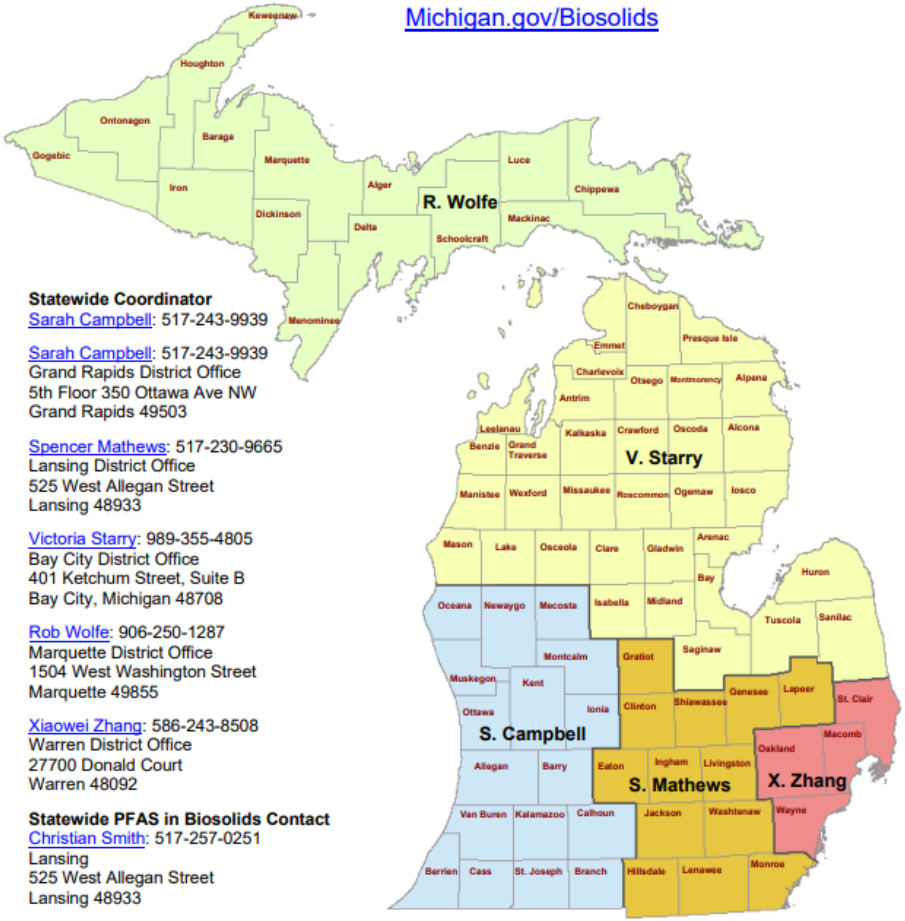
EGLE's Biosolids Program and PFAS Interim Strategy

Sarah Campbell
Christian Smith

Biosolids Program Staff

Michigan.gov/Biosolids



Statewide Coordinator
Sarah Campbell: 517-243-9939

Sarah Campbell: 517-243-9939
Grand Rapids District Office
5th Floor 350 Ottawa Ave NW
Grand Rapids 49503

Spencer Mathews: 517-230-9665
Lansing District Office
525 West Allegan Street
Lansing 48933

Victoria Starry: 989-355-4805
Bay City District Office
401 Ketchum Street, Suite B
Bay City, Michigan 48708

Rob Wolfe: 906-250-1287
Marquette District Office
1504 West Washington Street
Marquette 49855

Xiaowei Zhang: 586-243-8508
Warren District Office
27700 Donald Court
Warren 48092

Statewide PFAS in Biosolids Contact
Christian Smith: 517-257-0251
Lansing
525 West Allegan Street
Lansing 48933

EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Water Resources Division

Michigan.gov/WRD ↔ 517-284-5567

2/22/2024

Biosolids Staff

Biosolids (michigan.gov)

What Are Biosolids?

Part 24 Rule Definition

"Biosolids" is defined as a solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. The term "biosolids" includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

What Type of Facilities Produce Biosolids?

Any facility where sanitary sewage goes through a treatment works produces biosolids. These facilities may be municipal, industrial, private or publicly owned, as long as the flow is mainly sanitary sewage.

Solids from industrial waste are not considered biosolids.

Other types of land application of solids

SEPTAGE

Land application under septage program (DWEHD)

MANURE

Land application under CAFO program (WRD)

OR

Under MDARD

FOOD PROCESSING BYPRODUCTS

Land applied under Agricultural Use Agreements (MMD)

INDUSTRIAL BYPRODUCTS

Land applied under Bennificial 3 use (MDARD)

Requirements for Facilities

Governed by Part 24 rules under the Clean Water Act

Must have a Residual Management Program (RMP)

Must meet criteria for pathogen reduction for either Class A or Class B biosolids

Must meet criteria for vector attraction reduction

Biosolids “Types”

CLASS A

- Must have a Process to Further Reduce Pathogen (PFRP) as well as a test for fecal colonies
- Can be used on public lands, gardens and to grow crops that touch biosolids
- Most often a solid
- Can also additionally be certified as “EQ” (Exceptional Quality)
- EQ can be distributed in nonbulk amounts, but may require a fertilizer license.

CLASS B

- More Common
- Either has a Process to Significantly Reduce Pathogens (PSRP) or tests for fecal colonies
- Larger restrictions for use
- Usually a liquid injected into the ground

Class B Pathogen reduction

PSRP (Process to significantly reduce pathogens)

OR

At least seven sludge samples analyzed for Fecal coliform meeting one of the following criteria:

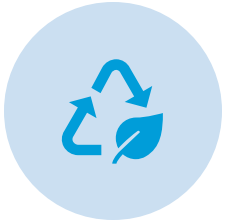
- Less than 2,000,000 Most Probable Number per gram of total dry solids
- Less than 2,000,000 Colony Forming Units per gram of total dry solids

PSRP (Process to Significantly Reduce Pathogens)

AEROBIC DIGESTION

AIR DRYING

ANAEROBIC DIGESTION



COMPOSTING

LIME STABILIZATION

Pathogen Reduction Process Examples

Class A Pathogen Reduction

MUST TEST ONE:

- A fecal coliform density less than 1,000 Most Probable Number per gram of dry total solids

OR

- A salmonella sp. Density less than 3 Most Probable Number per 4 grams of total dry solids

AND

MUST HAVE ONE PROCESS:

- Time/Temperature

OR

- Alkaline Treatment

OR

- Testing for Enteric Virus/Viable Helminth Ova

OR

- PFRP (Process to Further Reduce Pathogens)

Vector Attraction Reduction Methods

- Reduce Volatile Solids by 38% (digestor/bench scale)
- Low Specific Oxygen Uptake Rate (SOUR)
- Aerobic Process
- Lime Stabilization
- Drying
- Injection
- Subsurface Incorporation

Vector Attraction Reduction Method Example

Site Restrictions (Class B)

Access/use:

- No animal grazing for 30 days
- Public access restricted for 1 year on areas of high exposure, and 30 days on low exposure
- Only one source of biosolids per year and no septage

Crops:

Above surface but touch biosolids: cannot be harvested for 14 months

Below surface: cannot be harvested for 20 -38 months depending on application

Food, feed, or fiber crops cannot be harvested for 30 days

Cannot harvest turf for 1 year

Management Practices

Cannot adversely affect threatened or endangered species

Cannot apply to flooded, saturated, frozen, or snow covered ground (cannot enter wetlands or waters of the state)

Cannot apply to a slope greater than 6%

Must be applied at agronomic rate

Soils must be tested for Bray P1

Owners/farmers must be given information on application

TABLE 6
Isolation Distance Requirements

Isolation from existing:	Distance (feet)	
	Surface application without incorporation	Injection or Surface application with incorporation*
Municipal well (type I or type IIA) **	2000	2000
Noncommunity public Water supply (type IIB or type III)	800	800
Domestic well	100	150
Homes	100	150
Commercial Buildings	100	150
Surface waters***	50	150

Testing and Monitoring Requirements

- 9 Metals (As, Cd, Cu, Pb, Hg, Mo, Ni, Se, Zn)
- Nutrients, percent solids (N, P)
- Field soil fertility testing every two years
- Fecal/Salmonella/Helminth/Enteric Viruses on an individual basis
- Interim Strategy (MPART required analytes)

Pollutant Tables

CEILING POLLUTANT CONCENTRATIONS

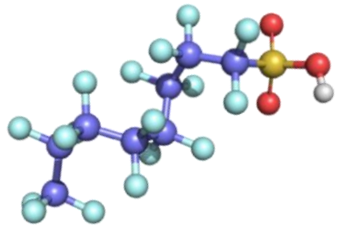
Pollutant	Ceiling Concentration milligrams per kilogram (on a dry weight basis)
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

POLLUTANT CONCENTRATIONS

Pollutant	Concentration milligrams per kilogram (on a dry weight basis)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	100
Zinc	2800

Interim Strategy for Land Application of Biosolids Containing PFAS

Per- and Polyfluoroalkyl Substances (PFAS)



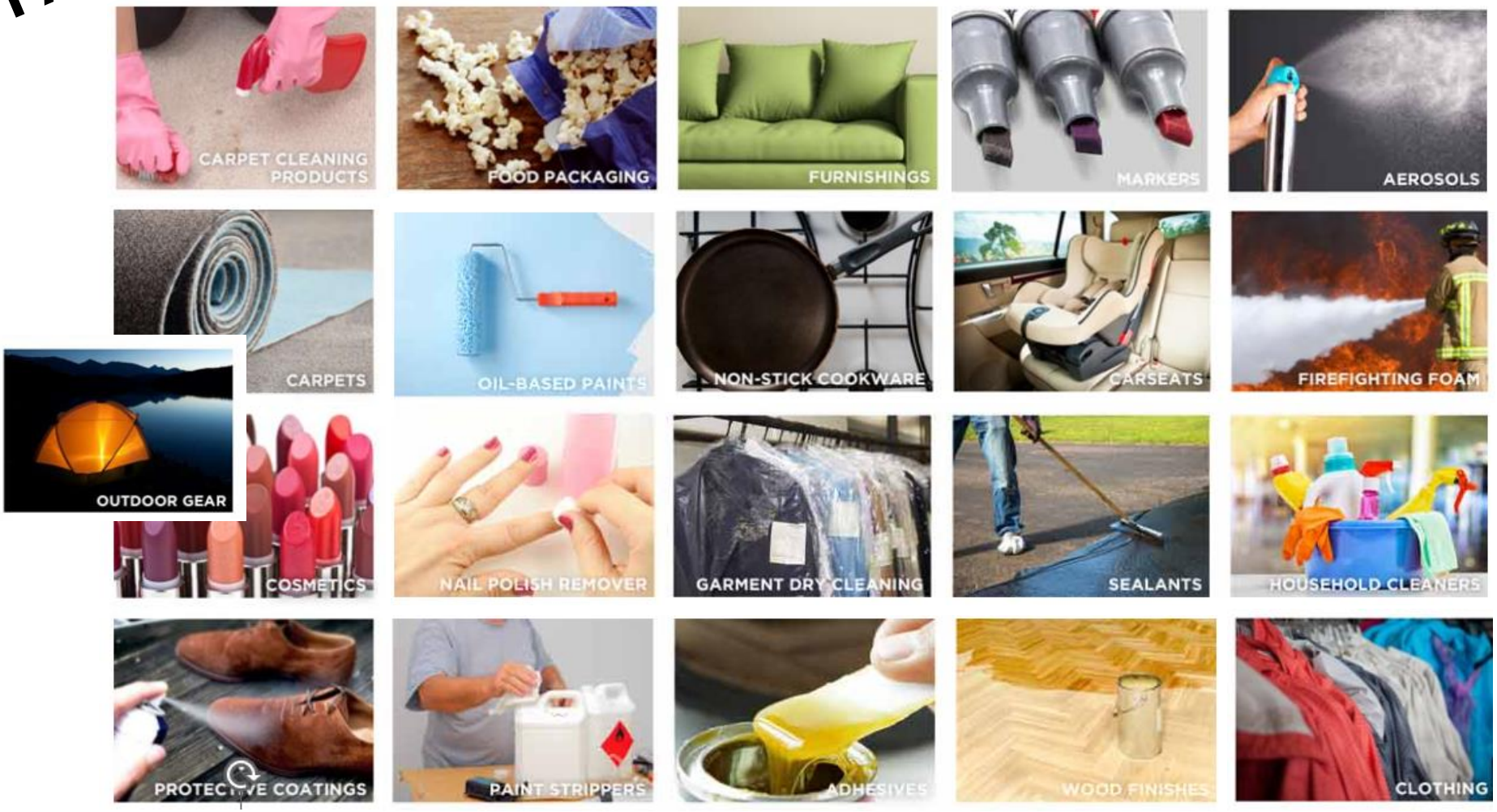
What are they?

- Strong Carbon-Fluorine Bonds
- Surfactants
- Highly Stable
- Repel Water, Oil, Fat, and Grease
- Began Developing in 1940s
- Thousands of Compounds Today

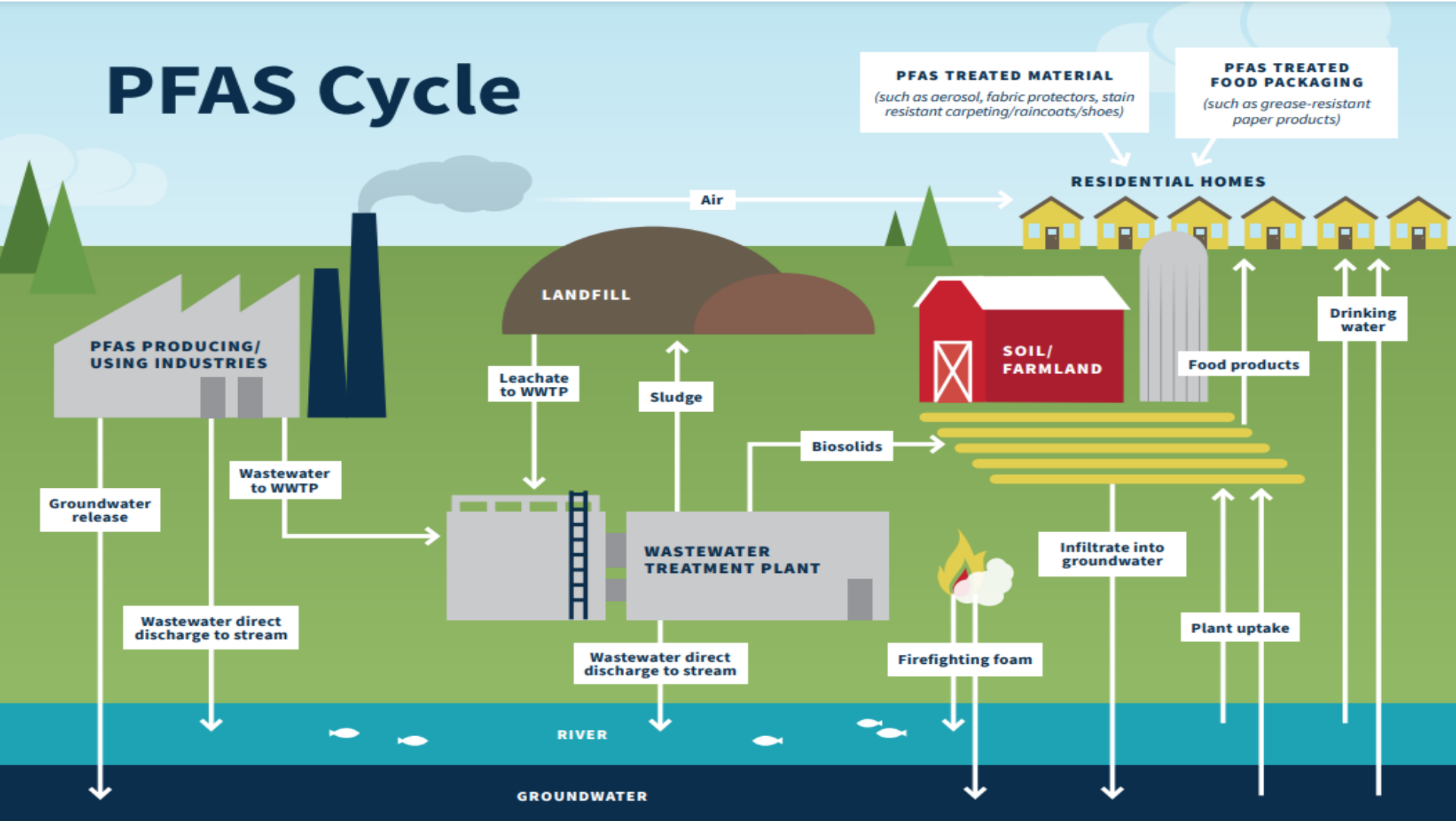
Why the concern?

- Widespread through the ecosystem
- Don't Break Down Easily - Hard to Get Rid of
- Bioaccumulate – Build Up in Our Bodies
- Some PFAS May Affect Health
- Some emerging science/information
- Federal Standards

PFAS Uses



https://www.sixclasses.org/videos/pfas


PFAS Cycle
PFAS TREATED MATERIAL
(such as aerosol, fabric protectors, stain resistant carpeting/raincoats/shoes)
PFAS TREATED FOOD PACKAGING
(such as grease-resistant paper products)
RESIDENTIAL HOMES
Air
LANDFILL
PFAS PRODUCING/ USING INDUSTRIES
SOIL/ FARMLAND
Drinking water
Food products
Leachate to WWTP
Sludge
Biosolids
Groundwater release
Wastewater to WWTP
WASTEWATER TREATMENT PLANT
Infiltrate into groundwater
Plant uptake
Wastewater direct discharge to stream
Wastewater direct discharge to stream
Firefighting foam
RIVER
GROUNDWATER

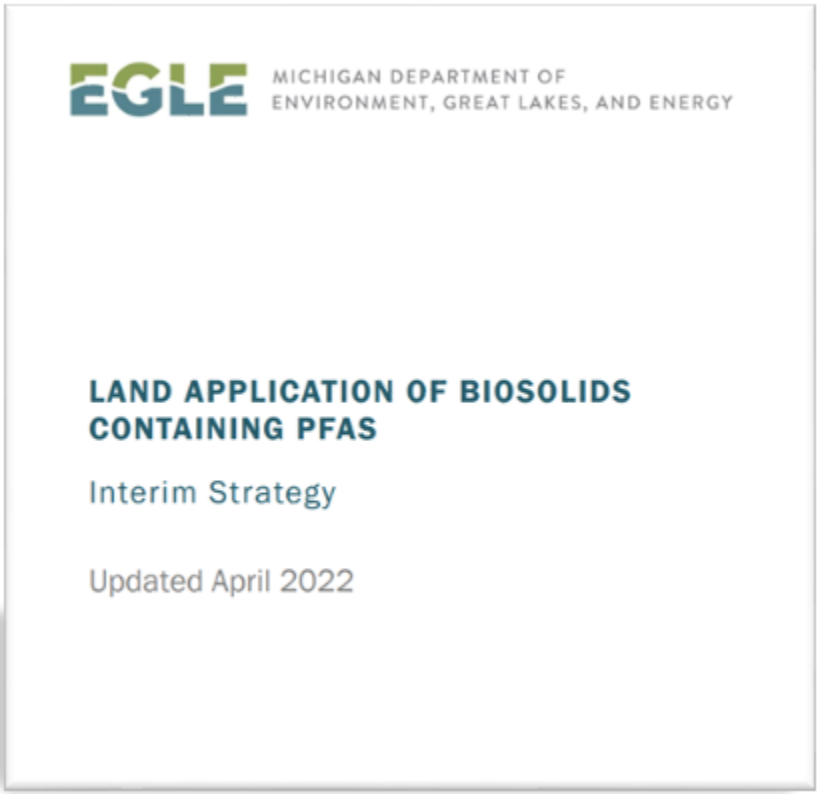
Michigan Surface Water Quality Values

Compound	Water Quality Value
PFOA	**170 ppt**
If Drinking Water Source	***66 ppt***
PFOS	**12 ppt**
If Drinking Water Source	***11 ppt***
PFBS	670,000 ppt
If Drinking Water Source	*8,300 ppt*
PFHxS	210 ppt
If Drinking Water Source	*59 ppt*
PFNA	30 ppt
If Drinking Water Source	*19 ppt*

Michigan's Rule 57 Water Quality Values apply to NPDES discharges

Land Application of Biosolids Containing PFAS Interim Strategy

- First Implemented July 1, 2021
- Only regulates residuals from wastewater treatment plants (WWTPs) which undergo additional treatment to be land applied as biosolids



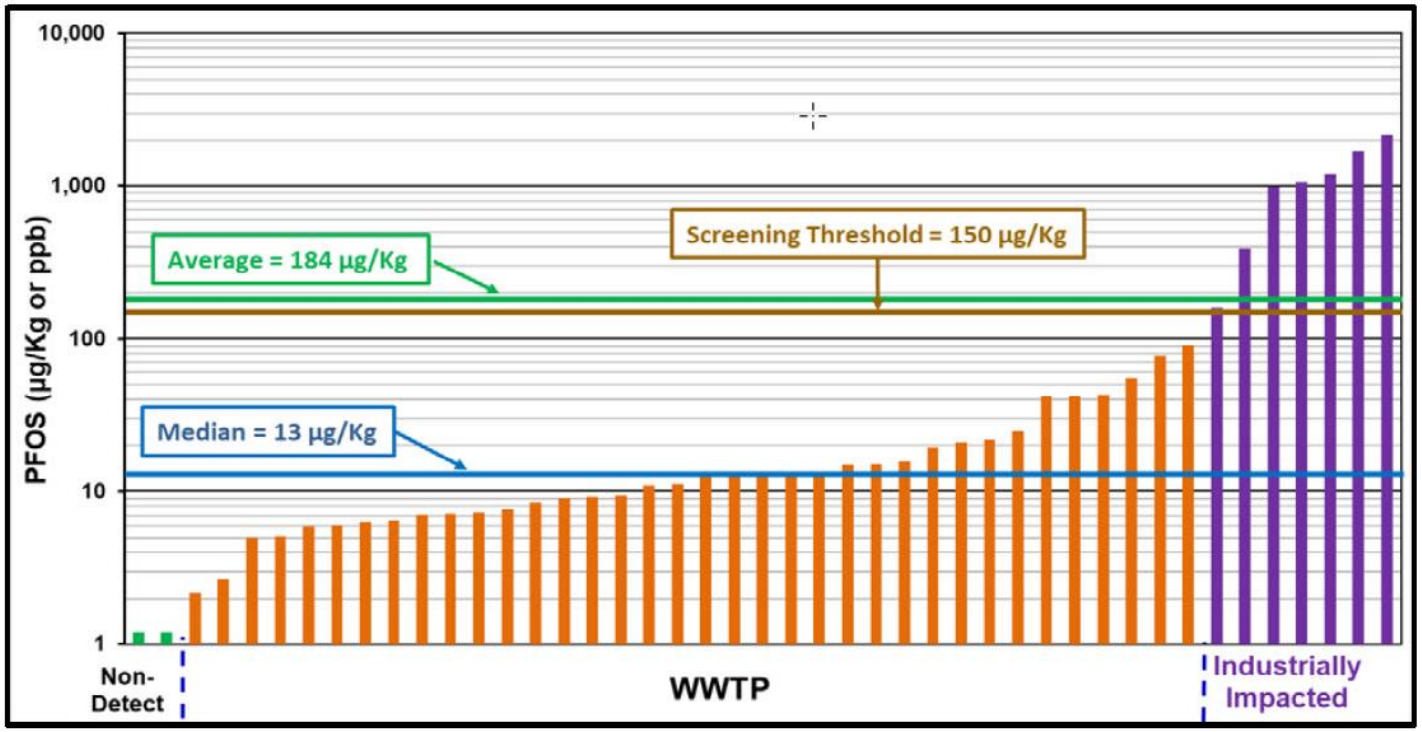
Land Application of Biosolids Containing PFAS Interim Strategy Goal

Reduce
- Continue source identification and reduction efforts

Prevent
- Prevent land application of industrially-impacted biosolids

Mitigate
- Mitigate (reduce) risks moving forward

Statewide Study of Wastewater Treatment Plants Informs Interim Strategy



2021:
150 ppb PFOS

2022:
125 ppb PFOS

2024:
100 ppb **PFOS or PFOA**

Source Investigation and Reduction Efforts Required Based on Analytical Results

- Based on the PFOS results, the WWTPs were placed in the following tiers in **2022 and 2023**:
  - Equal to or Below 20 ppb
    - *No restrictions*
  - Above 20 ppb – Less than 50 ppb
    - *Recommended* to sample effluent and identify sources
  - Above 50 ppb – Less than 125 ppb **(Mitigation Required)**
    - *Required* to sample effluent, identify sources, and reduce land application rate
  - Equal to or Above 125 ppb **(Land App Prohibited)**
    - Deemed Industrially Impacted

New Updates to Interim Strategy in 2024

- **PFOA added** as a limiting analyte
- Lowered the industrially-impacted threshold and trigger for mitigation
- Based on the PFOS or PFOA results:
  - **Below 20 ppb** (same as 2022)
    - *No restrictions*
  - **Equal to or Above 20 ppb – Less than 100 ppb** (updated)
    - ***Required*** to sample effluent and identify sources
    - ***Required*** to mitigate during land application
      - Reduce land application rate to 1.5 dry tons per acre or submit alternative strategy
  - **Equal to or Above 100 ppb** (updated)
    - Deemed industrially impacted and ***land application prohibited***
    - ***Required*** to sample effluent and identify sources

Mean and Median Values of Biosolids/Sludge Concentrations Since 2018

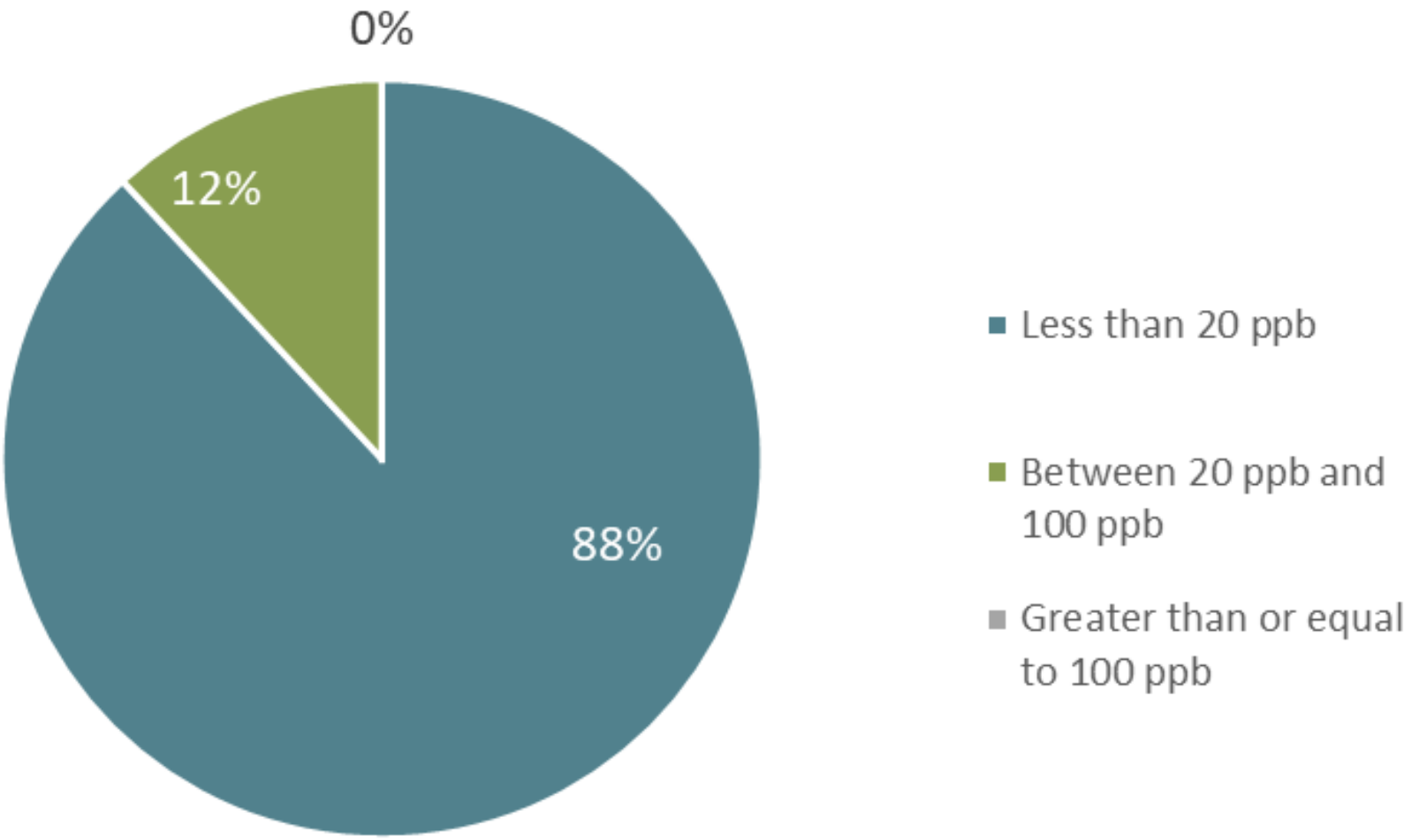
Year	PFOS		PFOA	
	Mean	Median	Mean	Median
2018*	184	13	25	7
2021	21	9	8	4
2022	16	10	7	3
2023	11	7	6	3
2024**	9	5	5	2

*Includes data from industrially impacted facilities as part of a statewide study

**Calculations based on 109 results received as of 5/29/24

All values listed are in parts per billion (ppb[µg/kg])

2024 Biosolids Interim Strategy WWTP PFOS and PFOA Levels

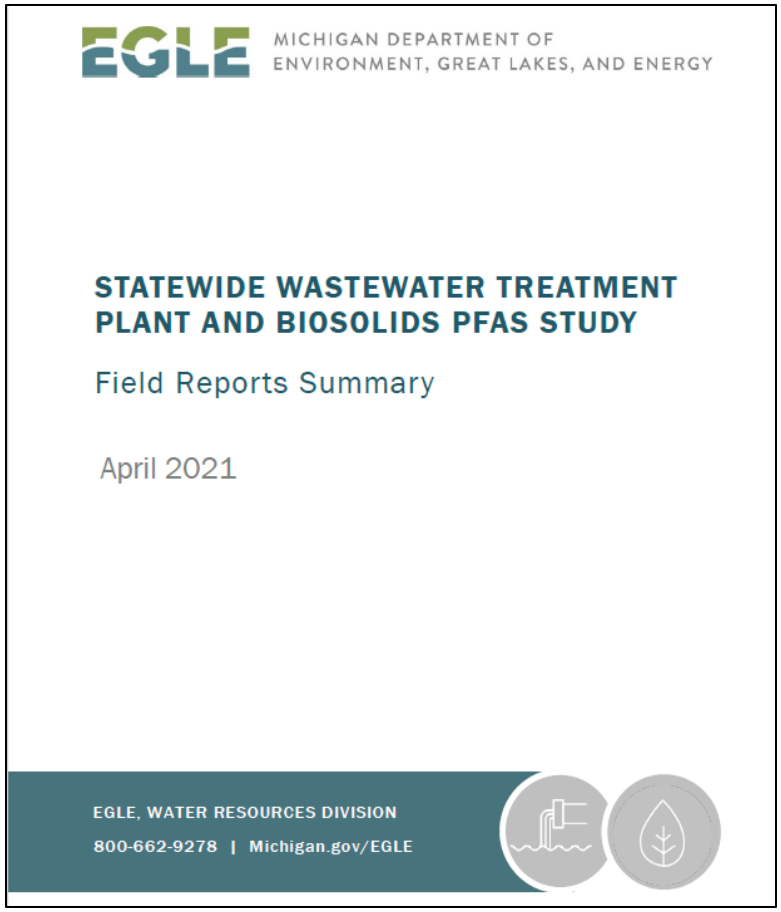


Areas Requiring Further Investigation

- Infiltration into collection system from former industrial sites with contaminated groundwater
- Firefighting foam training areas and deployment sites
- Commercial operations where PFAS containing products may have been used (i.e., laundries, car washes, carpet cleaners, etc.)
- Residential and commercial septage disposal
- Large multi-use facilities like schools, medical complexes, and retail box stores

Source Identification and Ongoing Sampling

- **Collection System Sampling**
  - Review areas of the community that may or may not show detections of PFAS
- **WWTP Site Visits**
  - EGLE provides assistance as needed on non-domestic user visits
- **Biosolids Storage Clean Outs**
  - Ensures possible historic accumulation is removed
- **Review of Users**
  - WWTPS review all users to the system to further investigate or eliminate potential sources
- **Review of nearby PFAS sites**



Land Application Site Investigations

Next Steps

- EPA Risk Assessment (anticipated September 2024)
- Continue implementing Interim Strategy
- Evaluate commercial and other non-industrial sources
- Legacy Contamination Sites

Questions?

Christian Smith
Emerging Pollutants Section
Water Resources Division
517-257-0251|
SmithC186@michigan.gov

Sarah Campbell
Biosolids Committee Chair
Water Resources Division
517-243-9939|
CampbellS32@michigan.gov