



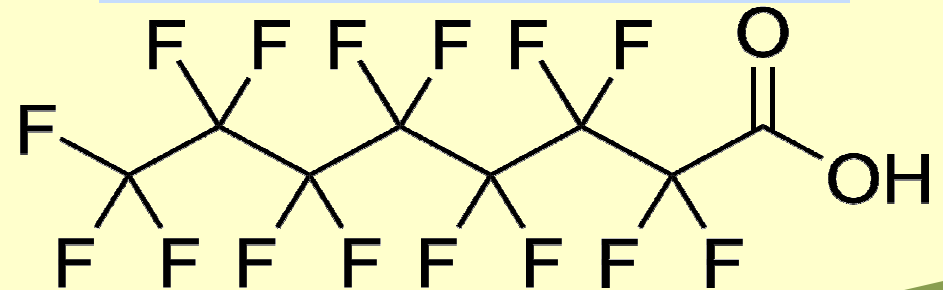
# *PFAS in Michigan Fish & Surface Waters*

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Water Resources Division, Surface Water Assessment Section

# Per- and Polyfluoroalkyl Substances

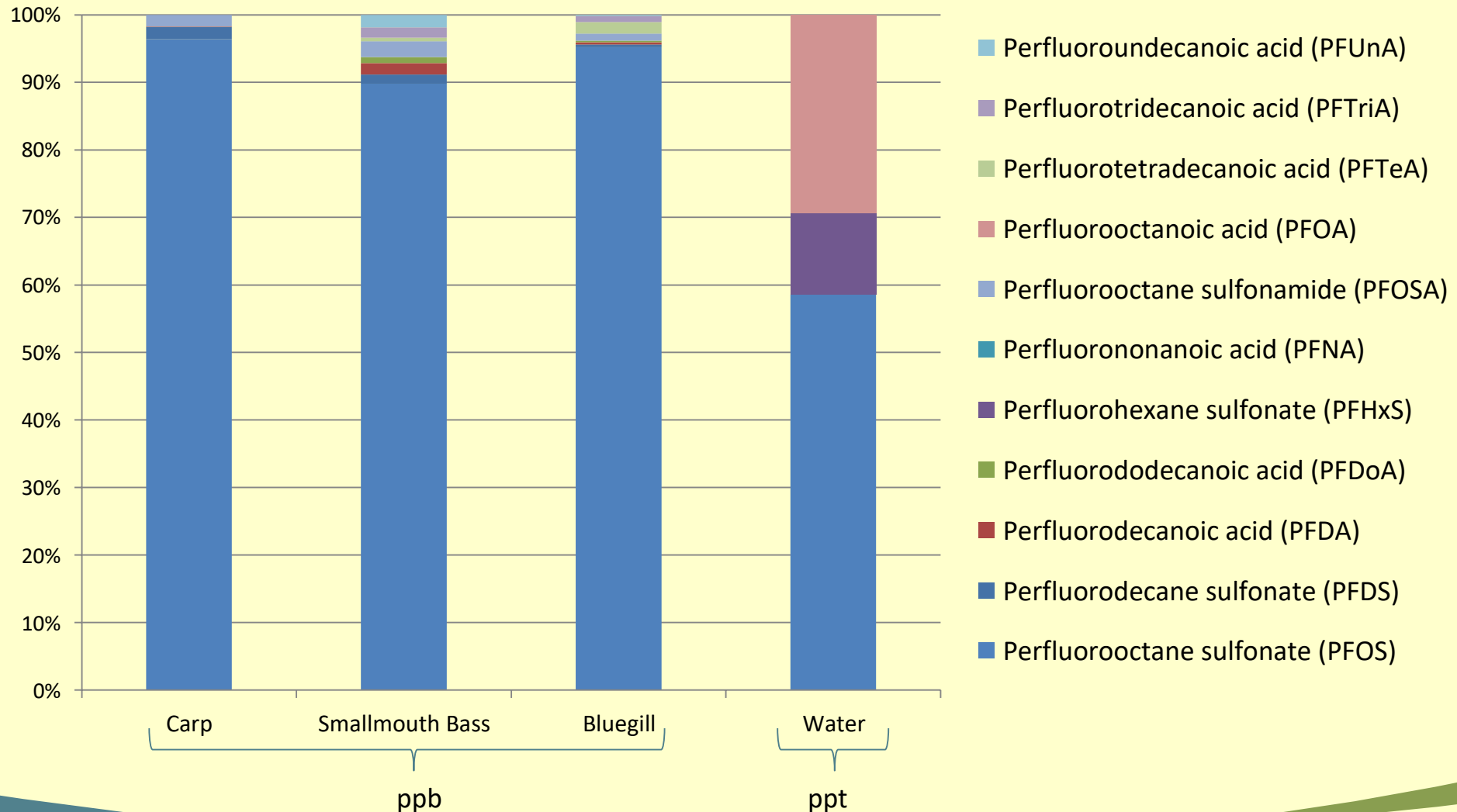
# Perfluorinated Compounds

# Perfluorooctane sulfonate



# Why focus on PFOS?

(Percent Composition Kalamazoo River, 2013)



# *Timeline*

- 2001 : Initial surface water sampling
- 2011 : Very high levels of PFAS in fish in Clark's Marsh
- 2011 : PFOA human health and aquatic life values developed (HNV=12,000 ng/L)
- 2012 – 2014: Statewide Reconnaissance Study
- 2014 : PFOS human health and aquatic life values developed (HNV=12 ng/L)
- 2015 – Present: Additional fish and surface water sampling

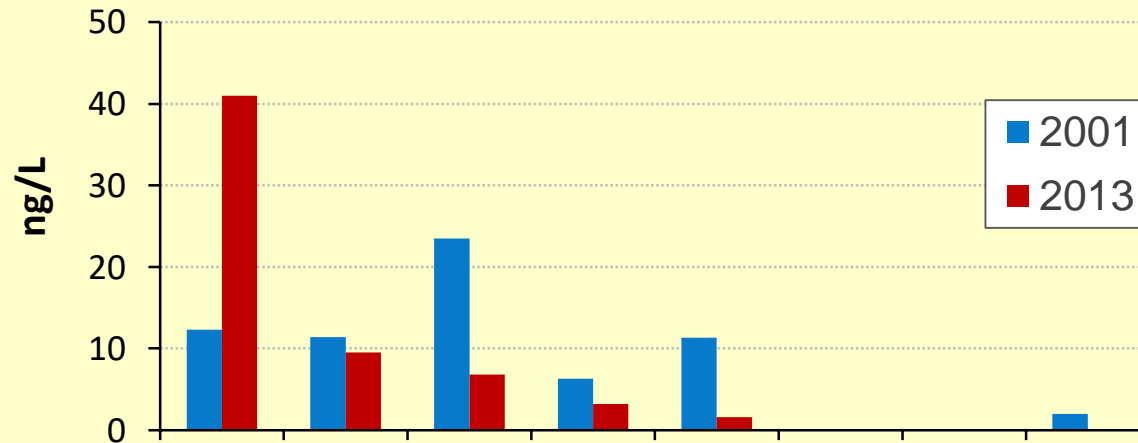
# *Statewide Reconnaissance Study (2012-2014)*

- Analyzed surface water & fish tissue at 13 sites
- Mix of Undeveloped / Urbanized / Legacy sites
- PFOS ranged from < 1.3 to 51 ng/L (Clark's Marsh max 7,400 ng/L)
- SW at 10 of 13 sites had PFOS < 12 ng/L
- PFOS concentrations were above fish consumption screening values at 8 sites

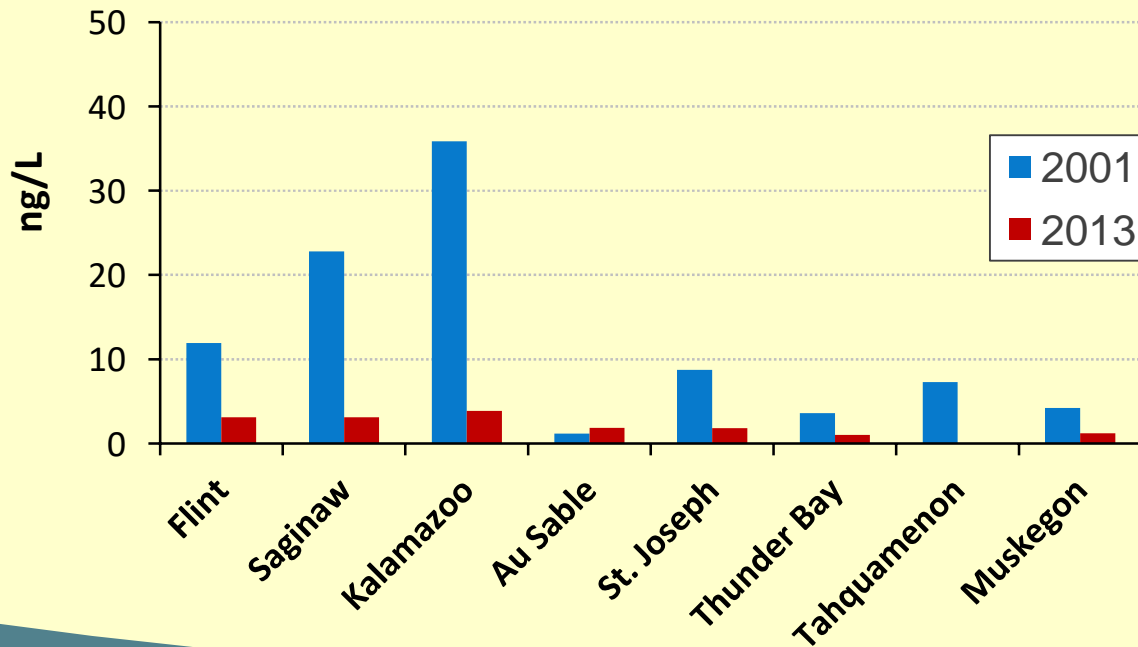
## *Recon Study Conclusions*

- Few samples exceeded the HNV for PFOS (no PFOA Exceedance)
- PFOS may be very low/non-detect in surface water but measurable in fish (It's Everywhere!)
- Combination of fish and surface water sampling is useful for finding/verifying problem areas

# Surface Water Temporal Comparisons



PFOS



PFOA

# Targeted Monitoring

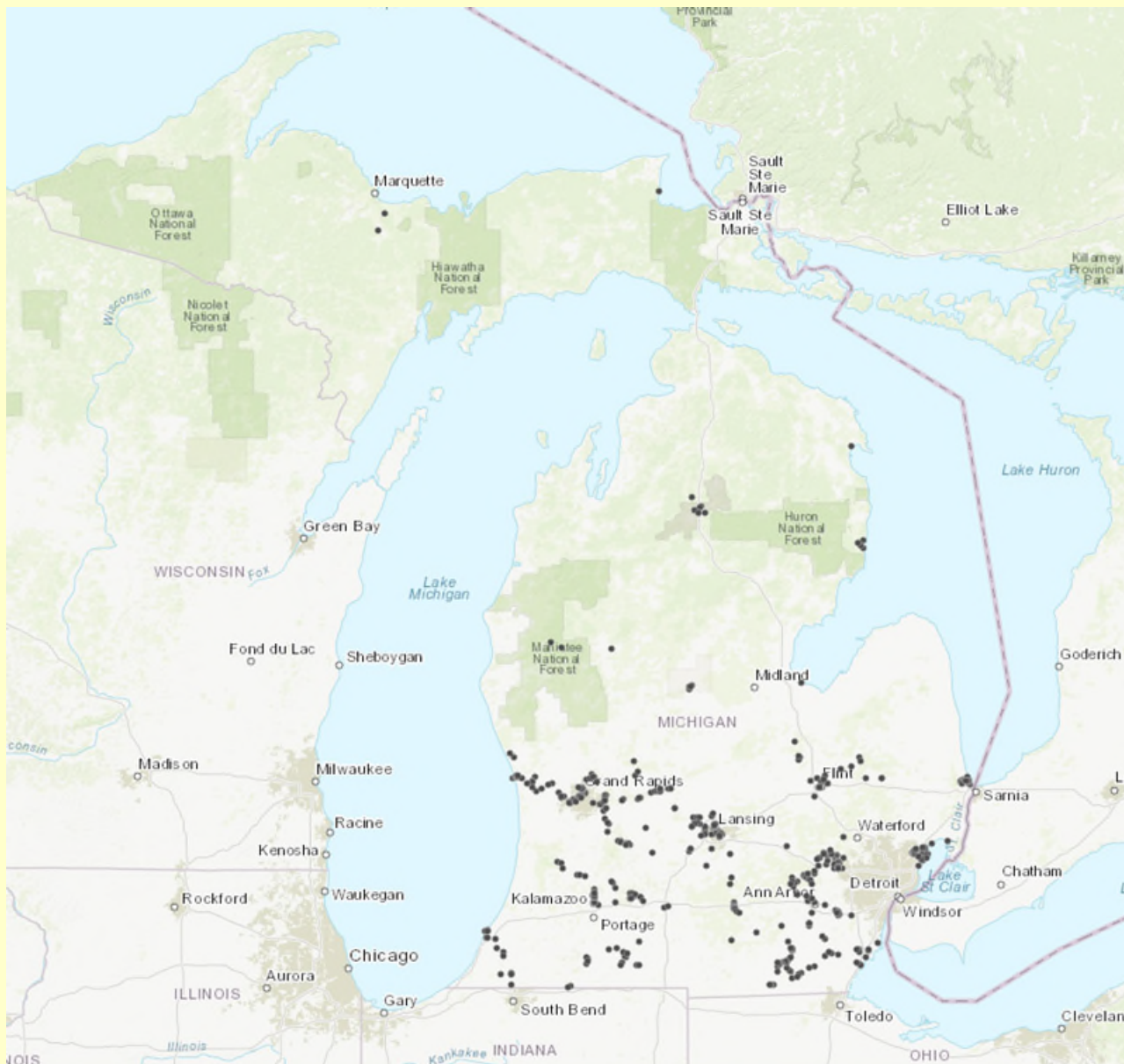
## *Sources Found in Michigan*

- ✓ Legacy use of AFFF
- ✓ Metal & plastic plating facilities
- ✓ Leather/Textile treatment
- ✓ Specialty paper production
- ✓ Landfill leachate
- ✓ Land application of biosolids

## *Other Potential Sources in Michigan*

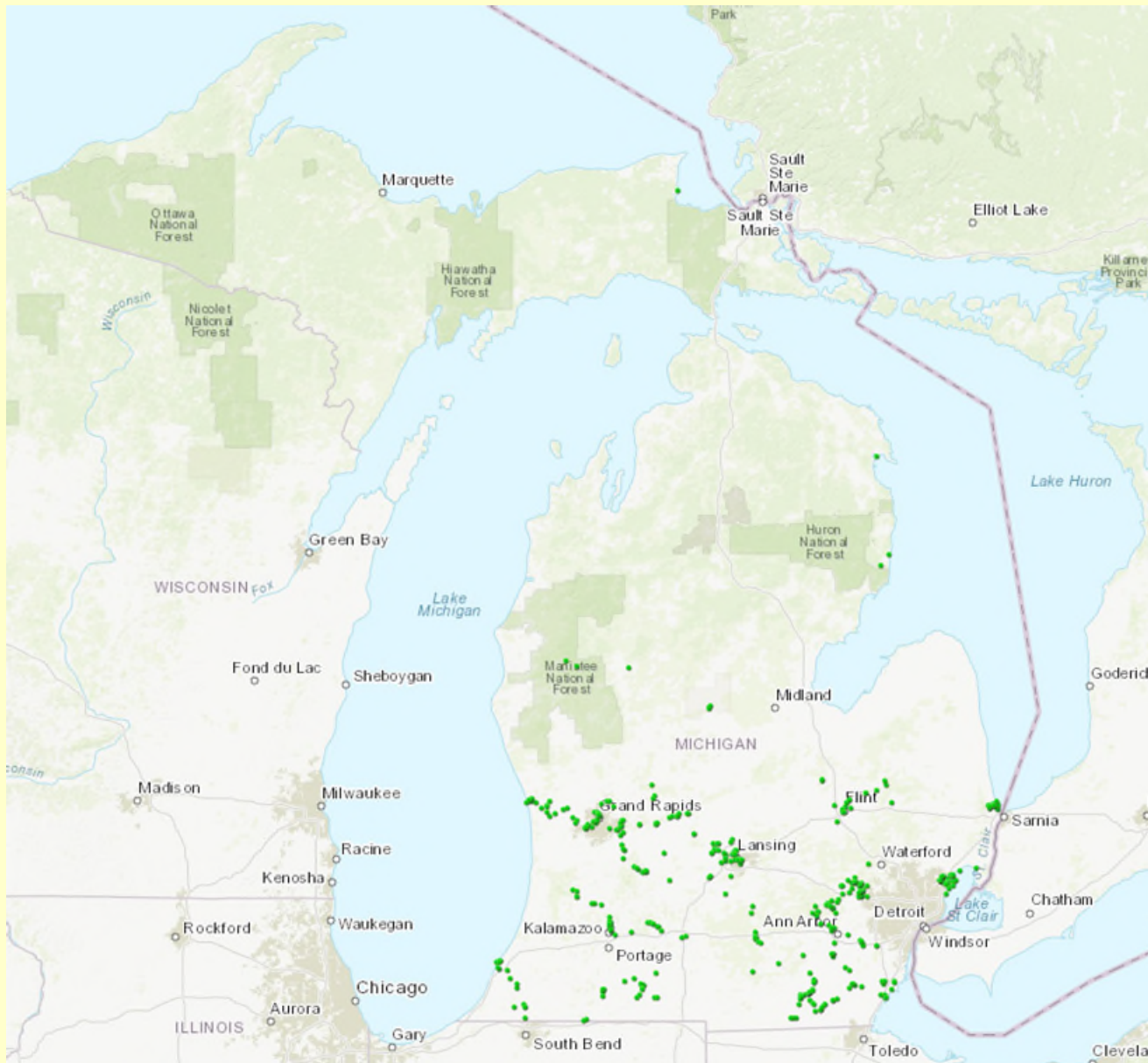
- ✓ Dry Cleaning Facilities
- ✓ Airports





## ***Targeted Surface Water Sampling As of September 2019***

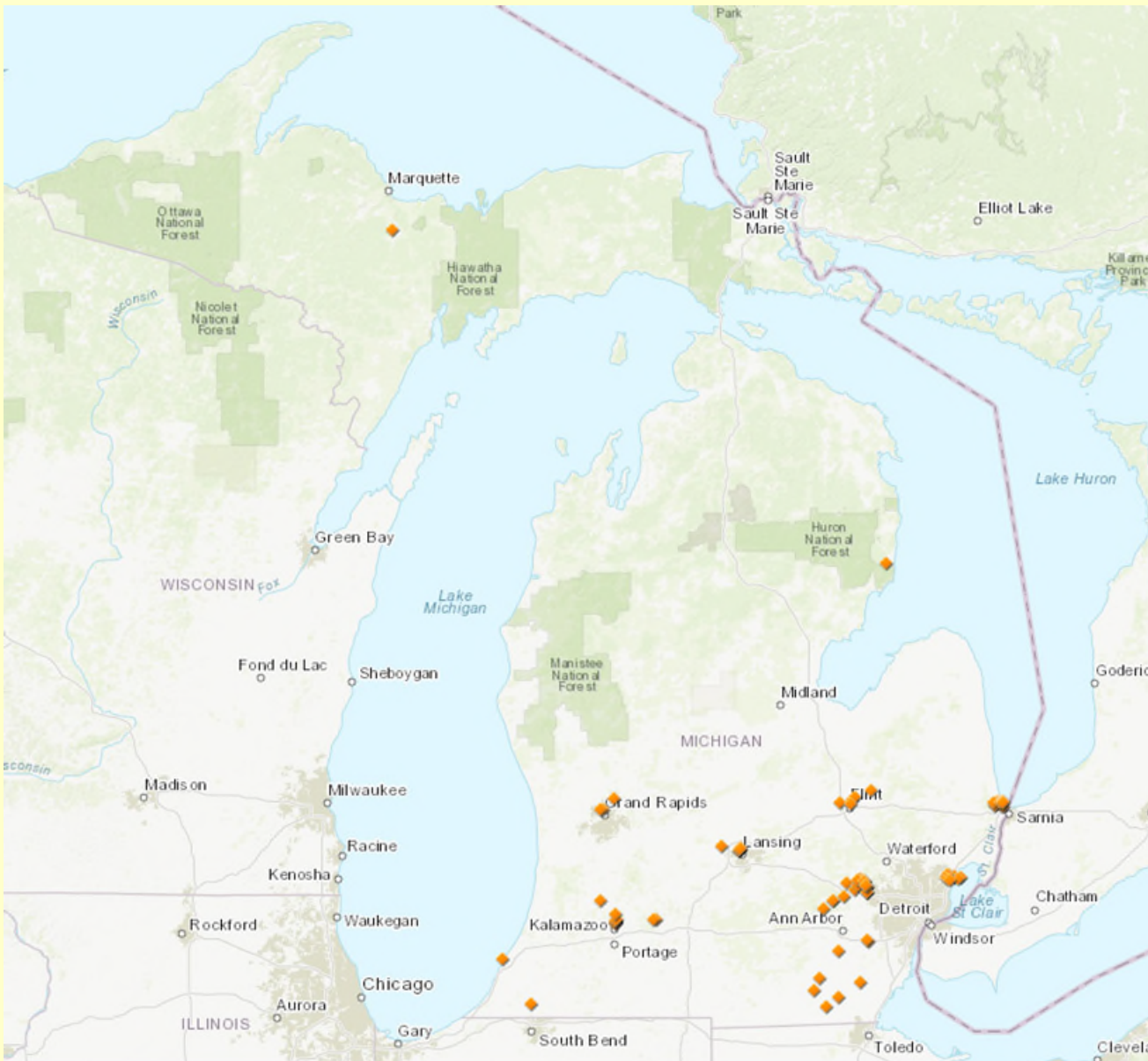
- 473 Sites
- 547 Samples Collected



## ***Surface Water Results***

Targeted Sampling Sites

PFOS < 12 ng/L

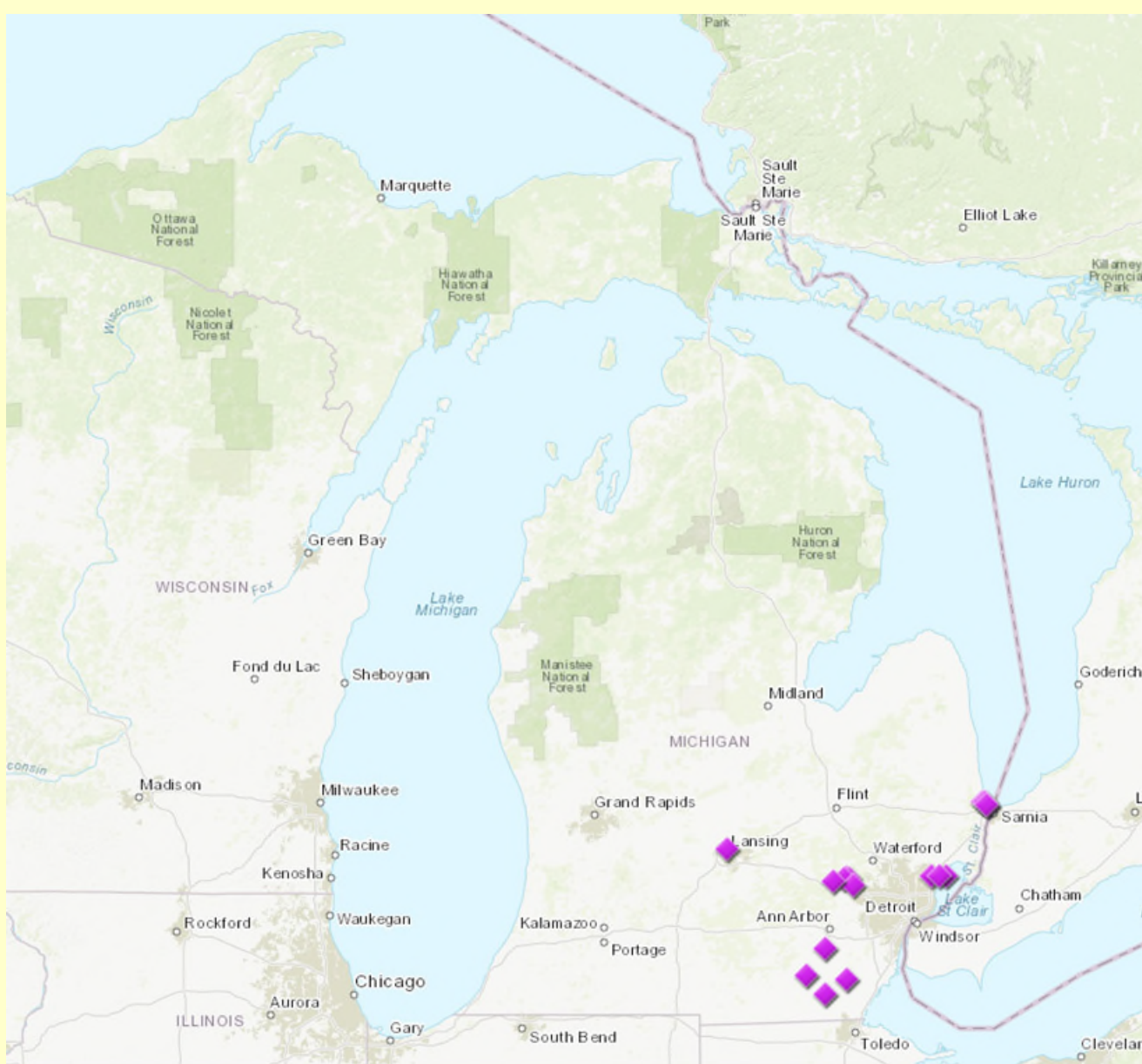


## ***Surface Water Results***

Targeted Sampling Sites

PFOS 12 - 100 ng/L

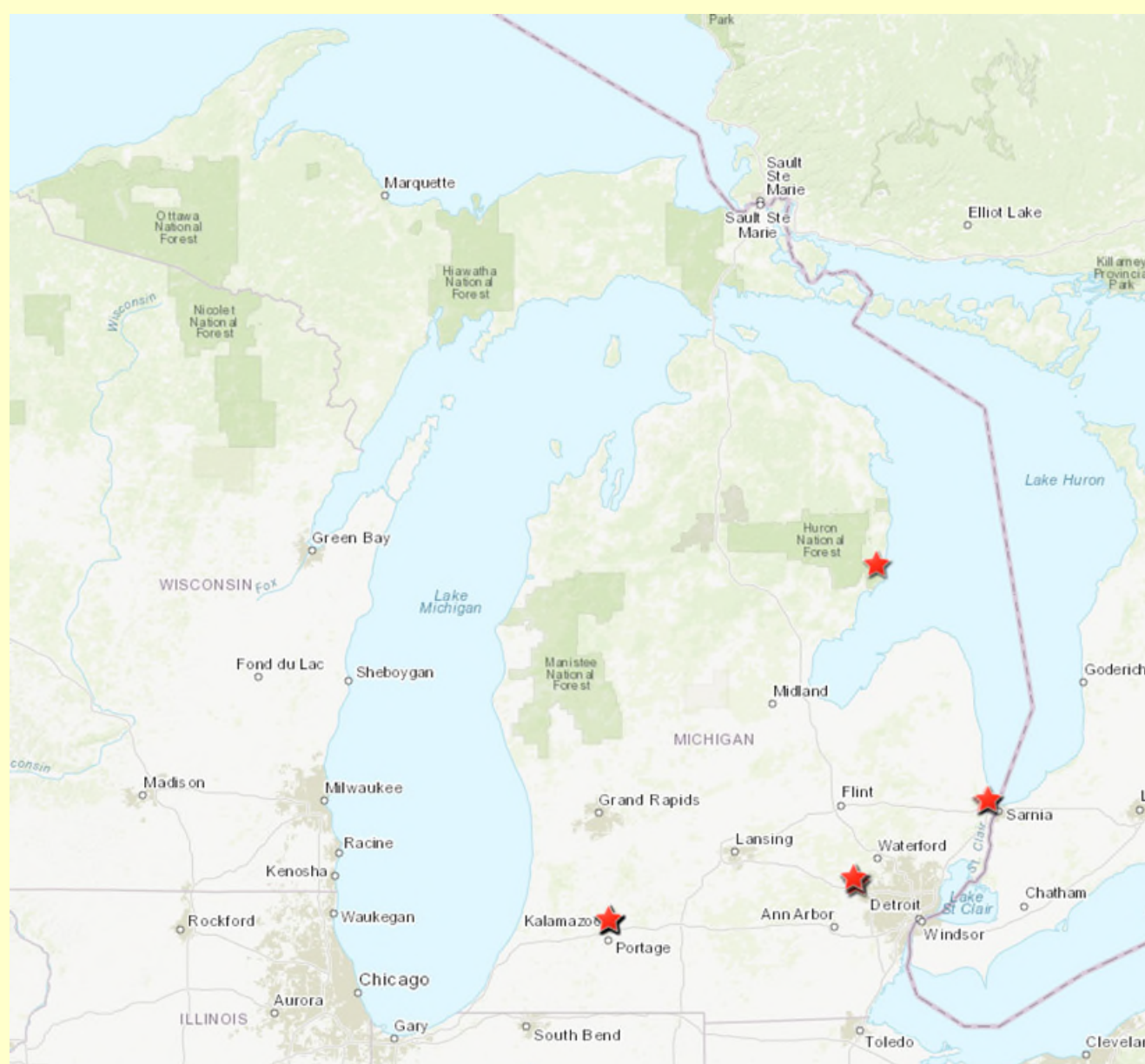




## ***Surface Water Results***

Targeted Sampling Sites

PFOS 100 - 1000 ng/L



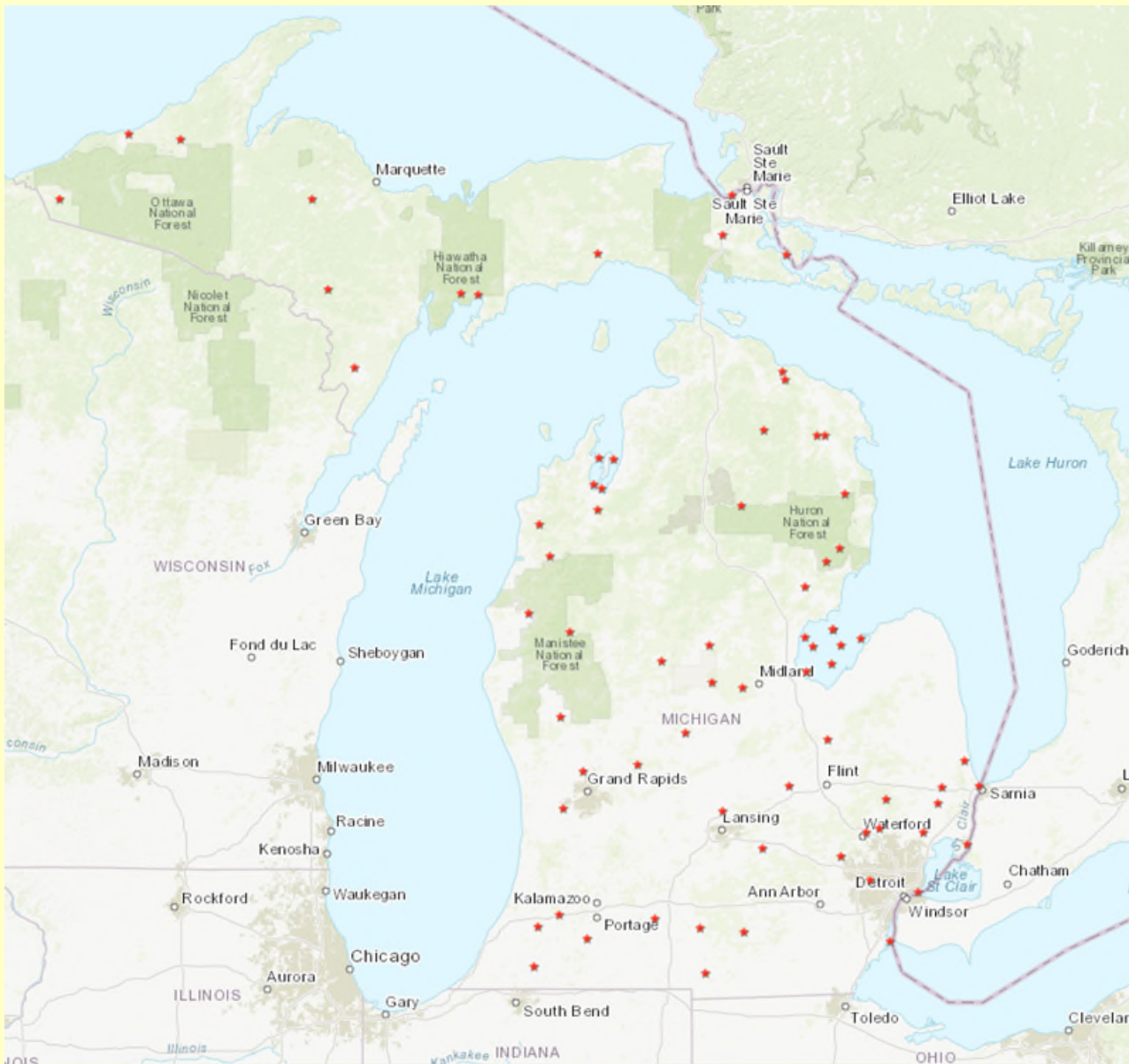
## ***Surface Water Results***

Targeted Sampling Sites

PFOS > 1,000 ng/L

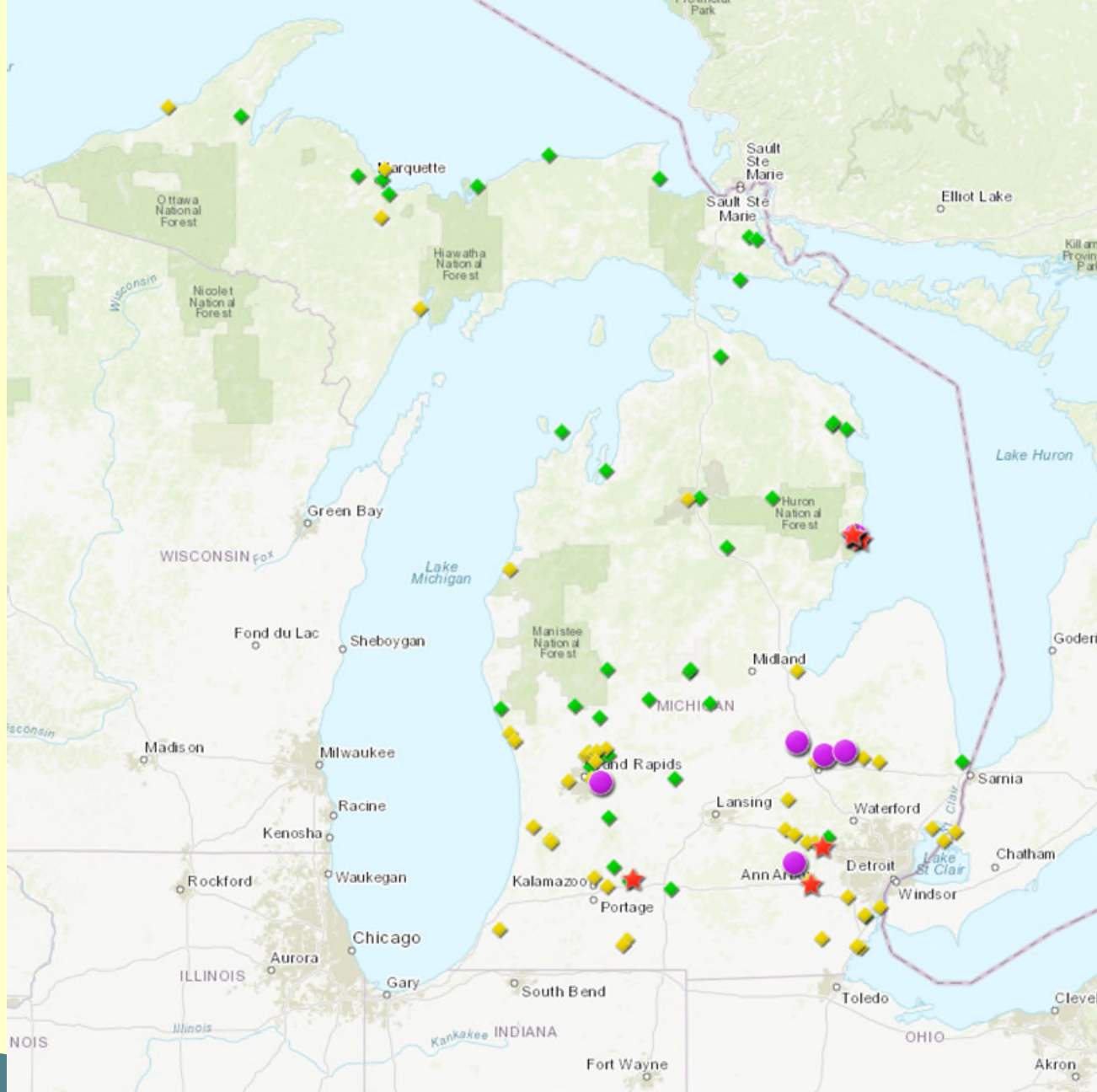
## ***Probabilistic Surface Water Sampling***

- 54 Randomized Sites
- 17 Bay & Connecting Channel Sites
- Sampled in May, July, Sept., Nov.





# PFOS in Fish Fillets



## Legend

Mean PFOS over 300 ppb



Mean PFOS 100-300 ppb



Mean PFOS 10-100 ppb



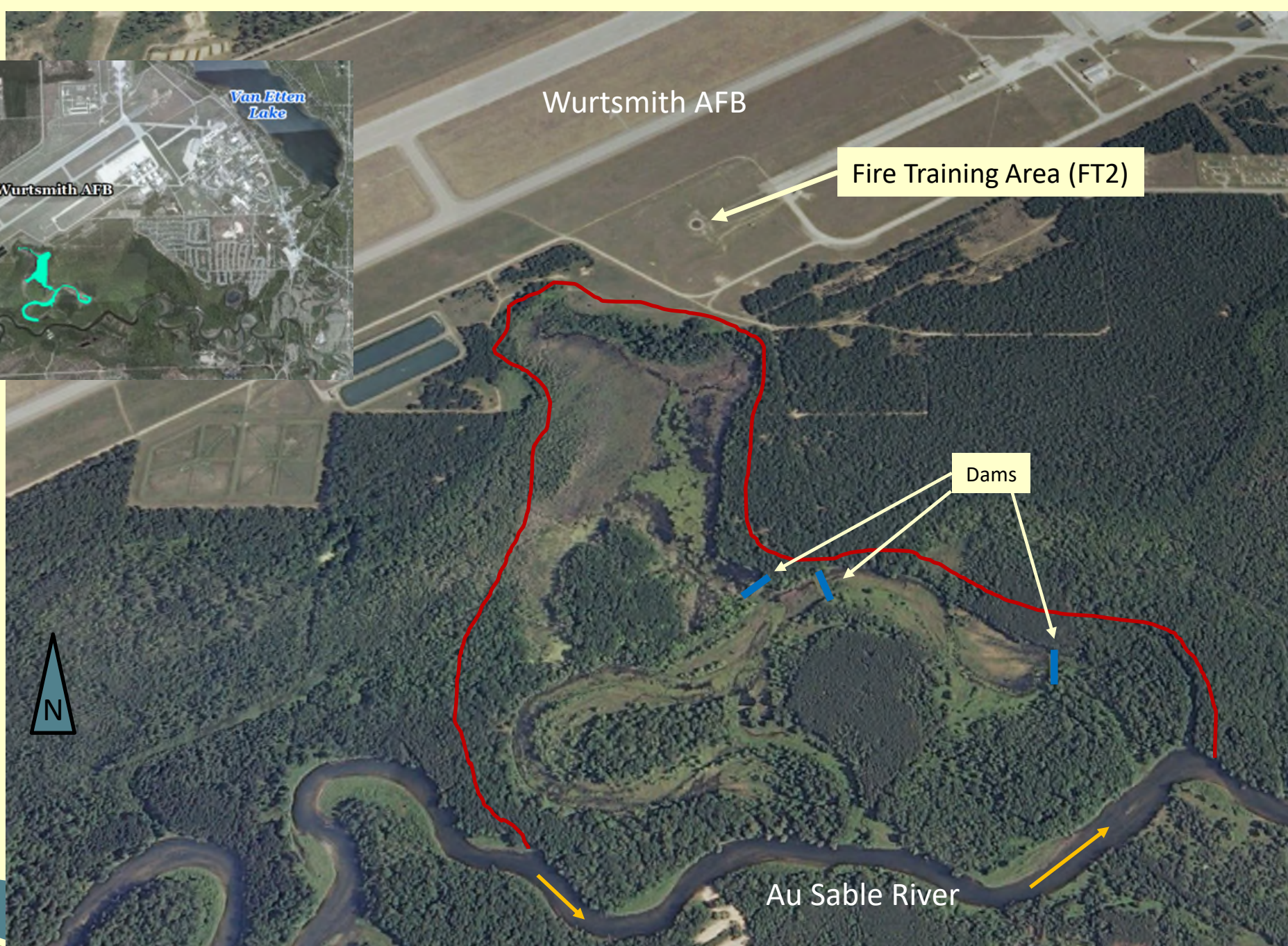
Mean PFOS 0-10 ppb



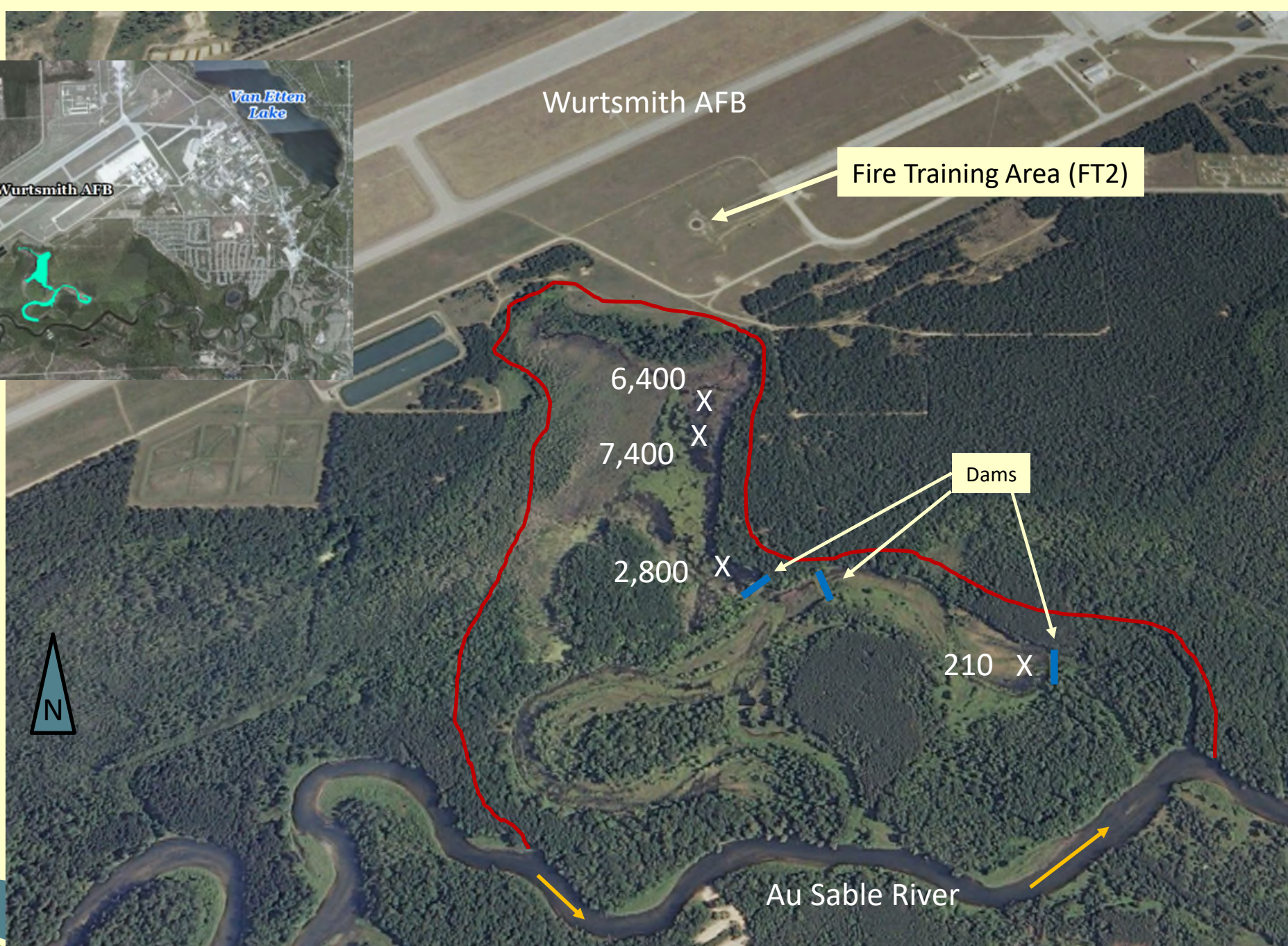
## PFAS in Fish Fillets

- 105 Sites Sampled
- 1,824 Total Samples









# Contact Information

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Michigan's PFAS Website:

<https://www.michigan.gov/pfasresponse/>