



Michigan Taking Action on PFAS

Liesl Clark, DEQ Director
Steve Sliver, DEQ MPART Executive Director
Dr. Eden Wells, MDHHS Population Health Administration Physician

March 7, 2019

House Natural Resources and Outdoor Recreation Committee
and
House Natural Resources and Environmental Quality
Subcommittee on Appropriations



1

Michigan PFAS Action Response Team (MPART)

- Executive Order 2019-3
- Unique multi-agency approach
- Leads coordination and cooperation among all levels of government
- Directs implementation of state's action strategy



2

MPART

- Transparency and outreach
- Stakeholders
- Other states and associations
- Advisory workgroups

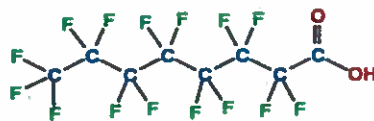


3



3

Per- and polyfluoroalkyl substances (PFAS)



PFOA - perfluorooctanoic acid

- Strong carbon-fluorine bonds
- Surfactants
- Hydrophobic (repels water) and oleophobic (repels oil, fat, grease)
- Began developing in 1940's
- 5,000+ compounds today

4



4

Common PFAS Abbreviations

- Perfluorooctanoic acid (PFOA)
- Perfluorooctane sulfonate (PFOS)
- Perfluorobutane sulfonic acid (PFBS)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- GenX
- ...

5



PFAS Uses



Aerospace



Apparel



Building and Construction



Chemicals and Pharmaceuticals



Electronics



Oil & Gas



Energy



Healthcare and Hospitals



Aqueous Film Forming Foam

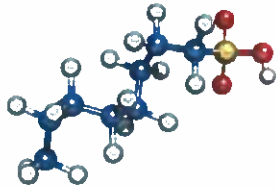


Semiconductors

6



Why the concern?



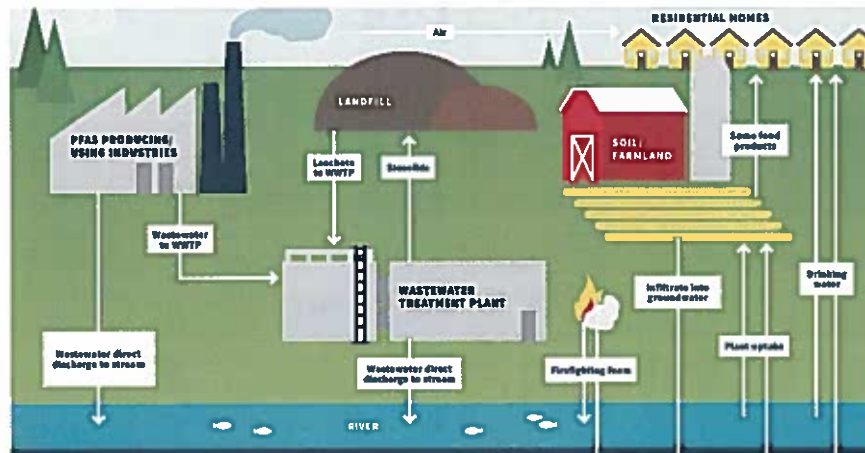
- Pervasive
- Persistent
- Bioaccumulative
- Associated with adverse health effects
- Scarcity of information in scientific literature
- Incomplete regulatory structure

7



7

PFAS Cycle



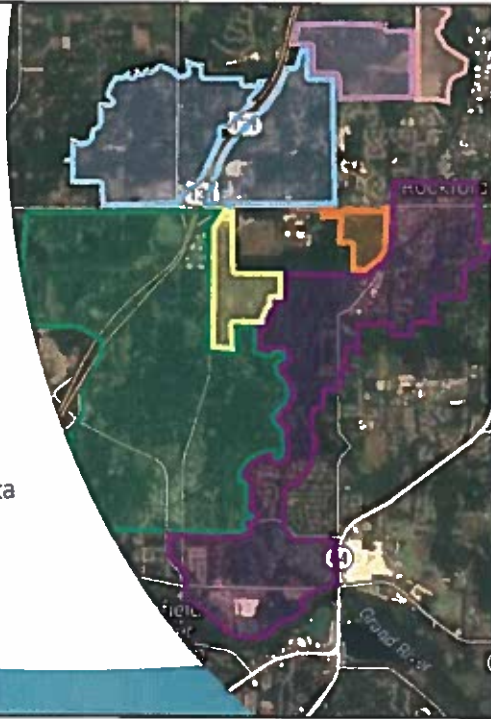
8



8

PFAS Emerge in Michigan

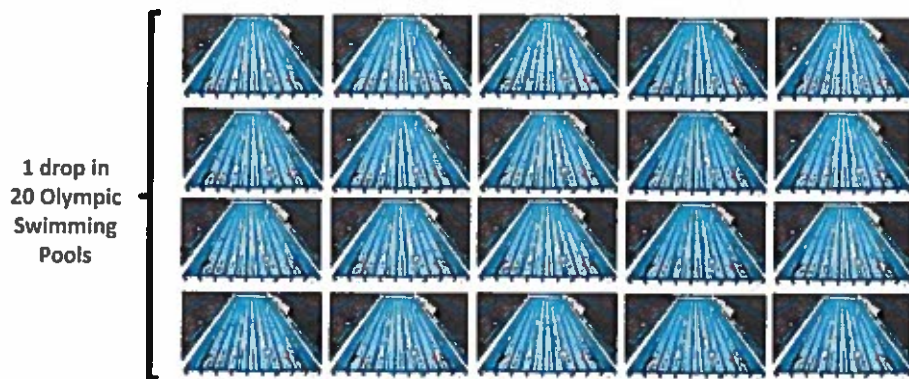
- 2012 Wurtsmith "Do Not Eat" fish advisory
- 2013 surface water recon sampling
- 2017 connecting channels data
- 2017 Camp Grayling sample data
- 2017 North Kent sample data



9

9

Part Per Trillion



10



10

Sampling and Analytical



- Sampling guidance
- Analytical methods
- Compounds analyzed
- State lab capabilities

11



11

Sites being investigated

- Map represents sources of groundwater contamination over 70 ppt PFOS+PFOA
- Once a source is identified, it becomes an official site
- Multiple other investigations with no known source yet



12



12

MI Public Water Supply Testing



- All community water supplies
- All NTCWS schools and day cares
- May – December 2018
- Will inform additional testing of other supplies

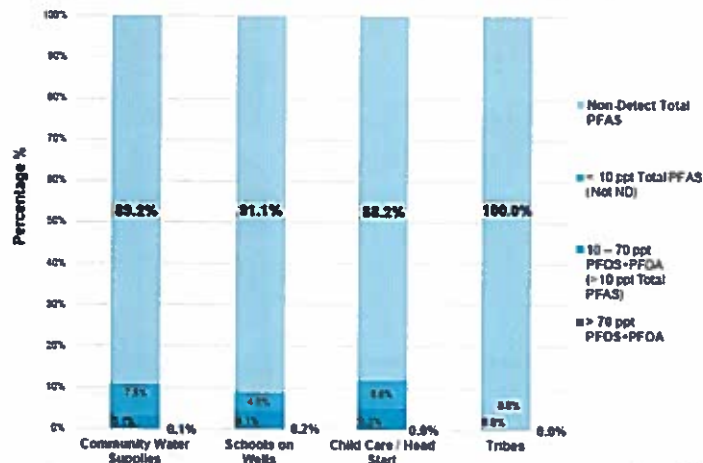
13



13

Statewide Public Water Supply Results

Statewide Public Water Supply Testing Initiative Results*



*As of February 8, 2019

14



14



City of Parchment, Michigan

Kalamazoo will extend water system to Parchment in wake of PFAS contamination

By BRUCE HUFFMAN - AUG 9, 2020

[Twitter](#) [Facebook](#) [Share](#) [Google+](#) [Email](#)



15



15

Surface Water Investigation

- Ambient monitoring
- Publicly owned treatment works (POTW)
 - Industrial Pretreatment Program (IPP)
 - Biosolids
- Industrial direct dischargers
- Fish
- Surface water foam



16



16

Treatment

- Granular Activated Carbon (GAC)
- Reverse Osmosis (RO)
- Incineration
- \$\$\$



17

17

Biosolids Study

- Land application of recycled nutrient-rich sludges
- Follow-up environmental testing on Lapeer field
- Influent, effluent, and biosolids from 41 WWTPs
- Develop guidance and field screening protocol
- Beginnings of plant uptake study



18

18

Landfills and Materials Management



- Leachate management
- Historical groundwater releases
- Waste industry initiative
- Other – compost facilities

19



19

Fire Fighting Foam



- State Fire Marshal survey of fire departments
- MDOT survey of airports
- Special equipment for required training
- PEAS Hotline for use
- Collection and disposal program

20



20

MDHHS PFAS RESPONSE

PFAS Toxicology and Health Effects

Eden V. Wells, MD, MPH, FACPM
MDHHS Population Health
Administration Physician

Putting people first, with the goal of helping all Michiganders lead healthier and more productive lives, no matter their stage in life.

21

PFAS WHAT YOU NEED TO KNOW

WHAT ARE PFAS CHEMICALS?

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that includes PFOA, PFOS and GenX chemicals. Since the 1940s, PFAS have been manufactured and used in a variety of industries around the globe, including in the United States. PFOA and PFOS have been the most extensively produced and studied of these chemicals. Both are very persistent in the environment and in the human body. Exposure to certain PFAS can lead to adverse human health effects.

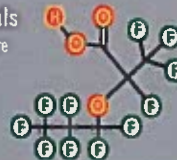
PFOA & PFOS

U.S. manufacturers voluntarily phased out PFOA and PFOS, two specific PFAS chemicals.



GenX Chemicals

GenX chemicals are a replacement for PFOA.



http://www.epa.gov/tdcr/products/chem/018-01/document1/cpfas15_208_0.pdf

22

22

Sources of PFAS

- ✓ Drinking water, typically localized and associated with a specific facility (e.g., manufacturer, landfill, wastewater treatment plant, firefighter training facility).
- 🏠 Food packaged in PFAS-containing materials, processed with equipment that used PFAS, or grown in PFAS-contaminated soil or water.
- 🏠 Commercial household products, including stain- and water-repellent fabrics, nonstick products (e.g., Teflon), polishes, waxes, paints, cleaning products, and fire-fighting foams (a major source of groundwater contamination at airports and military bases where firefighting training occurs).
- 💻 Workplace, including production facilities or industries (e.g., chrome plating, electronics manufacturing or oil recovery) that use PFAS.
- 👤 Living organisms, including fish, animals and humans, where PFAS have the ability to build up and persist over time.

23

23

CHEMICALS EVERYWHERE



Slide information courtesy of:
Susan Buchanan, MD, MPH
Great Lakes Center for Children's Environmental Health
Region 5 Pediatric Environmental Health Specialty Unit
University of Illinois at Chicago School of Public Health

- Environmental chemicals in pregnant women in the United States: NHANES 2003-2004. Woodruff TJ, Zota AR, Schwartz JM. Environ Health Perspect. 2011 Jun;119(6):878-85
 - 163 chemicals, 268 pregnant women
 - “Certain polychlorinated biphenyls, organochlorine pesticides, PFCs, phenols, PBDEs, phthalates, polycyclic aromatic hydrocarbons, and perchlorate were detected in 99-100% of pregnant women.”

24

24

HUMAN EXPOSURE

- Ingestion is main pathway
 - Drinking contaminated water
 - Ingesting food contaminated with PFAS, such as certain types of fish and shellfish
 - Eating food packaged in materials containing PFAS (e.g., popcorn bags, fast food containers, etc.)
 - Until recently- PFAS now largely phased out of food packaging
- Hand-to-mouth transfer from surfaces treated with PFAS-containing chemicals

25

25

HEALTH OUTCOMES (PFOA & PFOS)

In People:

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

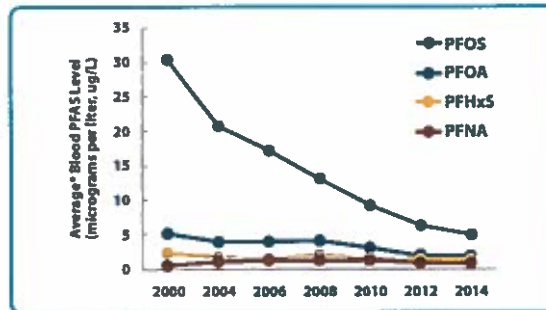
In Laboratory Animals:

- 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

26

26

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.

27

27

PFAS BLOOD TESTING

- 98% US population have some level of PFAS (PFOA or PFOS) 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)

28

28

PFAS BLOOD TESTING – COMMUNITY

- Blood tests for PFAS are most useful when they are part of a scientific investigation or a health study
 - ATSDR (Jan 2018 website) <https://www.atsdr.cdc.gov/pfas/pfas-blood-testing.html>

PFAS Exposure Assessment Framework

Using Serum Testing as a Component for Assessing Exposure in Communities with Drinking Water Contaminated with Per- or Polyfluoroalkyl Substances (PFAS)

This framework document is designed to help state health departments when measuring and evaluating community exposures to per- or polyfluoroalkyl substances (PFAS) in drinking water.

In this framework, a statistically based approach to recruit, measure, and evaluate community exposures to PFAS includes:

- Biomonitoring (serum testing).
- Identifying exposure source(s), and
- Administering questionnaires to provide an assessment of exposure source(s) along with the magnitude and distribution of exposure in the community.

CDC PEATF May 2017

29

29

PUBLIC HEALTH ASSESSMENT

- Evaluate levels in environmental media (e.g., air, drinking water, fish, groundwater, surface water, soil).
 - Compare to screening levels if available
 - If above screening levels, site-specific evaluation
- Make recommendations to impacted people on how to minimize or eliminate exposure
- May include evaluation of available public health surveillance data (e.g., cancer incidence data).
- If enough people impacted, may conduct an exposure assessment.
- If enough people with high exposure confirmed, may conduct a health study.

30

30

EXPOSURE ASSESSMENTS

- **Exposure Assessments** assesses community exposure to PFAS from affected drinking water.
- Recruits individuals from exposed community
- Water and blood tests conducted to establish association between the suspected source (drinking water) to person's blood level
- Survey to assess other potential exposures person has had to PFAS in their environment.
- May take 1-2 years to conduct

ATSDR PEATT 2017

31

31

Exposure Assessments are NOT Health Studies

- A Health Study is an epidemiologic study
- "...may include a comparison group, an expanded health effects questionnaire, additional laboratory data relating to potential health effects and, potentially, a medical records review."
- Can take several years to conduct

ATSDR PEATT, 2017

32

32

NORTH KENT COUNTY EXPOSURE ASSESSMENT



Launch November 27, 2018



Recruitment letters begin week November 26, 2018



Assess exposures from PFAS to clients exposed to ≥ 70 ppt (n=400) and those < 70 ppt (n= 400)



Study to assess population exposed and magnitude of exposure



Health Study May be conducted if Exposure Assessment identifies elevated exposure in study population due to environmental source.

33

33

MDHHS AND PFAS

MDHHS supports communities impacted by PFAS by:

- Following federal guidance to evaluate PFAS data, identify hazards, and initiate public health protective actions (Fish and Deer consumption advisories, Provide filters, avoid foam ingestion)
- Technical assistance to local public health, regulatory agencies, and residents regarding interpreting toxicological and epidemiologic data
- Public health assessments that document public health actions
- Surveillance data review – example, cancer incidence report
- Exposure Assessments and Biomonitoring – example North Kent County
- Community engagement and Health Education – example, town hall meetings

34

34



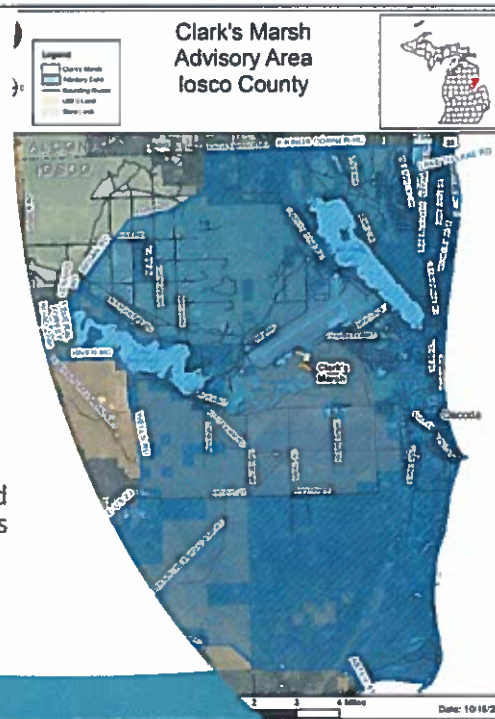
Fish Consumption Advisories

- Over 600 fish filets have been analyzed at the Michigan Department of Health and Human Services Analytical Chemistry Lab
- PFOS fish consumption screening levels range from 9 ppb (ng/g) to >300 ppb (“Do Not Eat”)
- 5 water bodies with “Do Not Eat” for PFOS (this includes the Huron River)
 - Approximately 60 fish consumption guidelines issued due to PFOS fish filet levels

35

Deer Consumption Advisory

- 128 deer
 - 80 deer from four targeted areas
 - 48 samples from hunter-harvested deer (submitted for disease testing)
- 1 deer with elevated PFOS in muscle
 - “Do Not Eat” advisory issued within 5 mile radius of Clarks Marsh
- Additional testing planned



36

36

PFAS Science Advisory Board



Dr. David Savitz (Chair)
Professor of Epidemiology, Brown University School of Public Health, Associate Dean for Research, Joint appointments in Obstetrics and Gynecology and Pediatrics in the Alpert Medical School.



Dr. Jennifer Field
Professor, Department of Environmental and Molecular Toxicology, College of Agriculture Studies at Oregon State University



Dr. Dan Jones
Professor, Department of Biochemistry and Molecular Biology and the Department of Chemistry, Michigan State University



Dr. Christopher Lau
Chief, Developmental Toxicology Branch in Toxicity Assessment Division, National Health and Environmental Effects Research Laboratory in the Office of Research and Development, U.S. Environmental Protection Agency



Dr. Susan Masten
Professor, College of Engineering, Michigan State University



Dr. Scott Bartell
Associate Professor, Public Health, Statistics, and Epidemiology, University of California, Irvine

37

37

Science Advisory Panel Questions



Health Advisory Recommendations:
Is 70 ppt for PFOS and PFOA sufficiently protective of health?

Health Outcomes Knowledge and Guidance:
Which health outcomes are of primary concern? Is PFAS carcinogenic? Is dermal contact with PFAS a concern?

Remediation and Mitigation:
What are the best degradation techniques? Are filters adequate to mitigation exposure?

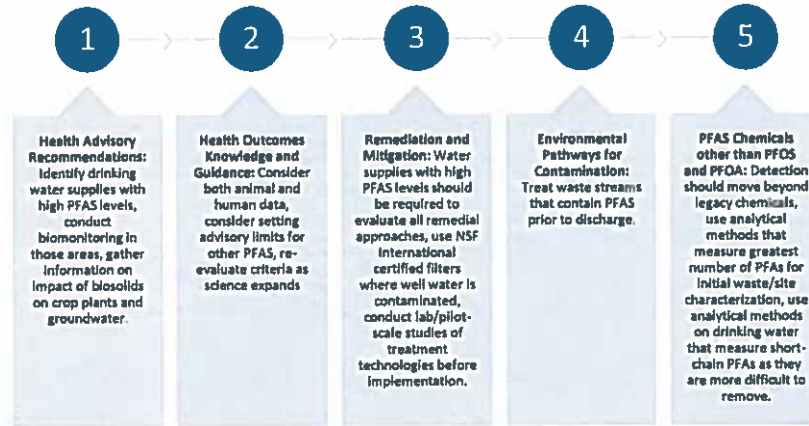
Environmental Pathways for Contamination:
Are there concerns with biosolid application to fields and resulting food products grown?

PFAS Chemicals other than PFOS and PFOA

38

38

Science Advisory Panel Recommendations



39

39

Review of Current Levels

"In response to the State's request to review the current EPA Lifetime Health Advisory Level of 70 parts per trillion (ppt) for PFOA and PFOS combined in drinking water, the Panel found that the current EPA level may not be low enough to guard against health effects."

40

40

MI Standards

Drinking water

- ✓ 70 ppt PFOA/PFOS lifetime health advisory
- ✓ MCL

Surface water quality

- ✓ 11/12 ppt PFOS
- ✓ 420/12,000 ppt PFOA

Groundwater cleanup

- ✓ 70 ppt PFOA/PFOS
- ✓ GSI per surface water quality standards



41

41

PFAS Funding: Appropriations to date

- Fiscal Year 2018
 - \$23.3 million providing funding for DEQ, DHHS, and MDARD activities
- Fiscal Year 2019
 - \$28.1 million providing funding for DEQ, DHHS, DNR, and MDARD activities
 - Renewing Michigan's Environment Funding
 - Local Health Department Response

42

42

PFAS RESPONSE TAKING ACTION PROTECTING MICHIGAN

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

Health Testing And Treatment Michigan PFAS Sites Fish And Wildlife Firefighting Foam About MPART

www.Michigan.gov/PFASresponse

43

