Environmental Commission Update on Water Quality Issues & Gelman Plume
January 24, 2019

Emerging Issues for WTP – Council Presentation on September 17, 2018

- PFAS
- New Disinfection Requirements
- Lead & Copper Rule Updates

What are PFAS?

- Per- and polyfluoroakyl substances
- Used in non-stick cookware, stain-resistant textiles, waterproofing, coating on food wrappers, consumer products, fire-fighting foam, other industrial applications




- Stable and do not degrade in the environment
- A family of thousands of compounds
- Analytical methods for detection of 24 of these compounds

How might PFAS impact health?

- Most data available on perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA)
- Ingestion is the primary route of exposure
- PFAS are bioaccumulative
- Health impacts may include:
  - Interference with hormone function
  - Increase in cholesterol
  - Affect on immune system
  - Increase in cancer risk
- Limited data on health impacts of other PFAS

How are PFAS regulated?

- PFAS are not currently regulated in Drinking Water in MI
- EPA Health Advisory Level: 70 parts per trillion (ppt) of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA)
- Proposed legislation in Michigan: 10 ppt for PFOS and PFOA
- Agency for Toxic Substances and Disease Registry (ATSDR) Report
  - Potential limit approximately 7 ppt for PFOS and 11 ppt for PFOA

PFAS in Ann Arbor

Huron River – Water

Drinking Water

Waste Water

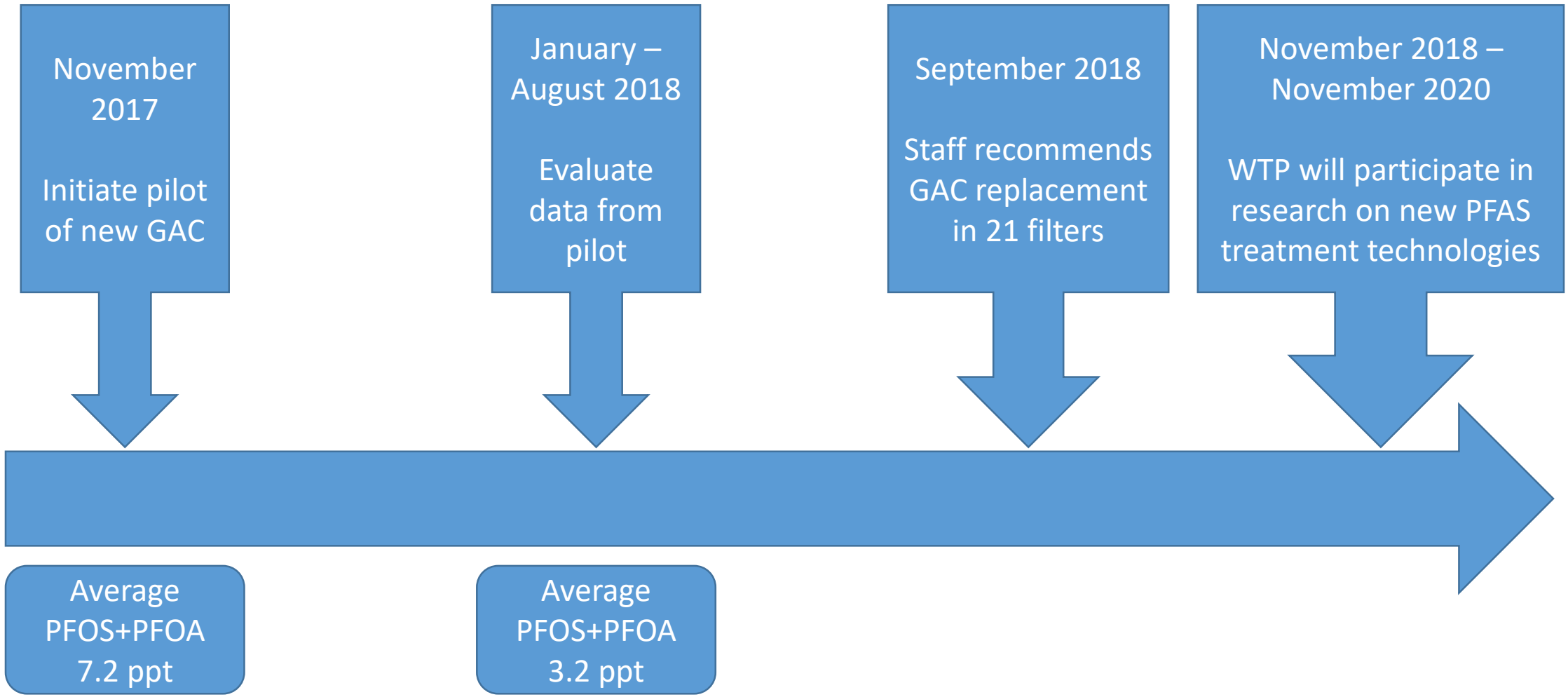
Huron River – Fish

Fire-Fighting Foam

PFAS in Ann Arbor Drinking Water

- Monitoring since 2014
- Currently monitoring monthly
- Maximum detection PFOS+PFOA: 43 ppt in 2014
- 2017 Data: average 7.2 ppt PFOS+PFOA (range 0 – 9.9 ppt)
- 2018 data: average 3.2 ppt PFOS+PFOA
- Granular active carbon (GAC) filtration is the best available technology

PFAS Control Strategy – Drinking Water



Michigan PFAS Timeline

Statewide SW Study

2001

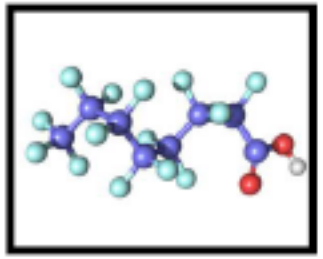
No Criteria Established

Provisional Health Advisory

2009

PFOA = 400 ng/L
PFOS = 200 ng/L

PFOA SW Criteria



2010

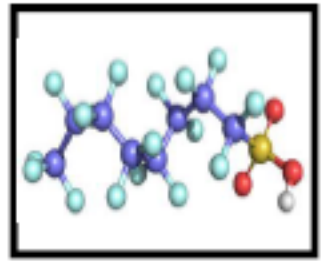
DW = 420 ng/L
Non-DW = 12,000 ng/L

WAFB Fish Study

2012

Filet = 9580 ppb
Liver = 73,200 ppb

PFOS SW Criteria



2013

DW = 11 ng/L
Non-DW = 12 ng/L

Michigan PFAS Timeline

Lifetime Health Advisory — 2017

MPART Formed — 2017

DW Criteria Promulgated — 2018

PFOA + PFOA < 70 ng/L

- IPP PFAS Initiative
- Identification of Sites
- Statewide PFAS Municipal Sampling
- Biosolids Evaluation
- Epidemiological Studies

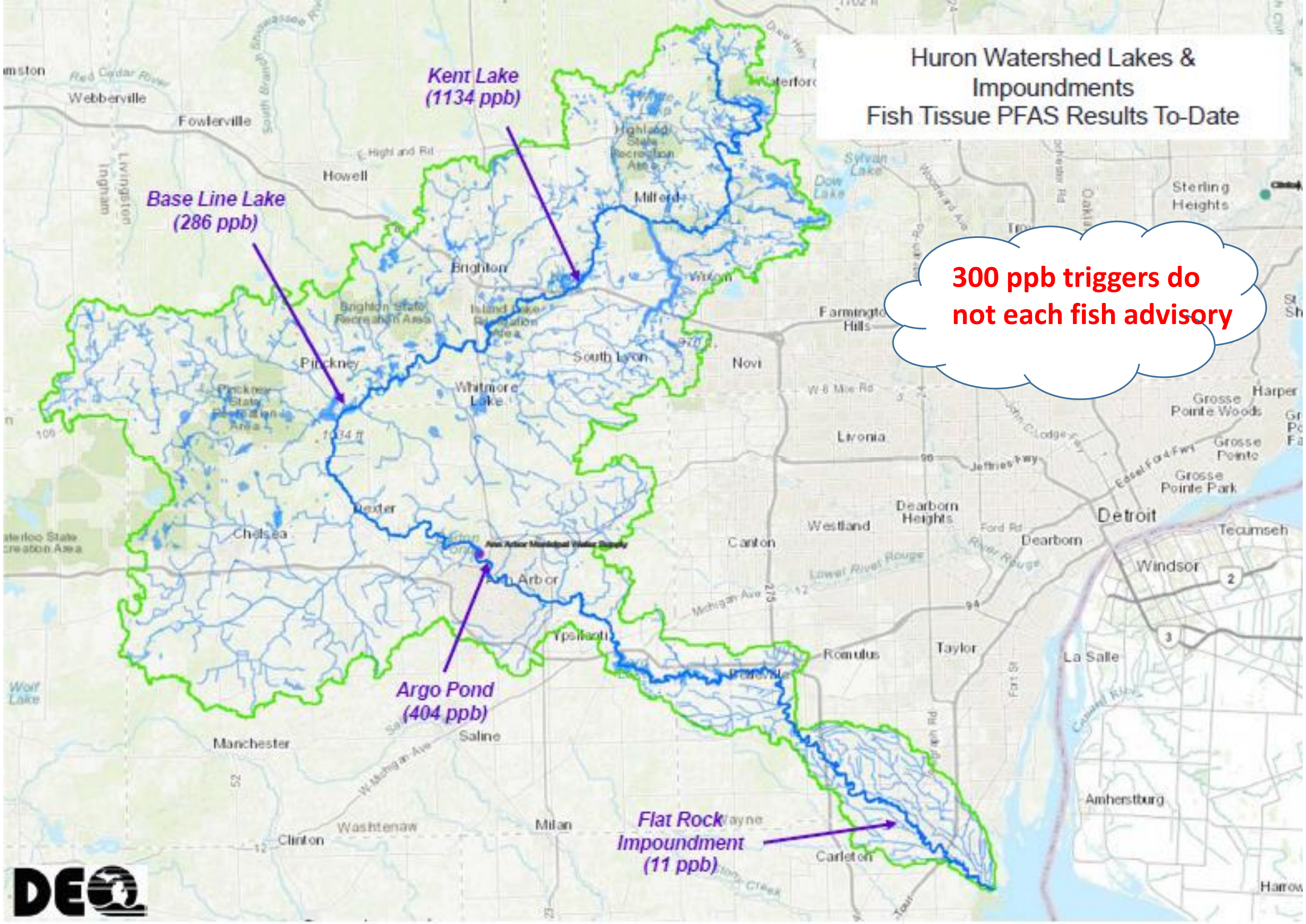
Statewide PFAS Drinking Water Testing Initiative

	Supplies Sampled	Overall Number of Supplies	% Complete	Supply Samples Received	< 10 ppt Total PFAS	10 – 70 ppt PFOS/PFOA (> 10 ppt Total PFAS)	> 70 ppt PFOS/PFOA
Community Water Supplies	1,111	1,111	100%	1,007	977	29	1
Schools on Wells	460	460	100%	411	394	16	1
Tribal Entities	16	16	100%	13	13	0	0
Total	1,587	1,587	100%	1,431	1,384	45	2
				As of November 30, 2018	96.7%	3.1%	0.14%

Results Posted:

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

Huron Watershed Lakes & Impoundments Fish Tissue PFAS Results To-Date

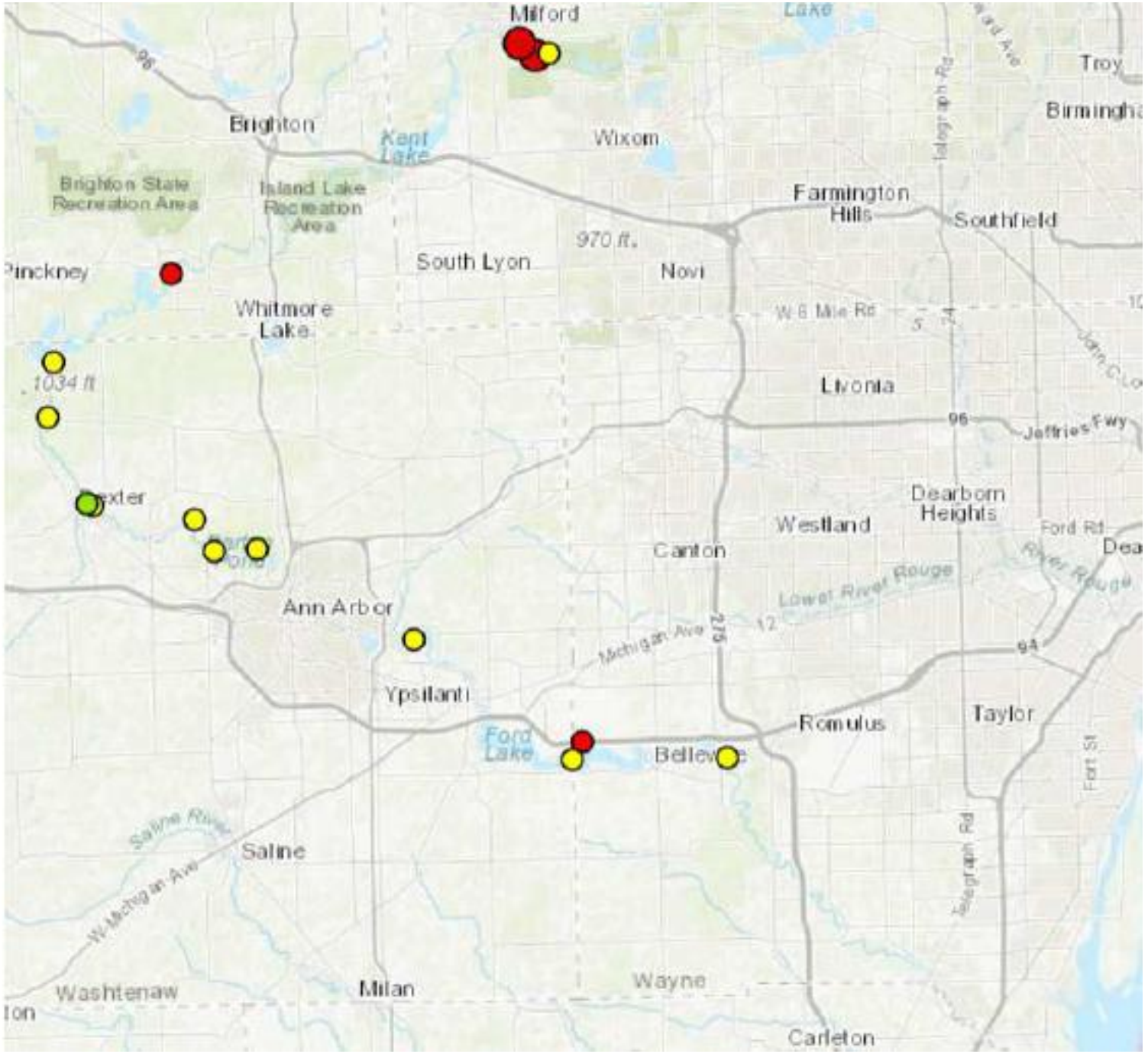


300 ppb triggers do not each fish advisory

Surface Water Sampling Results July 24, 2018

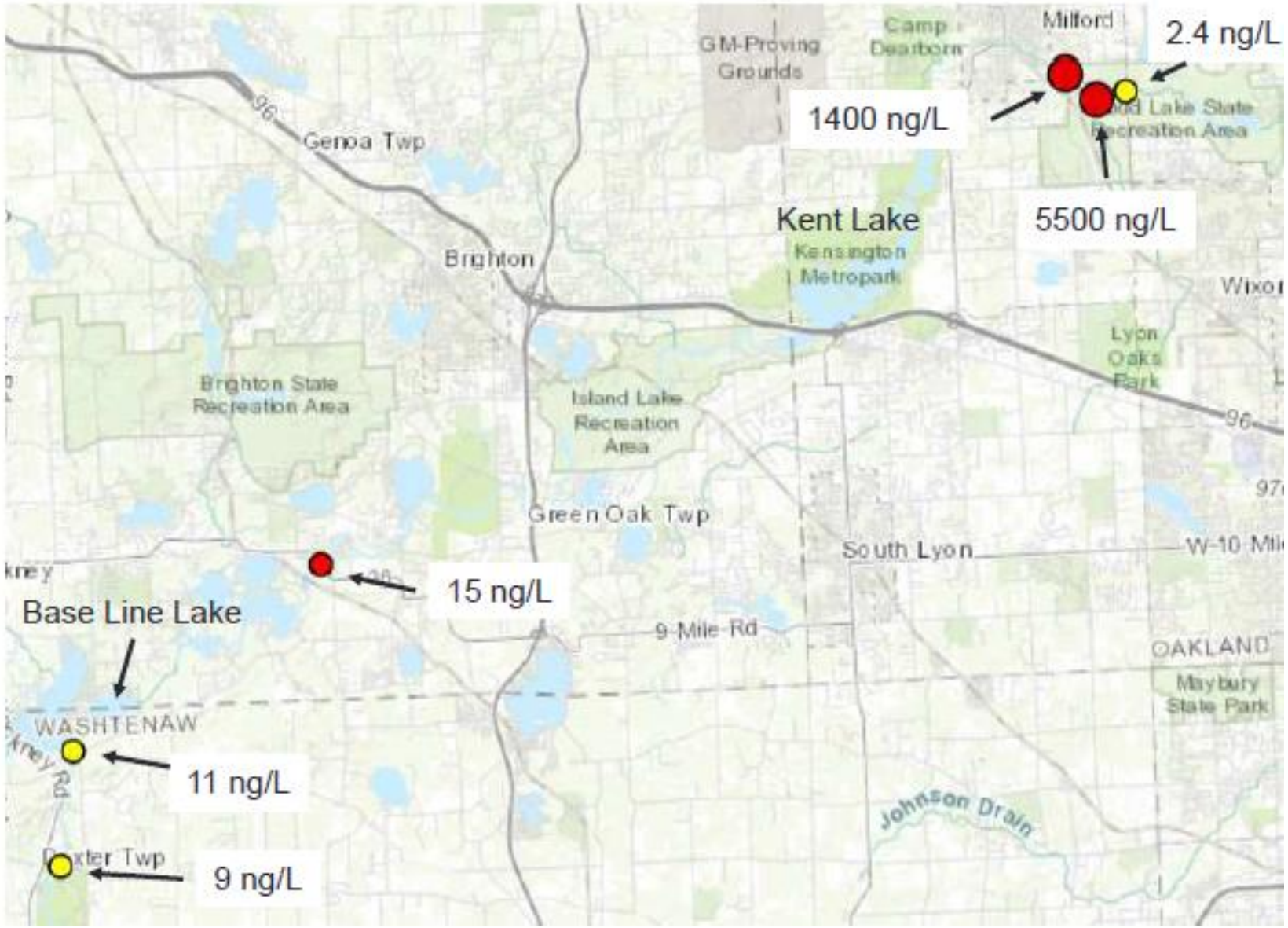
PFOS Concentration Range (ng/L)

- >1000-5500
- >100-1000
- >12-100
- >0-12
- Non-Detect



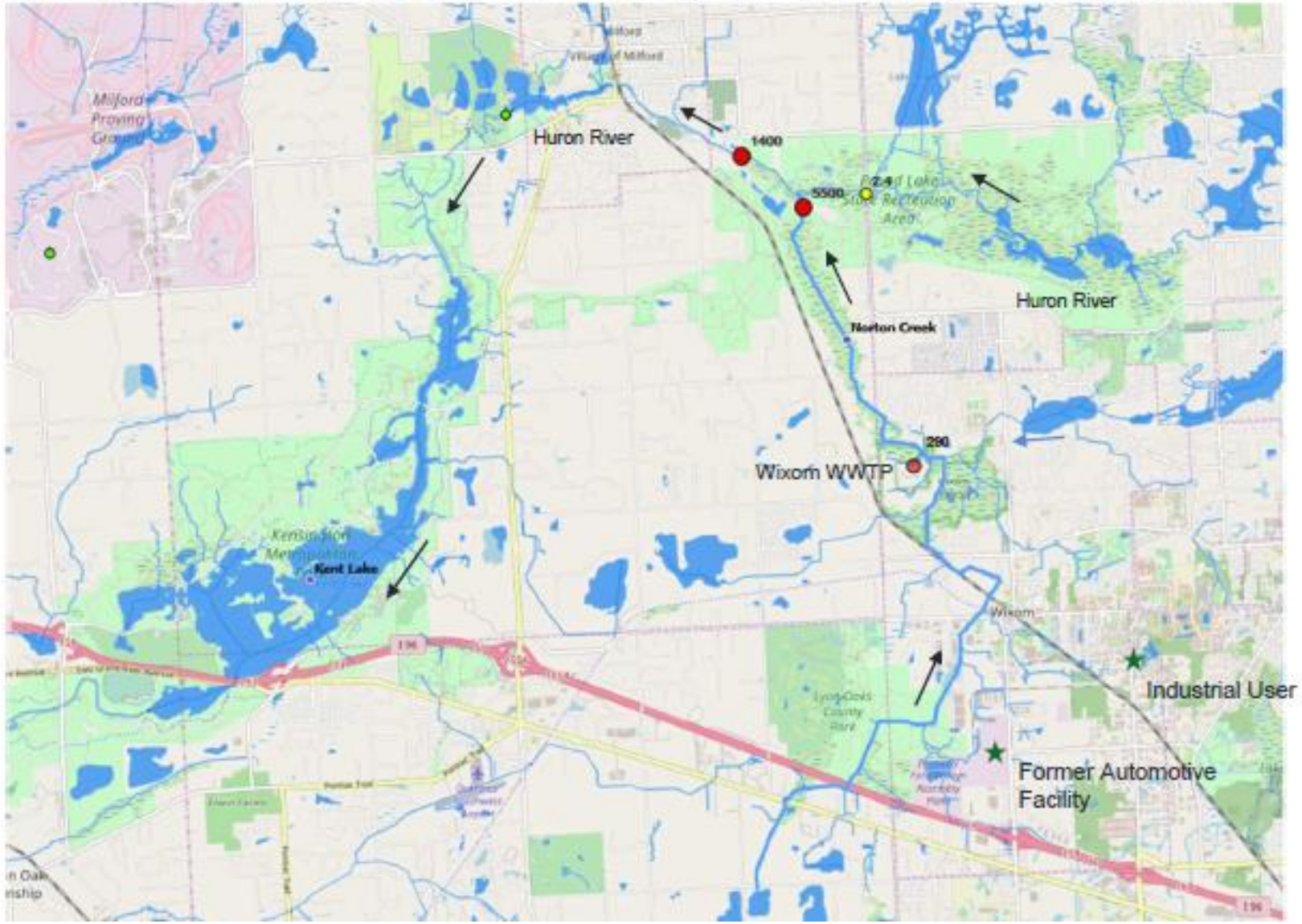
Surface Water Sampling Results July 24, 2018

Upper Huron Watershed



Other Potential Sources?

Norton Creek Drainage Area – Source Tracking Sampling



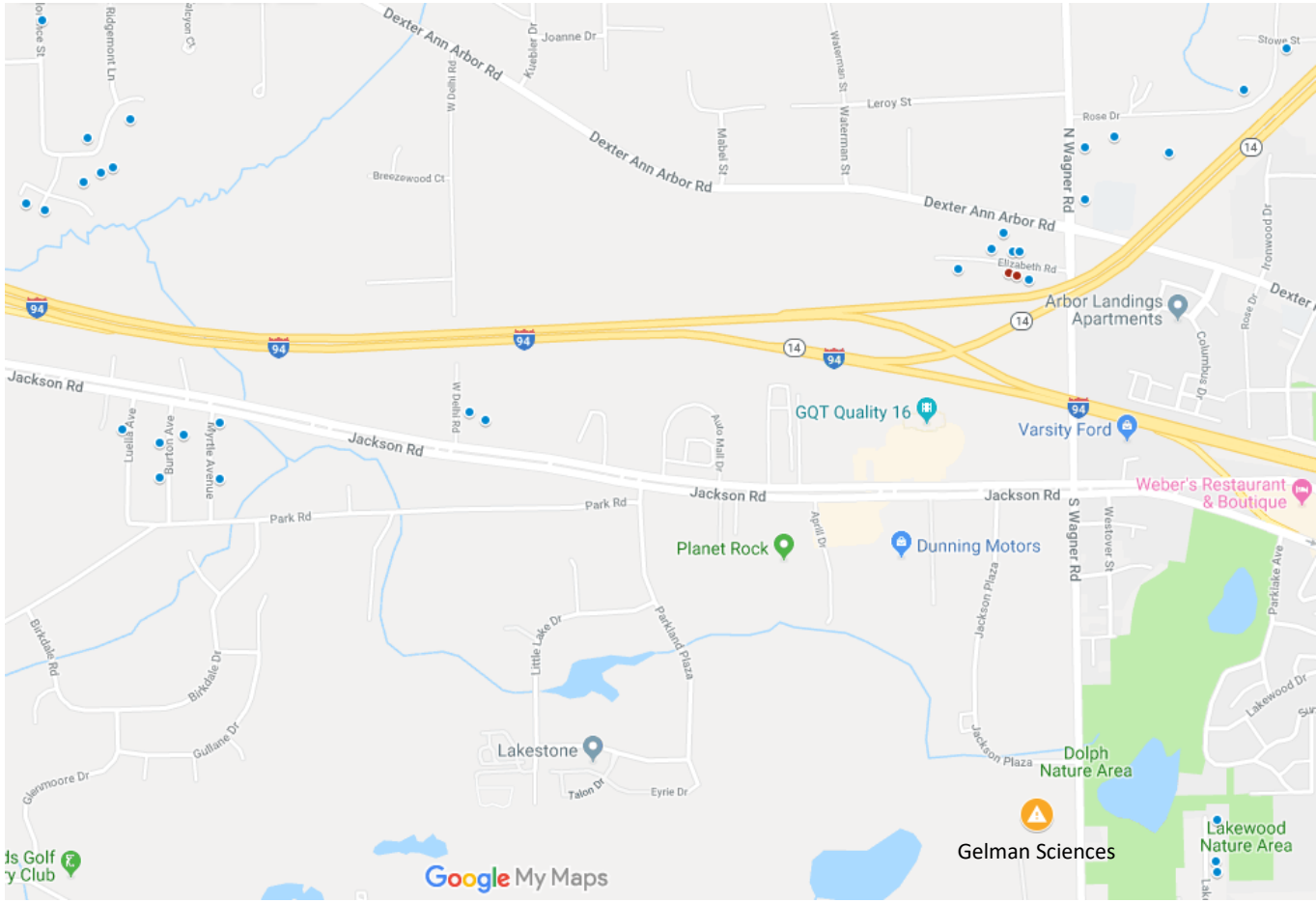
PFAS-containing Foam

- PFAS do not go through skin readily
- Adults and children should avoid swallowing foam
- Try to keep pets out of areas with foam and rinse them off to prevent them from swallowing the foam

Foam at the Hubbell Pond Dam in Milford (9/8/2018)

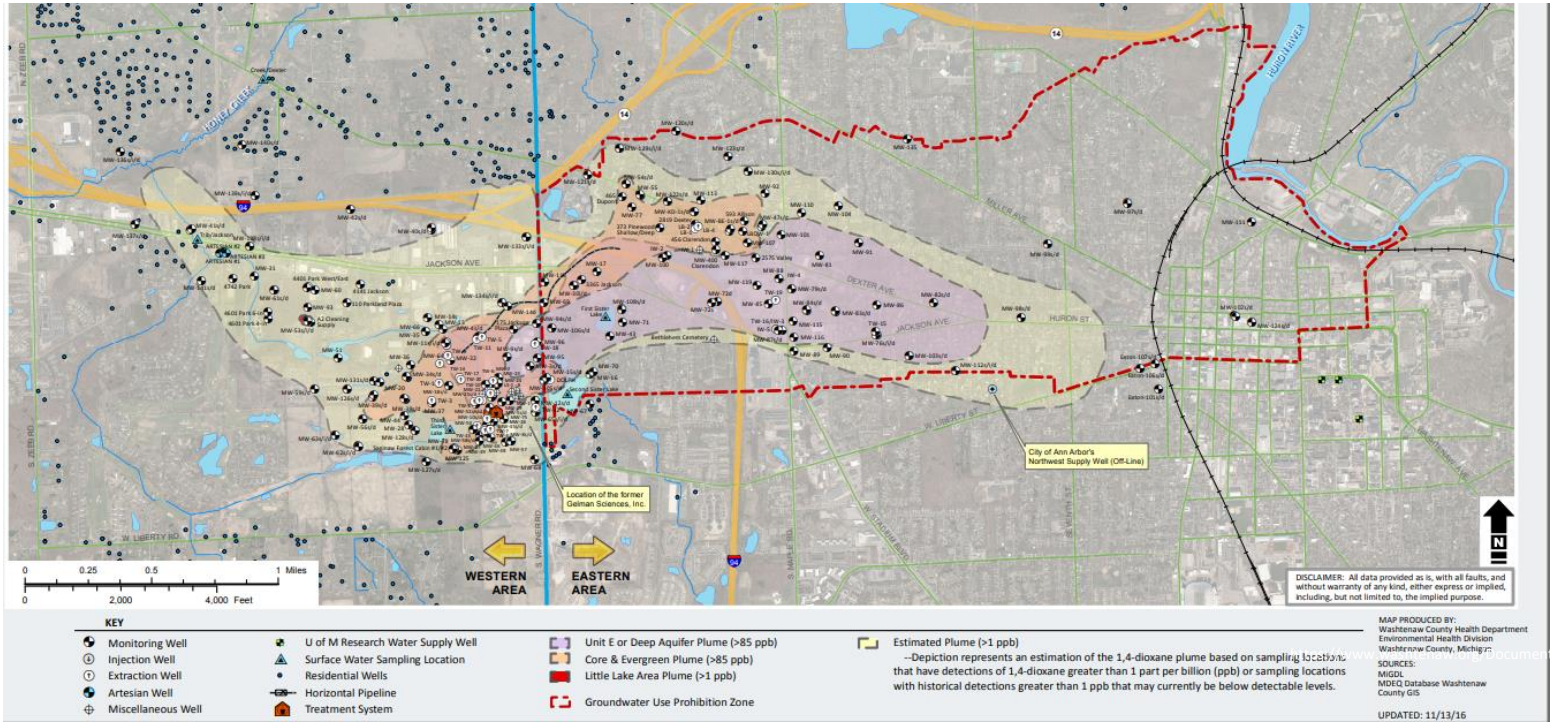
1,4-Dioxane in Water Supply Wells

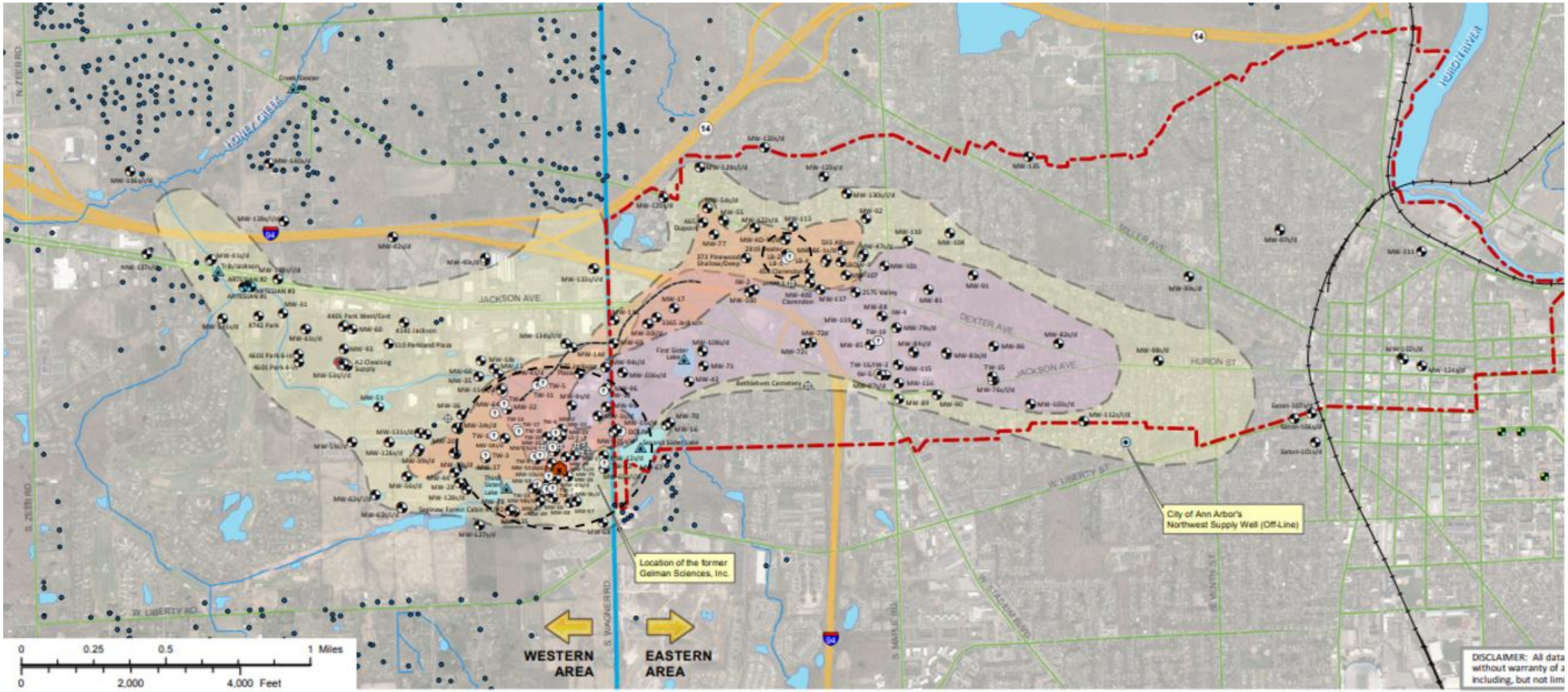
- 67 wells were sampled around former Gelman Plant
- No wells showed levels above 7.2 ppb standard
- 2 wells showed detectable levels
  - South side of Elizabeth Rd., 1-2 ppb



Gelman Sciences' Remediation

- Gelman extracts 473 gpm of contaminated ground water
  - Pumped to Gelman Sciences
- May-September of 2018, Gelman treated 81,407,286 gal
  - Ozone and hydrogen peroxide treatment
  - Removed 282 pounds of 1,4-Dioxane





KEY

- Monitoring Well
- Injection Well
- Extraction Well
- Artesian Well
- Miscellaneous Well
- U of M Research Water Supply Well
- Surface Water Sampling Location
- Residential Wells
- Horizontal Pipeline
- Treatment System
- Unit E or Deep Aquifer Plume (>85 ppb)
- Core & Evergreen Plume (>85 ppb)
- Little Lake Area Plume (>1 ppb)
- Groundwater Use Prohibition Zone
- Estimated Plume (>1 ppb)
  --Depiction represents an estimation of the 1,4-dioxane plume based on sampling locations that have detections of 1,4-dioxane greater than 1 part per billion (ppb) or sampling locations with historical detections greater than 1 ppb that may currently be below detectable levels.

Shallow Groundwater and Surface Water

Groundwater was tested within the Prohibition Zone and Scio Township

- 16 sites with groundwater within 20 feet of surface
  - 2 sites with detectable levels of 1,4-Dioxane between 1.9 and 3.3 ppb, below the EPA RSL of 4.6 ppb

DEQ sampled 18 surface water sites

- 8 showed detectable levels of 1,4-Dioxane between 2.1 and 19 ppb

Regional Screening Level (RSL): Exposure limits corresponding to a 10^{-6} risk level for carcinogens