AECOM Imagine it. Delivered.



Statewide PFAS Sampling of Public Water Supplies in Michigan

John Cuthbertson & Dorin Bogdan, Ph.D.

October 17, 2019

Unregulated Contaminant Monitoring Rule 3 (UCMR3)

TUESDAY, MAY 22, 2018

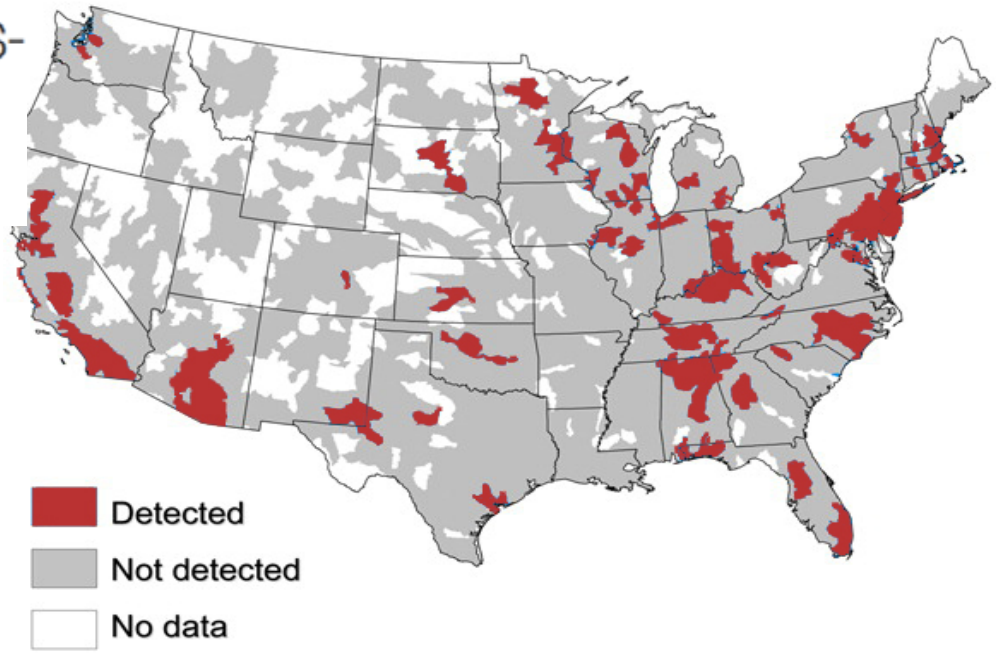
By David Andrews, Senior Scientist

REPORT: UP TO 110 MILLION AMERICANS COULD HAVE PFAS-CONTAMINATED DRINKING WATER

PFAS Tap Water Data Was Funded By Taxpayers But Kept Secret

	WATER UTILITIES THAT EXCEED THE EPA REPORTING LIMITS OF 10-90 PPT	WATER UTILITIES THAT EXCEED 5 PPT	WATER UTILITIES THAT EXCEED 2.5 PPT
EWG estimate for water systems with PFAS	4%, from EPA data	21%	39%
EWG estimate of people served by systems with PFAS contamination	16 million people	Approximately 60 million	Approximately 110 million

Hydrological units with detectable PFASs



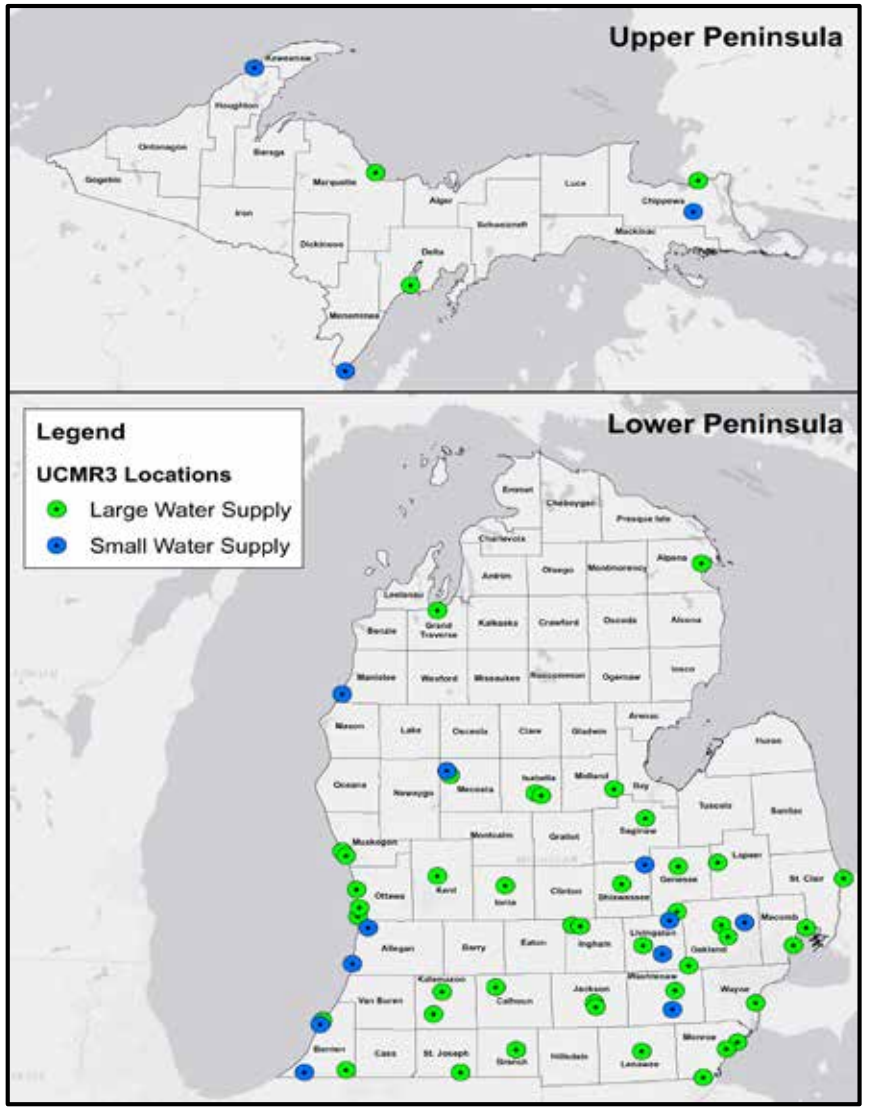
AECOM

Unregulated Contaminant Monitoring Rule (UCMR3) 2013 - 2015

- USEPA UCMR3 Study - Michigan:
  - 136 Large Public Water Supplies
  - 26 Small Public Water Supplies

- PFAS Detected in 2 Supplies
  - **Plainfield Township** – PFOS 60 ppt
  - **Ann Arbor** – PFOS 43 ppt

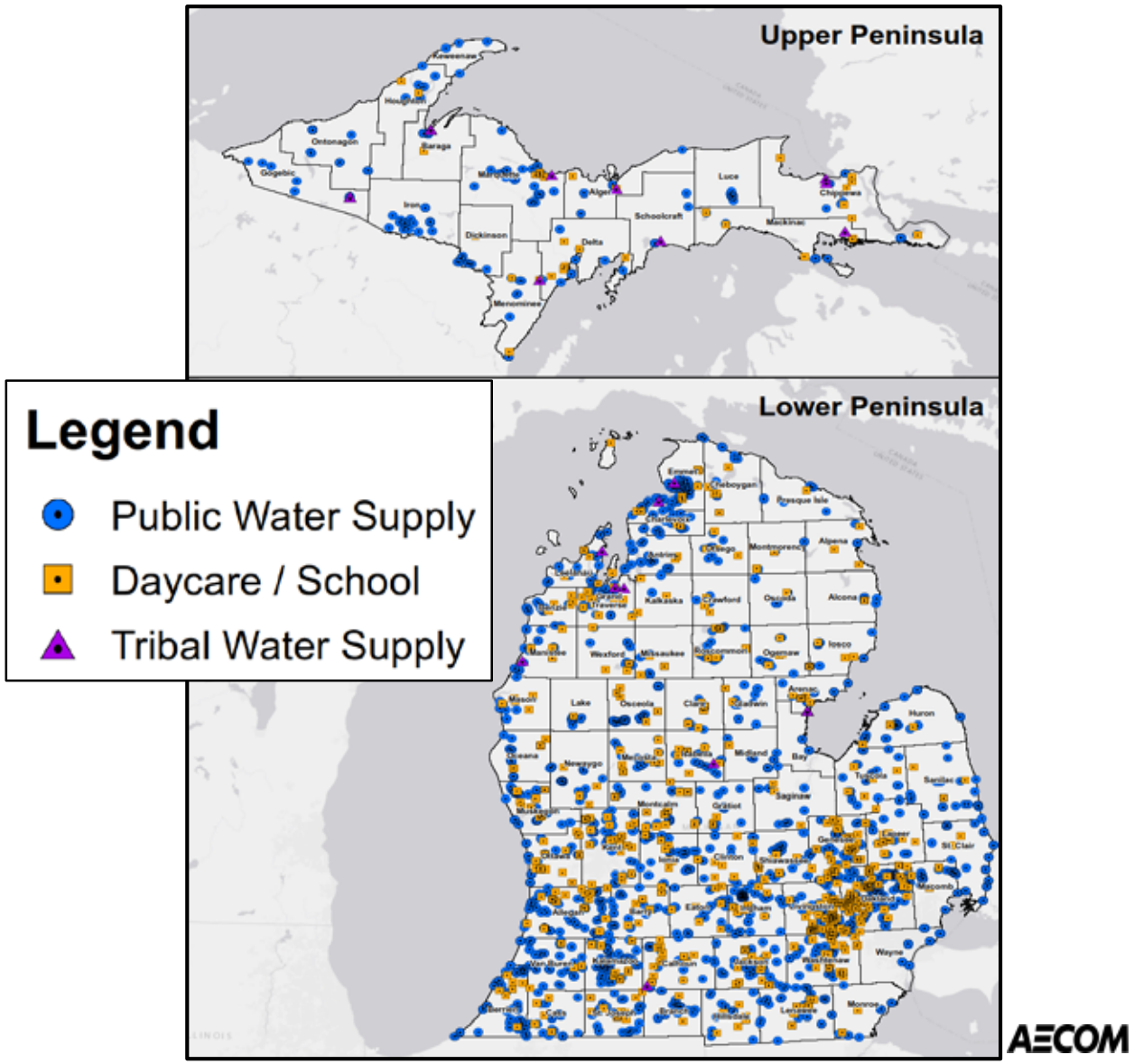
PFAS	Minimum Reporting Limit (MRL) (ng/L)	Total Locations	PWS ≥ MRL
PFOS	**40**	**162 (~103 Buyers)**	**2**
PFOA	**20**		**0**
PFNA	20		0
PFHxS	30		0
PFHpA	10		0
PFBS	90		0



AECOM

Phase 1 - 2018 Statewide PFAS PWS Sampling Scope

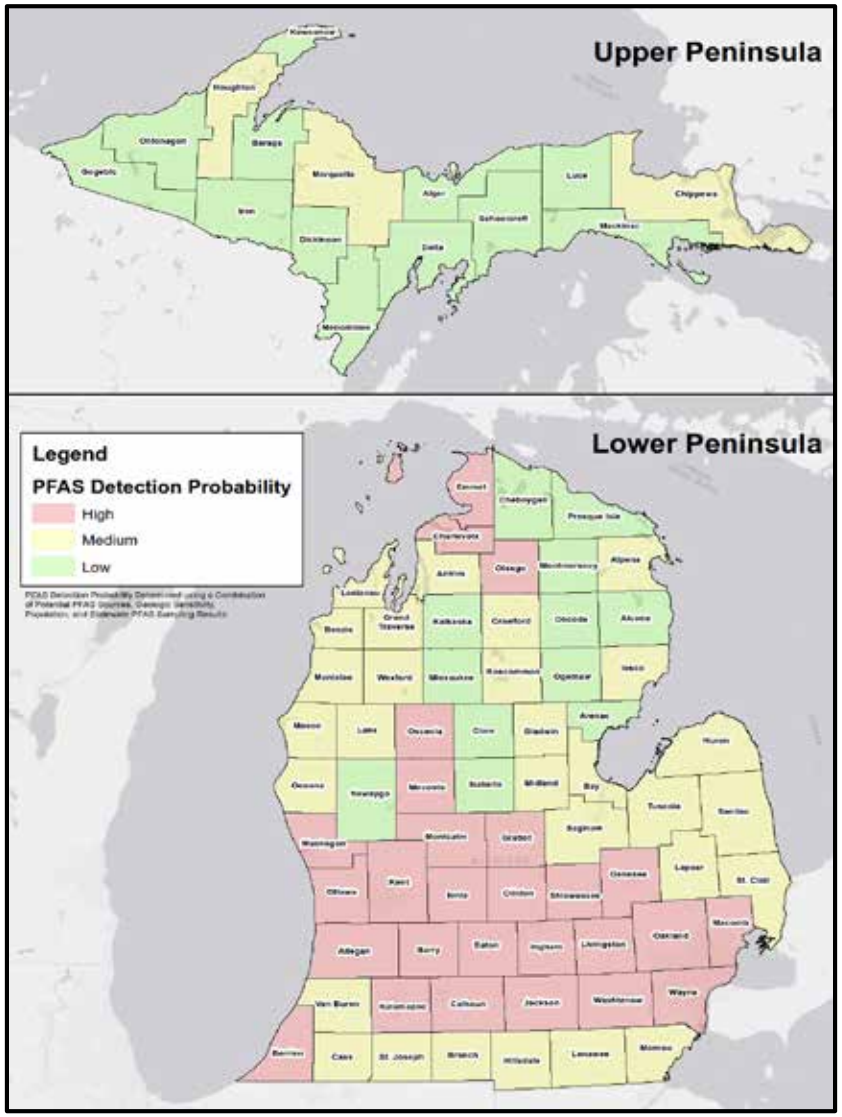
- 1,740 Locations (2,283 Samples)
  - 1,112 Community Water Supplies
    - o Municipalities
    - o Apartment Complexes
    - o Subdivisions
    - o Condominiums, etc.
  - 460 Schools
  - 152 Child Care Providers (Daycares)
  - 17 Tribal Entities
- ~75% of all Michigan Residents
- ~ 7.9 Million Residents



AECOM

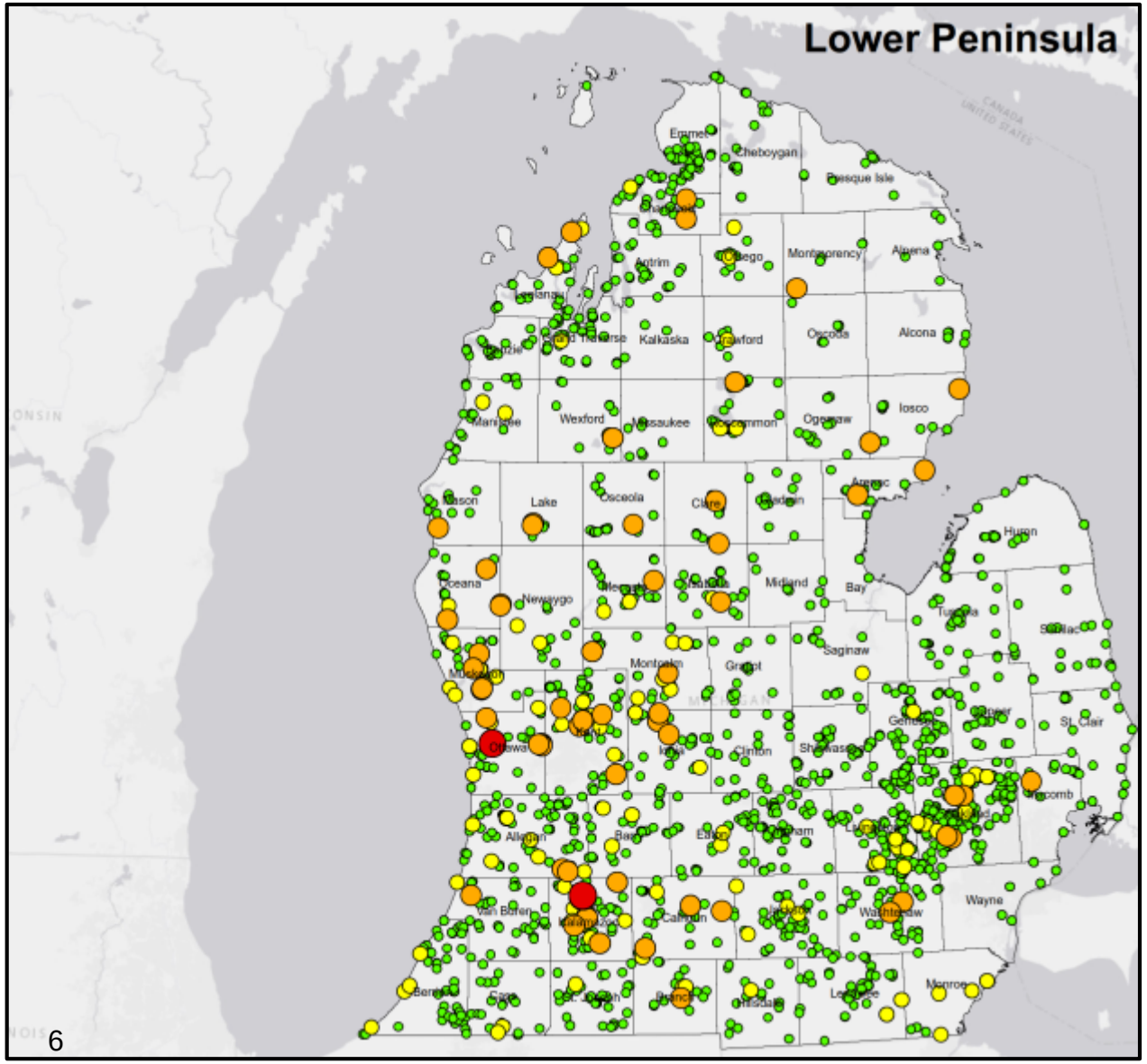
Sampling Implementation / Challenges

- 1,740 Locations | 3 Sampling Teams | 8 Months
- EPA Method 537 Rev 1.1 – 14 Compounds / 2ppt.
- Scheduling / Documentation / Shipping
- High Level of Scrutiny (Facilities, Media, Public)
- Resampling of 70 Locations (Total PFAS > 10 ppt)
- Data Management / Processing



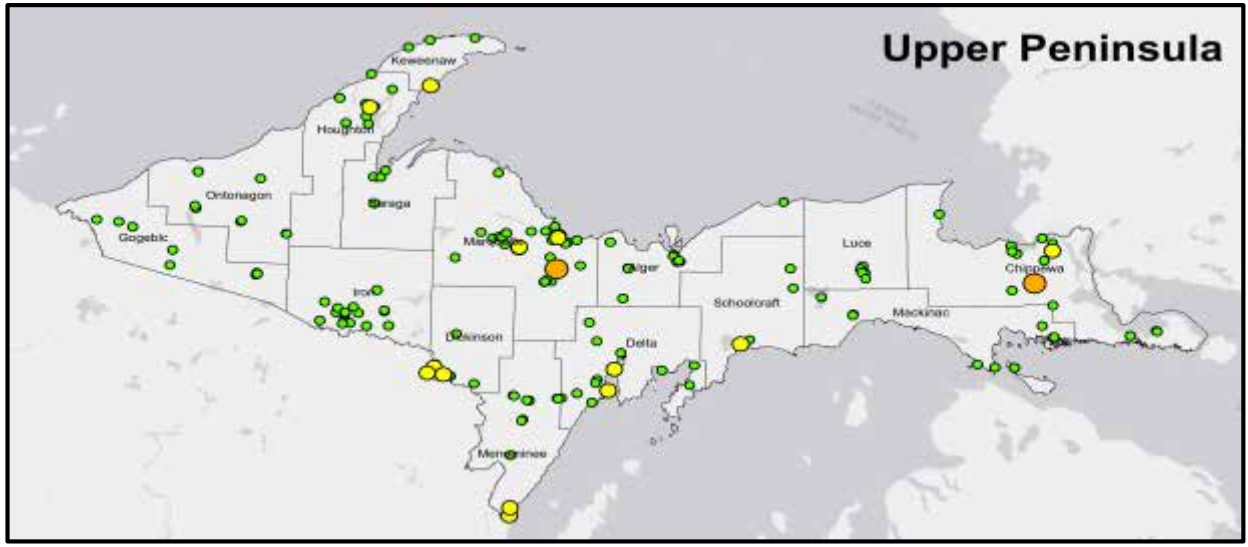
AECOM

Phase 1 - PWS Sampling Results cont.



Legend Units: ng/L or ppt

- Non-Detect
- Total PFAS < 10
- Total PFAS >= 10
- PFOA + PFOS > 70



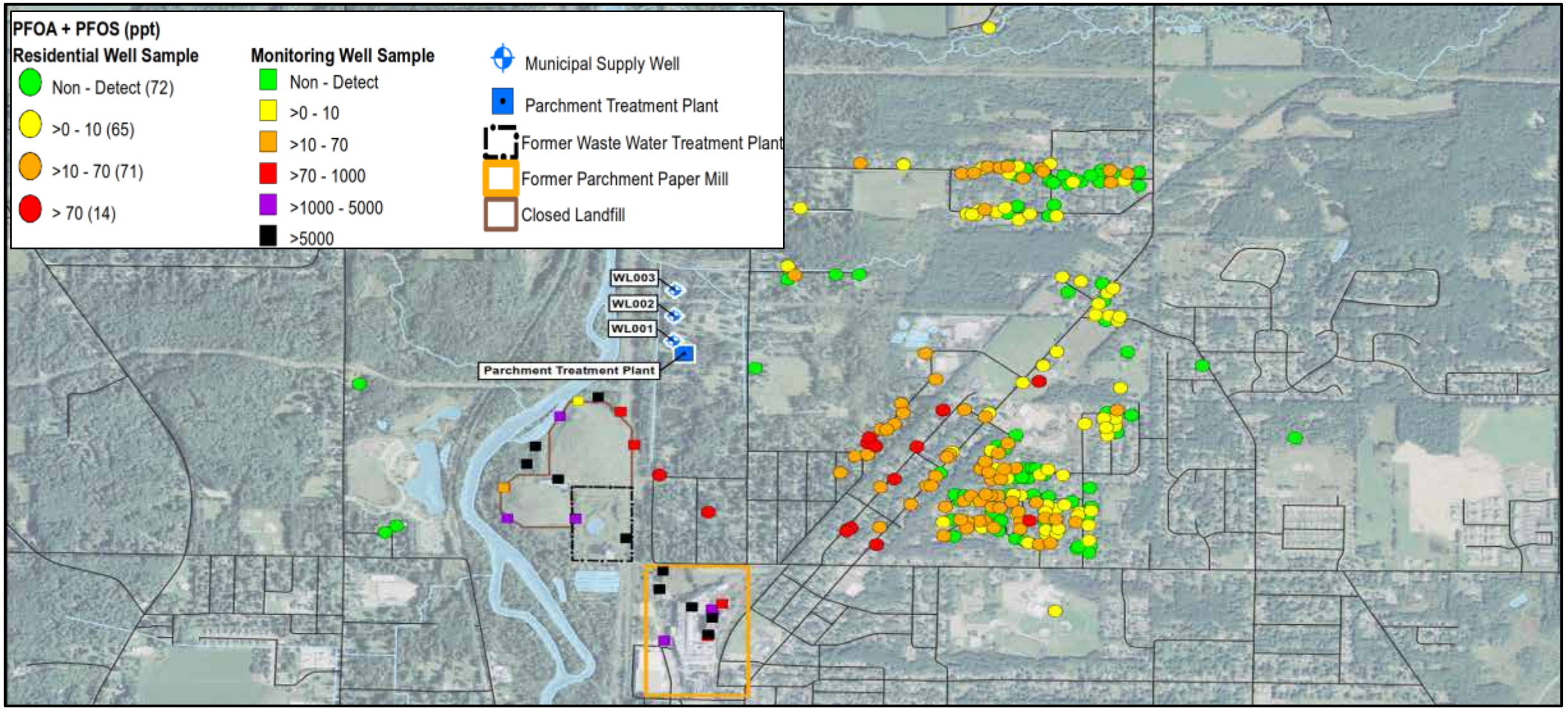
AECOM

Phase 1 - PWS Sampling Results

Non-Detect	Total PFAS < 10ppt	Total PFAS > 10ppt	PFOS+PFOA > 70ppt
89.7% (1,561) 5.8M	6.6% (115) 1.4M	3.6% (62) 490,000	0.1% (2) 3,500

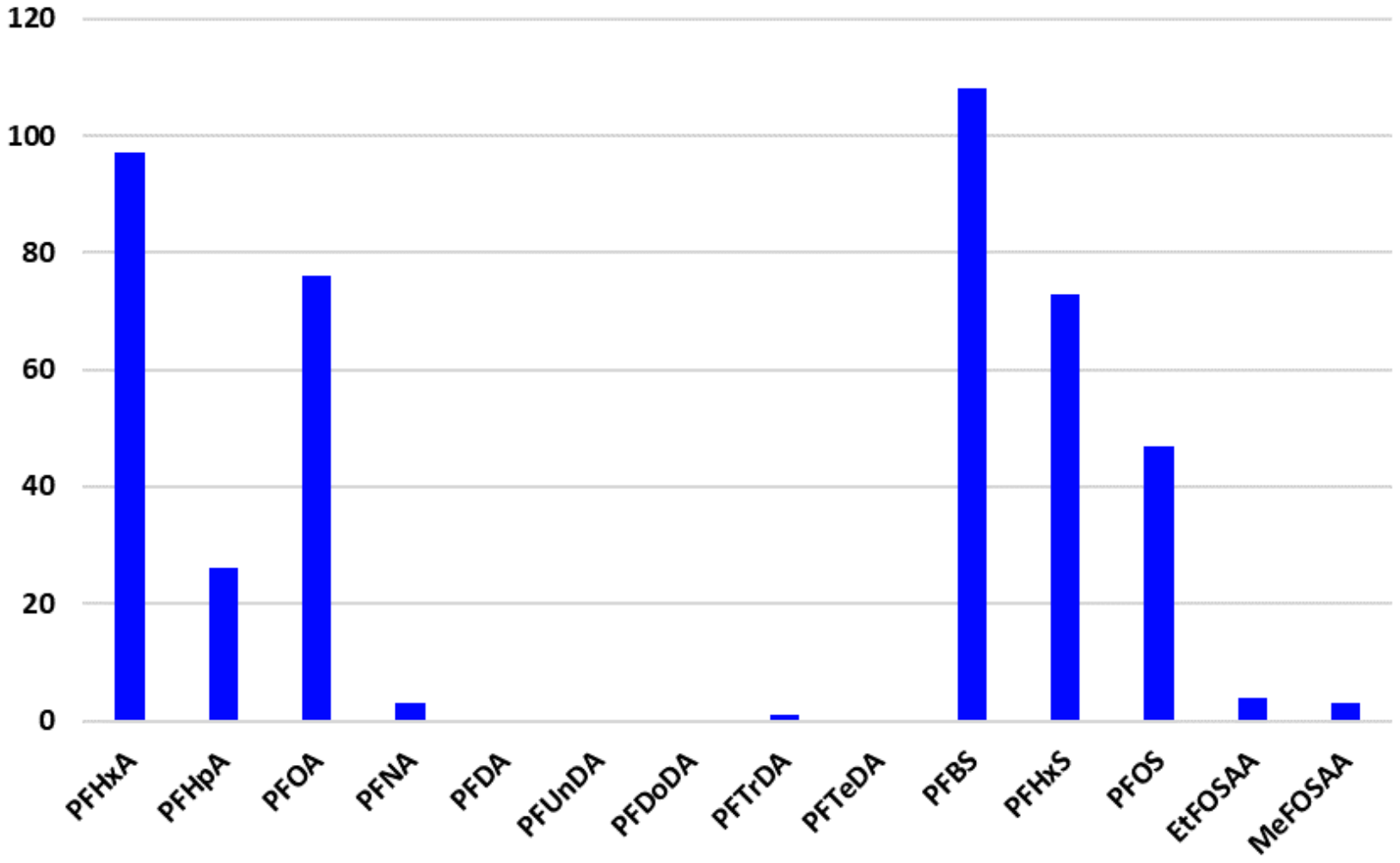
1,740 Individual Supplies

City of Parchment



AECOM

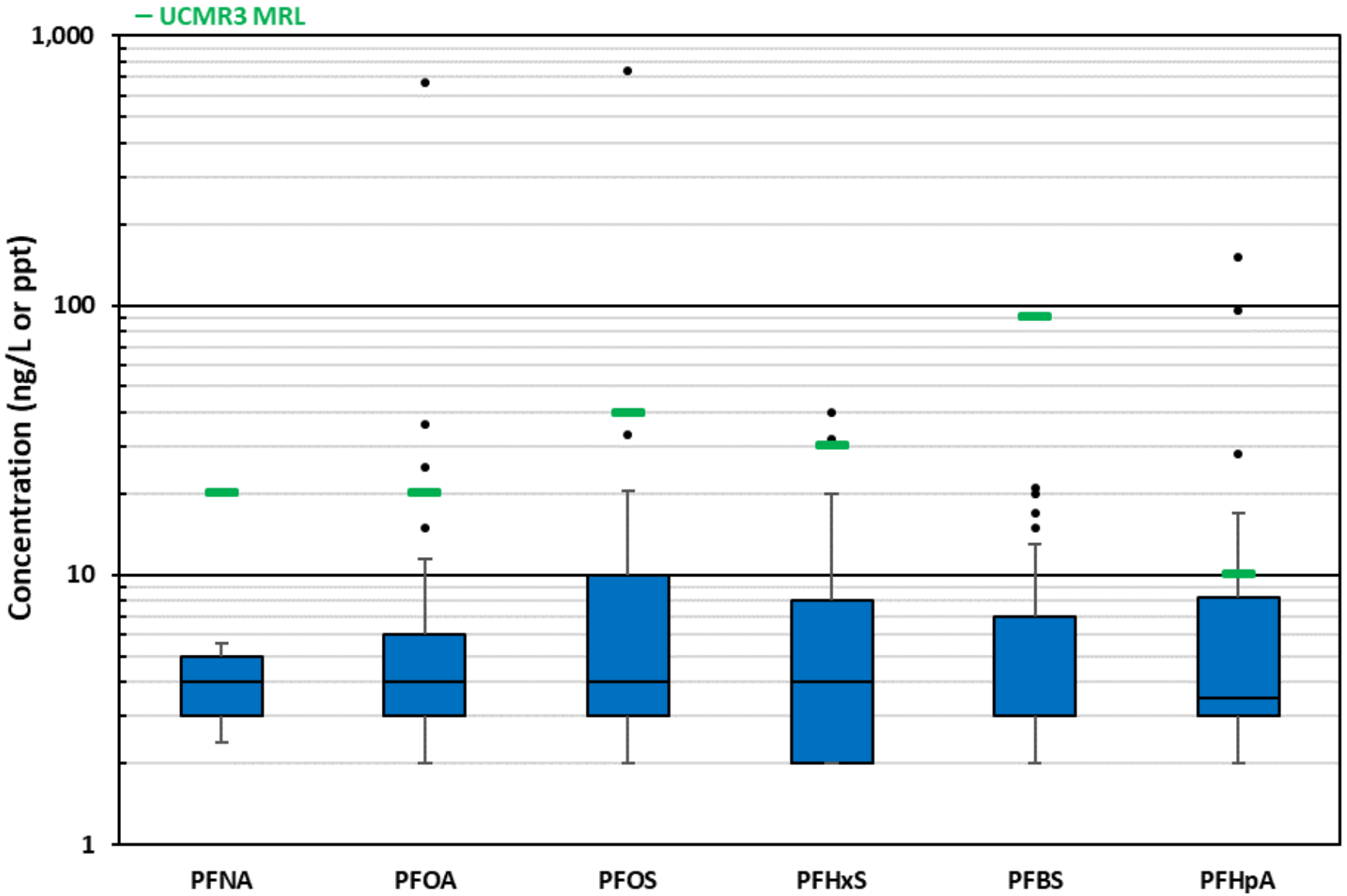
Phase 1 - Number of PFAS Detections



PFAS	% Detection
PFBS	4.7
PFHxA	4.2
PFOA	3.3
PFHxS	3.2
PFOS	2.1
PFHpA	1.1
EtFOSAA	0.2
PFNA	0.1
MeFOSAA	0.1

AECOM

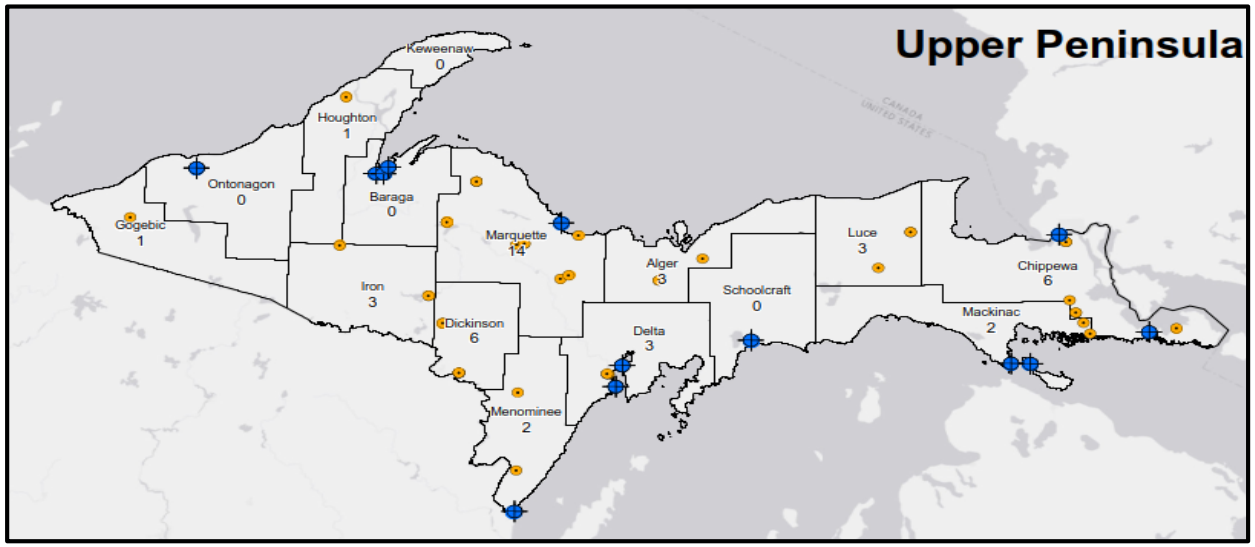
Phase 1 - PFAS Drinking Water Detections

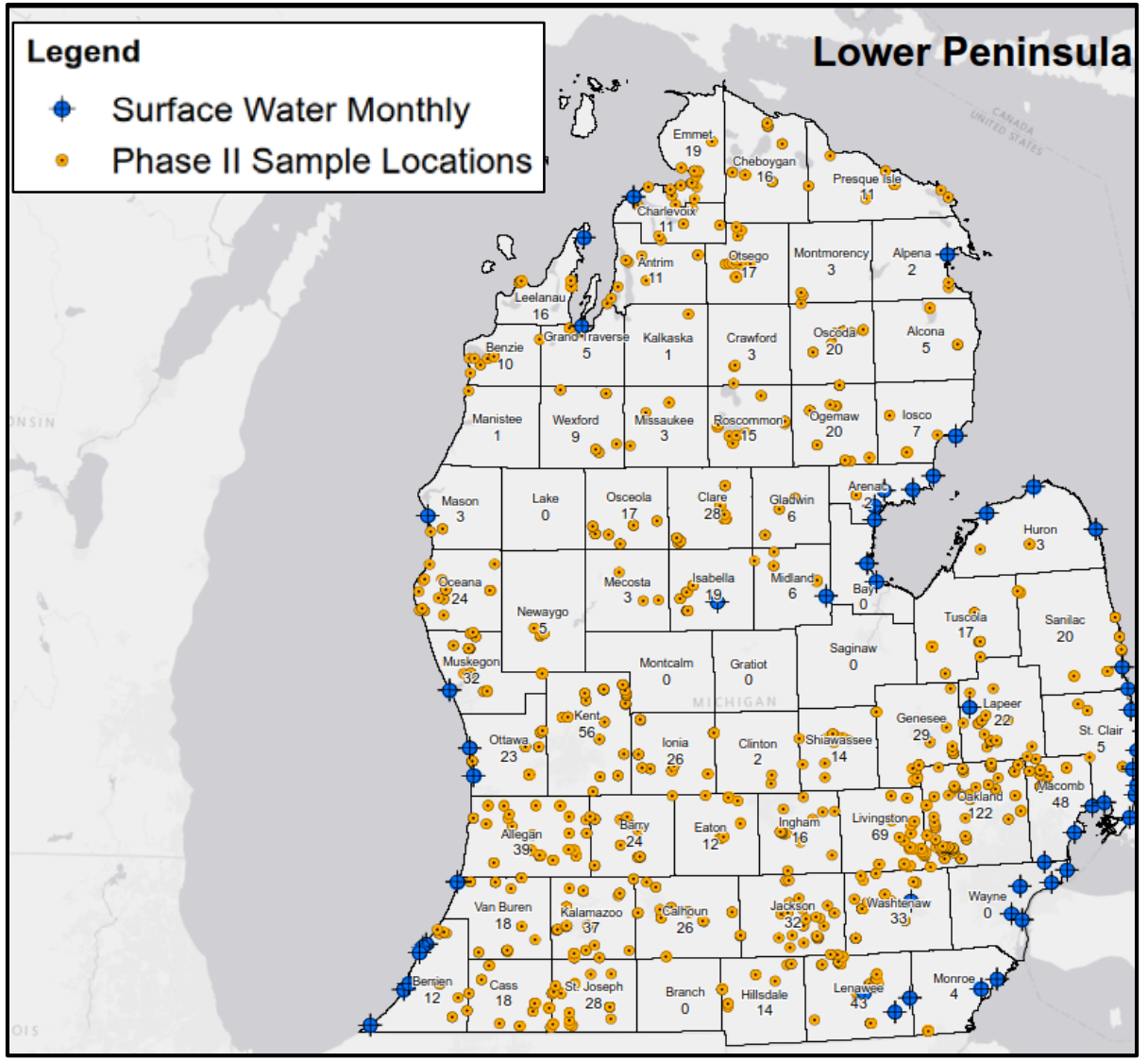


AECOM

Phase 2 - 2019 Statewide PFAS PWS Sampling Scope

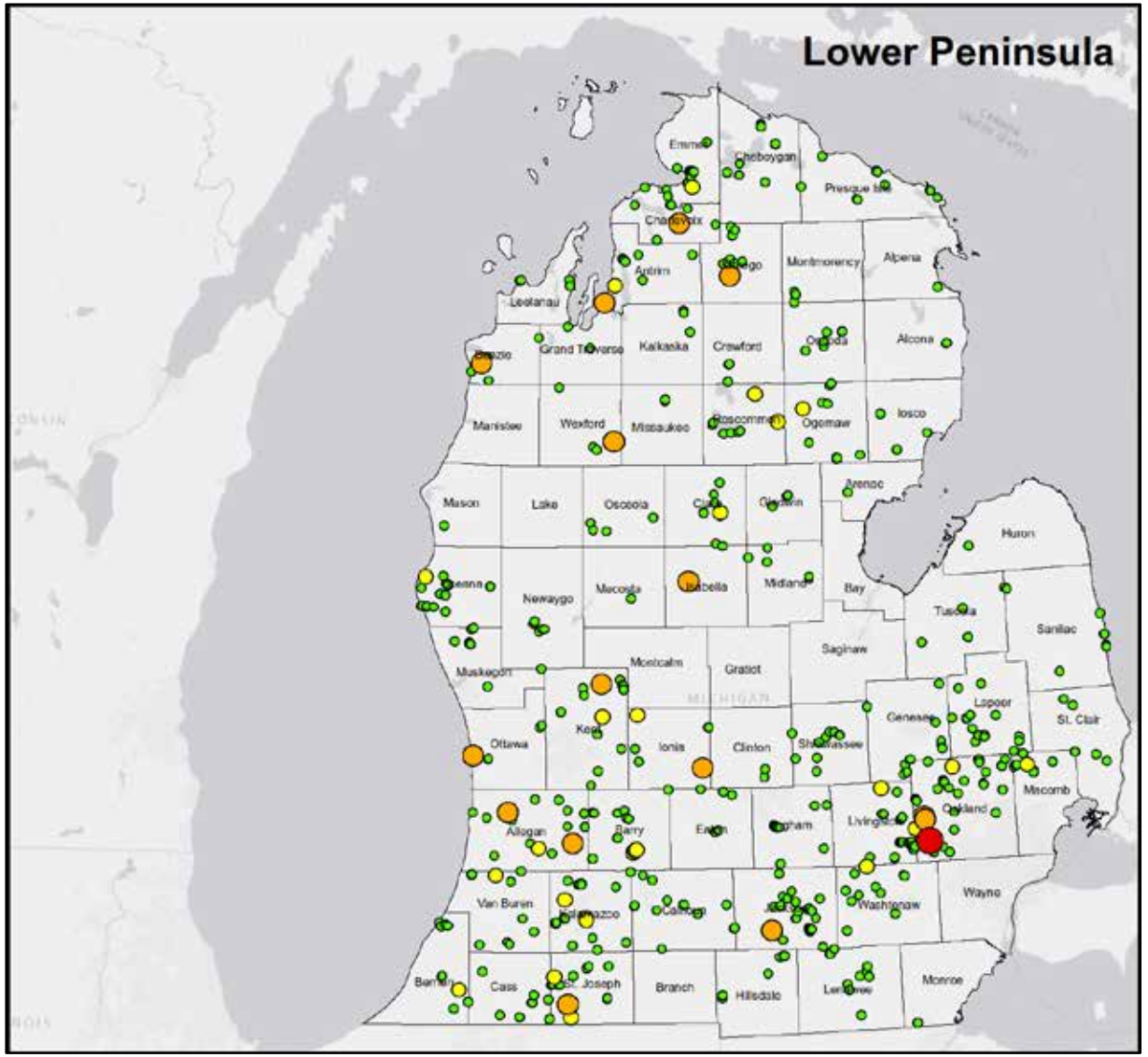
- 630 Locations (920 Samples)
  - Commercial / Medical Offices
  - Adult Foster Cares / Motels
  - Children Camps / Parks





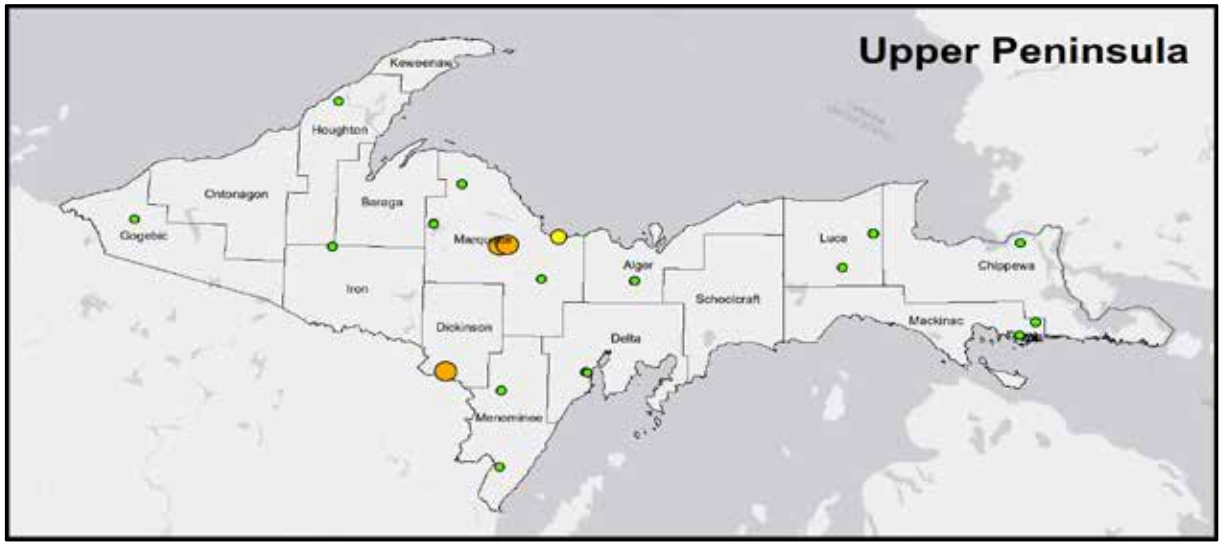
AECOM

Phase 2 - PWS Preliminary Sampling Results



Legend Units: ng/L or ppt

- Non-Detect
- Total PFAS < 10
- Total PFAS >= 10
- PFOA + PFOS > 70



AECOM

Phase 1 & 2 - PWS Sampling Results

Non-Detect	Total PFAS < 10ppt	Total PFAS > 10ppt	PFOS+PFOA > 70ppt

Phase 1 = 1,740 Supplies

89.7% (1,561)	6.6% (115)	3.6% (62)	0.1% (2)

Phase 2 = 482 out of 632 Supplies

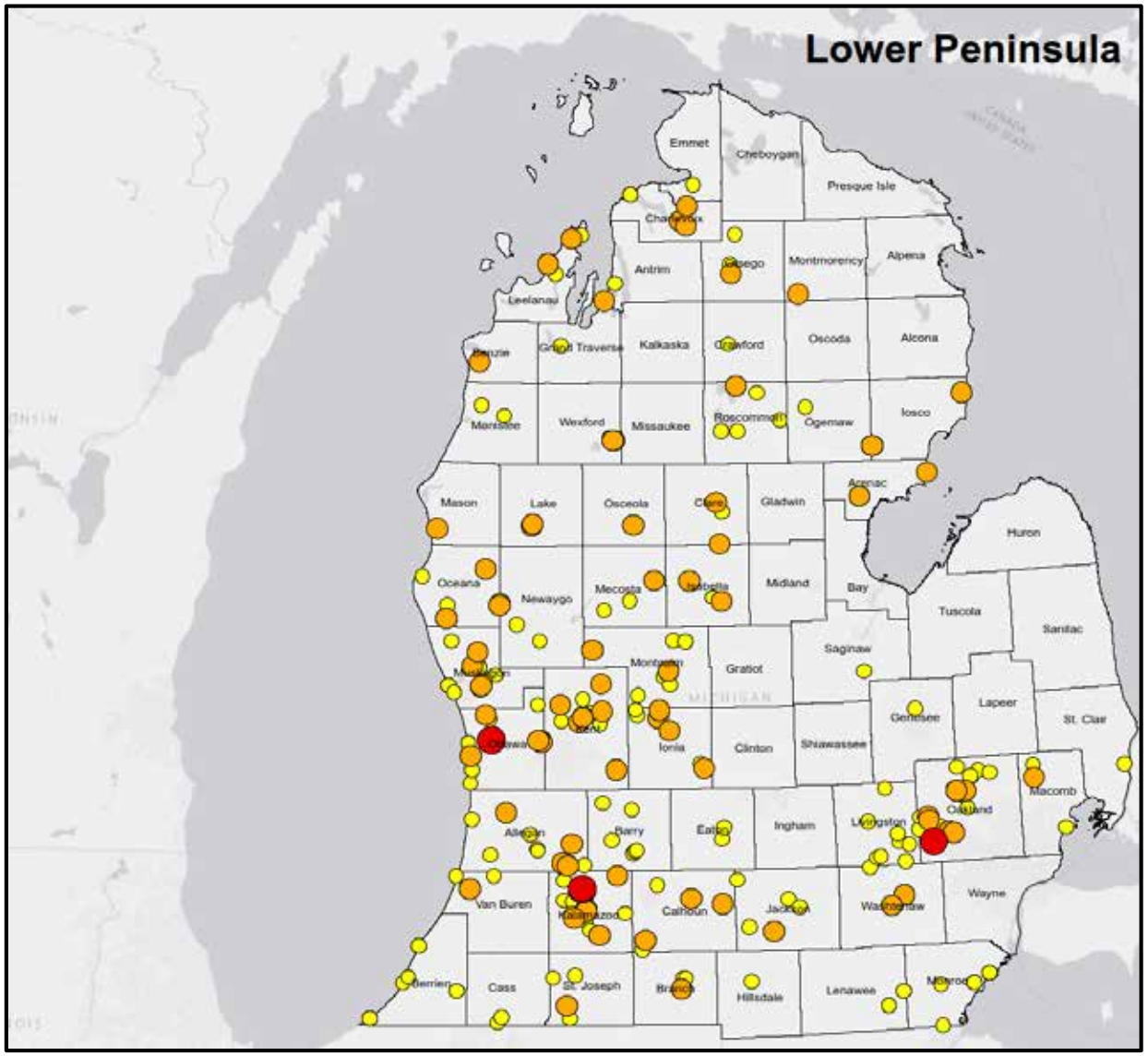
91% (439)	5% (24)	3.8% (18)	0.2 % (1)

Phase 1 & 2 - PWS Sampling Results cont.

Phase 1&2 = 2,222 Supplies

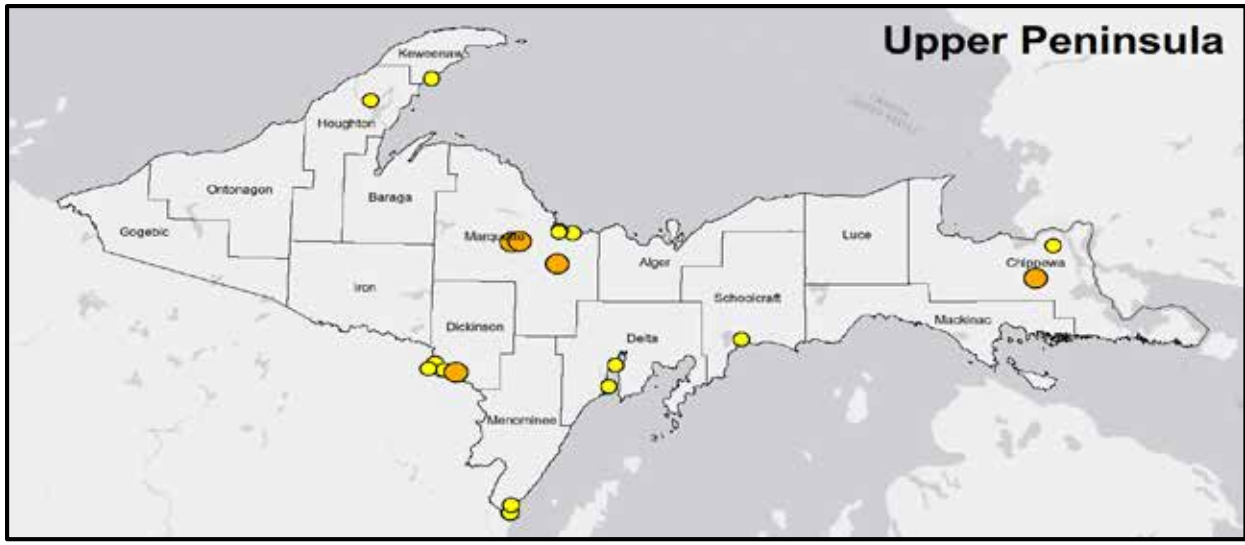
Non-Detect	Total PFAS < 10ppt	Total PFAS > 10ppt	PFOS+PFOA > 70ppt
90% (2,000)	6.3% (139)	3.6% (80)	0.1% (3)

Phase 1&2 - PWS Sampling Results Compared to Proposed MCL



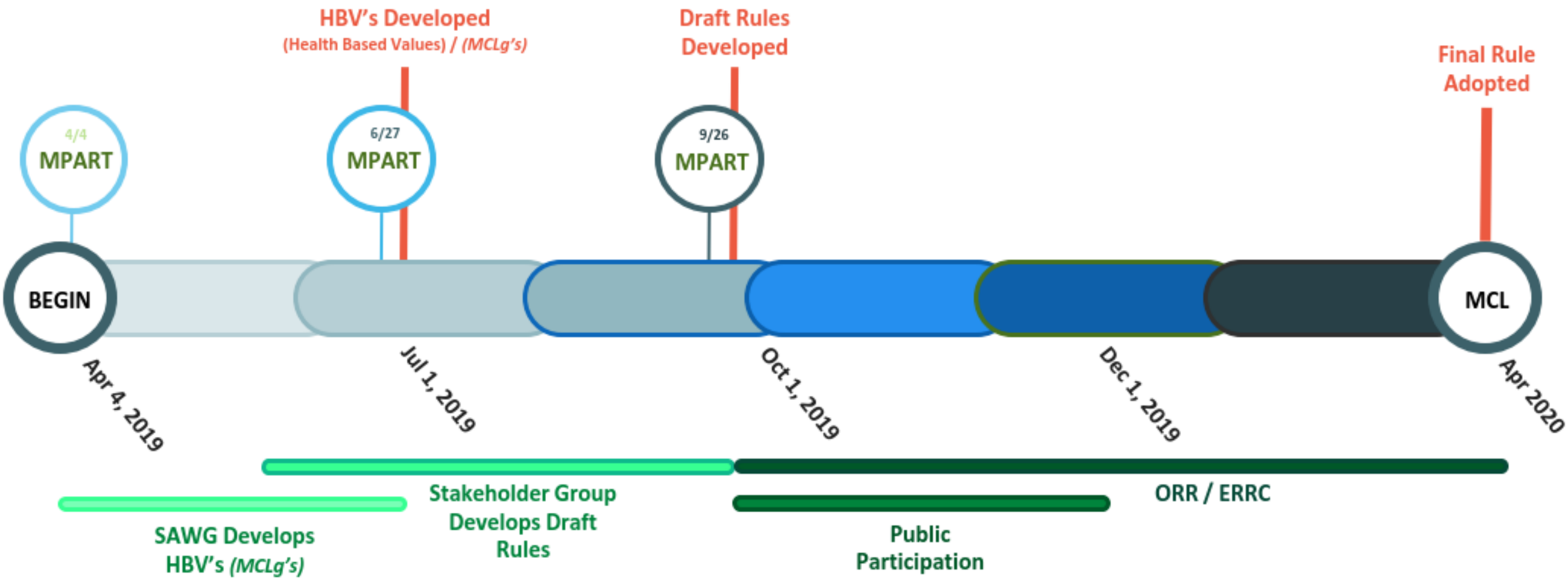
Legend Units: ng/L or ppt

- Total PFAS < 10
- Total PFAS >= 10
- PFOA + PFOS > 70



AECOM

Michigan MCL Timeline

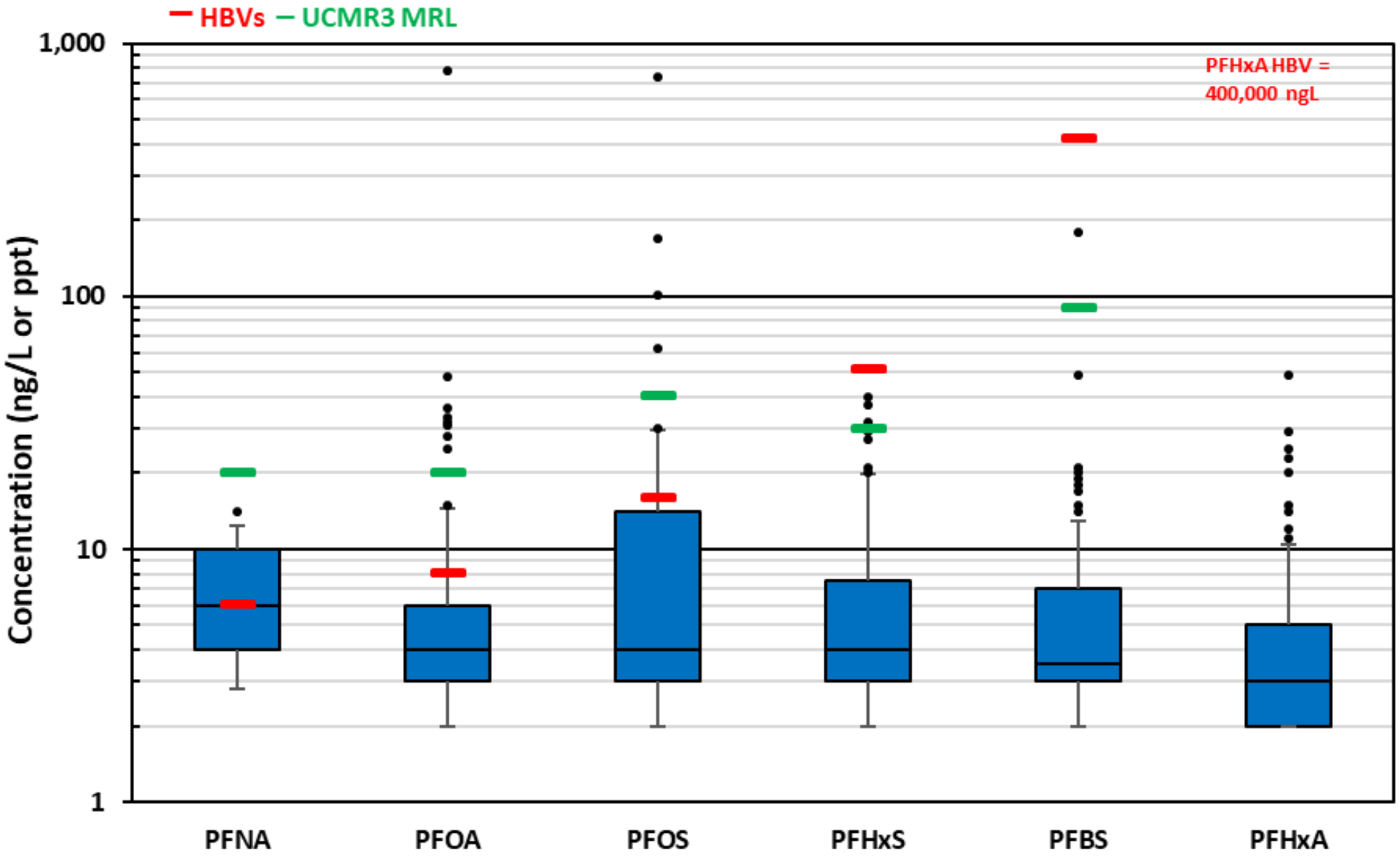


AECOM

Michigan PFAS Health-Based Values (HBV)

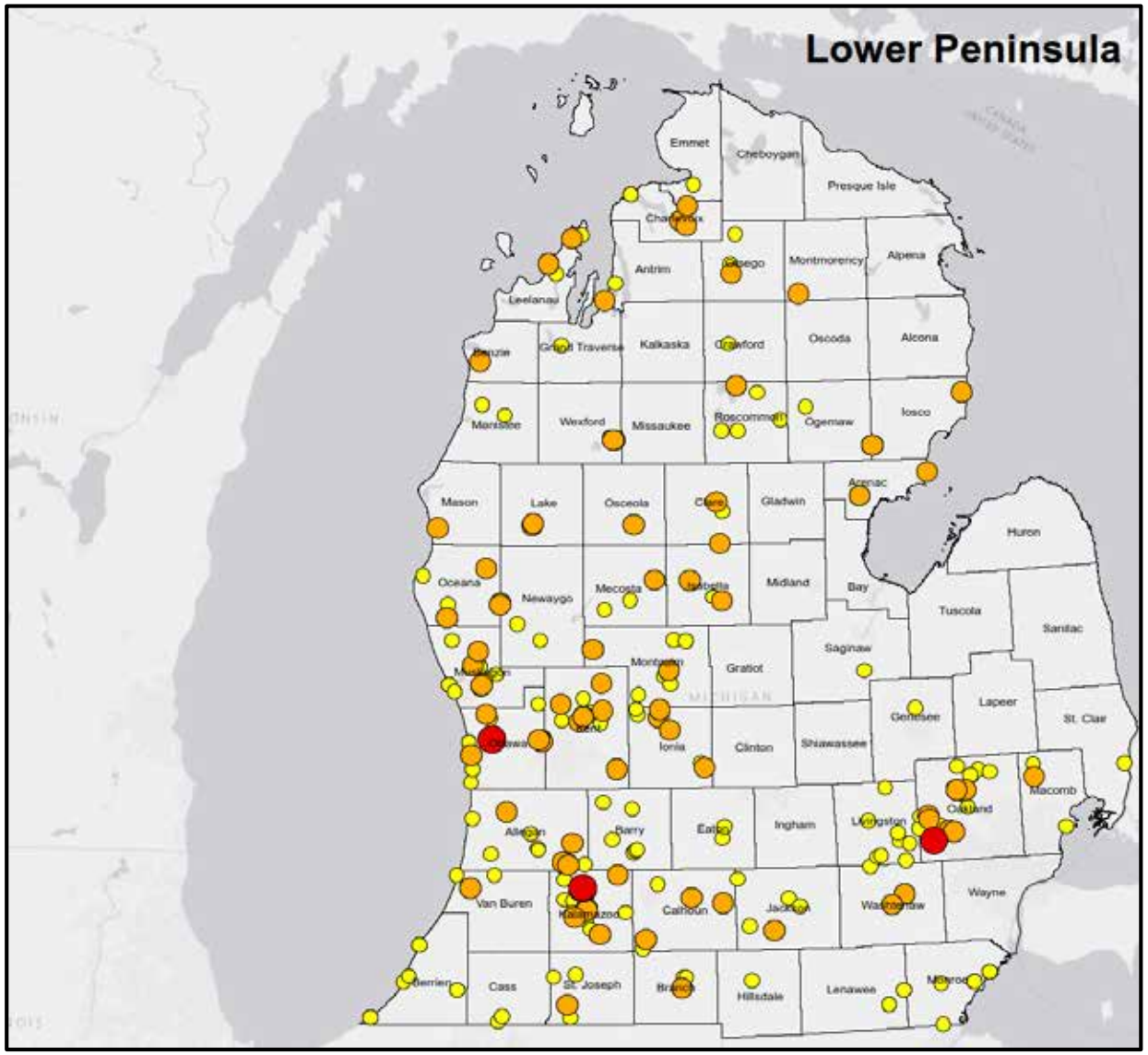
PFAS	HBV (ng/L)	Chemical Abstract Services Registry Number (CASRN)
Perfluorohexanoic acid (**PFHxA**)	400,00	307-24-4
Perfluorooctanoic Acid (**PFOA**)	8	335-67-1
Perfluorononanoic Acid (**PFNA**)	6	375-95-1
Perfluorobutane sulfonic acid (**PFBS**)	420	375-73-5
Perfluorohexane sulfonic acid (**PFHxS**)	51	355-46-4
Perfluorooctane sulfonic acid (**PFOS**)	16	1763-23-1

Phase 1 & 2 - PFAS Drinking Water Detections



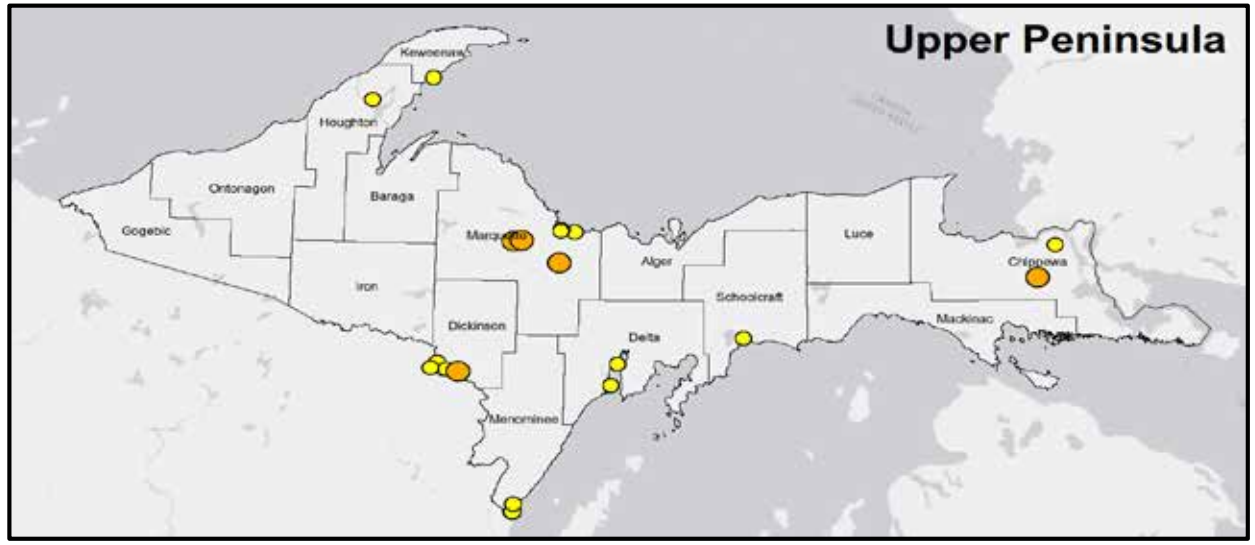
AECOM

Phase 1&2 - PWS Sampling Results Compared to Proposed MCL



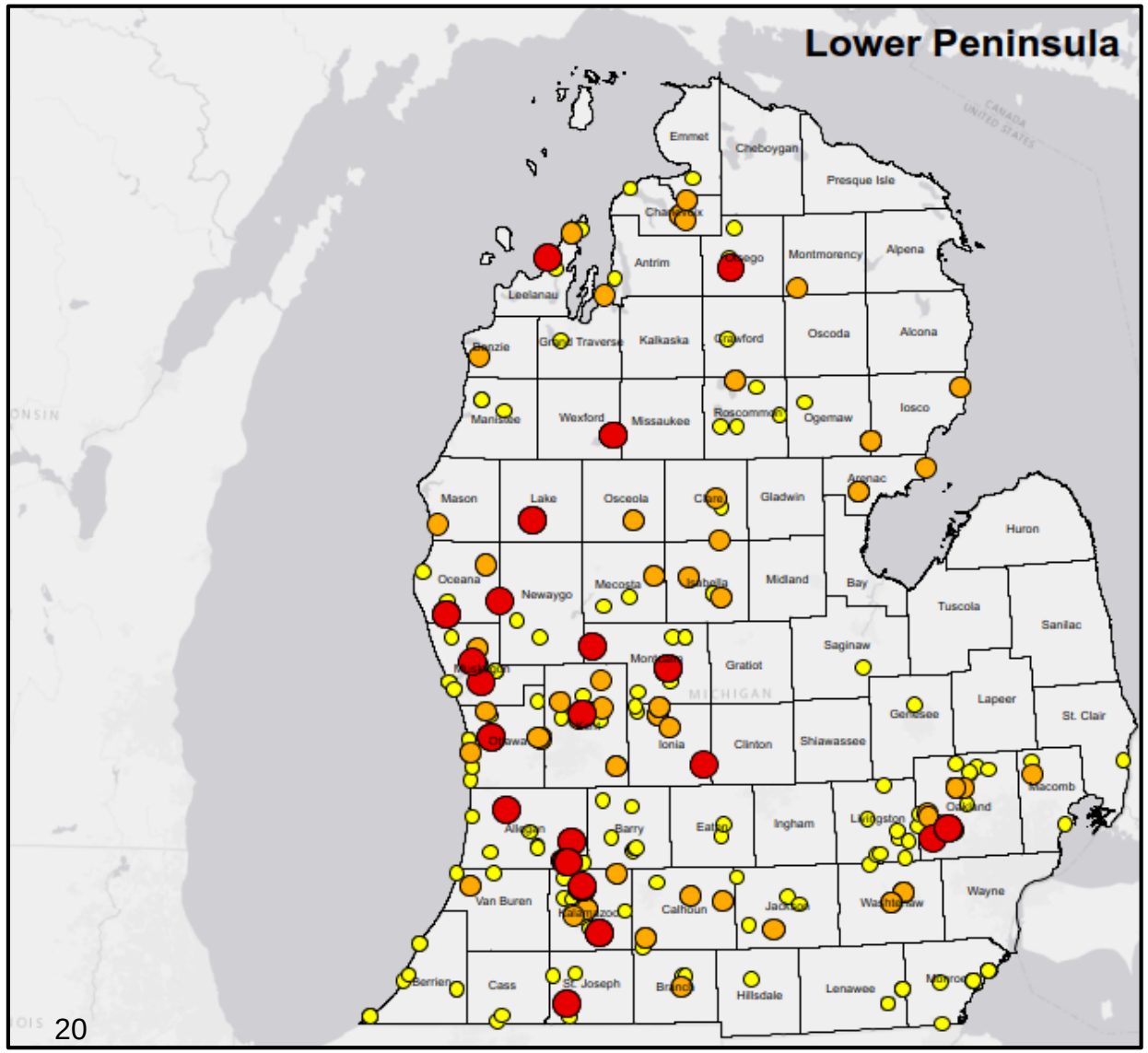
Legend Units: ng/L or ppt

- Total PFAS < 10
- Total PFAS >= 10
- PFOA + PFOS > 70



AECOM

Phase 1&2 - PWS Sampling Results – HBV Criteria

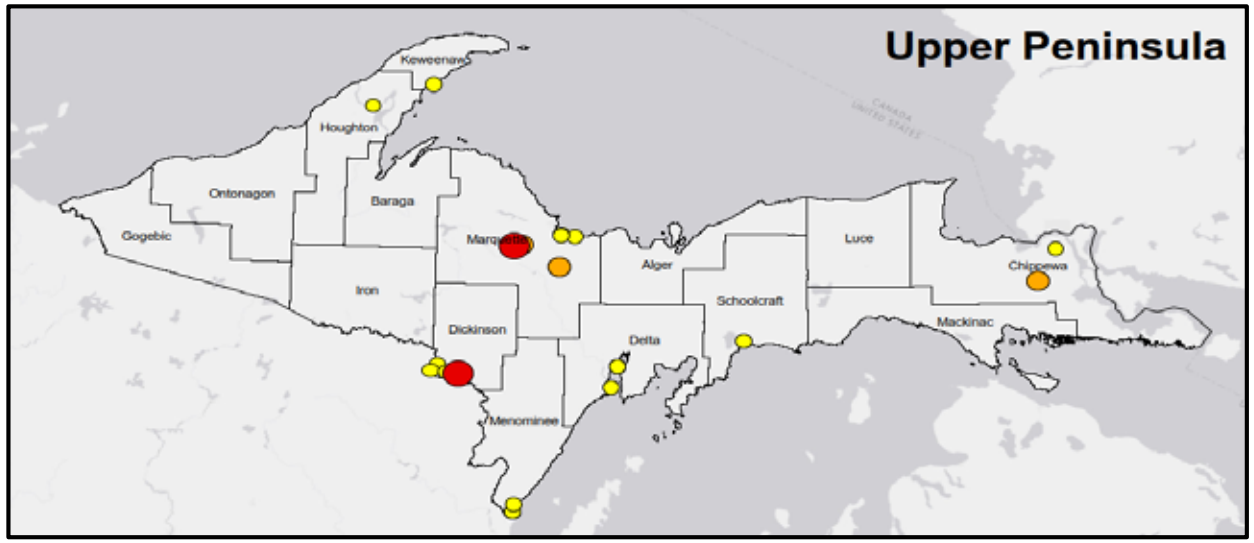


Legend

Michigan PFAS Health-Based Values (HBV)

PFNA = 6
PFOA = 8
PFOS = 16
PFHxS = 51
PFBS = 420
PFHxA = 400,000

- Total PFAS > 0 and < 10
- Total PFAS >= 10 and < Michigan PFAS HBVs
- Exceeds Michigan PFAS HBVs



What is Being Done Nationally?

N.C. Policy Collaboratory Launches New Statewide Study on GenX with $5 Million State Appropriation

August 1, 2018

Top University Researchers Across the State to Collaborate on Emerging Contaminant Detection, Modeling and Impact Assessment

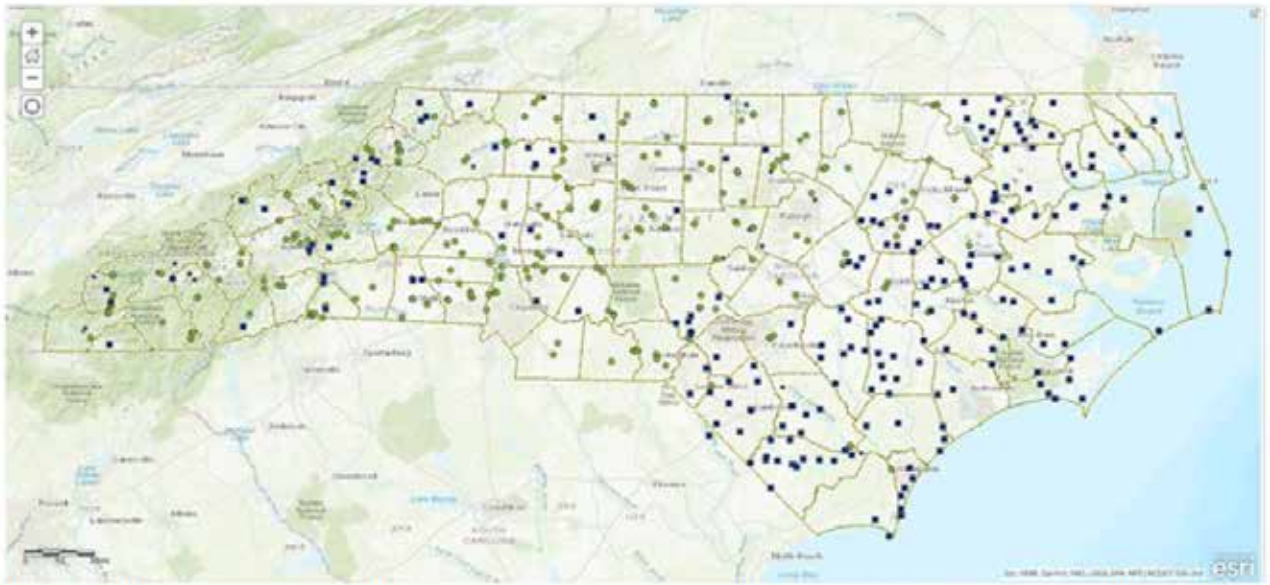


Figure 1: Surface (green dots) and groundwater (blue dots) sampling sites for drinking water sources to be analyzed for PFAS including GenX.

News Feature | May 14, 2019

Pennsylvania To Test 350 Water Systems For PFAS Contamination

The ingestion of PFAS through drinking water has been linked to cancer and other serious health consequences. Pennsylvania has identified 493 public water systems that are located within half of a mile of potential PFAS contamination sources, according to Philly.com.

DNR taking more steps to protect Wisconsin drinking water

Contact(s): Jason Knutson, 608-267-7894

July 22, 2019 at 2:18:07 pm

What is Being Done Nationally? - California

CA.GOV Share:

CALIFORNIA WATER BOARDS
State Water Resources Control Board

Board Programs Drinking Water Water Quality

New! Public Water System Testing Results

Background

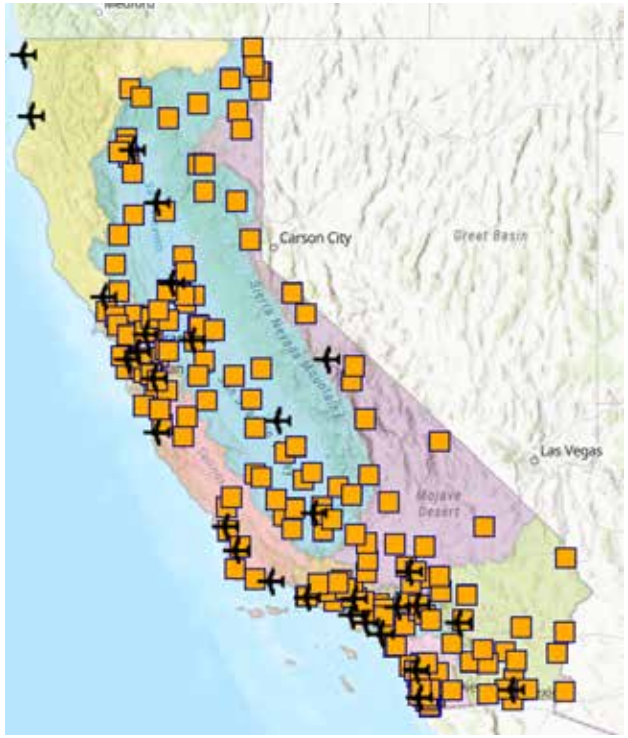
In April 2019, the State Water Board issued specific orders to airports, landfills and adjacent water systems, identified as potential PFAS source locations. Data from more than 600 water system sites adjacent to nearly 250 airports with fire training areas and municipal solid waste landfills within California have been received by the State Water Board in response to these specific orders. The assessment of this data obtained by these actions is a prolonged undertaking and additional analysis will be conducted in the coming years. Selection of the location of public water supply (PWS) wells sampled was based on the following criteria:

- Within 2 miles of a commercial airport* and/or within 1 mile of a municipal solid waste landfill that received Investigative Orders on March 20, 2019
- Resampling of PWS wells sampled during the 2013-2015 US EPA's Third Unregulated Contaminant Monitoring Rule (UCMR 3)
- Within 1 mile of UCMR 3 sampled PWS wells that had detections of PFOA and PFOS

*Certified by Federal Aviation Administration per Title 14 Code of Federal Regulations Part 139

The specific orders issued by the Division of Drinking Water required the Public Water Systems to sample the PWS wells quarterly for four consecutive quarters. The results of the PWS wells sampled during the 1st Quarter are now available for the public to view.

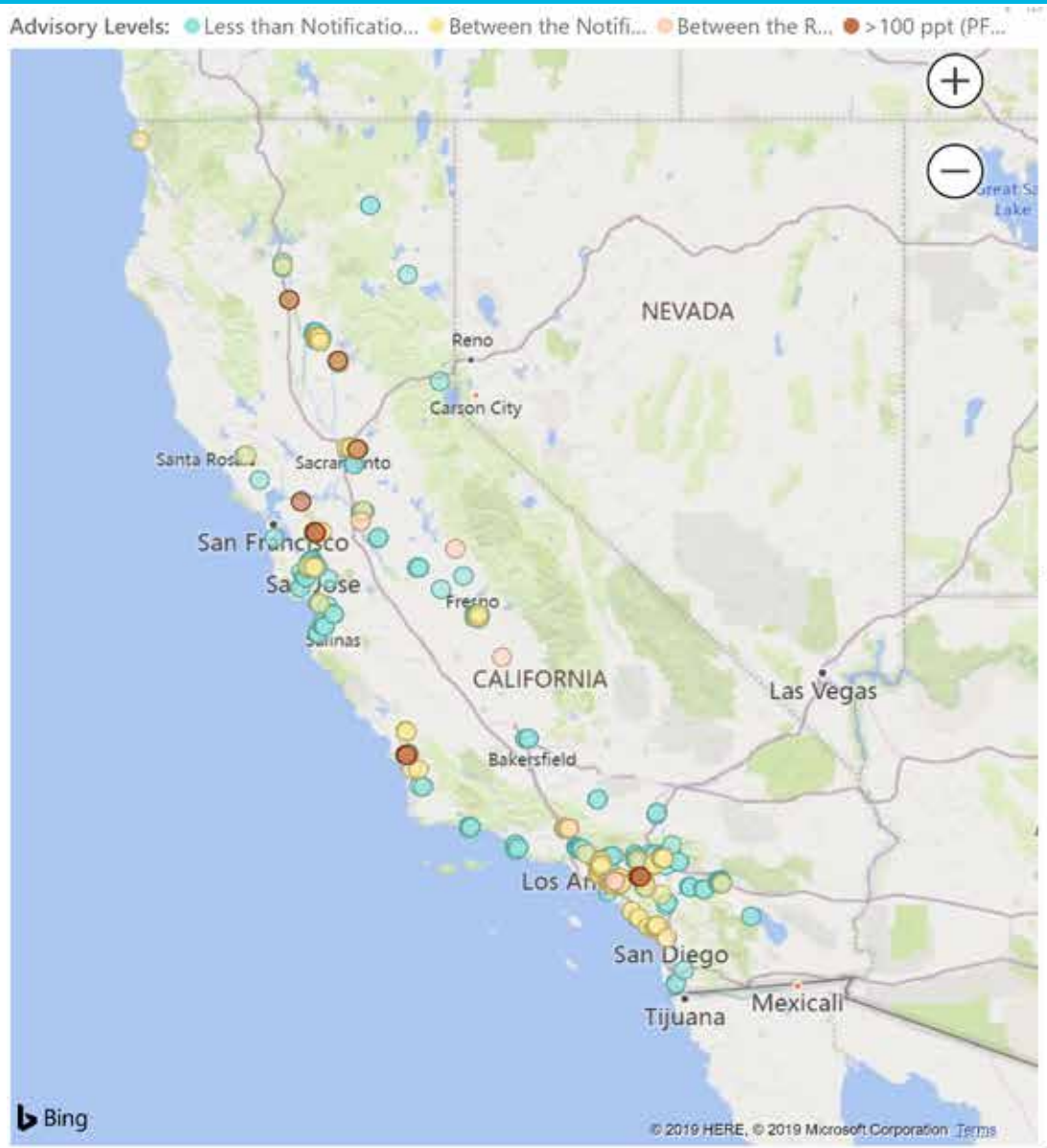
Airports and Landfills



PFAS Detections in CA

AECOM

What is Being Done Nationally? California cont.



One part per trillion (**ppt**) denotes one part per 1,000,000,000,000 parts, and a value of 1 × 10−12. This is equivalent to about thirty seconds out of a million years.

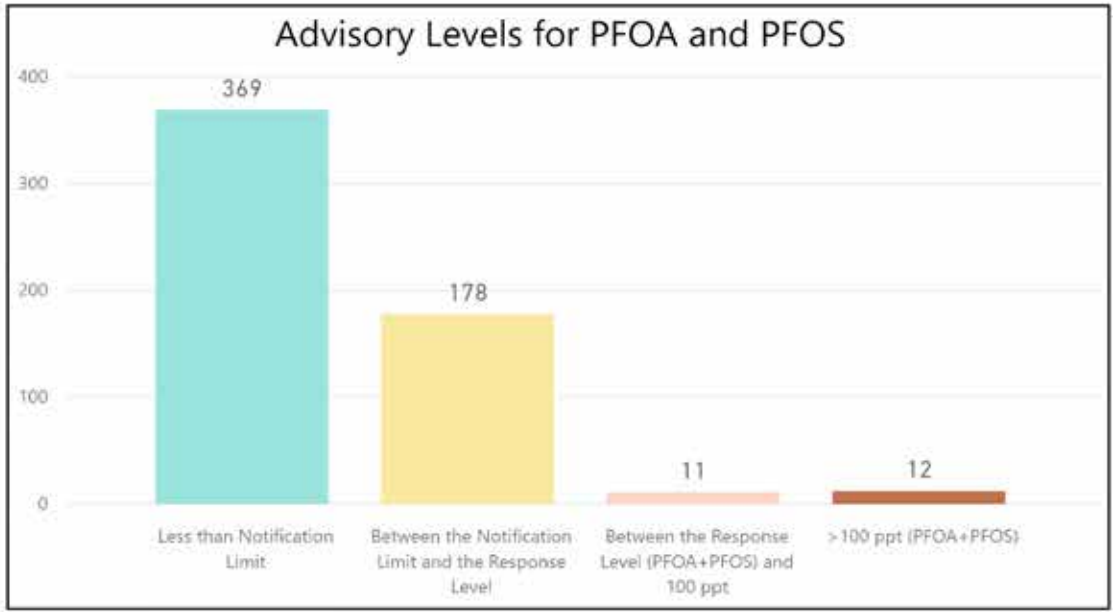
Concentration Range:
Notification Level (NL) is set at 5.1 ppt for PFOA, and 6.5 ppt for PFOS.
Response Level (RL) is set at 70 ppt for PFOA, PFOS and the sum of PFOA + PFOS

Reset

Advisory Levels

- Select all
- Less than Notification Limit
- Between the Notification Limit and the Response Level
- Between the Response Level (PFOA+PFOS) and 100 ppt
- >100 ppt (PFOA+PFOS)

Hold down the "CRTL" key to select multiple Concentrations.



AECOM

Key Takeaways

- PFAS is not ubiquitous in groundwater, it has a source
- UCMR3 evaluation is not sufficient to evaluate potential PFAS impacts to the drinking water systems
- A statewide study provides a better evaluation of potential impact to drinking water systems
- Adequate planning for a statewide sampling effort is required for a successful program
- Rapid response is needed and address exceedances

AECOM Imagine it. Delivered.

Image credit: iStock

Thank You!

John M. Cuthbertson
North America Industrial and Oil & Gas Lead
Central Region PFAS Practice Lead

- Grand Rapids, MI
- (616) 481-4009
- john.cuthbertson@aecom.com