Kent Co. Investigations & Thornapple River

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DEQ Overview

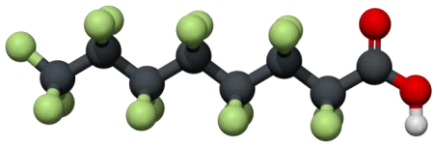
- PFAS Basics and MPART
- Kent Co. Investigations
- River Overviews
  - Surface water, fish, etc.

What are PFAS?

Per and Poly-fluoroalkyl substances

- Generic family of chemicals = over 3000
- Man-made and do not occur naturally
- Developed in 1940's
- Used to make products that resist heat, oils, grease, stains and water

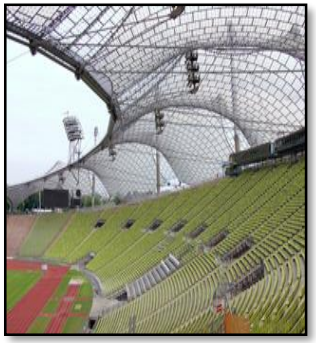
Most Prevalent and researched: PFOS & PFOA



PFAS Uses

Aerospace

Apparel



Building and Construction

Chemicals and Pharmaceuticals

Electronics

Oil & Gas

Energy

Healthcare and Hospitals

Aqueous Film Forming Foam

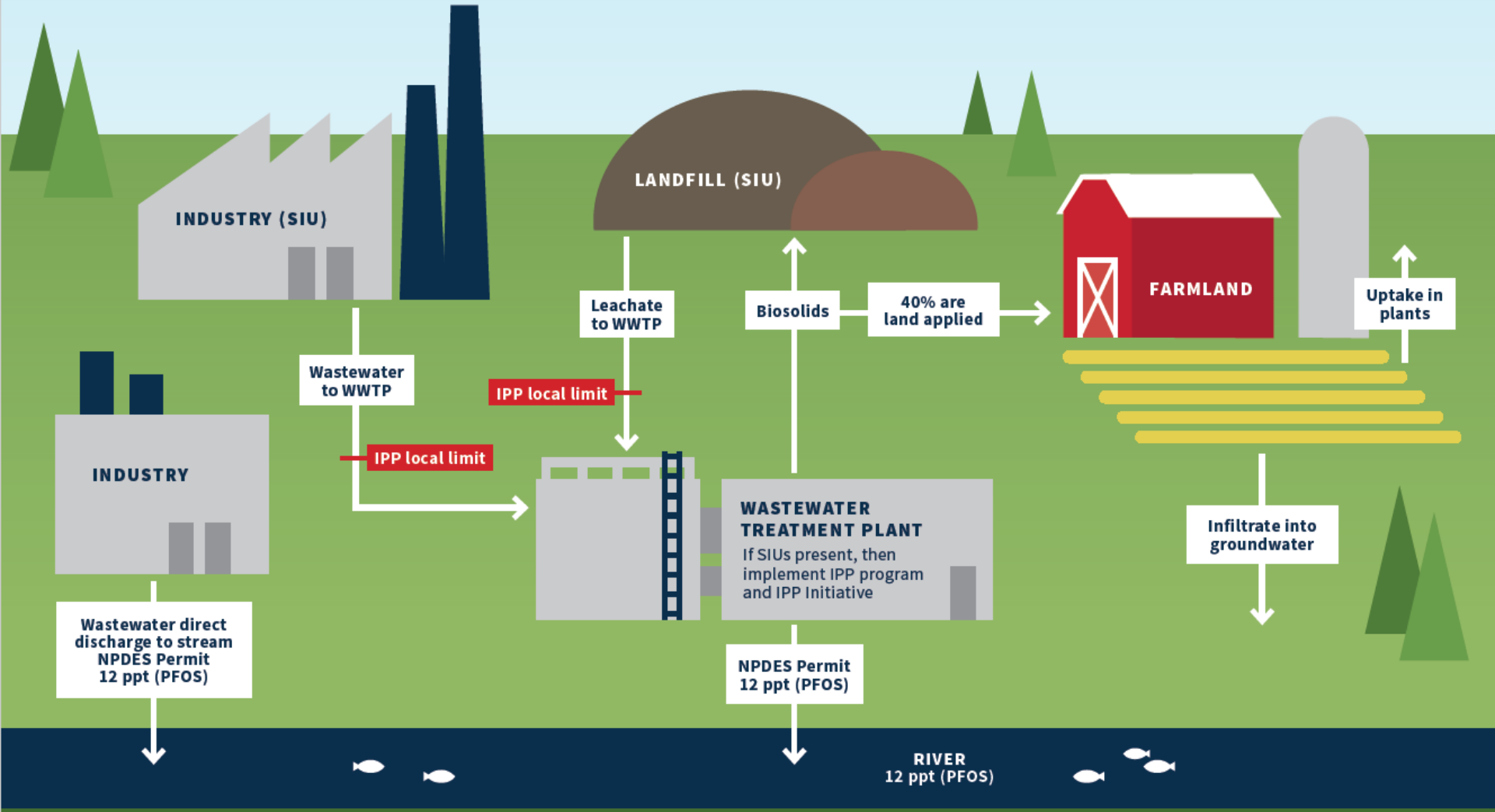
Semiconductors

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

PFAS Water Cycle

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



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

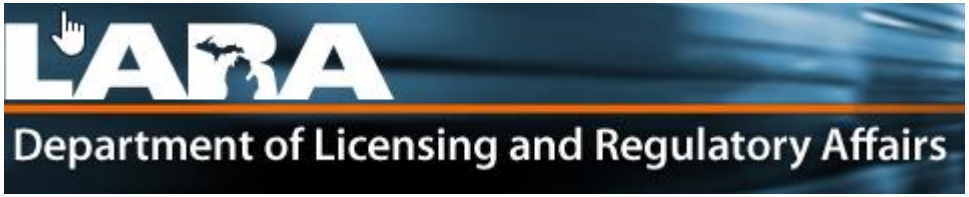
04/2018

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.

Who is MPART?....



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

Regular Monitoring Plus

- Site-specific monitoring of known PFAS sites
- Monitoring of PFAS in rivers, lakes and streams, and fish
- Monitor point sources (Direct Discharges)
- Industrial Pretreatment Program Initiative (Indirect Discharges)
- Biosolids program
- Superfund program
- Coordinate with other Divisions (AQD, WMRPD and DHHS, others)

Other Potential Sources of PFOS & PFOA for WWTPs

- Platers using fume suppressants/demisters/wetting agents
- Leather and fabric treaters, tanneries
- Paper and packaging manufacturers
- Manufacturers of parts w/PTFE coatings
- Centralized Waste Treaters
- Landfills (leachate)
- AFFF fire fighting foam

Aqueous Film Forming Foam (AFFF)

Photo Credit: U.S. Air Force

AFFF meets Military Specification

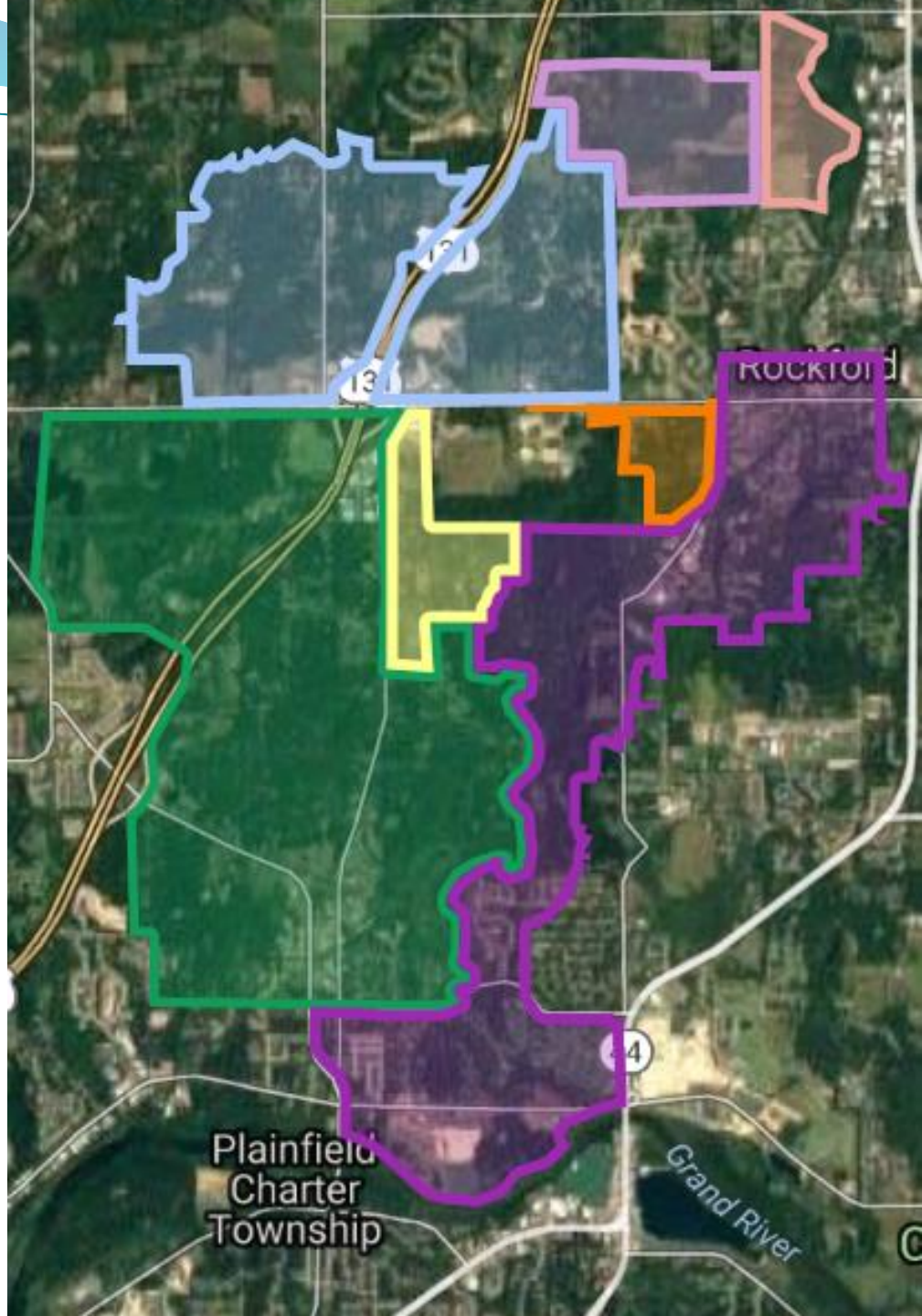
Community Water Supplies and Schools

1,380 community water supplies
461 schools
12 systems from 8 Tribes
> 700 supplies sampled so far
Represents 75% of MI residents
To be completed December 2018

Kent County Investigations

July 2018 North Kent Sampling Areas

- [x] PFAS Investigation Areas
  - House Street
  - North Childsdale/10 Mile
  - Rogue River
  - 12 Mile - White Pine Trail Area
  - Wolven - Jewell Sampling Area
  - Wolven Northeast
  - North Kent Landfill Area



PFOS / PFOA Results

Legend

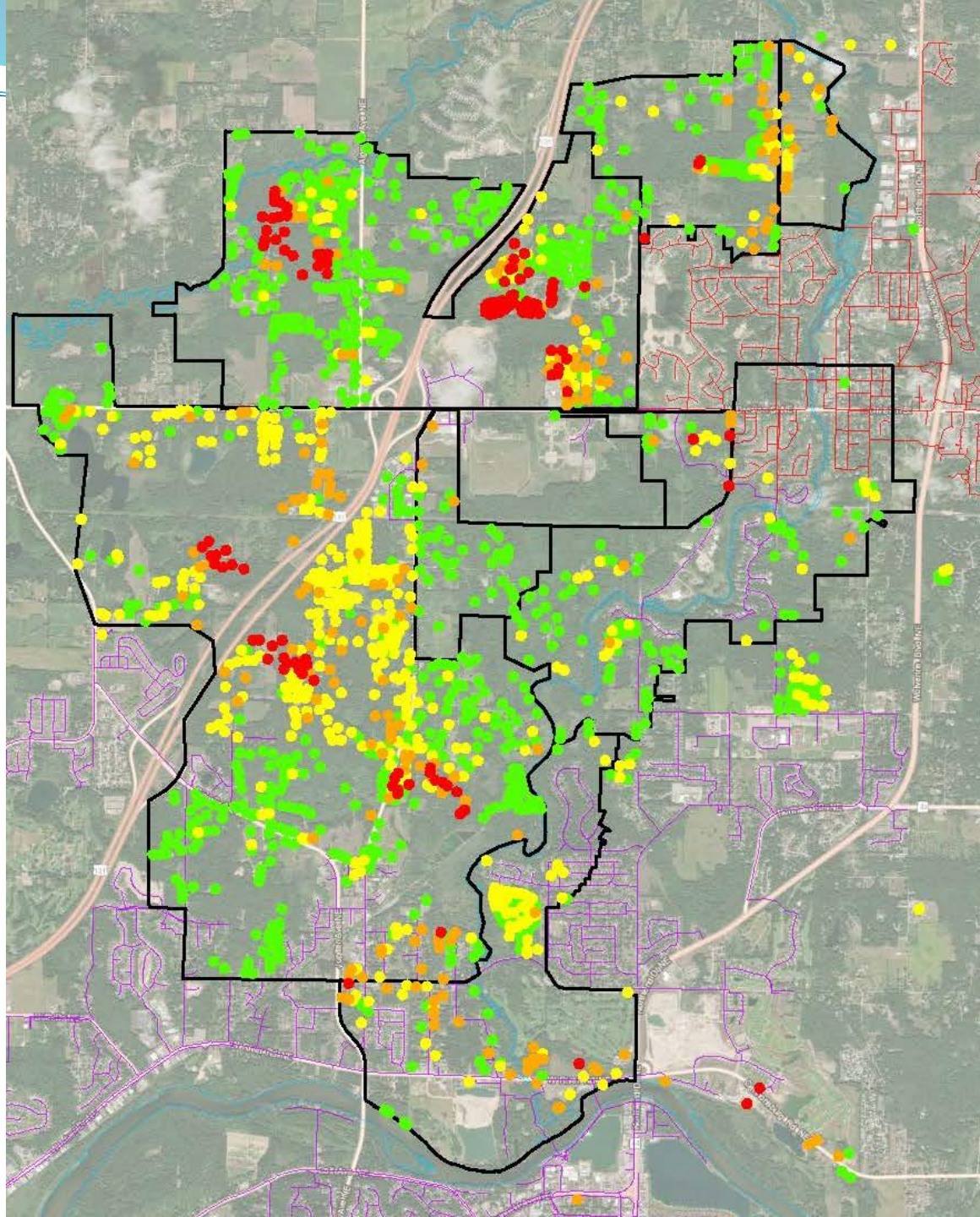
PFOS + PFOA, ppt (1,701)

- Non-Detect (922)
- >0 to 10 (463)
- >10 to 70 (196)
- > 70 (120)

DRAFT

MAXIMUM DETECTED
PFOS + PFOA CONCENTRATIONS
AS OF 8/23/2018

NORTH KENT DISPOSAL AREA
KENT COUNTY, MI



Thornapple River and Others

Thornapple River:

DEQ has conducted:

- Surface Water sampling for PFAS
- Foam sampling at Cascade Dam
- Responded to citizen concerns about foam
- Fish Studies underway

Ada Dr SE
East Grand Rapids
Forest Hill Ave SE
Spaulding Ave SE
Laraway Lake Dr SE
Grand River Dr SE
Sparks Dr SE
29th St SE
Shaffer Ave SE
Kraft Ave SE
Buttrick Ave SE
Snow Ave SE
Breton Rd SE
44th St SE
Patterson Ave SE
Thornapple River Dr SE
Whitneyville Ave SE
52nd St SE
Wing Ave SE
2.94 mi
Ada Dam
Cascade Dam
Rogue and Thornapple River Foam Health Advisories

Foam and Surface Water

Thornapple River Sampling:

Collected just below Cascade Dam

Foam (ppt)

PFOA + PFOS	Total PFAS
199	317

Surface Water (ppt)

PFOA + PFOS	Total PFAS
9.6	18

Rogue River Sampling:

Various Rockford collection locations

Foam (ppt)

PFOA + PFOS	Total PFAS
261,255	296,585
42,149	44,812
43,176	46,497

Surface Water (ppt)

PFOA + PFOS	Total PFAS
61.4	76.6
9.93	15.01
9.1	12.5

Fish and Surface Water Sampling: Thornapple River

Wild Fish Tissue Collection Sites

- Middleville
- Cascade
- Ada

} Impoundments / dams

Caged Fish and Surface Water Sampling

- Mouth of Thornapple River (Thornapple River Drive)

Sites on Grand, Rogue and selected inland lakes included in study

Fish study in collaboration with MDHHS

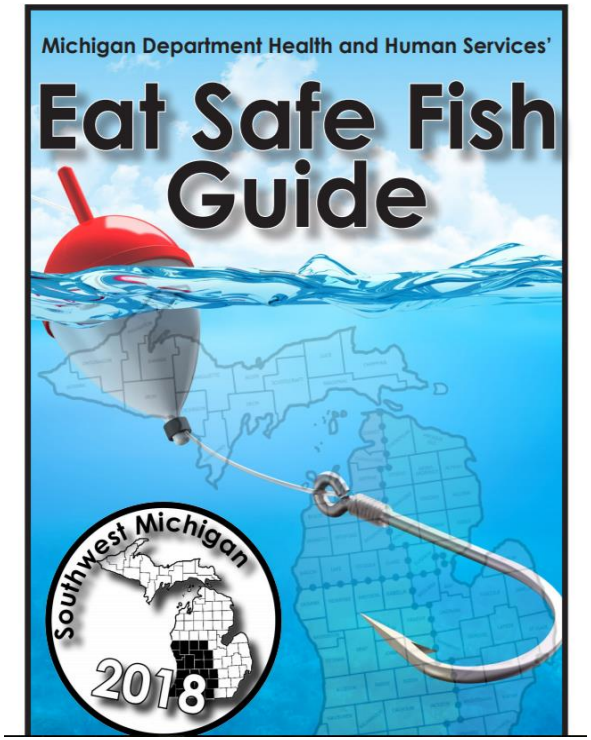
State Fish Advisories

Kent County (continued)

Thornapple River

(downstream of Middleville Dam in Barry County; includes the Ada Impoundment, the Cascade Impoundment, and the LaBarge Impoundments)

Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Carp	PCBs & Mercury	Any	2
Largemouth Bass	Mercury	Under 18"	1
		Over 18"	6 Per Year
Smallmouth Bass	Mercury	Under 18"	1
		Over 18"	6 Per Year



DEQ- Next Steps

Continue to monitor…

- Known PFAS Sites
- PFAS in rivers, lakes, streams, and fish
- Point sources

Prioritize new sites based on findings from:

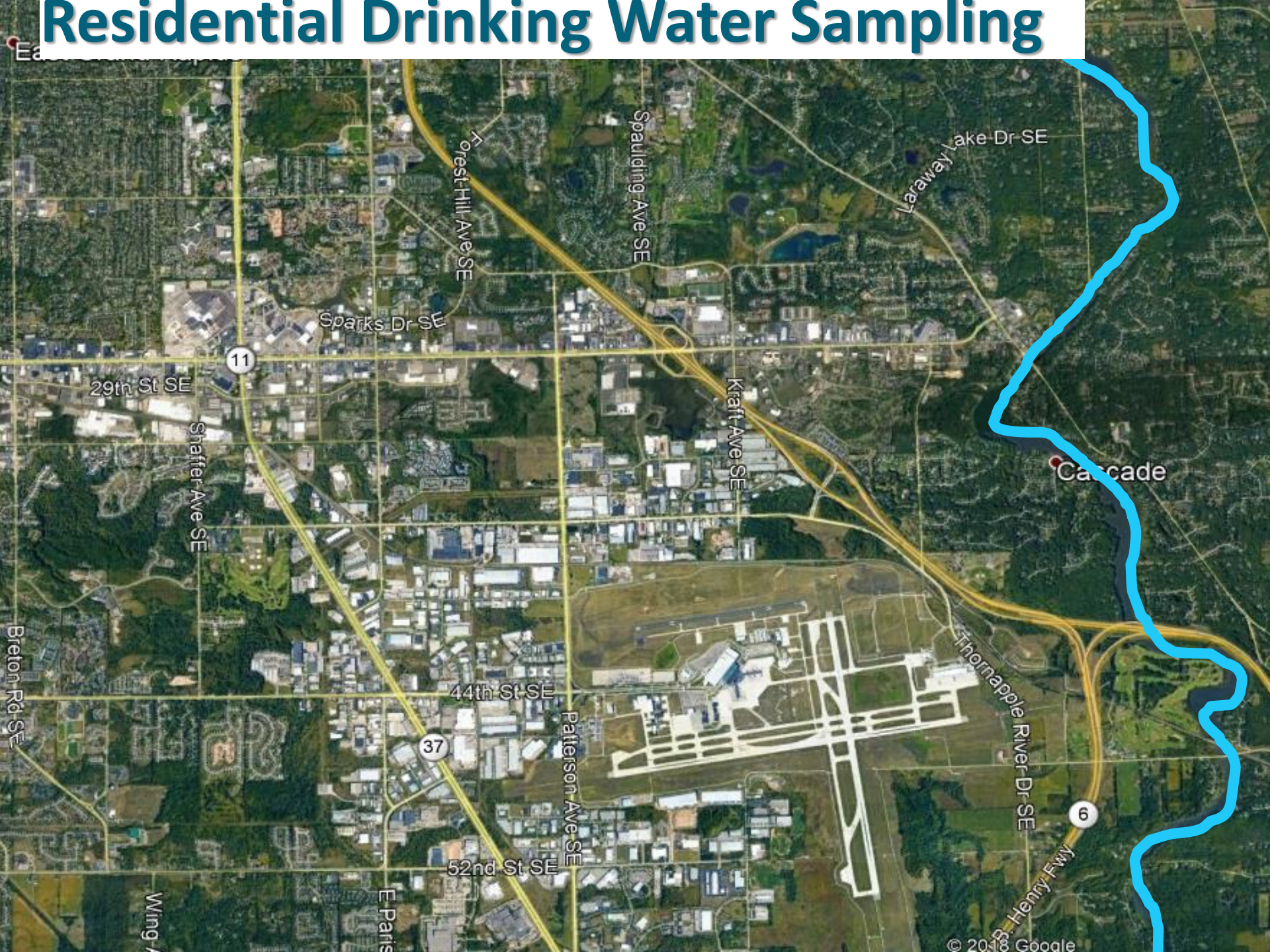
- IPP initiative; community and school water supply testing, etc.

Continue to coordinate with MPART, other Divisions and community stakeholders

Next Steps Continued…

- Continue to oversee the investigation at GFIA (offsite-residential drinking water sampling**)**
- Continue to review onsite groundwater and soil data at GFIA
- Continue to evaluate AFFF use at GFIA
- Continue to work with community: Cascade Twp, Kent County, etc.
- Evaluating other potential PFAS sources in the area
- Reviewing all PFAS sampling in the area (point source, municipal sampling etc.)

Residential Drinking Water Sampling



Additional Information

www.Michigan.gov/pfasresponse

https://www.accesskent.com/Health/PFAS/default.htm

http://www.cascadetwp.com/Community/What-s-Happening/Well-Water-Resources.aspx

Michigan Department of Environmental Quality

800-662-9278
www.michigan.gov/deq

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Per and Polyfluorinated Alkyl Substances

(PFAS)

Bill Farrell
Toxicologist
Michigan Department of Health and Human Services
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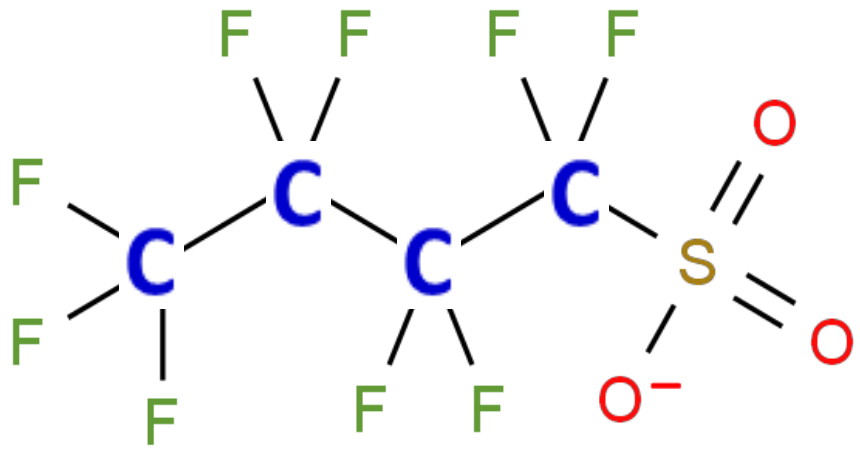
The Role of MDHHS

- Determine if chemicals in the environment may cause harm to health
- Provide recommendations
- Provide technical support to your local health department
- Outreach to residents, healthcare providers, others
- Be proactive/respond immediately to protect health of people

Chain Lengths

Short-chain

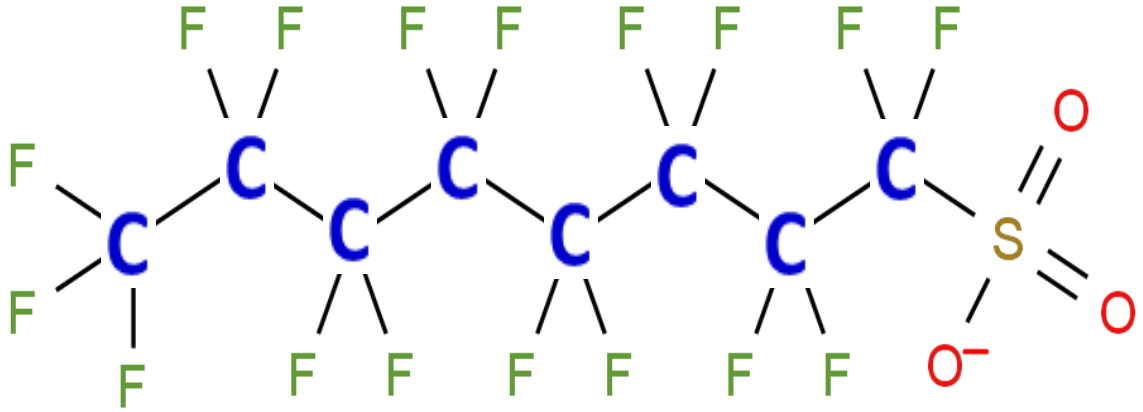
PFBS n = 4
PFPeS n = 5



PFBS

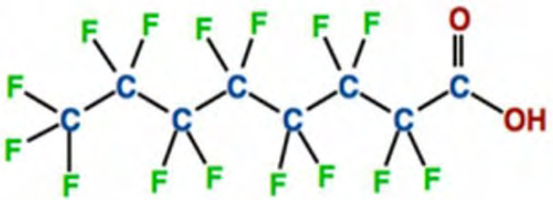
Long-chain

PFHxS n = 6
PFHpS n = 7
PFOS n = 8

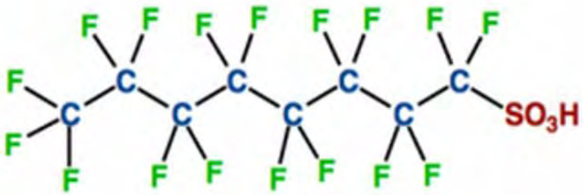


PFOS

Characteristics

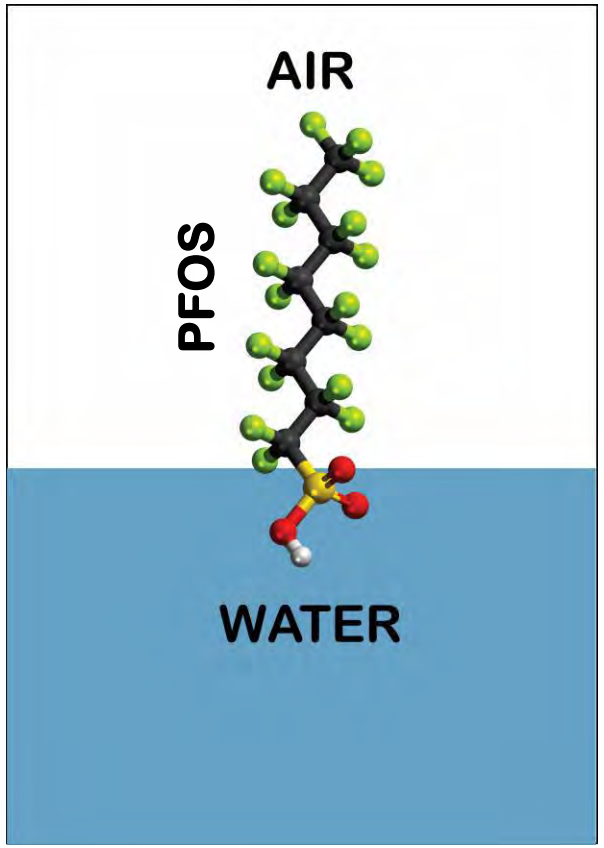


PFOA - perfluorooctanoic acid

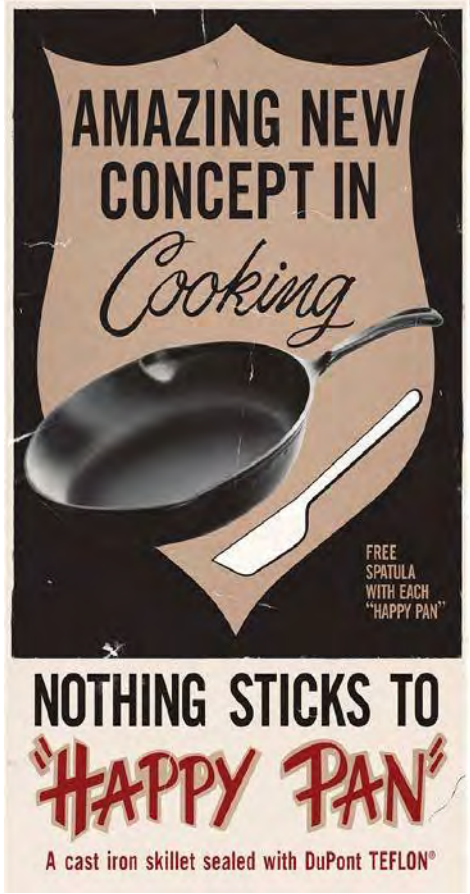


PFOS - perfluorooctanesulfonic acid

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



Sources


AMAZING NEW
CONCEPT IN
Cooking
FREE
SPATULA
WITH EACH
"HAPPY PAN"
NOTHING STICKS TO
"HAPPY PAN"
A cast iron skillet sealed with DuPont TEFLON®

PFAS
Sources
Shampoo
Non-stick
Cookware
Stain Resistance
Product
Photography
Firefighting
Foams
Fast Food
Packaging
Pesticides
Paints

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

Health Outcomes

C8 Health project

70,000 residents with drinking water exposure linked to serum-PFOA concentrations and variety of health outcomes.

Epidemiological studies showed health associations for both PFOA and PFOS

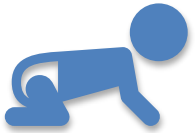
- High cholesterol
- Ulcerative colitis
- Thyroid disease
- Pregnancy-induced hypertension
- Cancer (testicular, kidney)

Environmental Protection Agency's "Lifetime Health Advisory" Level

Based on reference doses (RfD) calculated from developmental toxicity study in rats

Lifetime Health Advisory

- PFOA + PFOS = 70 ppt (ng/L)
- Short-term and long-term exposure

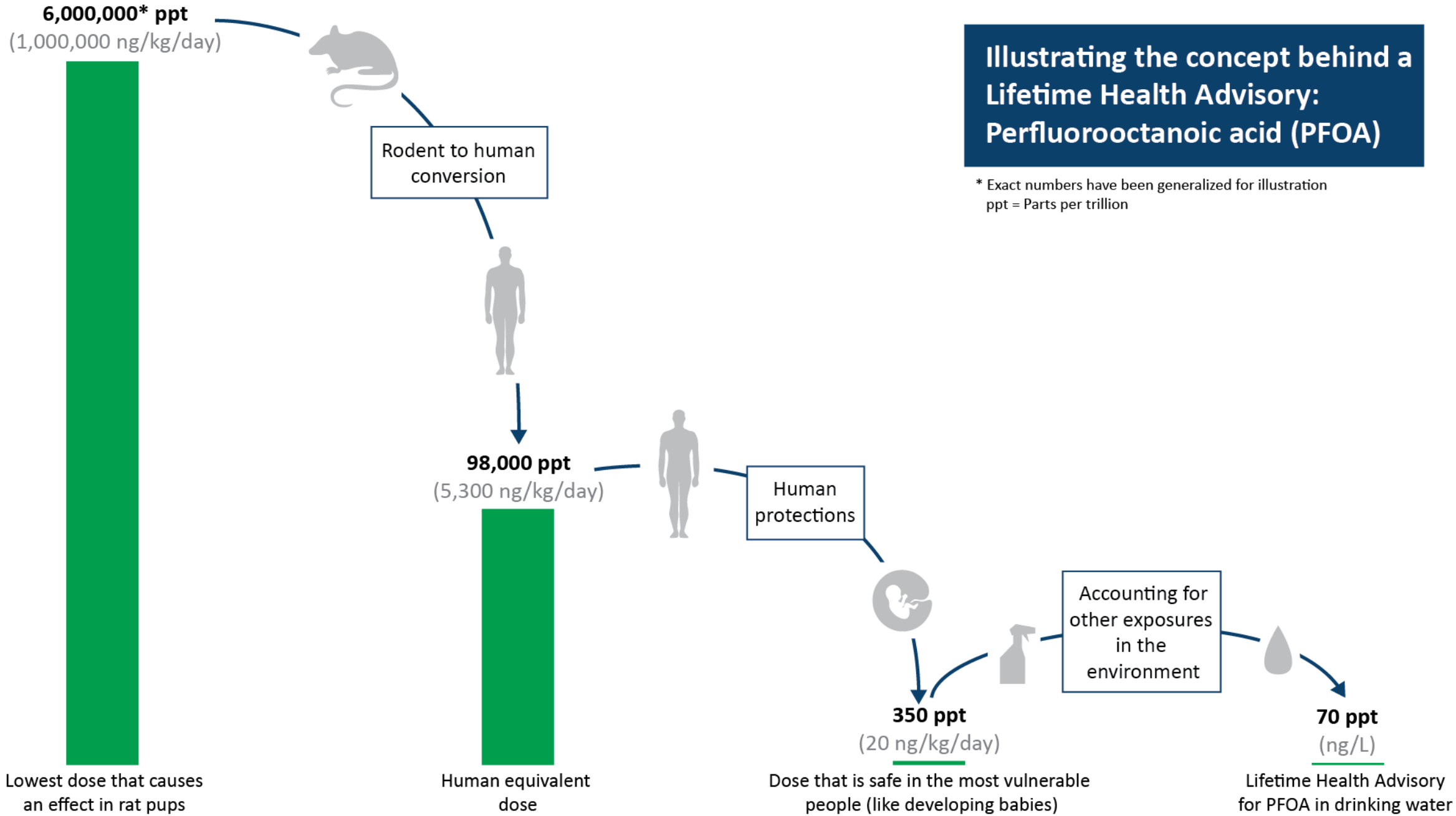


Protective of unborn baby against developmental effects

Protective of all against cancer and noncancer health effects

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

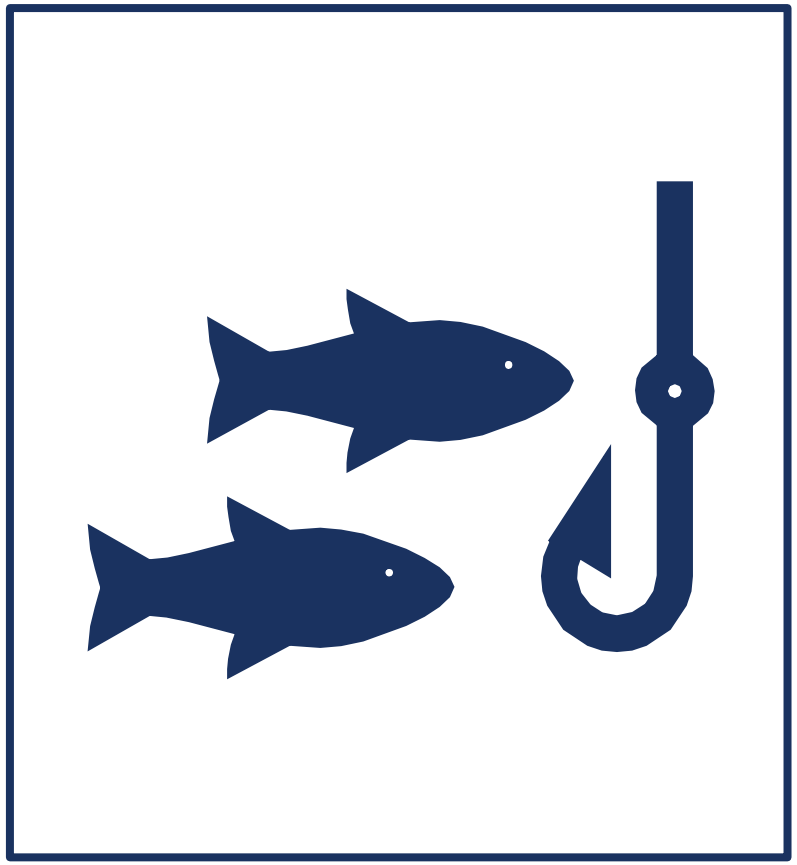
* Exact numbers have been generalized for illustration
ppt = Parts per trillion



Various State Standards

State	PFOA ppt	PFOS ppt	Comments	Source
Alabama	70	70		EPA
Alaska	400	400		ADEC
California	Prop 65	Prop 65	Proposed	OEHHA
Connecticut	70	70	PFNA, PFHxA, PFPeA, PFHpA	DPH
Colorado	70	70	PFHpA	
Delaware	70	70		DNR
Georgia	70	70	Proposed	DPH
Illinois	400	200		
Iowa	70	70		DNR
Kentucky	400	200		NKWD
Maine	70	70		ME DEP
Maryland	70	70		
Michigan	70	70	HB 5373 proposed 5	MI DEQ
Minnesota	35	27		MDH
New Hampshire	70	70		DES
New Jersey*	14	13		NJDEP
New York	70	70		
North Carolina	2000	NA		DENR
Ohio	400	200		EPA
Oregon	24000	300000	PFHpA, PFNA, PFOSA	
Pennsylvania	70 (May lower to 6)	70		PA DEP
Rhode Island	70	70		
Texas	290	560	PCLs for 16 PFCs	CEQ
Vermont	20	20		VT DOH
West Virginia	400	200		

Thornapple River



- Recreational Uses
  - Swimming
  - Fishing

Thornapple River - Recreational Use Surface Water

- MDHHS Toxicologists evaluated recreational-use risks associated with surface water PFAS results for various surface water bodies across the state
  - Rogue River
  - Lake St. Clair

Conclusion:

MDHHS has concluded that incidental swallowing or dermal contact with PFAS-containing surface water via recreational activities (swimming, water sports, etc.) in these areas are not expected to cause harm to human health.

→

PFAS concentrations in Thornapple well below PFAS concentrations at these other sites.

→

Recreational activities on Thornapple River are not expected to cause harm to human health.

Thornapple River - Recreational Use Foam

- MDHHS Toxicologists evaluated incidental exposures (ingestion and skin contact) to PFAS-containing foam during recreational activities
  - Rogue River

Conclusion:

MDHHS has concluded that swallowing PFAS-containing foam may pose a human health risk.

→

Skin contact with foam is not expected to cause harm to human health.

→

Kent County Health Department issued a Health Advisory to avoid swallowing foam during recreational activities on Thornapple River (June 2018).

The Michigan Fish Consumption Advisory Program

Michigan Department of Health and Human Services

GENERAL PROCESS FOR CONSUMPTION GUIDELINE DEVELOPMENT

Sampling & analysis

- Planning
- Fish collection
- Fish processing (filets)
- Analysis of filets for the ESF Guides (MDHHS Analytical Chemistry Laboratory)

Data evaluation

- Comparing fish tissue chemical levels to screening levels
- Additional considerations

Issuing a guideline

- Outreach products – ESF Guides and others (statewide and site-specific)
- Michigan Public Health Code – Act 368

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.

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

2018 Eat Safe Fish Guide Thornapple River

Thornapple River

(downstream of Middleville Dam in Barry County; includes the Ada Impoundment, the Cascade Impoundment, and the LaBarge Impoundments)

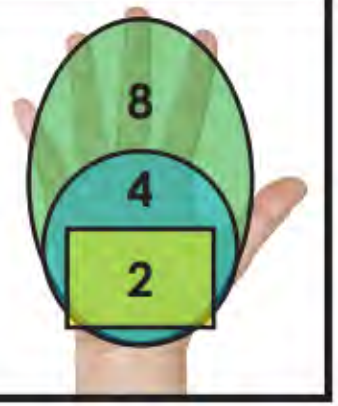
Type of Fish	Chemicals of Concern	Size of Fish (length in inches)	MI Servings per Month*
Carp	PCBs & Mercury	Any	2
Largemouth Bass	Mercury	Under 18"	1
		Over 18"	6 Per Year
Smallmouth Bass	Mercury	Under 18"	1
		Over 18"	6 Per Year

Fish collections are planned in 2018 for the Thornapple River to assess PFAS concentrations in surface water and fish

“MI SERVING”

My Michigan, *MI Serving* Size

- ☑ 8 ounces of fish = size of an adult’s hand (large oval)
- ☑ 4 ounces of fish = size of the palm of an adult’s hand (small circle)
- ☑ 2 ounces of fish = size of half a palm of an adult’s hand (rectangle)



How much is *MI Serving*?

Weight of Person	*MI Serving* Size
45 pounds	2 ounces
90 pounds	4 ounces
180 pounds	8 ounces

What you can do

Reduce your exposure to PFAS from other sources:

- Use a filter if it is recommended
  - Point-of-Use (POU) – NSF Certified
  - Point-of-Entry (POET)
- Follow MI's Eat Safe Fish guidelines
- Read consumer product labels and avoid using those with PFAS

- outdoor clothing
- carpets
- cleaning products
- cosmetics
- leather goods
- ski waxes

"perfluoro…" "polyfluoro…" "polyperfluoro…"

Thank you

Contact information:

Bill Farrell

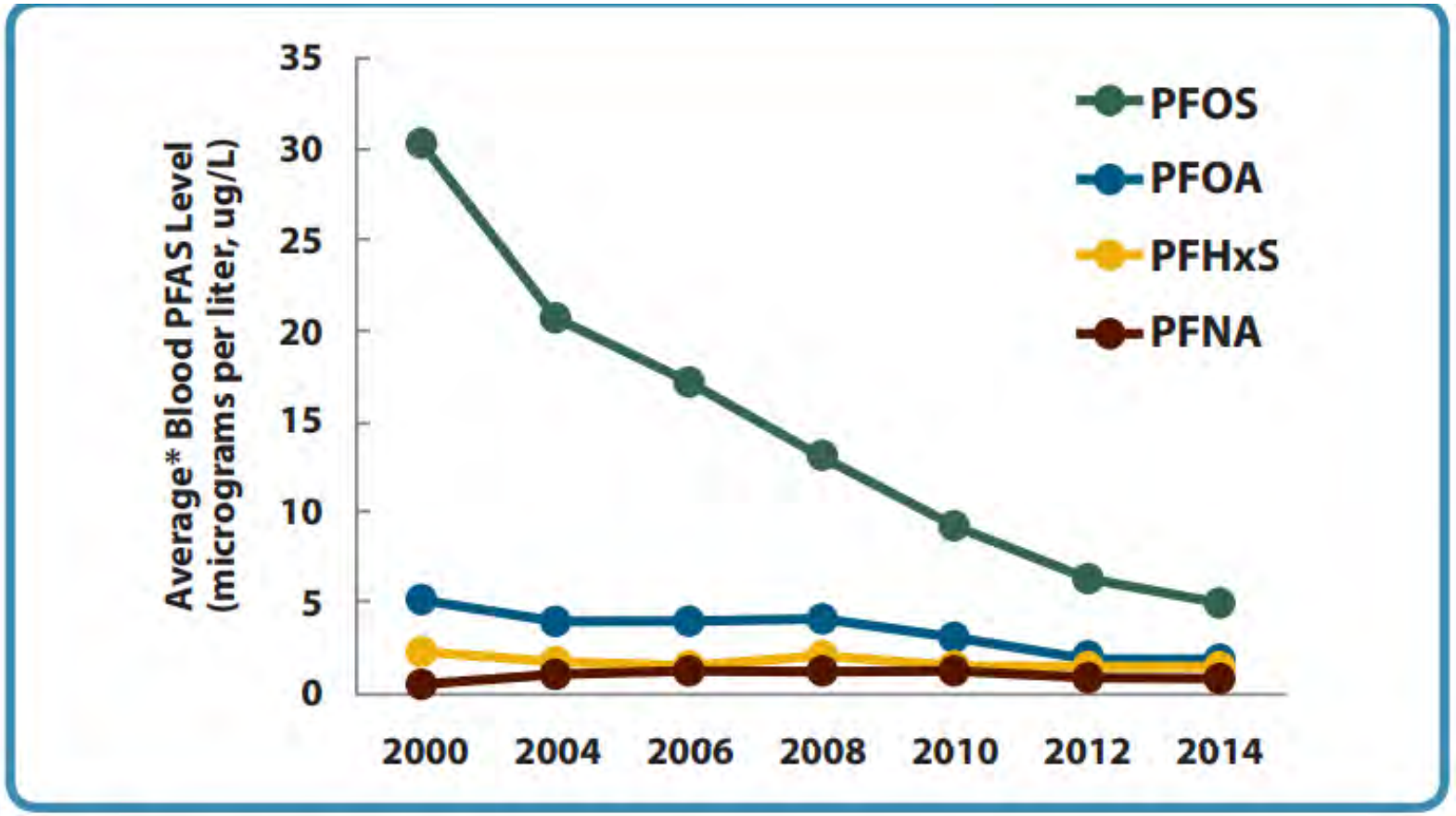
Michigan Department of Health and Human Services

(517) 284-0018

farrellw@michigan.gov

Blood Testing

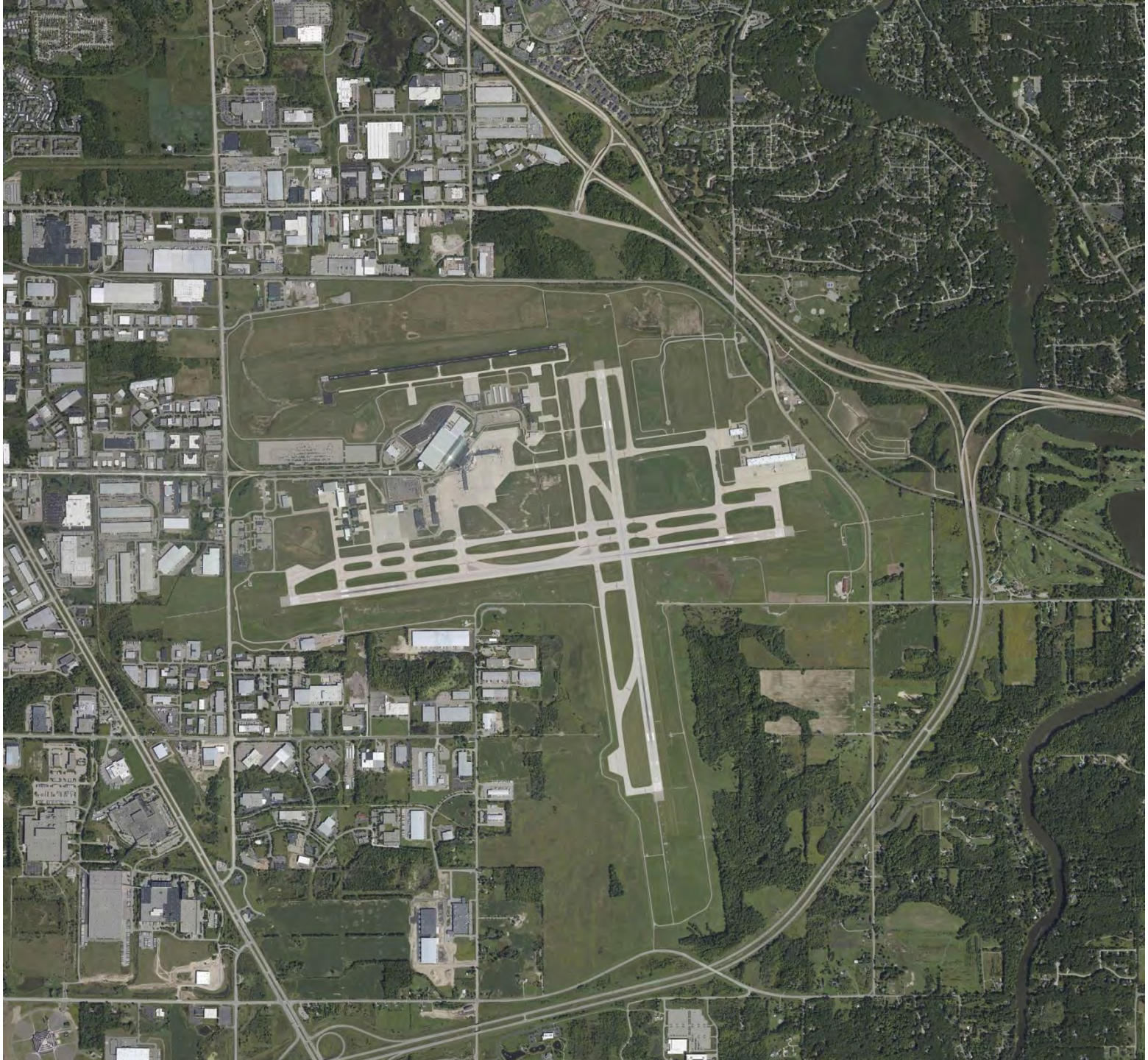
PFAS are in many products commonly used	People are expected to have some level of PFAS in their blood	Blood testing:
		CAN tell you the concentration in your blood at time of test CANNOT tell you if current or future health conditions are due to PFAS or how you were exposed (where the PFAS came from)



* 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



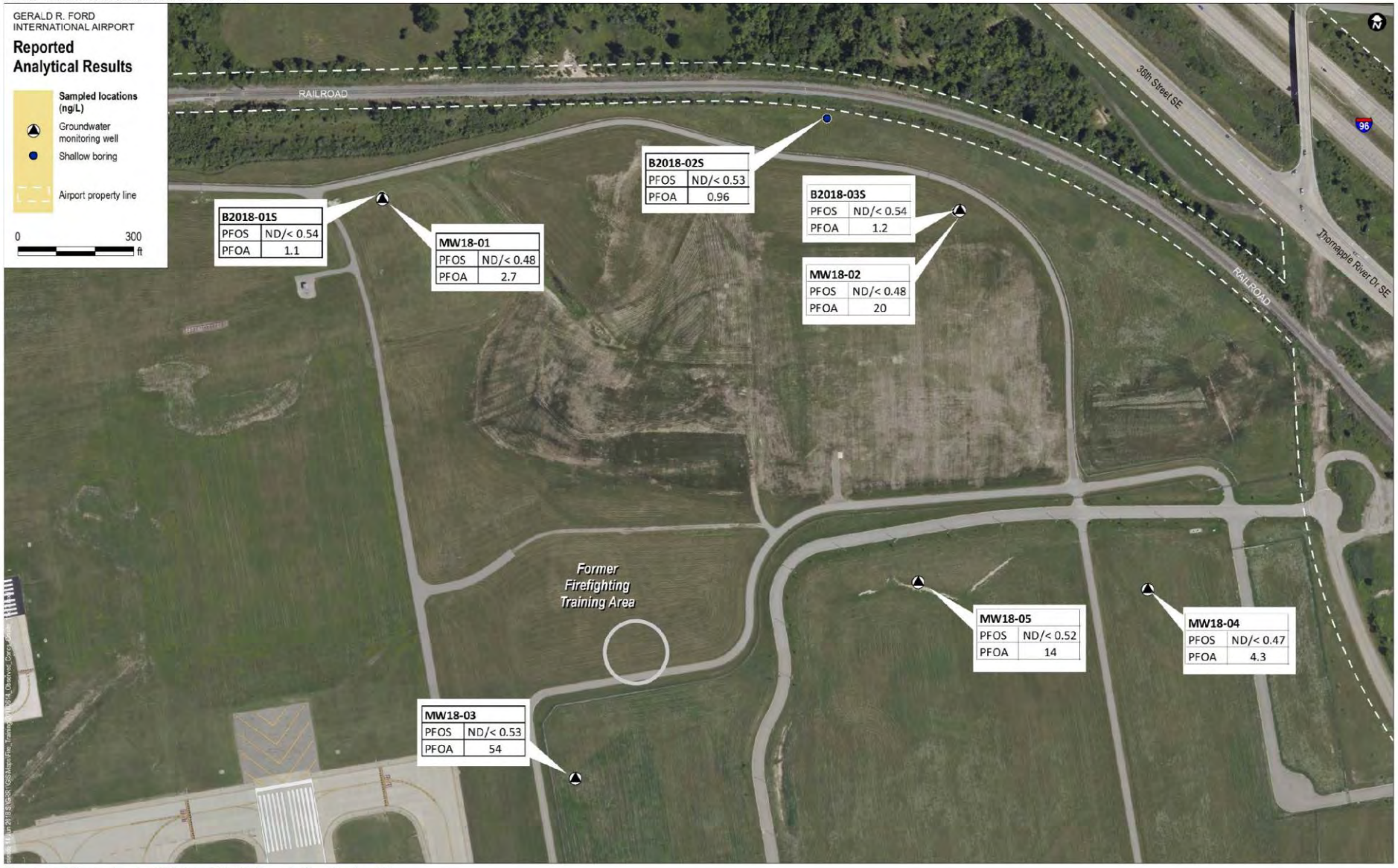


Figure 3-3. Groundwater PFOS and PFOA Sample Results (ng/L).