



TOWN HALL MEETING

Robinson Township
120th Avenue PFAS
Study Area

AGENDA

5:30 pm: Presentations Start

Michigan Department of Environmental Quality

Abigail Hendershott, District Supervisor & Paul Knoerr, Environmental Quality Analyst/Geologist

Michigan Department of Health and Human Services

Bill Farrell, Toxicologist

6:30 pm-7:30 pm: Questions & Answers

120th Avenue PFAS Study Area

Abigail Hendershott

Grand Rapids District Supervisor

hendershotta@michigan.gov

Paul J. Knoerr

Project Manager-Geologist

knoerrp@michigan.gov

Remediation & Redevelopment Division

Michigan Department of Environmental Quality



DEQ Overview

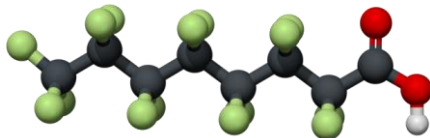
- PFAS Basics and MPART
- Residential Well Sampling
- Hydrogeological Investigation
- Next Steps

What are PFAS?

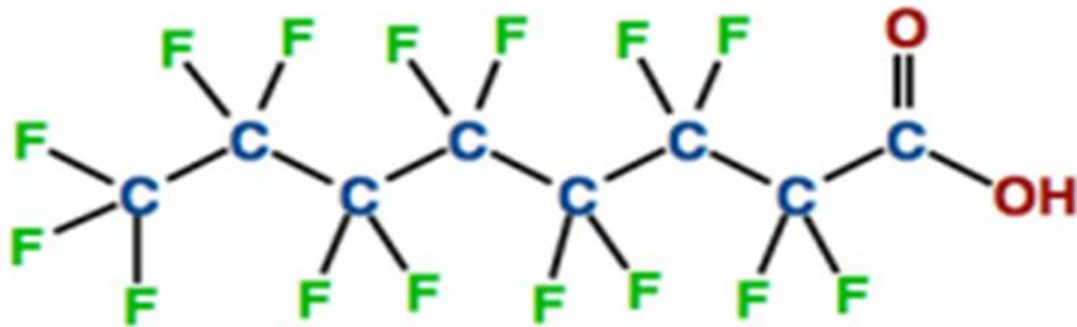
Per and Poly-fluoroalkyl substances

- Generic family of chemicals = over 5000
- Man-made and do not occur naturally
- Developed in 1940's
- Used to make products that resist heat, oils, grease, stains and water

Most Prevalent and researched : PFOS & PFOA



Per-and polyfluoroalkyl substances (PFAS)



PFOA - perfluorooctanoic acid

- Strong carbon-fluorine bonds
- Surfactants
- Hydrophobic (repels water) and oleophobic (repels oil, fat, grease)
- 5,000+ compounds

PFAS Uses



Aerospace



Apparel



Building and Construction



Chemicals and Pharmaceuticals



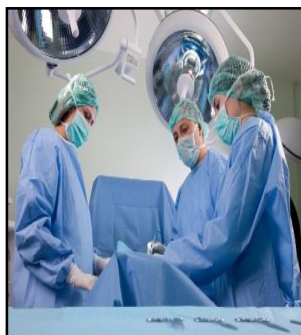
Electronics



Oil & Gas



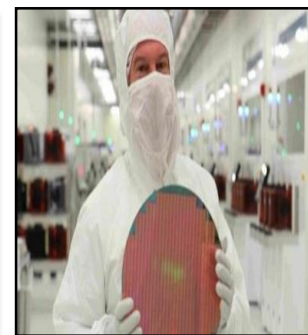
Energy



Healthcare and Hospitals



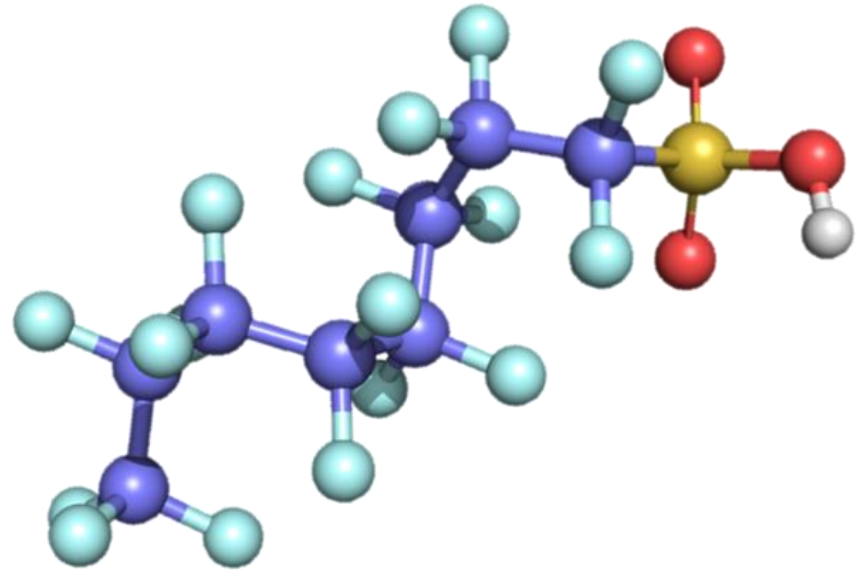
Aqueous Film Forming Foam



Semiconductors

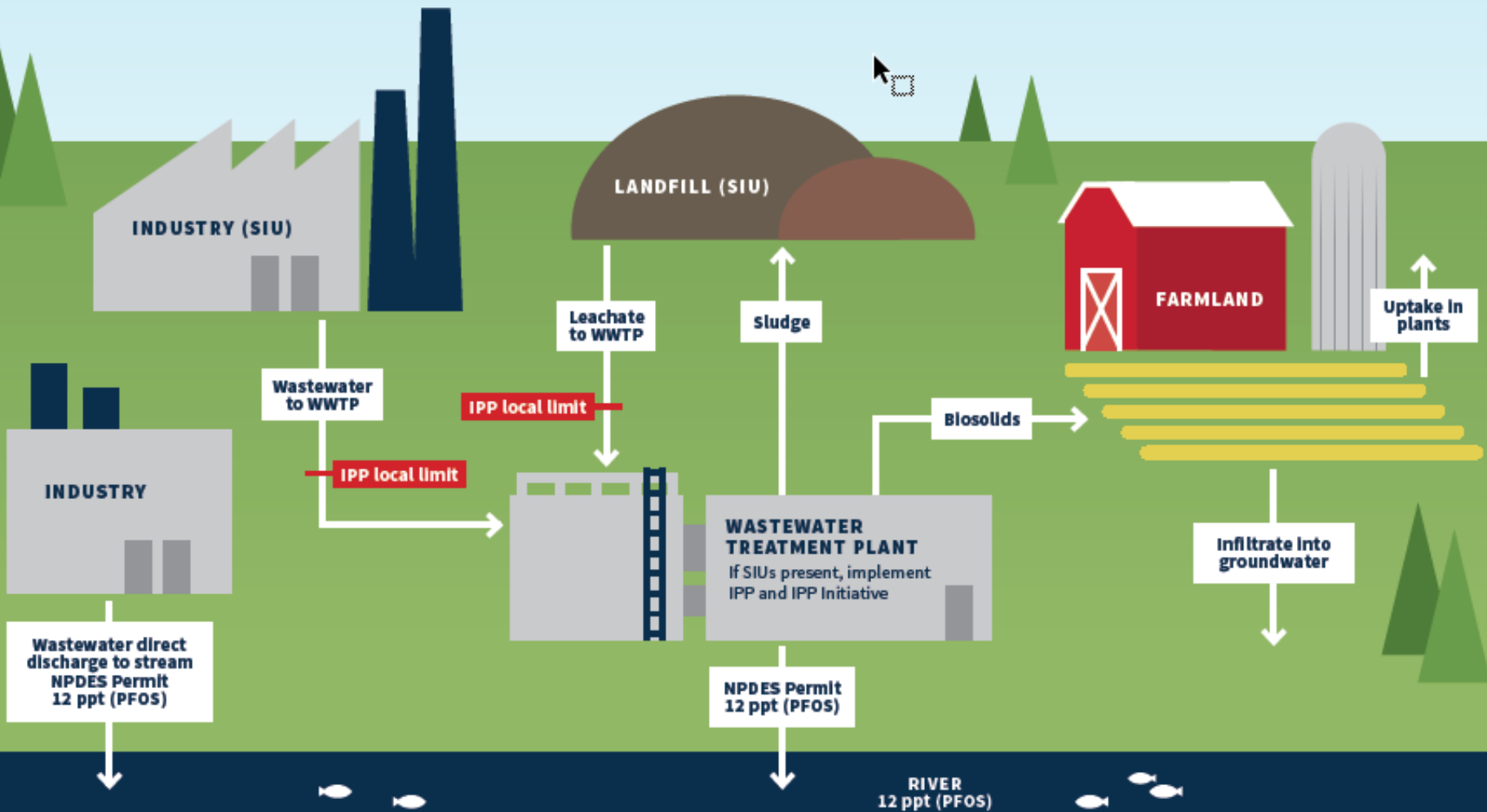
Why the Concern?

- Pervasive
- Persistent
- Bioaccumulative
- Associated with adverse health effects
- Scarcity of information in scientific literature
- Lack of sufficient standards



PFAS Water Cycle

IPP = Industrial Pretreatment Program
SIU = Significant Industrial User
NPDES = National Pollutant Discharge Elimination System
PPT = Parts Per Trillion
WWTP = Wastewater Treatment Plant



MPART

Michigan PFAS Action Response Team

- Governor Snyder signed ED 2017-4 on November 13, 2017
- Statewide cooperation and collaboration to strategically and proactively address this emerging contaminant.

Michigan.gov

FAQS NEWS AND EDUCATION CONTACT MPART SEARCH

PFAS RESPONSE

TAKING ACTION, PROTECTING MICHIGAN

HEALTH TESTING AND TREATMENT MICHIGAN PFAS SITES FISH AND WILDLIFE FIREFIGHTING FOAM ABOUT MPART

TAKING ACTION TO PROTECT THE PUBLIC'S WATER

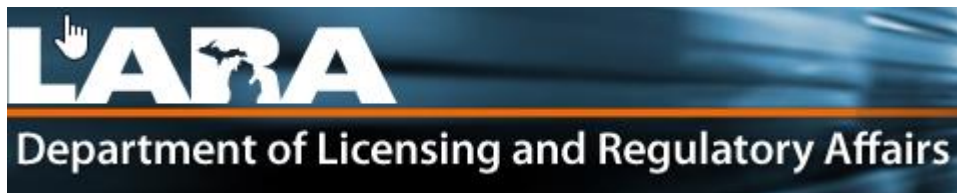
Perfluoroalkyl and polyfluoroalkyl substances (PFAS), such as perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), are part of a group of chemicals used globally during the past century in manufacturing, firefighting and thousands of common household and other consumer products.

In recent years, experts have become increasingly concerned by the potential effects of high concentrations of PFAS on human health.

Although there is more to learn about PFAS and human health, the State of Michigan takes this issue seriously and is one of the first states in the nation to establish a clean-up standard for PFAS in groundwater used for drinking water.

Launched in 2017, the Michigan PFAS Action Response Team (MPART) is the first multi-agency action team of its kind in the nation. Agencies representing health, environment and other branches of state government have joined together to investigate sources and locations of PFAS contamination in the state, take action to protect people's drinking water, and keep the public informed as we learn more about this nationally emerging contaminant.

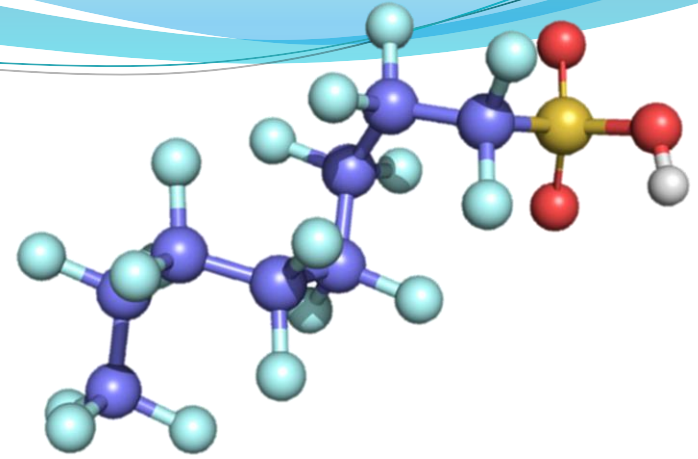
Who is MPART?....



Statewide cooperation and collaboration to strategically and proactively address this emerging contaminant.

MPART Response

- Protect Public Health
- Standardize sampling and analytical
- Study occurrence
- Identify sources and source pathways
- Study environmental transport and fate
- Study ecological effects
- Develop standards



What Types of Sites Can Be Sources of PFAS?

- Fire training facilities
- Fire stations
- Refineries
- DoD sites/Military bases
- Commercial and Private Airports
- Landfills
- Biosolids land application
- Rail Yards
- Chemical facilities
- Plating facilities
- Textile/Carpet Manufactures
- Residential areas with septic systems



Aqueous Film Forming Foam (AFFF)



Photo Credit: U.S. Airforce

AFFF meets Military Specification

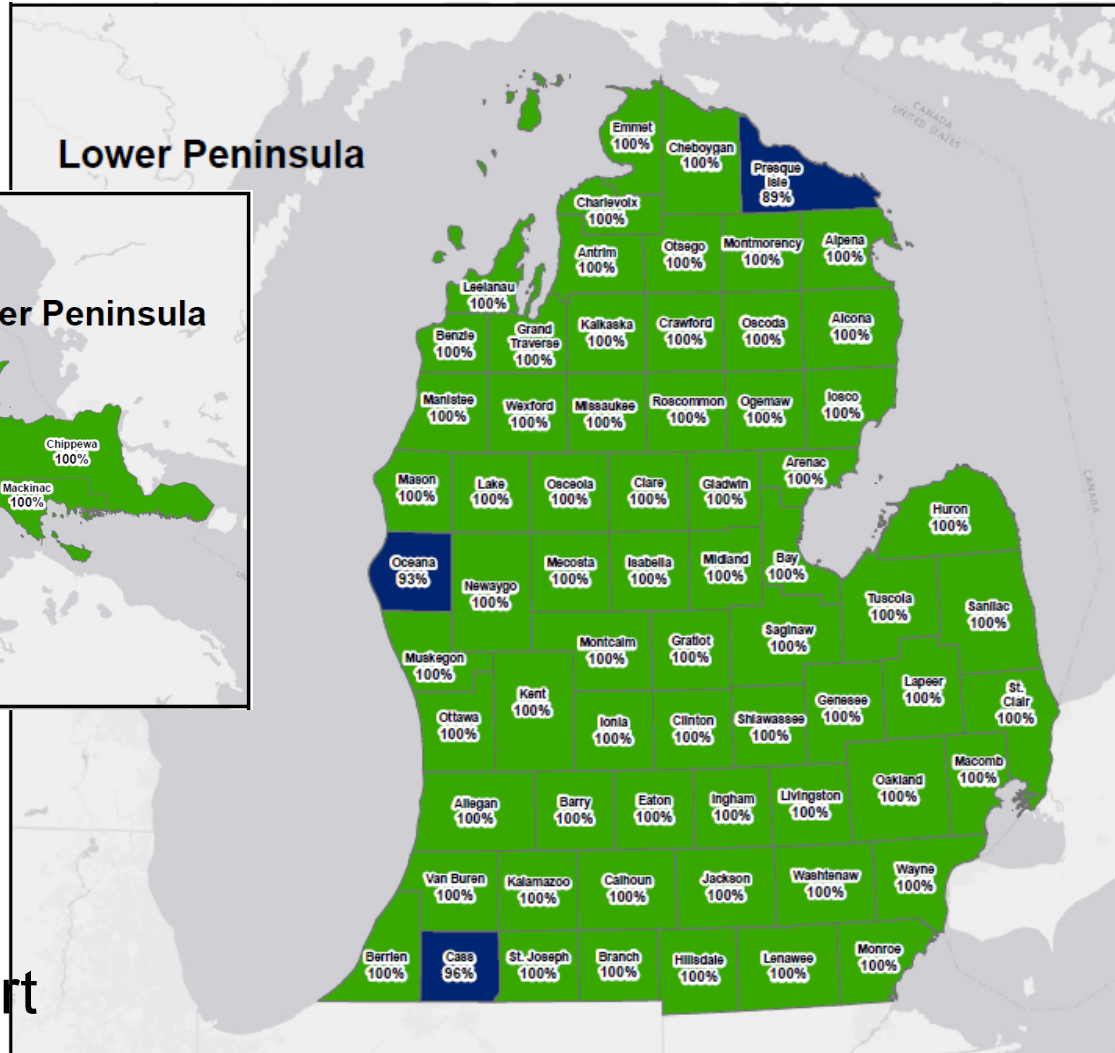
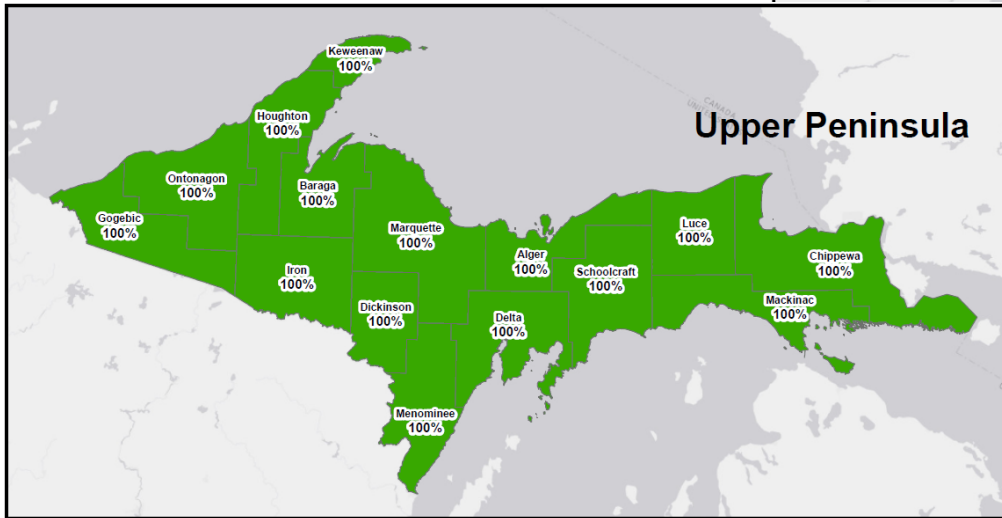
The MPART Testing Continues...

- Statewide municipal drinking water testing
- Schools/ Daycare on private wells
- 40+ PFAS Contamination sites identified
- River, Lakes, Streams sampling
- Biosolids
- Landfill leachate sampling
- Fish & Deer sampling
- Foam Sampling

Statewide Municipal Drinking Water Testing Program

Lower Peninsula

Upper Peninsula



- 1,119 community water supplies sampled
- 461 Schools sampled
- 168 Daycares/Head start facilities sampled



Sampling Completion Percentage - County Name, Completion Percentage
As of January 4, 2019

Completion % Locations Sampled / Total Locations

0% (No Samples Taken)	100% (Sampling Completed)
< 20%	
20% - 50%	
> 50% - 75%	
> 75% - 99.9%	

0 25 50 100 Miles

N

PFAS SAMPLING OF COMMUNITY WATER SUPPLIES & SCHOOLS
DRAFT
MICHIGAN COUNTIES

Source: ©2019 USGS, Terra Meta


Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Carp	PCBs	Any	Limited [▲]
Catfish	PCBs	Any	1 ^{2x}

(continued on the next page)

* See page 6

[▲] See page 7

^{2x} See page 8

Best Choice! = 

State Fish Advisories- Ottawa County

Ottawa County (continued)

Grand River

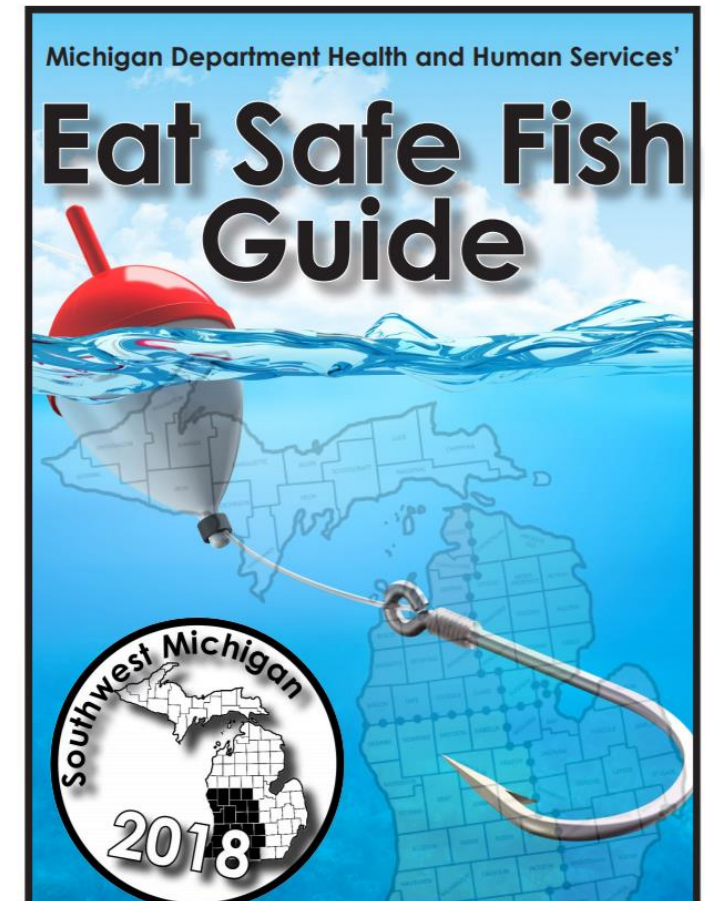
(continued from page 75)

Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Northern Pike	PCBs	Under 30"	2 ^{2x}
	PCBs & Mercury	Over 30"	2
Suckers	PCBs	Any	1 ^{2x}
Walleye	PCBs	Any	6 Per Year [▲]

When fishing the river near Lake Michigan, please use the guidelines on page 16.

Lake Macatawa

Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Carp	PCBs	Any	Do Not Eat [▲]
Largemouth Bass	PCBs & Mercury	Under 18"	2
	Mercury	Over 18"	1
Smallmouth Bass	PCBs & Mercury	Under 18"	2
	Mercury	Over 18"	1
Walleye	PCBs	Any	Limited [▲]





120th Avenue Area PFAS Study Investigations

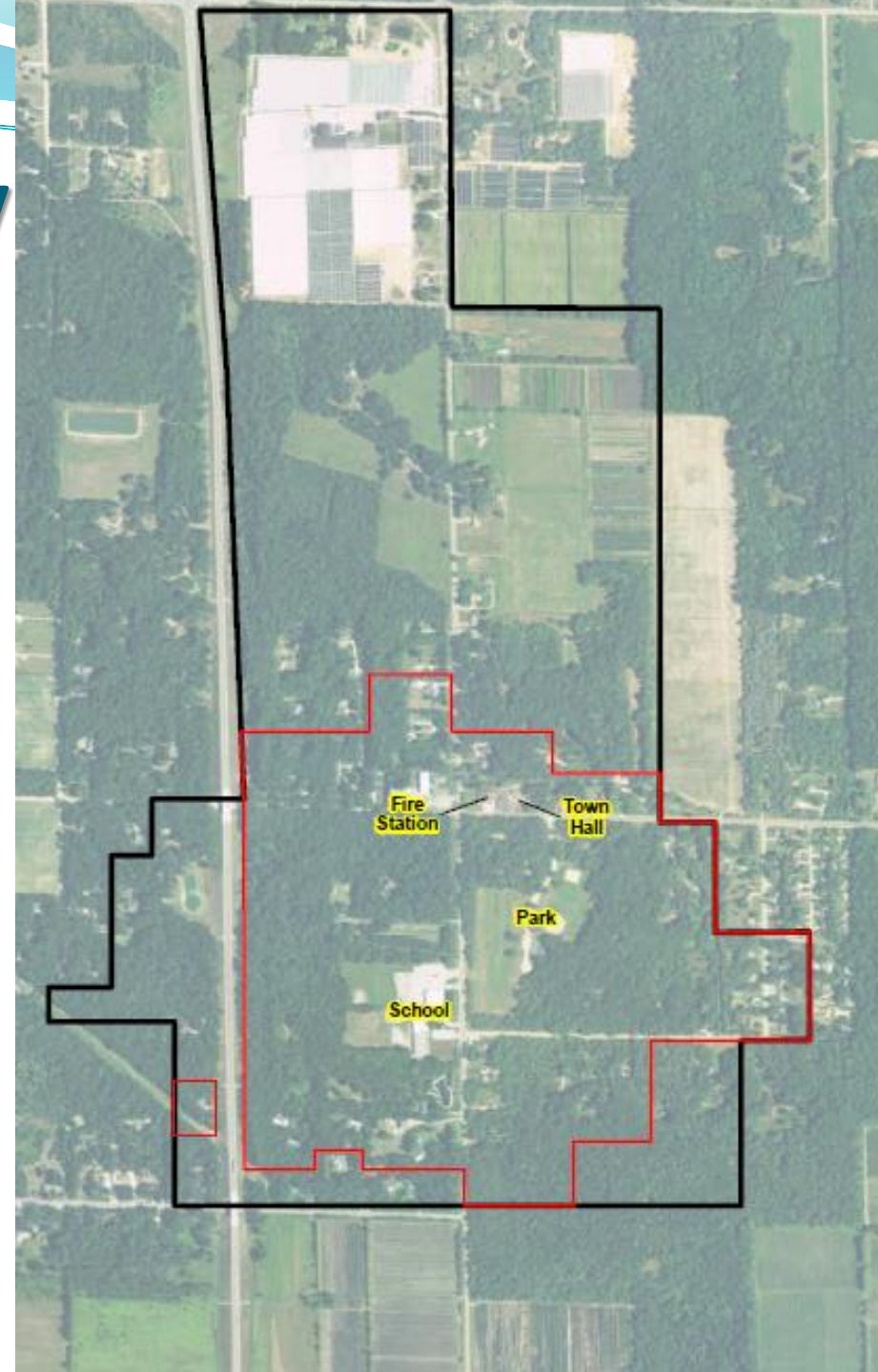


Grand Haven Area Public Schools

- October 29, 2018 – Statewide PFAS Testing for Robinson Township results document the presence of PFOS+PFOA at 110 ppt which exceeds EPA’s Lifetime Health Advisory of 70 ppt for PFOS+PFOA.
- Grand Haven Area Public Schools (GHAPS) before noon had provided bottled water for drinking water use and will continue to provide until a long term solution is achieved
- GHAPS has been working with Ottawa County Health Department to secure a permit and met with an environmental engineering firm to do design/build and install a water filtration system on the existing Type II community well at Robinson Elementary
- GHAPS has participated in meetings with Robinson Township and the Ottawa County Road Commission to explore the potential to bring a municipal water loop to the school and surrounding area

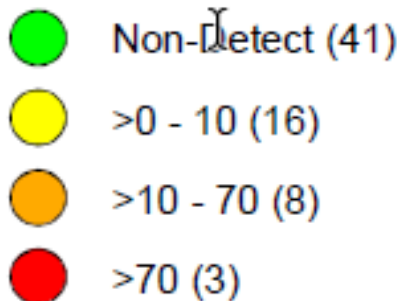
120th Avenue PFAS Study Area Sampling

- Robinson Elementary School Wells (School and Irrigation Wells)
- Loving Hearts Little Hands Daycare
- Robinson Township Fire Station
- Robinson Township Office
- Robinson Township Park
- Robinson Baptist Church
- 60 Residential Wells



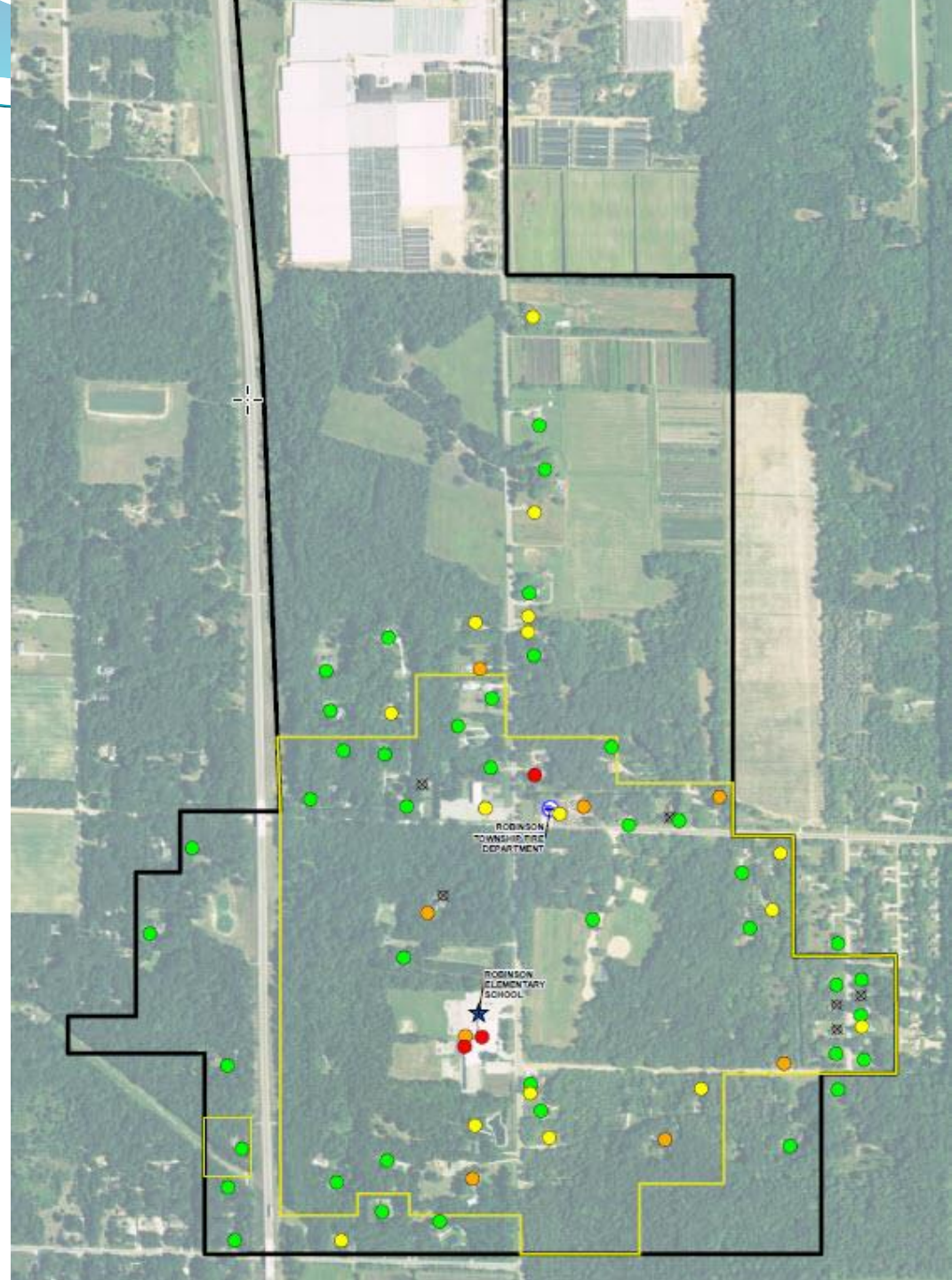
Private Drinking Water Well Results PFOS + PFOA

PFOS + PFOA (ppt)



120TH AVENUE
PFAS STUDY AREA
PFOA + PFOS CONCENTRATION

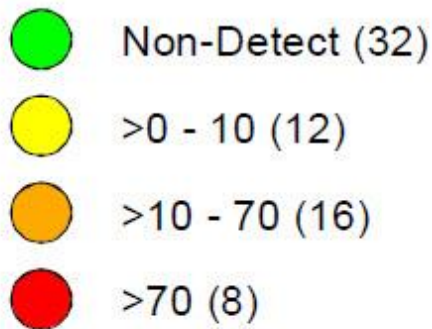
DRAFT
OTTAWA COUNTY, MI



Private Drinking Water Well Sampling Results

Total PFAS

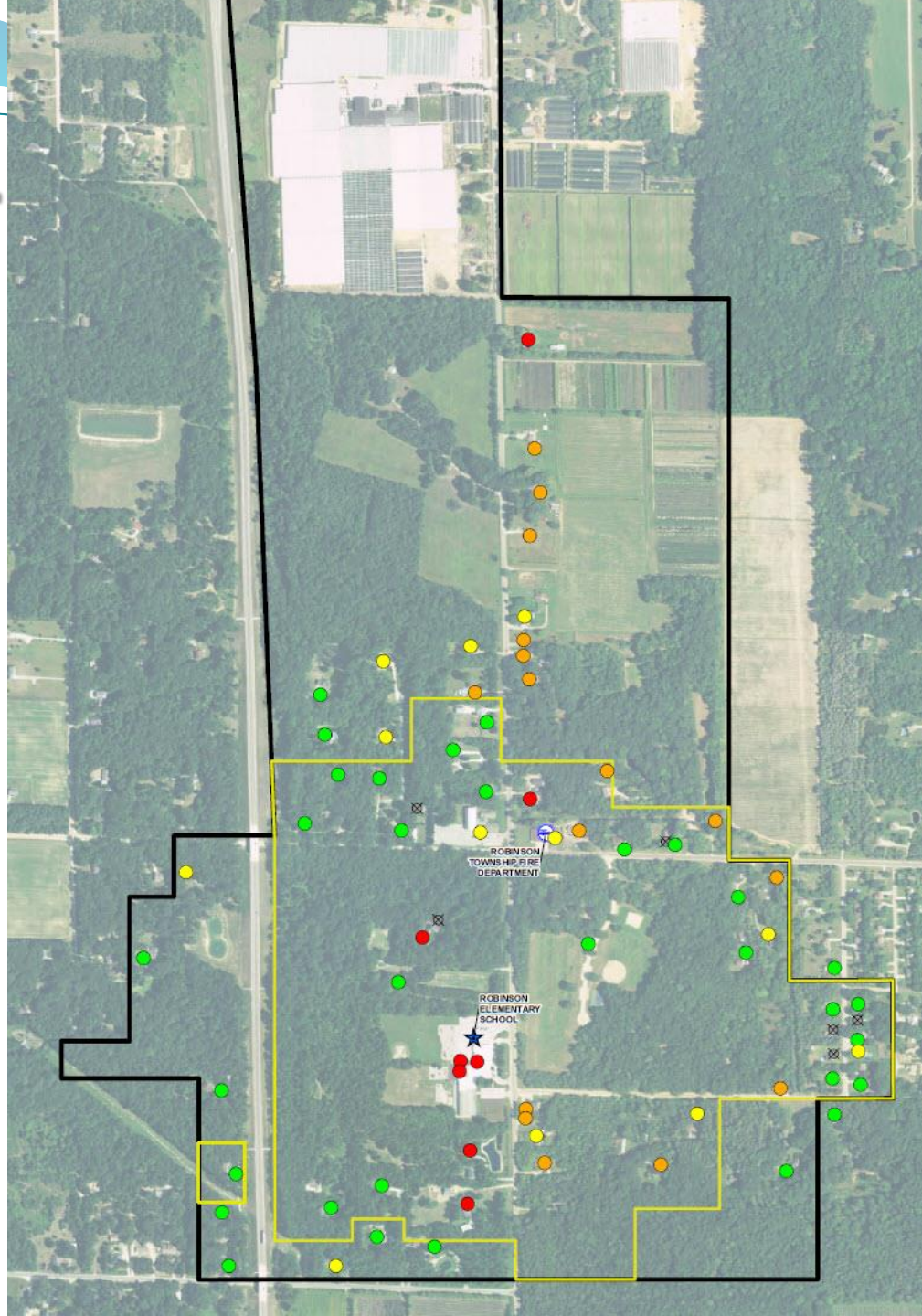
Total PFAS (ppt)



120TH AVENUE
PFAS STUDY AREA
TOTAL PFAS CONCENTRATION

DRAFT

OTTAWA COUNTY, MI



DEQ Investigation Status:

- Only two (2) wells exceed PFOS +PFOA >70 ppt Lifetime Health Advisory (LHA)Criteria
- Most drinking water wells are shallow.
- Sandy aquifer: 0-50 feet deep that lies above a thick clay layer.
- Groundwater flow towards the north to slightly northeast along 120th Avenue.
- Additional investigation needed to confirm flow direction



Proposed Hydrogeological Investigation

Hydrogeological Investigation:

DEQ plans

- Install monitoring wells to confirm GW flow
- Additional Vertical Groundwater sampling
- Sample Shallow Soils for source areas
- Sample nearby ponds

Hydrogeological Investigation



Proposed Surface Water Sample (3)



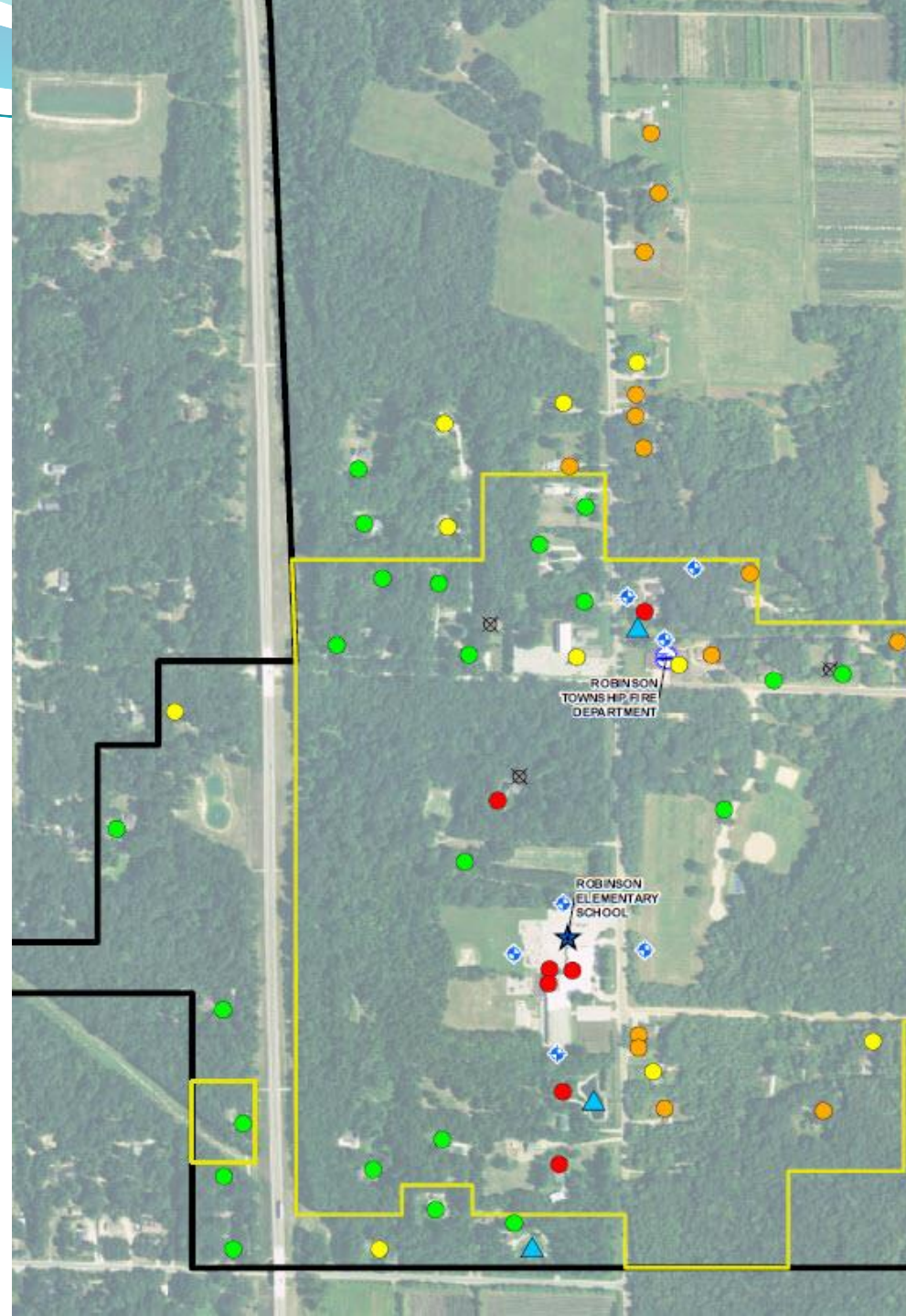
Proposed Soil Boring (7)

Tentative Start: Week of Feb.18

-Drilling to take 1-2 weeks

Sampling Ponds later in Spring
after melt

Completion: Spring 2019



Next Steps:

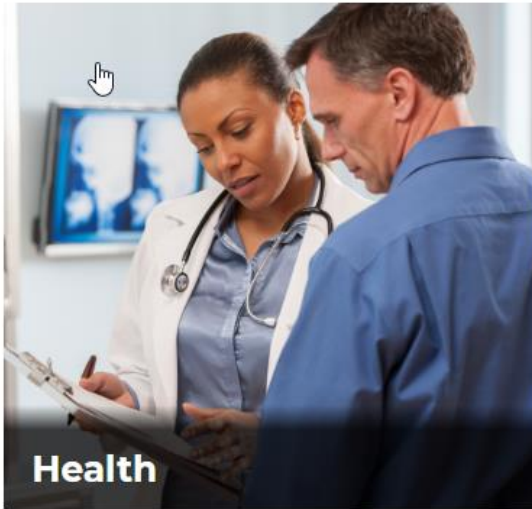
DEQ plans to:

- Review Hydrogeologic data
- Determine need for additional residential wells sampling
- Determine need for additional sub-surface samples
- Continue to update the MPART and MIOTTAWA.org/pfas/ websites with the results of work completed and future plans

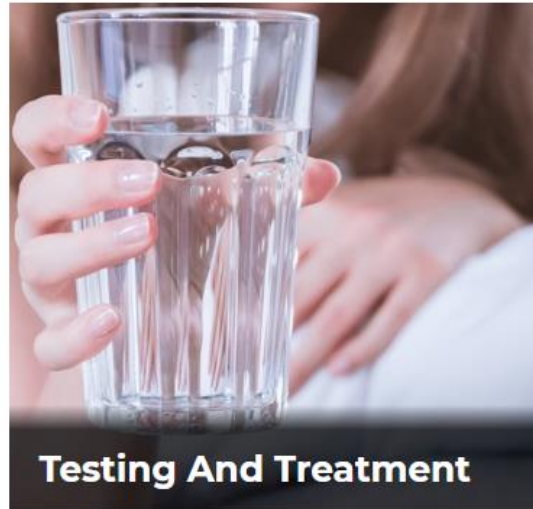


Questions?

www.Michigan.gov/pfasresponse



Health



Testing And Treatment



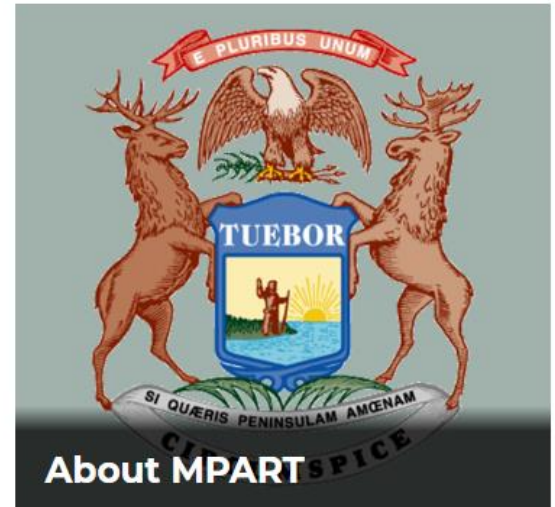
Michigan PFAS Sites



Fish And Wildlife



Firefighting Foam



About MPART

www.Michigan.gov/PFASresponse

Michigan Department of Environmental Quality

800-662-9278

www.michigan.gov/deq



Sign up for email updates

Follow us on Twitter @MichiganDEQ





Per and Polyfluorinated Alkyl Substances (PFAS)

Bill Farrell

Toxicologist

Michigan Department of Health and Human Services

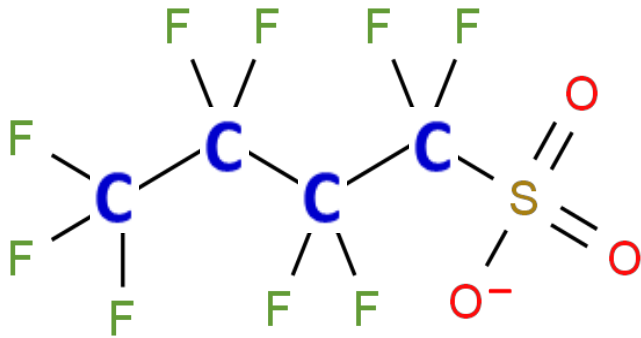
(517) 284-0018

Chain Lengths

Short-chain

PFBS $n = 4$

PFPeS $n = 5$



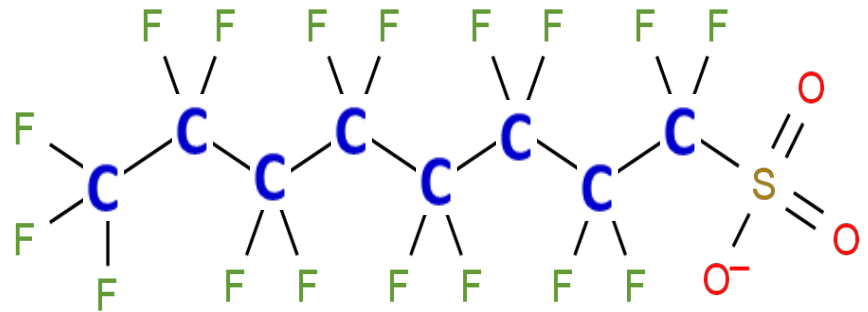
PFBS

Long-chain

PFHxS $n = 6$

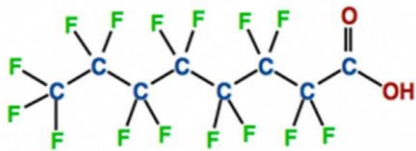
PFHpS $n = 7$

PFOS $n = 8$

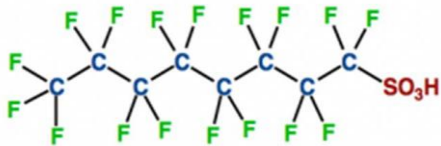


PFOS

Characteristics



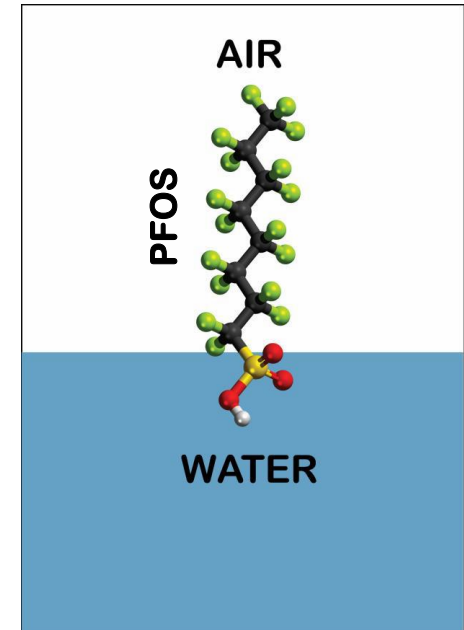
PFOA - perfluorooctanoic acid



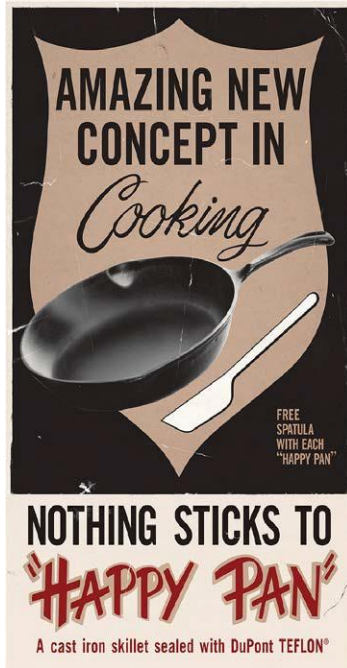
PFOS - perfluorooctanesulfonic acid

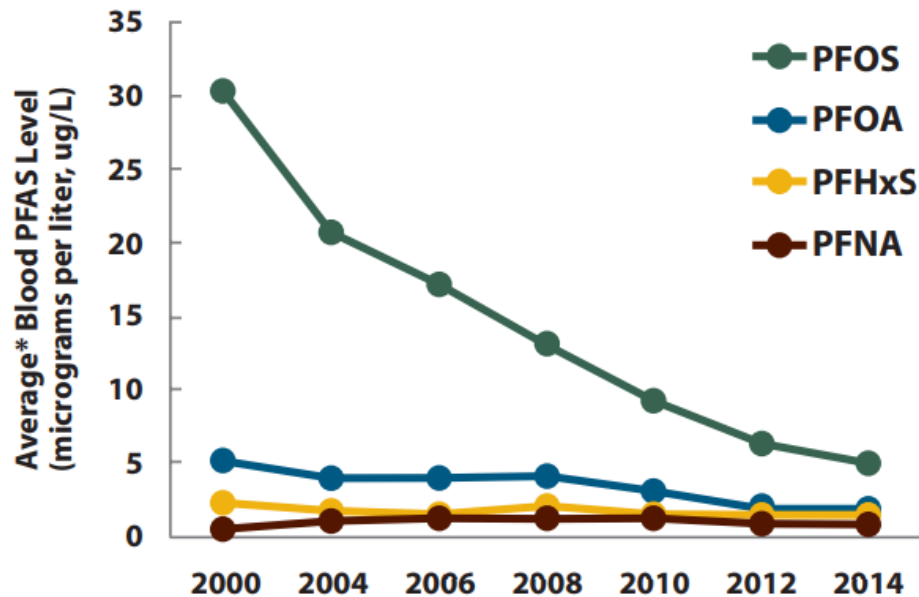
- Incredibly Stable
- Highly soluble and mobile
- Grease, soil and water-repellant properties
- Bioaccumulate in Biota

INTERFACE DWELLERS



Sources





* 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.

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

The Role of MDHHS/OCDPH

- Provide Public Health Support
- Be proactive/respond immediately to protect health of people
- Evaluate residential well results and provide recommendations/public health response actions
- Outreach to residents, healthcare providers, others

Exposure to PFAS Chemicals

Health problems are
not immediate



If you drink high levels
of PFAS chemicals
over time you could
be more likely than the
average person to
develop some health
problems in the future

Associated Health Outcomes – PFOA and/or PFOS

- Animal

- Liver effects
- Immunological effects
- Developmental effects
- Endocrine effects (thyroid)
- Reproductive effects
- Tumors (liver, testicular*, pancreatic)

- Human (associated outcomes)

- Liver effects (serum enzymes/bilirubin, cholesterol)
- Immunological effects (decreased vaccination response, asthma)
- Developmental effects (birth weight)
- Endocrine effects (thyroid disease)
- Reproductive effects (decreased fertility)
- Cardiovascular effects (pregnancy induced hypertension)
- Cancer* (testicular, kidney)

* PFOA only

EPA's "Lifetime Health Advisory"

- Based on Reference Dose (RfD) derived from developmental toxicity study in rats
- Lifetime Health Advisory
 - PFOA + PFOS = 70 ppt
- Protective of unborn baby against developmental effects
- Protective of all against non-cancer and cancer effects

6,000,000* ppt
(1,000,000 ng/kg/day)



Rodent to human
conversion



98,000 ppt
(5,300 ng/kg/day)



Human
protections



350 ppt
(20 ng/kg/day)



Accounting for
other exposures
in the
environment



70 ppt
(ng/L)

Lowest dose that causes
an effect in rat pups

Human equivalent
dose

Dose that is safe in the most vulnerable
people (like developing babies)

Lifetime Health Advisory
for PFOA in drinking water

Illustrating the concept behind a Lifetime Health Advisory: Perfluorooctanoic acid (PFOA)

* Exact numbers have been generalized for illustration
ppt = Parts per trillion

Water Well Results

MDHHS/OCDPH Public Health Response Actions

- Exceedance of PFOA + PFOS LHA of 70 ppt
 - Advise use of filtered water for drinking, cooking
 - OCDPH provides POU filter

Water Well Results

MDHHS/OCDPH Public Health Response Actions

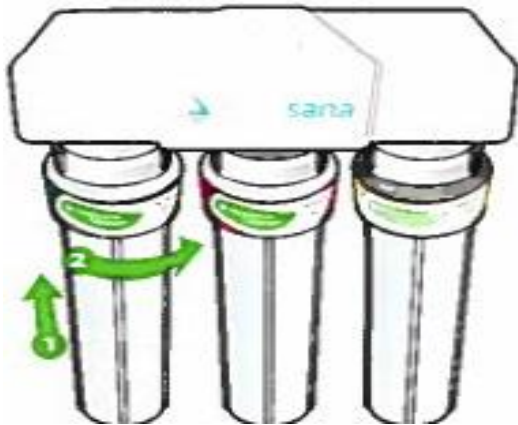
- Detectable Levels of PFAS; but PFOA + PFOS < 70 ppt
 - Interim precaution - OCDPH offering filter
- Purpose of filters?
 - Need time to conduct investigation to:
 - Determine source area extent and strength
 - Determine horizontal and vertical extent of PFAS in groundwater
 - Gather information to determine long-term groundwater quality
 - Therefore – filter provides residents with protection from potential fluctuations in PFAS levels while investigation is going on

Water Well Results

MDHHS/OCDPH Public Health Response Actions

- No detectable levels of PFAS
 - No public health actions

Point-of-Use Filter



- NSF P473 Certification
- Certified to remove up to 96% of PFOA and PFOS
- Certified only for water containing PFOA + PFOS concentrations less than 1,500 ppt



Full system certified to NSF/ANSI Standards 42, 53, 401 and conforms to NSF protocol P473.

Residential Well Water Testing

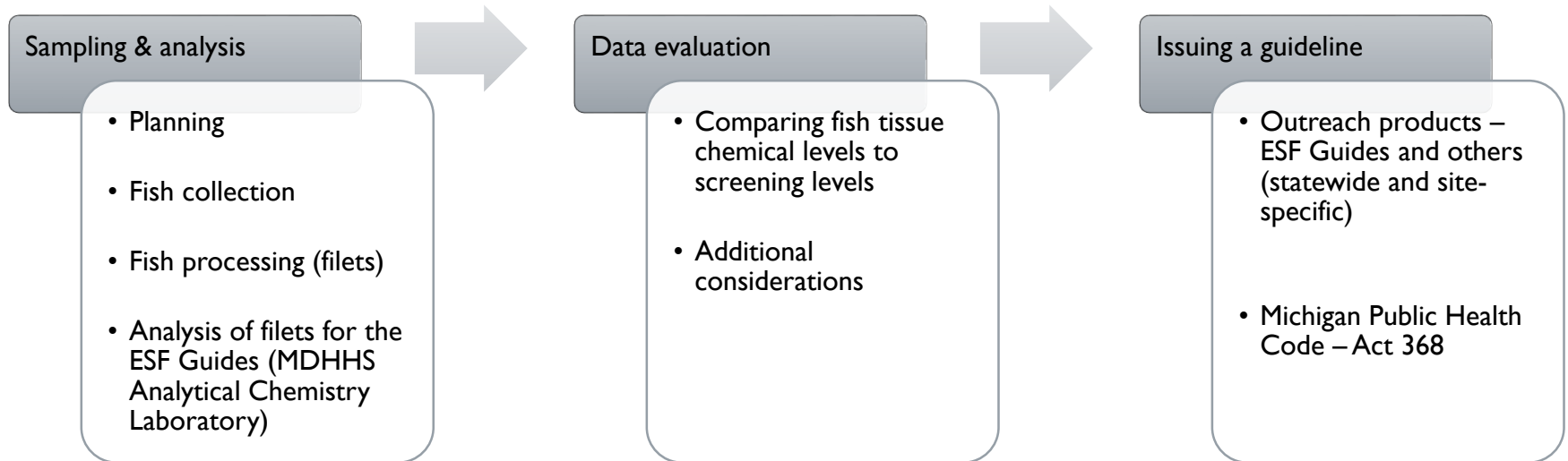
- MPART Website - PFAS Response – State of Michigan
 - Residential Well Water Testing and Results
- Handouts at MDHHS Table
 - *Sampling and Lab Information for Residents Wanting to Test Their Private Residential Well*
 - *For Homeowners – Private Residential Well PFAS Sampling*



The Michigan Fish Consumption Advisory Program

Michigan Department of Health
and Human Services

General Process For Consumption Guideline Development



Type of Fish	Chemical of Concern	Size of Fish (length in inches)	MI Servings per Month*
Black Crappie	Mercury	Any Size	4
Bluegill	Mercury	Any Size	8
Carp	PCBs	Any Size	2
Catfish	PCBs & Mercury	Any Size	4
Largemouth Bass	Mercury	Under 18"	2
		Over 18"	1
Muskellunge (Muskie)	Mercury	Any Size	1
Northern Pike	Mercury	Under 30"	2
		Over 30"	1
Rock Bass	Mercury	Any Size	4
Smallmouth Bass	Mercury	Under 18"	2
		Over 18"	1
Suckers	Mercury	Any Size	8
Sunfish	Mercury	Any Size	8
Walleye	Mercury	Under 20"	2
		Over 20"	1
White Crappie	Mercury	Any Size	4
Yellow Perch	Mercury	Any Size	4

Statewide Safe Fish Guidelines

- These general guidelines are based on the typical amount of chemicals found in fish filets tested from around the state. Some fish may be higher or lower.
- These general guidelines can be used for lakes, rivers, and fish species not included in the Eat Safe Fish Guide.

2018 Eat Safe Fish Guide – Ottawa County

Grand River

(continued from page 75)

Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Northern Pike	PCBs	Under 30"	2 ^{2x}
	PCBs & Mercury	Over 30"	2
Suckers	PCBs	Any	1 ^{2x}
Walleye	PCBs	Any	6 Per Year [▲]

When fishing the river near Lake Michigan, please use the guidelines on page 16.

Lake Macatawa

Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Carp	PCBs	Any	Do Not Eat [▲]
Largemouth Bass	PCBs & Mercury	Under 18"	2
	Mercury	Over 18"	1
Smallmouth Bass	PCBs & Mercury	Under 18"	2
	Mercury	Over 18"	1
Walleye	PCBs	Any	Limited [▲]

MDHHS/OCDPH Contacts

MDHHS:

Lisa Fisher, Toxicologist

(517) 284-4287

fisherl@michigan.gov

Bill Farrell, Toxicologist

(517) 284-0018

farrellw@michigan.gov

www.Michigan.gov/pfasresponse

OCDPH:

Matt Allen, Environmental Health Supervisor

(616) 393-5635

mallen@Ottawa.org

Kristina Wieghmink, Public Information Officer

(616) 494-5597

kwieghmink@Ottawa.org

www.miOttawa.org/PFAS