Huron River Watershed PFAS Update

Michigan Department of Environmental Quality (DEQ)
Michigan Department of Health and Human Services (DHHS)
City of Wixom

Introductions

Tracy Kecskemeti– DEQ, Southeast Michigan District, PFAS Regional Team Lead

Stephanie Kammer – DEQ, Water Resources Division, Huron River Watershed PFAS Project Manager

Jennifer Gray– DHHS, Division of Environmental Health

Steve Brown – City Manager, City of Wixom

PFAS - An Emerging Contaminant

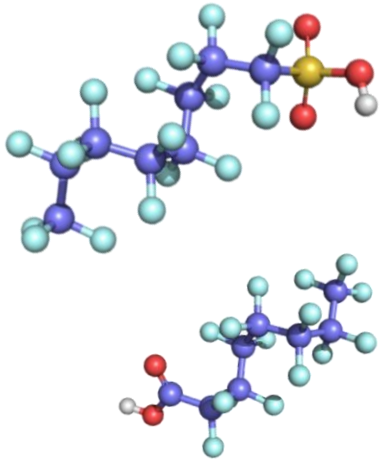
Chemicals and materials that have pathways to enter the environment and present real or potential unacceptable human health or environmental risks…

and either

Do not have peer-reviewed human health standards

or

Standards/regulations are evolving due to new science, detection capabilities or pathways.

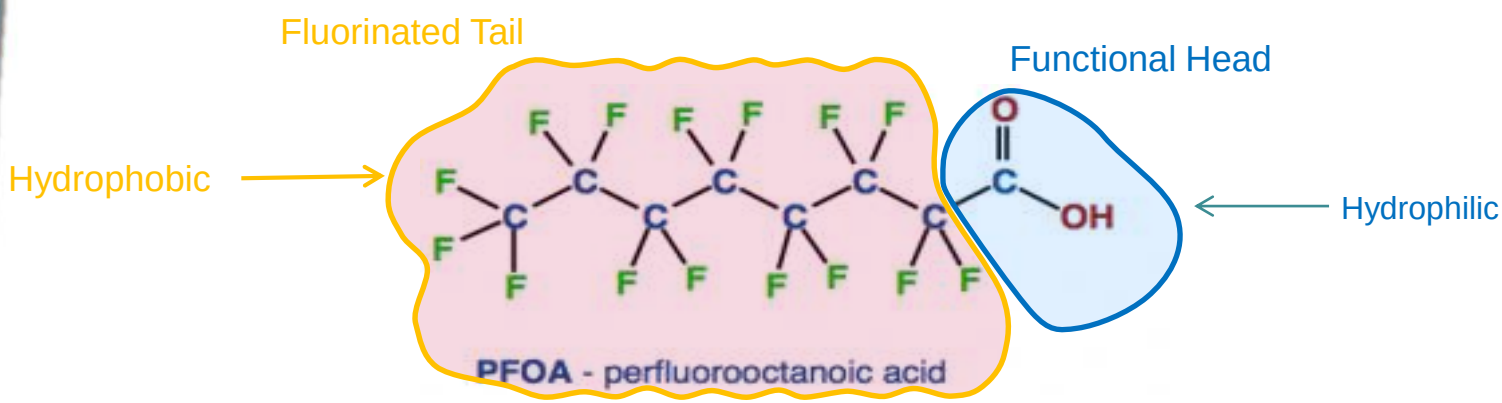


Emerging Contaminant does not mean it is a new issue but rather that health effects and fate and transport are not well understood

PFAS Chemistry 101

Carbon-fluorine bonds:

- The H is replaced with a F
- Very strong, inert
- Resists thermal, chemical, and biological degradation
- Surfactant, reduced surface tension
- Hydrophobic(repels water) *and* oleophobic (repels oil/fat/grease)



PFAS Uses

Aerospace

Apparel

Building and Construction

Chemicals and Pharmaceuticals

Electronics

Oil & Gas

Energy

Healthcare and Hospitals

Aqueous Film Forming Foam

Semiconductors

Michigan PFAS Action Response Team (MPART)

- Governor Snyder signed Executive Directive 2017-4 on November 13, 2017
- Design: ensure comprehensive, cohesive, timely response to continued mitigation PFAS across Michigan
- Goal: provide cooperation and coordination among all levels of government

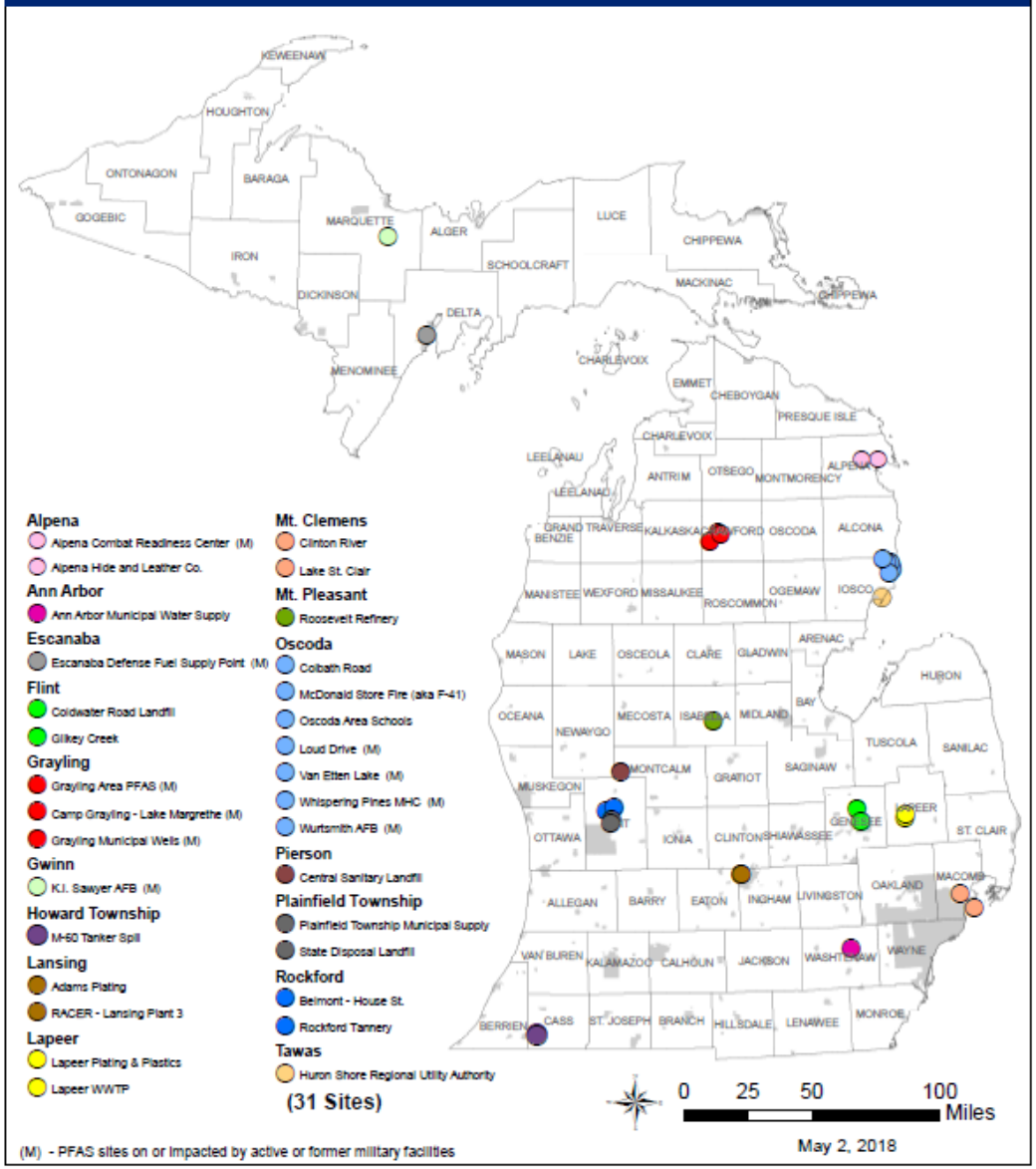
MPART Goals

Focus on

- Protecting public health
- Proactive efforts
- Working with communities
- Assisting responsible parties in remediation efforts
- Increasing scientific understanding

Michigan Department of Environmental Quality

Confirmed PFAS Sites



Criteria and Guidelines

Drinking Water

- 70 ppt PFOA and PFOS combined or individually
- EPA Lifetime Health Advisory Level
- Not enforceable MCL

Groundwater

- 70 ppt PFOA and PFOS combined or individually
- Enforceable standard under Part 201
- Took effect January 10, 2018

Criteria and Guidelines

Surface Water - Rule 57 Water Quality Standards

- PFOS:
  - 11ppt (drinking water source)
  - 12 ppt (non-drinking water source)
- PFOA:
  - 420ppt (drinking water source)
  - 12,000ppt (non-drinking water source)

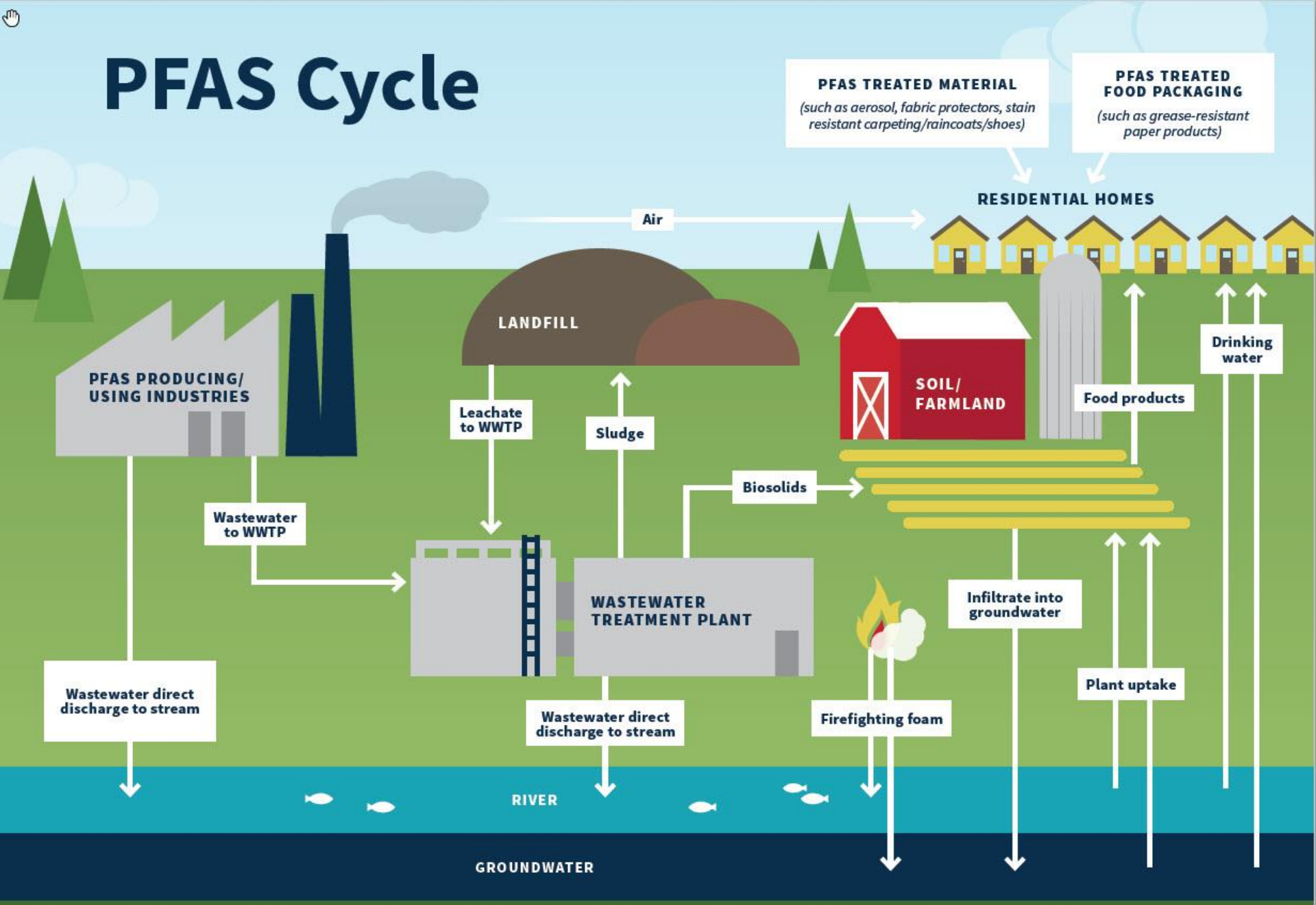
	HNV (nondrinking)	HNV (drinking)	FCV	FAV	AMV
PFOS (ng/L)	12	11	140,000	1,600,000	780,000
PFOA (ng/L)	12,000	420	880,000	15,000,000	7,700,000

Parts Per Trillion

1 ppt = 1 drop (0.05mL) in 20 Olympic Swimming Pools

Note: 1 Olympic Pool = 660,000 gallons

PFAS Cycle



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
800-662-9278 | www.michigan.gov/pfasresponse

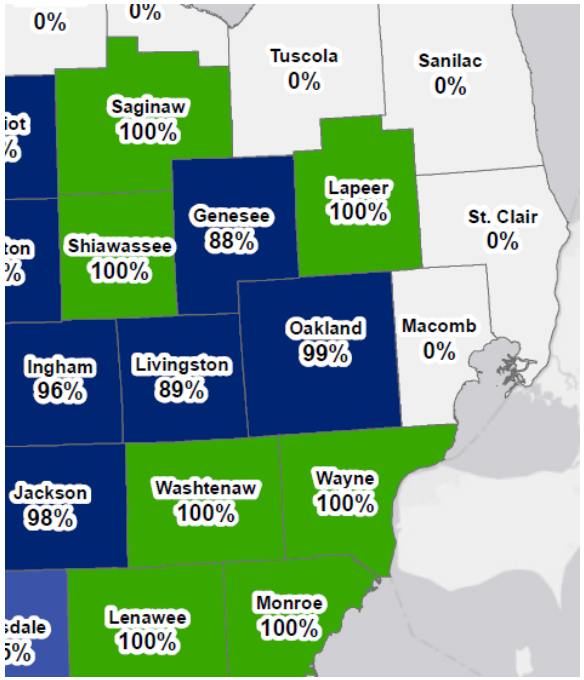
09/2018

Statewide Public Water Supply Testing Initiative

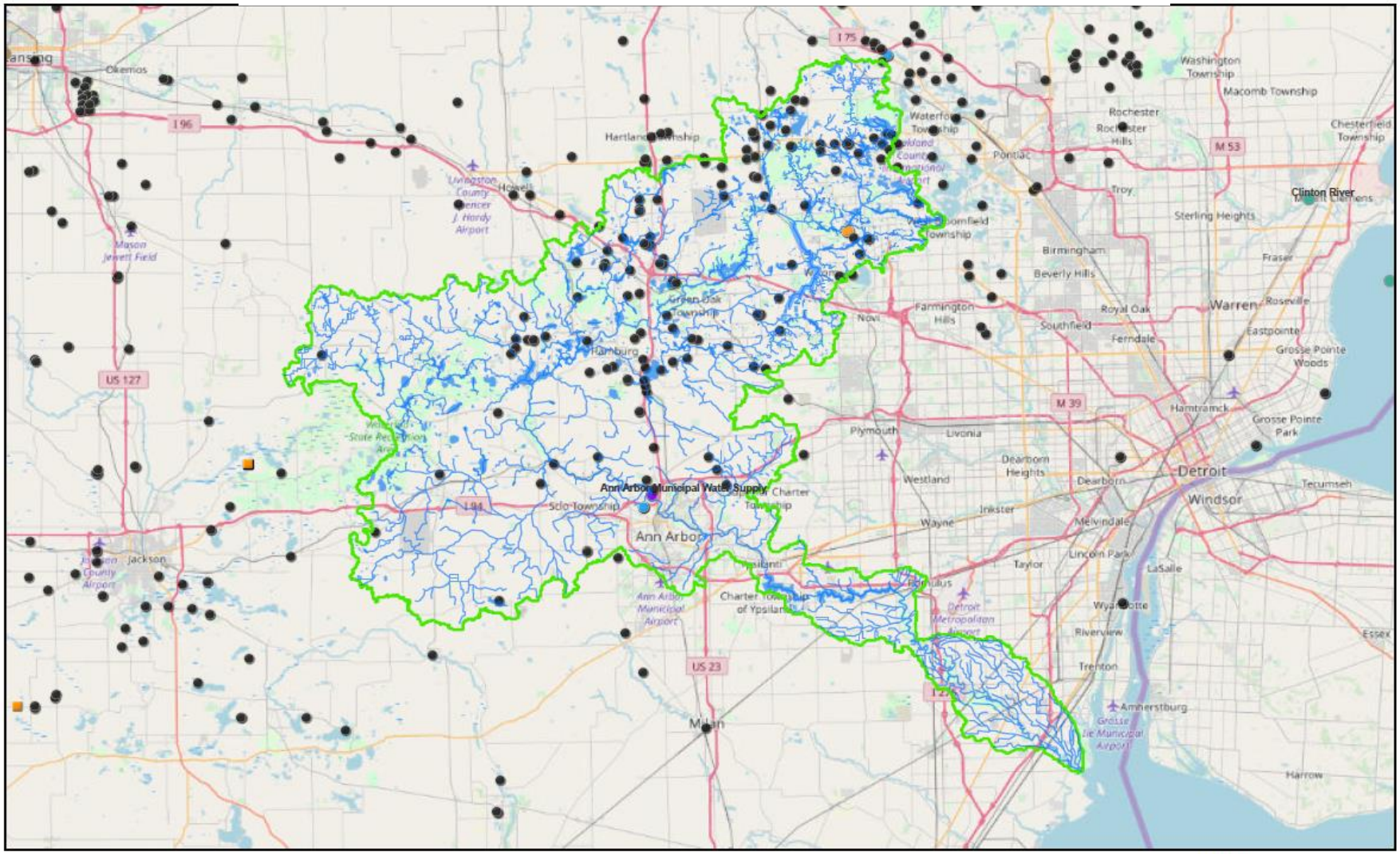
The DEQ continues its statewide initiative to test drinking water from all **schools** that use well water and **community water supplies** for PFAS.

Up to date results for all sampled supplies can be found here:

https://www.michigan.gov/pfasresponse
Click on Treatment and Testing



Community Water Supply/School Well Testing



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Huron River Flowline

Huron River - Norton Creek

Huron River Waterbodies

Huron River Watershed

CWS & Schools Raw PFAS Results as of 9-26-2018

0 – 0

> 0 – 11

> 11 – 70

1:781,945

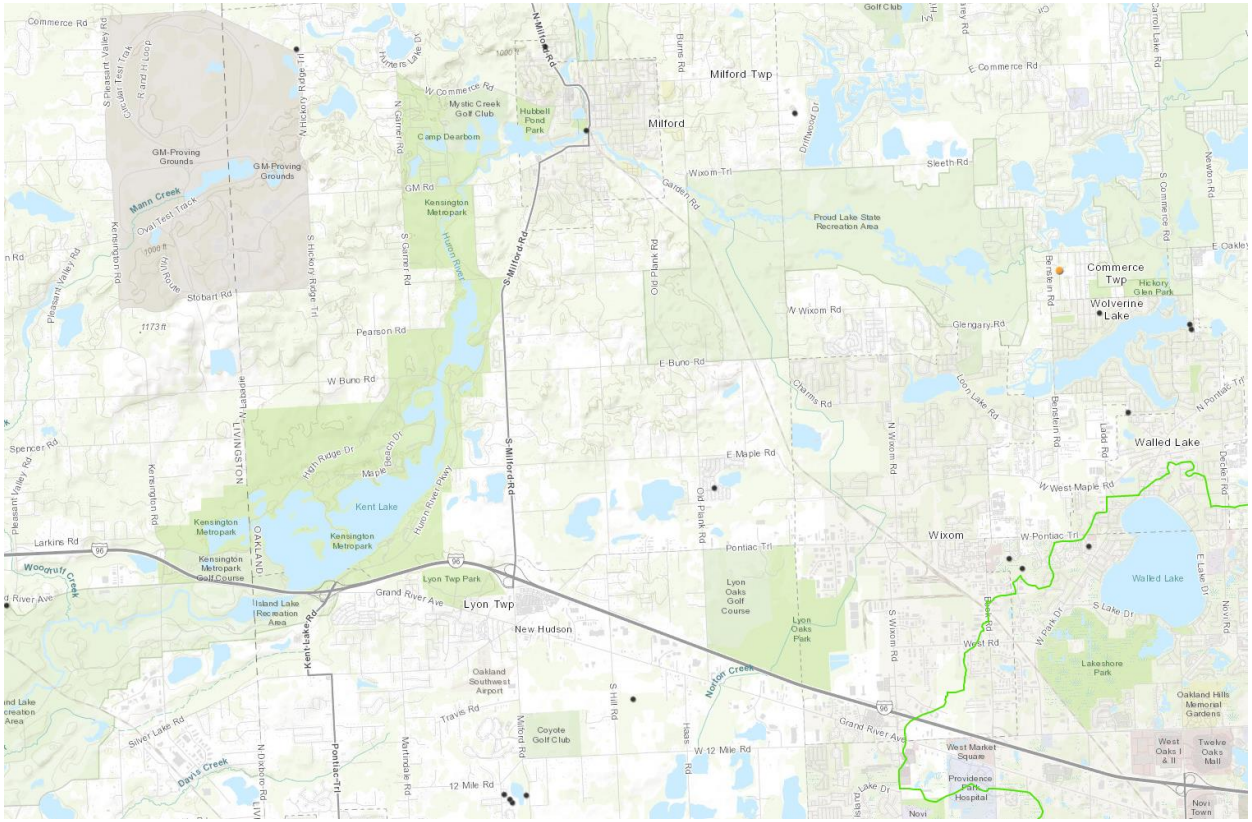
0 5 10 20 mi

0 5 10 20 km

Web AppBuilder for ArcGIS

Source: USGS, EPA | Map data © OpenStreetMap contributors, CC-BY-SA |

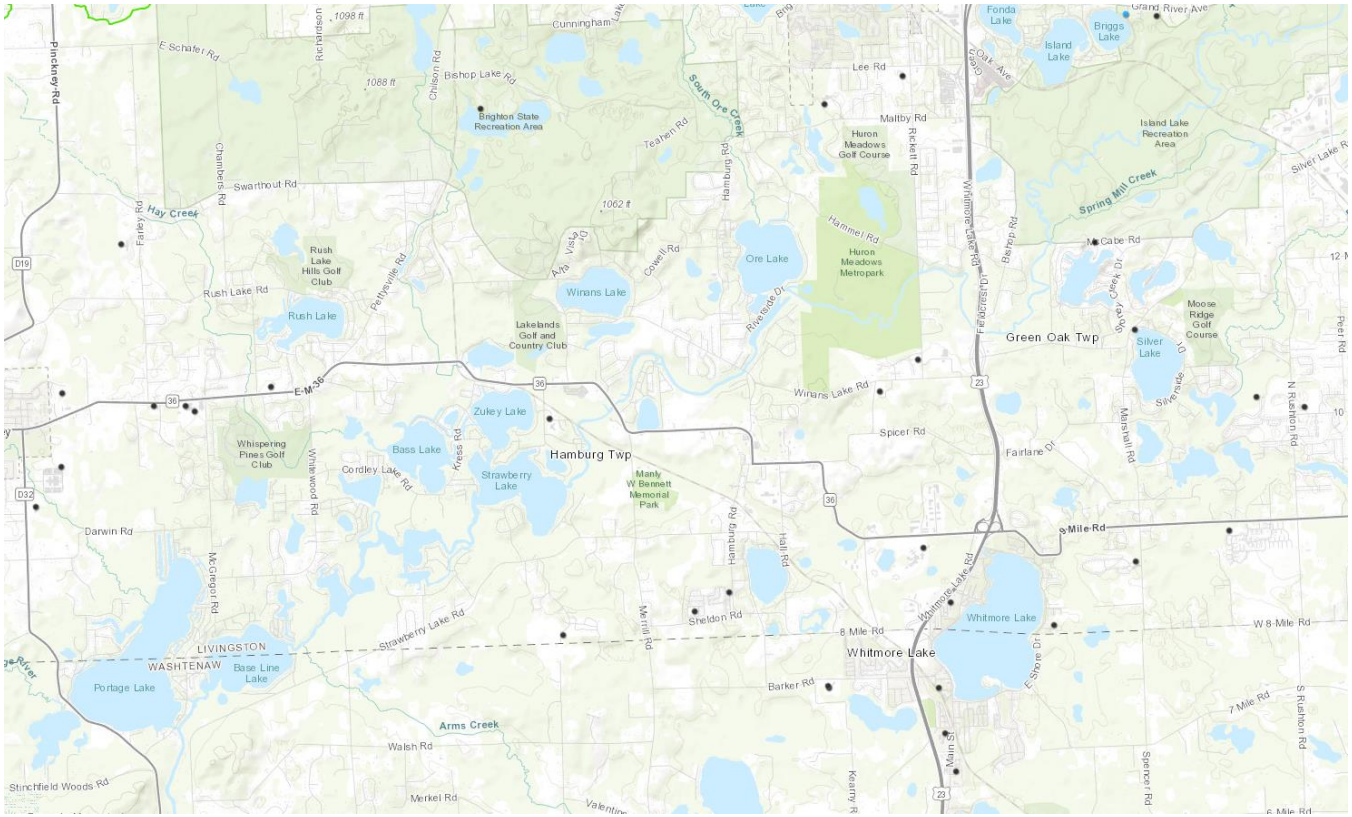
Community Water Supplies Tested for PFAS



PFOA + PFOS (ppt)

- > 1,000 - 1,520
- > 70 - 1,000
- > 11 - 70
- > 0 - 11
- 0 - 0

Community Water Supplies Tested for PFAS



PFOA + PFOS (ppt)

- > 1,000 - 1,520
- > 70 - 1,000
- > 11 - 70
- > 0 - 11
- 0 - 0

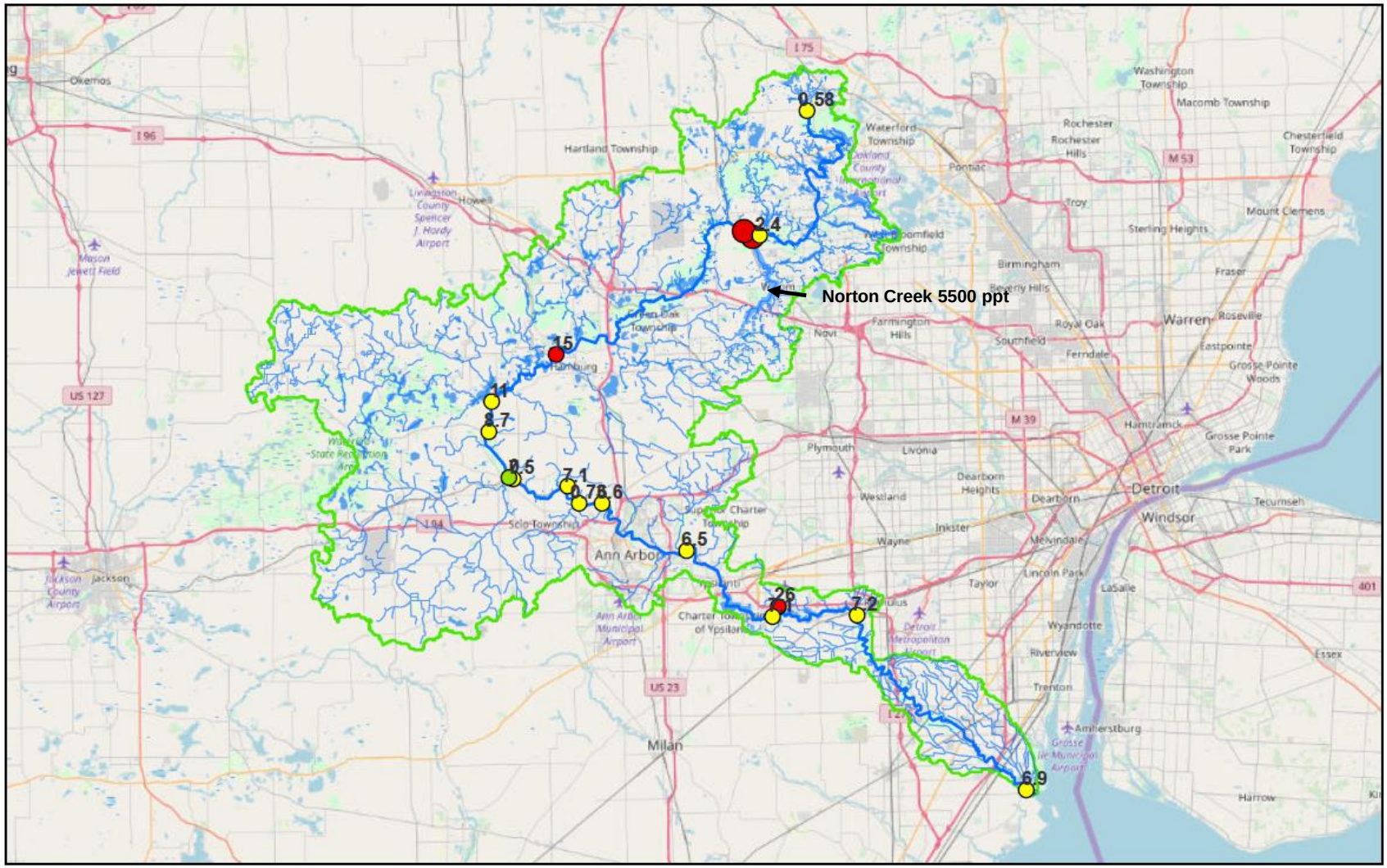
Ann Arbor Municipal Water Supply

- 2013/2014 – EPA's Unregulated Contaminant Monitoring program
- 2016 – Ann Arbor begins proactive monthly sampling
- Ann Arbor currently conducting a treatment study
- 2016 – Ann Arbor also samples upstream and groundwater wells

DEQ Surface Water Sampling for PFAS

- Over 300 ambient surface water samples from 20 waterbodies analyzed for PFAS through September 2018
- St. Marys, St. Clair, Detroit Rivers sampled for PFAS in 2017 – PFOS was consistently low
- Seven major watersheds sampled intensively as part of source tracking investigations
  - Kalamazoo River
  - St. Joseph River
  - River Raisin
  - Clinton River
  - Rogue River
  - Huron River
  - Flint River

Huron River Surface Water July 24, 2018 PFOS Results



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Huron River PFAS Sampling Results 20180724

- Non-Detect
- >0-12
- >12-100
- >1000-5500
- Huron River Flowline
- Huron River - Norton Creek
- Huron River Main Channel
- Huron River Waterbodies

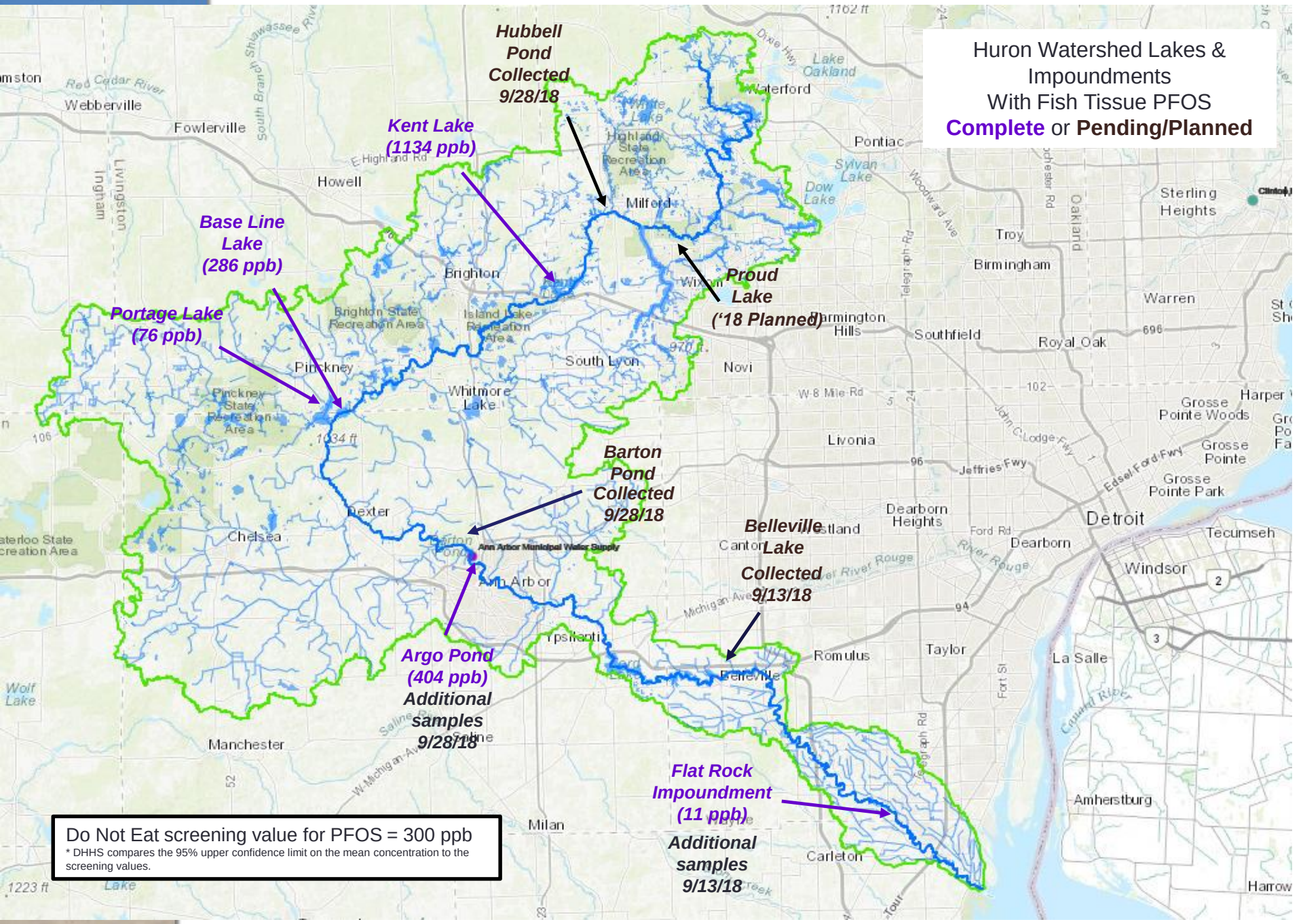
1:781,945

0 5 10 20 mi

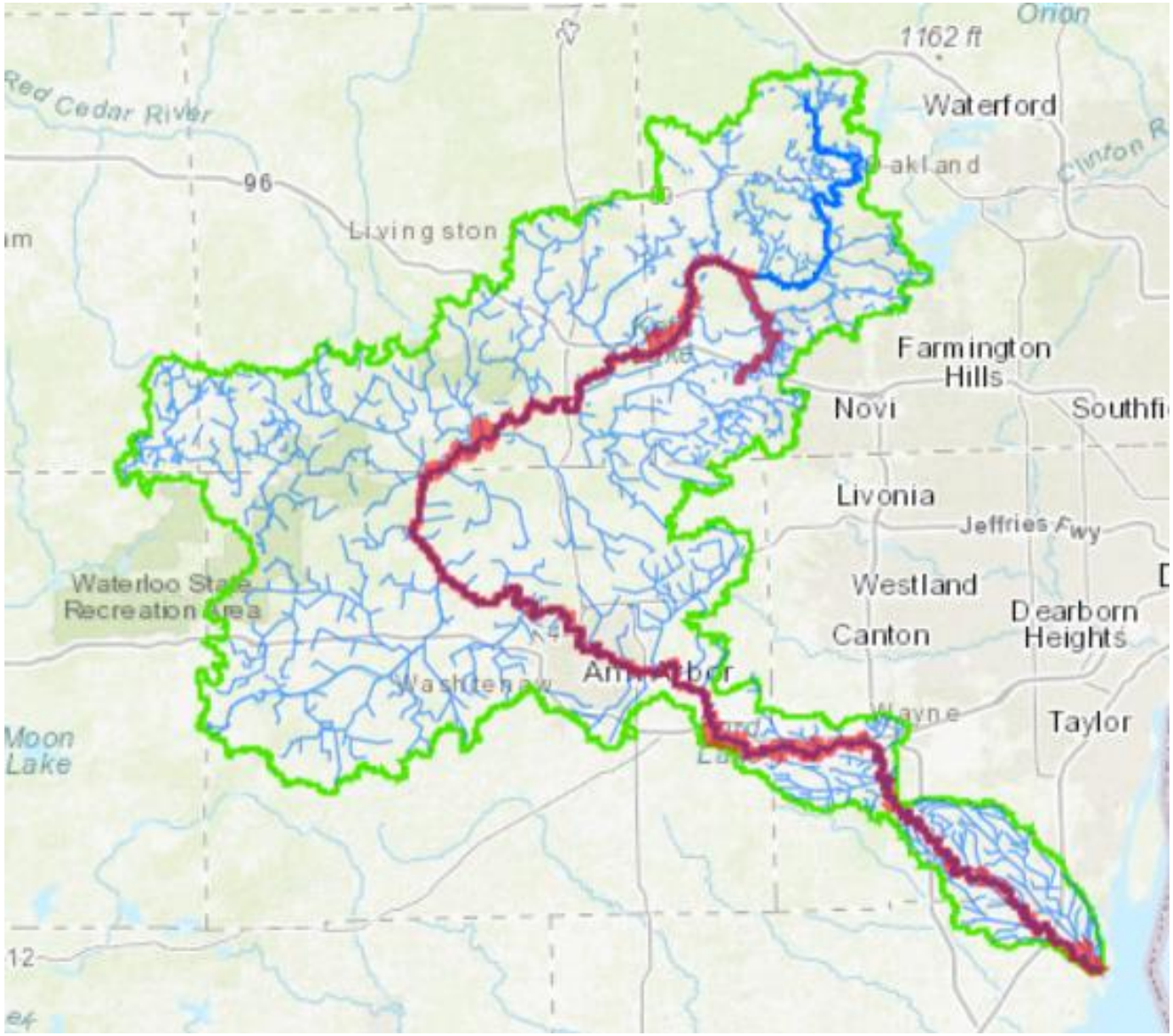
0 5 10 20 km

Web AppBuilder for ArcGIS

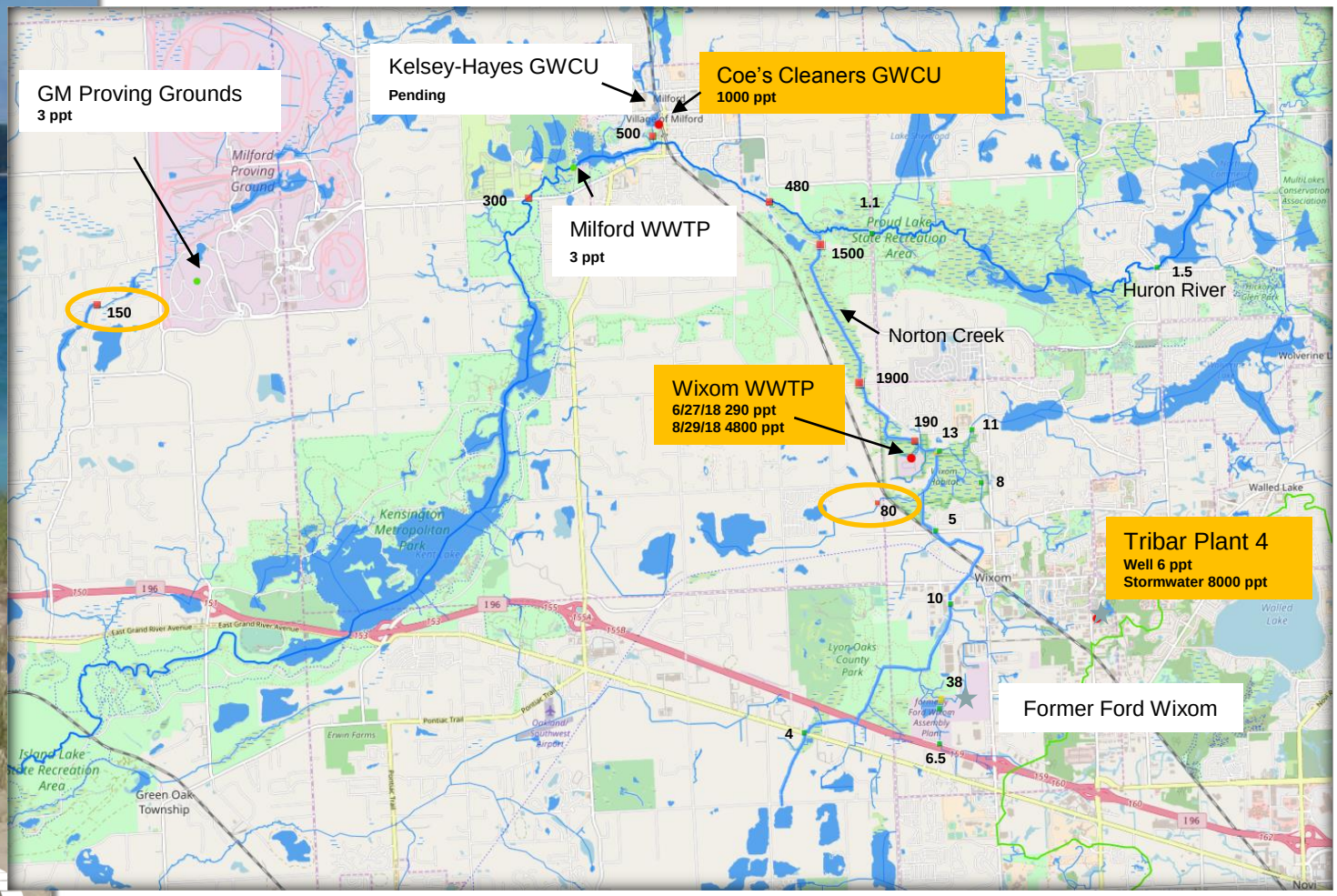
Source: USGS, EPA | Map data © OpenStreetMap contributors, CC-BY-SA |


Huron Watershed Lakes & Impoundments
With Fish Tissue PFOS
Complete or Pending/Planned
Hubbell Pond Collected 9/28/18
Kent Lake (1134 ppb)
Base Line Lake (286 ppb)
Portage Lake (76 ppb)
Proud Lake ('18 Planned)
Barton Pond Collected 9/28/18
Belleville Lake Collected 9/13/18
Argo Pond (404 ppb) Additional samples 9/28/18
Flat Rock Impoundment (11 ppb) Additional samples 9/13/18
Do Not Eat screening value for PFOS = 300 ppb
* DHHS compares the 95% upper confidence limit on the mean concentration to the screening values.
Webberville
Fowlerville
Howell
Milford
Brighton
Pinckney
South Lyon
Whitmore Lake
Novi
Pontiac
Waterford
Troy
Birmingham
Warren
Southfield
Royal Oak
Livonia
Dearborn Heights
Dearborn
Detroit
Windsor
Tecumseh
Dexter
Chelsea
Ann Arbor
Ypsilanti
Romulus
Taylor
La Salle
Belleville
Manchester
Milan
Carleton
Amherstburg
Harrow
Sterling Heights
Grosse Pointe Woods
Grosse Pointe
Grosse Pointe Park
Wolf Lake
Lake Oakland
Sylvan Lake
Dow Lake
Ann Arbor Municipal Water Supply

Huron River Fish Advisory



Huron River – August 2018 Surface Water & Point Source Monitoring for PFOS



Wixom Wastewater Treatment Plant (WWTP)
Industrial Pretreatment Program (IPP) PFAS Initiative

February 2018 - DEQ required PFAS screening at Publicly Owned Treatment Plants with IPPs

- City of Wixom WWTP discharges treated wastewater to Norton Creek
  - Sampled probable sources. Tribar Manufacturing Plant 4 identified with high PFAS levels (28,000 ng/L PFOS) in their wastewater discharge to the WWTP
  - Decorative chrome plater on plastics – uses hexavalent chromium
  - Use of PFAS chemicals to protect worker health & safety from exposure to hex chrome
  - Plant 4 switched to a PFOS-free product in 2015 per EPA ban
  - Plant 5 (online 2017) has only used the PFOS-free product and sample results were <20 ppt

Additional information on IPP PFAS Initiative:
www.mi.gov/ipp and https://www.michigan.gov/pfasresponse
Click on Treatment and Testing, then Wastewater Treatment

Status in Wixom

- Tribar Manufacturing, aka Adept Plastics, Plant 4 identified as PFAS source – discharge sample tested at 28,000 ppt for PFOS

- Effluent sampling at Wixom WWTP for presence of PFOS substances
  - June 2018 sample at 290 ppt; August 2018 at 4,800 ppt
  - MDEQ WQS is 12 ppt for PFOS
  - No information on how the result increased from June

- MDEQ worked with City of Wixom to develop a plan to identify the source since no known sources of PFAS in City operations

- City issued an Administrative Compliance Order (ACO) to Tribar on September 19, 2018, requiring the following by October 19th:
  - Continuation of monthly sampling
  - Evaluation of causes, implementation of strategies and plans to reduce and eliminate PFAS substances from wastewater

Wixom Update Since ACO Issuance

Tribar has indicated the company will implement a mobile/temporary filtration system onsite by October 5th

- A granular-activated carbon system
- Anticipated to reduce levels of PFAS dramatically

Tribar has plans to implement a permanent filtration system onsite by early December 2018

- A granular-activated carbon system
- Will include redundancy to allow 24/7 operation even as spent filter media is replaced
- Anticipated to reduce PFOS, PFOA presence in wastewater discharge to less than 12 ppt, in compliance with guideline

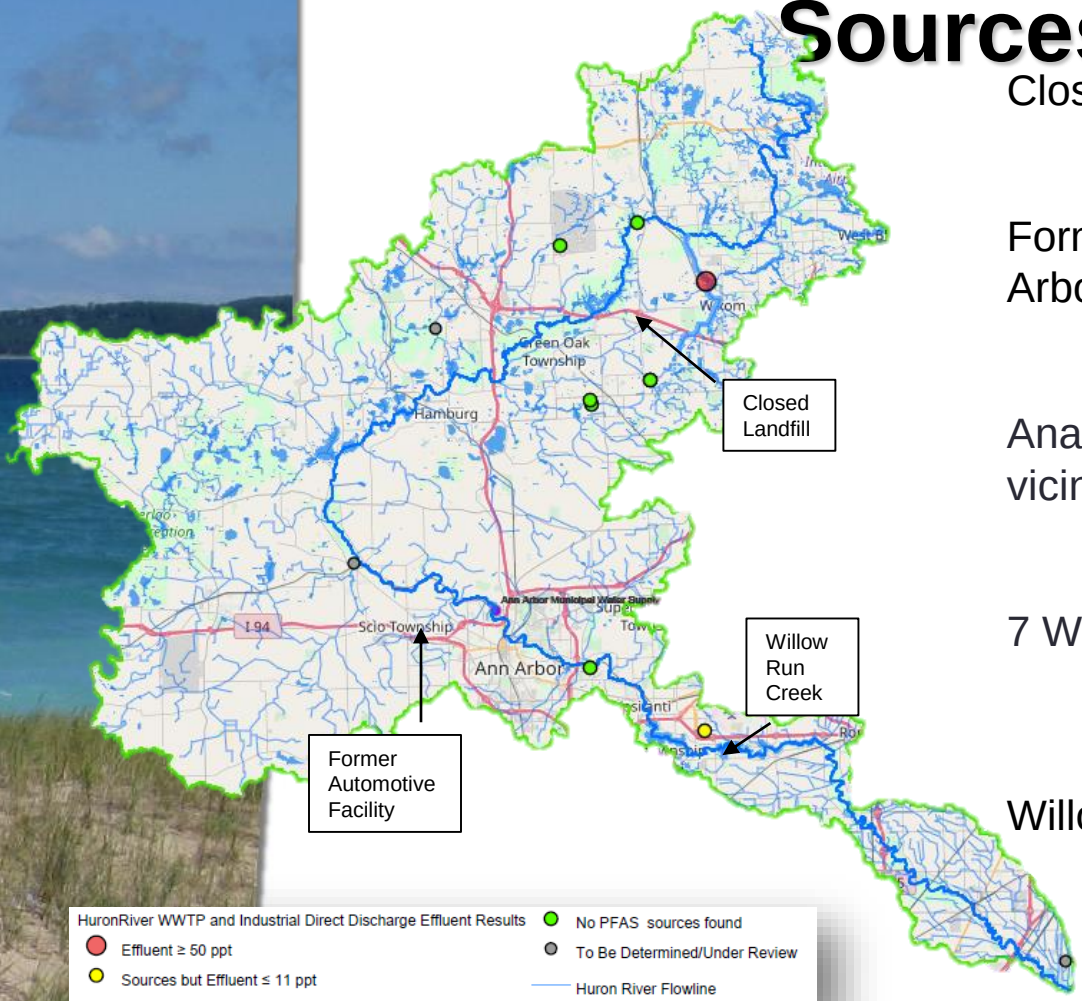
Wixom WWTP effluent sampling should reflect corresponding improvement

Wixom is planning additional sampling in an effort to screen for/identify other possible PFAS sources

Point Source Follow-up Actions

- Wixom WWTP
  - DEQ & City working together through the IPP PFAS Initiative
- Coe's Cleaners Groundwater Clean Up
  - DEQ managed site – necessary to protect Milford Wells
  - Samples from Milford Wells = Non-Detect
  - Additional sampling scheduled
  - Evaluating treatment options
- Tribar Manufacturing Plant 4
  - Require stormwater study
  - Implement of appropriate controls for stormwater
  - Comply with City requirements to control/reduce industrial wastewater discharge of PFOS

Activities to Identify Other Potential Sources



Closed Landfill in Lyon Township

- Working with responsible party to sample groundwater monitoring wells

Former Automotive Facility upstream of Ann Arbor

- PFAS detected in groundwater. None above drinking water protection criteria.

Analysis of 4 permitted discharges in the vicinity of Kent Lake

- All below WQS (Milford WWTP, S. Lyon WWTP, Seamless Tube, GM Proving Grounds

7 WWTPs participating in IPP PFAS Initiative

- 1 above WQS (Wixom); 3 no sources or effluent below WQS (Ann Arbor, Brighton, Dexter, Lyon Twp., YCUA); 1 yet TBD (S. Huron Valley UA)

Willow Run Creek (26 ppt)

- Evaluate potential sources – (former automotive manufacturing facility, airport, landfill).

Mann Creek; W. Branch of Norton Creek & Portage Lake

- Evaluate potential sources

What's Next?

- Coordinate activities with MPART agencies and DEQ Divisions to protect public health and restore designated uses to the Huron River
- Wixom WWTP
  - Monthly WWTP effluent monitoring
  - Expect significant reductions
- Surface water - fish tissue samples
- Review of incoming data with respect to Do Not Eat Fish Advisory within watershed and update as needed
- Continued public engagement of issues surrounding PFAS
- DEQ and DHHS are always available for discussions on this issue or any issues related to public health and the environment

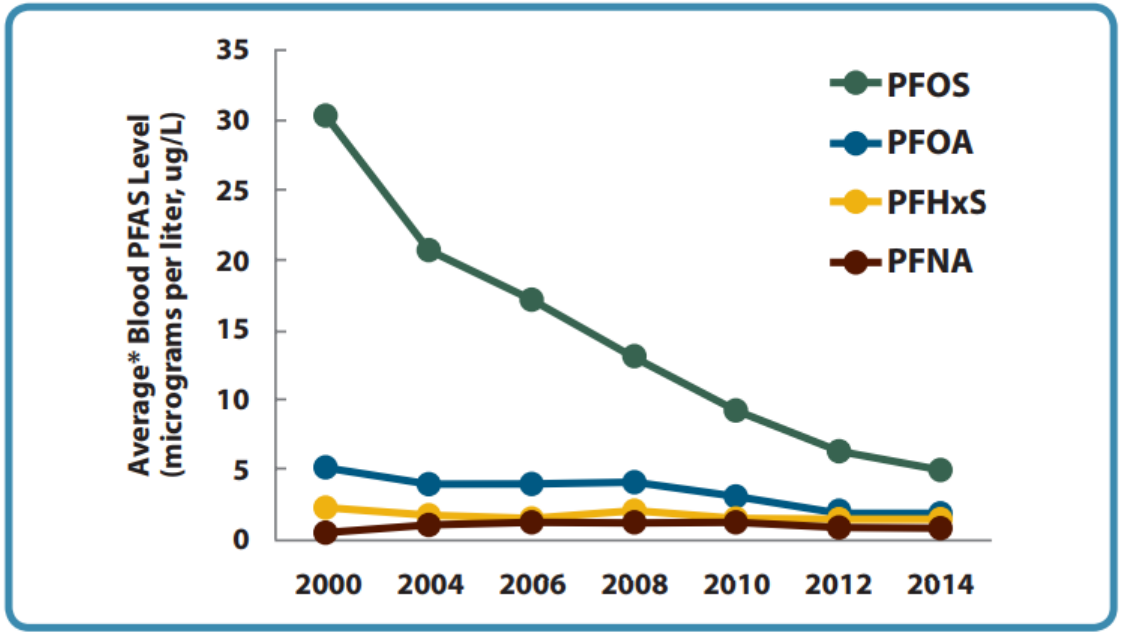
The Role of MDHHS

- Evaluate potential exposure to chemicals in the environment
- Determine if harm may occur
- Provide recommendations
- Provide technical support to the local health department
- Outreach to public, healthcare, others

EPA's Health Advisory Levels

- Based on reference doses (RfD) derived from developmental toxicity study in rodents
- Lifetime Health Advisory
  - PFOA + PFOS = 70 ppt (ng/L)
  - Short-term and long-term exposure
- Protects fetus and others against noncancer health issues (also protective against development of cancer)

Blood Levels of the Most Common PFAS in People in the United States from 2000-2014



* Average = geometric mean

Data Source: Centers for Disease Control and Prevention. Fourth Report on Human Exposure to Environmental Chemicals, Updated Tables, (January 2017). Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Health Outcomes (PFOS and PFOA)

In people:

- Alter cholesterol
- Thyroid disease (PFOA)
- Ulcerative colitis (PFOA)
- Testicular and kidney cancer (PFOA)
- Alter immune system function

In laboratory animals:

- Developmental effects
  - Reduce ossification of the proximal phalanges
  - Decrease pup birth weight
  - Accelerated puberty in male pups
- Immune system dysfunction
- Alter liver and kidney weight

History of the Michigan Fish Consumption Advisory Program

- Preventable exposures identified
  - First Advisory issued in 1970 Mercury
    - 1968 through 1970s – known presence of chemicals and health risk of mercury identified (Minamata Disease)

- Additional chemicals added to the program and major changes
  - 1977 PCBs & DDT first included
  - 1979 Dioxin & PBB first included
  - 1984 Dieldrin, Chlordane, & Toxaphene first included
  - 1989 Statewide Mercury Advisory for Inland Lakes (mercury is widespread)
  - 1990 Great Lakes Consortium for Fish Consumption Advisories (begin using risk assessment methods)
  - 2011 Selenium first included
  - 2012 PFOS first included

Children with Congenital Minamata Disease due to intrauterine methylmercury poisoning (Harada 1986).

Huron River
Do Not Eat fish advisory

- Huron River at N Wixom Road, including Norton Creek in Oakland County downstream to the Huron River at Lake Erie at Wayne and Monroe Counties
- This includes:
  - Norton Creek, Hubbell Pond (aka Mill Pond), Kent Lake (Oakland County)
  - Ore, Strawberry & Zukey, Gallagher, Loon, and Whitewood Lakes (Livingston County)
  - Base Line & Portage Lakes (Livingston/Washtenaw County line)
  - Barton Pond, Argo Pond, Geddes Pond, and Ford Lake (Washtenaw County)
  - Belleville Lake (Wayne County)

www.Michigan.gov/pfasresponse, under Fish and Wildlife

Why is there a do not eat advisory?

- Kent Lake fish filet PFOS levels (press release Aug 4)
  - PFOS fish filet levels elevated
- PFOS surface water levels (press release Aug 24)
  - Elevated PFOS surface water levels cause elevated fish filet PFOS levels
- Base Line Lake and Argo Pond fish filet PFOS levels (press release Aug 31)
  - PFOS fish filet levels elevated

Partnership on signage

- Working with county health departments, local municipalities, and Huron-Clinton Metroparks on temporary and more durable signs

- Temporary signs (in English) were placed at various access points throughout the stretch of the Huron River approximately two weeks ago

- More durable (weather resistant) signs are under development in Arabic, English, and Spanish

PFAS-containing Foam

- PFAS do not go through skin readily
- Adults and children should avoid swallowing foam
- An accidental swallow of a small amount of water during recreational activities is not a health concern
- Try to keep pets out of the foam and rinse them off to prevent them from swallowing the foam

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

For More Information:

www.Michigan.gov/pfasresponse

Contact Information and Questions

DEQ Environmental Assistance Center:
1-800-662-9278

DHHS Health Hotline:
1-800- MI-TOXICS (1-800-648-6942)

Stephanie Kammer - 517-897-1597 – kammers@michigan.gov
PFAS in the Huron River, Norton Creek, and in Livingston County

Tracy Kecskemeti – 248-200-6469 – kecskemetit@michigan.gov
PFAS activities in Oakland & Wayne County

Gerald Tiernan – 517-582-0520 - tiernang@michigan.gov
PFAS activities in the Washtenaw & Monroe County

Joe Bohr – 517-284-5525 - bohrj@michigan.gov
Fish sampling

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