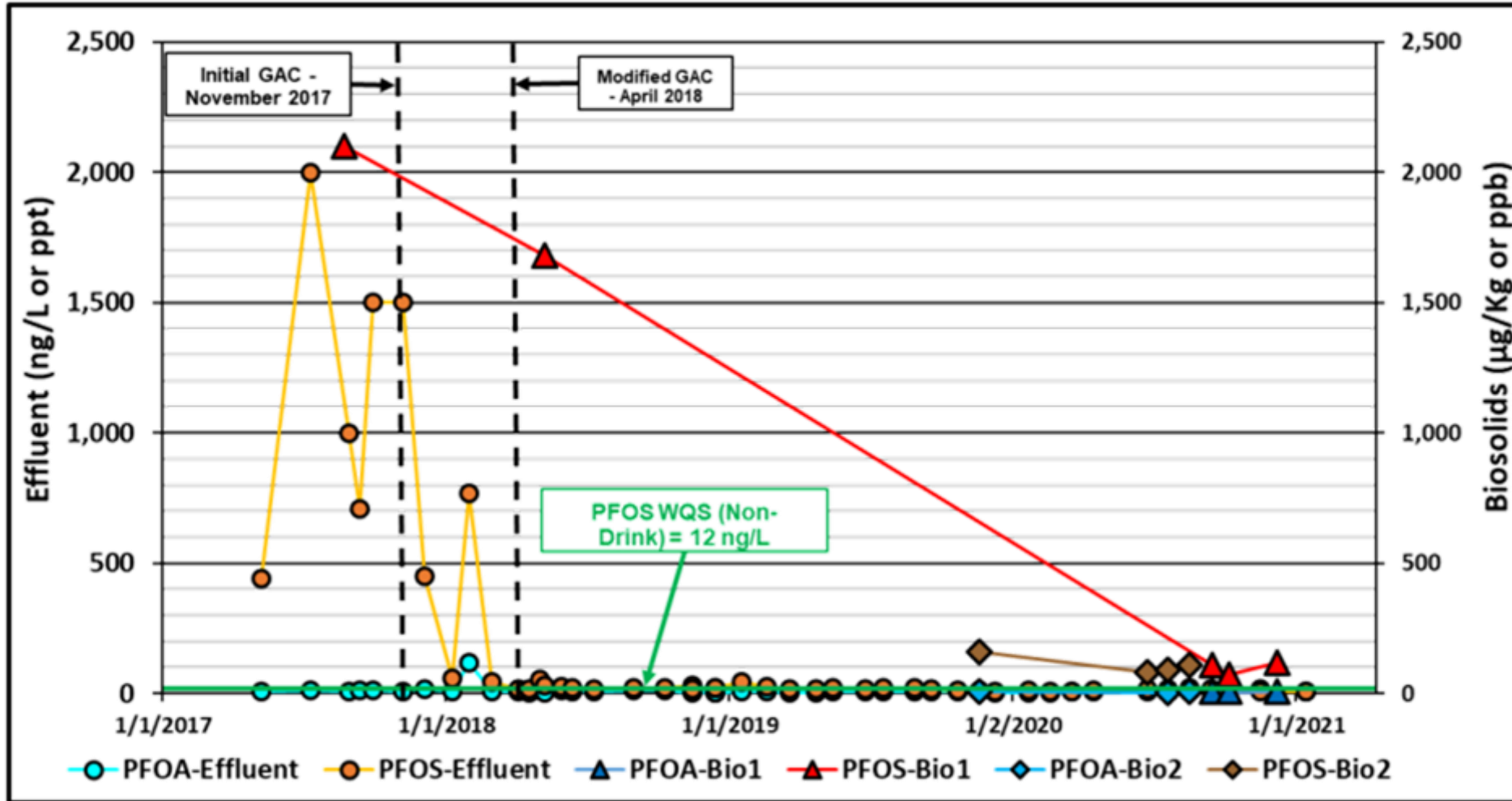
# Example Project on PFAS Source Reduction



Municipal WWTP	Recent PFOS, Effluent* (ng/L)	PFOS Reduction (highest to most recent)	Actions Taken to Reduce PFOS
Bronson WWTP	5	99%	Treatment (GAC) at source (1)
Howell WWTP	5	96%	Treatment (GAC/Resin) at source (1)
Ionia WWTP	<6	99%	Treatment (GAC) at source (1)
Kalamazoo WWTP	5	90%	Treatment (GAC) at source (2), change of water supply
KI Sawyer WWTP	9	96%	Eliminated leak of AFFF
Lapeer WWTP	8.2	99%	Treatment (GAC) at source (1)
Wixom WWTP	34	99%	Treatment (GAC) at source (1)

<https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/WRD/IPP/pfas-initiatives-statewide-full-report.pdf?rev=0efd2574f6f64b78a1273512f79b105a&hash=63E60CF503131E79AD9E73C960C4A04B>

# Example of Source Reduction in Effluent and Biosolids



<https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/WRD/IPP/pfas-initiatives-statewide-full-report.pdf?rev=0efd2574f6f64b78a1273512f79b105a&hash=63E60CF503131E79AD9E73C960C4A04B>

# Example of PFAS Evaluation Within the WWTP



**Legend:**

Treatment Code ( Total PFAS | PFOA | PFOS )

Aqueous Sample (ng/L)

Solids (µg/Kg)

★ Sample location

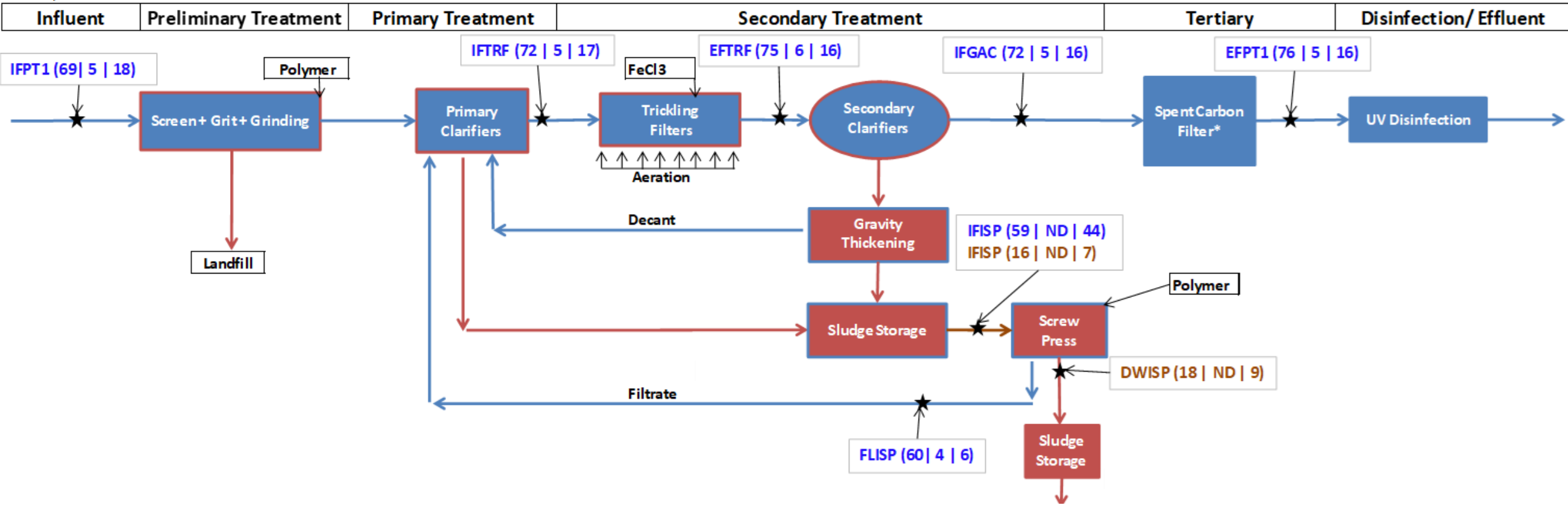
SRT: < 3 days

Current Flow: 7.3MGD

Design Flow: 18MGD

Wastewater Sources: 20% Industrial | 20% Commercial | 60% Residential

Sludge Percentage: Primary 80% and Secondary 20%



# Deploying innovative PFAS solutions across Massachusetts

AECOM selected to deliver a first-of-its-kind PFAS pilot program at municipal wastewater treatment plants for the Massachusetts Department of Environmental Protection

 [Read more](#)

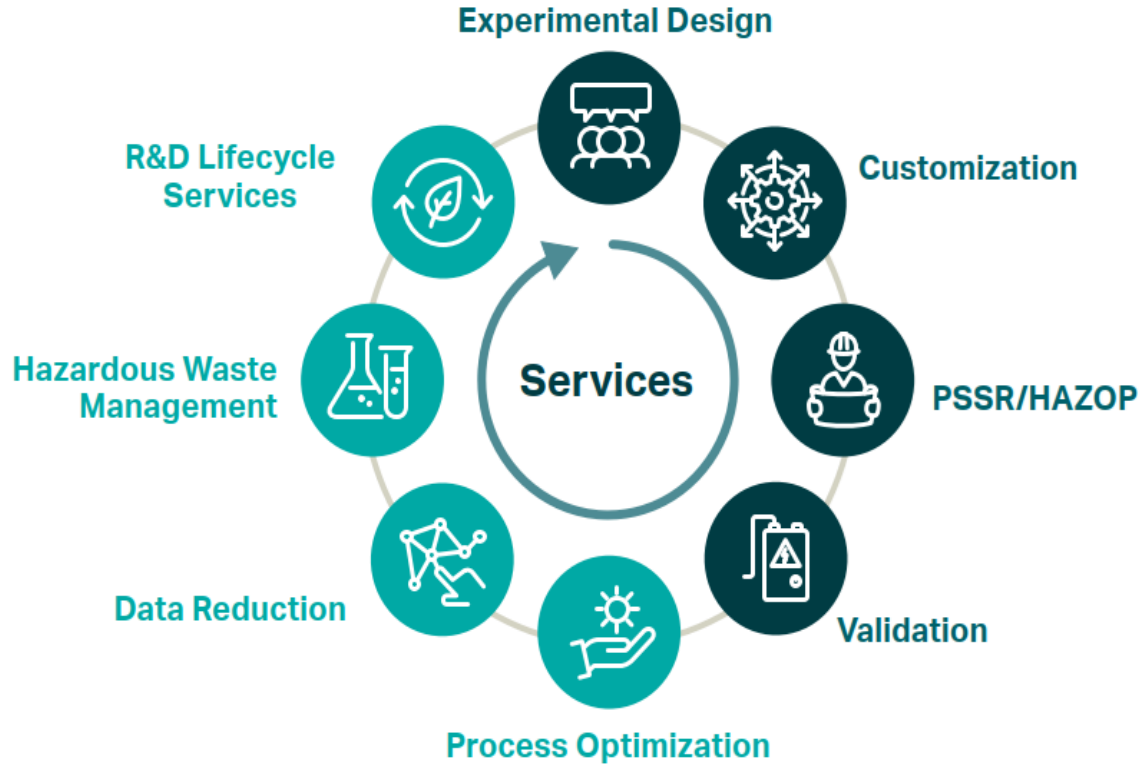
**PFAS**

IDENTIFY. RESOLVE.

**CLEANTECH HUB**  
AECOM

At **AECOM**:

We **test, build, and operate** systems at all scales using **conventional and novel** treatment technologies.





IDENTIFY. RESOLVE.

**AECOM** Delivering a  
better world

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