



MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Michigan's IPP PFAS Initiative

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Michigan PFAS Action Response Team (MPART)

Governor Whitmer signed Executive Order 2019-3 on February 4, 2019:

- The Order establishes MPART as an enduring body
- MPART is an advisory body within the DEQ (e.g. DEQ lead)
- Includes the same agencies
- Ensures ongoing, across-agency coordination
- Creates a Citizen Advisory work group

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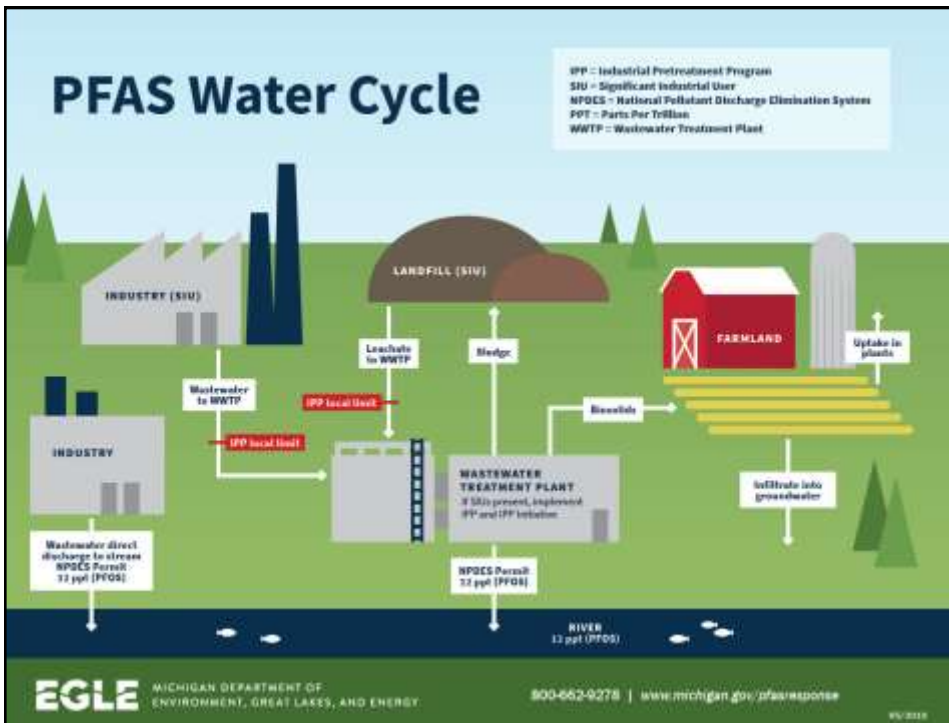
MPART Goals

- Protecting public health
- Investigating areas and reducing exposure
- Assisting responsible parties in remediation efforts
- Working with communities and other agencies
- **Implementing proactive efforts**

WRD PFAS Work

- Surface Water
 - Ambient water sampling
 - Fish collection
- Wastewater
 - Industrial Pretreatment Program
 - Biosolids
 - Direct industrial discharges
- Landfills
- Sharing with other states and EPA





Michigan Standards			
Criteria	PFOS	PFOA	PFOS/PFOA
Drinking Water Health Advisory Level	70 ppt	70 ppt	70 ppt
Groundwater (used as a drinking water source)	70 ppt	70 ppt	70 ppt
Soil protective of groundwater (for GSI pathway)	0.24 ppb	10,000 ppb	n/a
Surface water (drinking water source)	11 ppt	420 ppt	n/a
Surface water (non-drinking water source)	12 ppt	12,000 ppt	n/a

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DEQ Water Quality Criteria for PFAS

- Michigan developed Rule 57 Human Noncancer Values (HNV) for PFOA (2011) and PFOS (2014) in surface waters

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

Human Noncancer Values (HNVs); Aquatic Life Final Chronic Value (FCV), Final Acute Value (FAV), and Aquatic Maximum Value (AMV)

- PFOS builds up in fish tissue to a higher degree than PFOA



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DEQ Fish Contaminant Monitoring

- 40 waterbodies and average 600 samples per year
- ~1,300 fillet samples from 55 waterbodies have been analyzed for PFAS to-date
- Data for DHHS "Eat Safe Fish" guidelines
- *Best indicator of significant source



https://www.michigan.gov/mdhhs/0,5885,7-339-71548_54783_54784_54785---,00.html

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Surface Water Sampling for PFAS

- Over 300 ambient surface water samples from 20 waterbodies
 - 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
 - Grand River - 2019

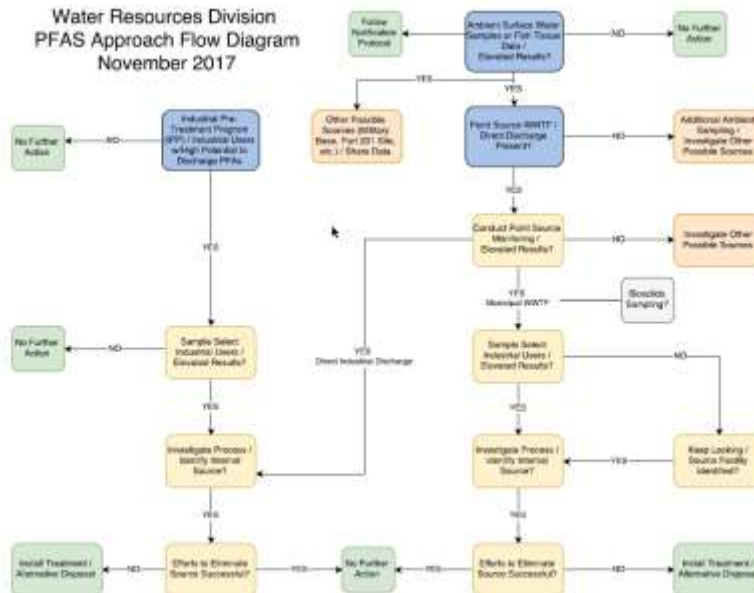


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Water Resources Division
PFAS Approach Flow Diagram
November 2017



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2017 Flint River/Lapeer

- 2013/2016 Elevated levels in Flint River
- Restrictive fish consumption advisories due to PFOS
- Source tracked back to Lapeer WWTP
- Industrial User – chrome plater
- High PFOS effluent and biosolid concentrations
- Biosolid application – impact to resources?

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2018 Industrial Pretreatment Program PFAS Initiative

- 95 Wastewater Treatment Plants with IPPs
 - Screen industrial users for PFAS
 - Sample users and effluent
 - Control/reduce discharges
 - Monitoring

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NPDES Requirement: Industrial Pretreatment Program (IPP)

- **Industrial Pretreatment Program** – A federally-mandated program to control industrial discharges into POTWs to protect the WWTP operations and the environment.
- **IPP is REQUIRED** when a POTW has significant industrial users such as metal finishers, chemical plants, etc.
- **Must** prevent pass through, harmful interference or impairment to ability to manage solids from industrial pollutants

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IPP PFAS Initiative

- February 2018 –POTWs required to screen Industrial Users
 - Survey Industrial Users with potential sources of PFAS
 - Follow-up sampling of probable sources
 - Sample POTW effluent if sources above screening criteria (12 ppt PFOS)
 - Interim Reports due **June 29, 2018** unless extension requested
 - 35 extension requests
 - Summary Reports due **October 26, 2018** unless extension

Additional information on IPP PFAS Initiative:

<https://www.michigan.gov/pfasresponse/0,9038,7-365-86510--,00.html>

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IPP PFAS Initiative

WRD Compliance Assistance and Outreach Activities



Recommended
Screening &
PFAS Evaluation
Procedures



Wastewater
PFAS
Sampling
Guidance



FAQs



Regional
Informational
Meetings



Multiple meetings,
presentations to
stakeholders

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Sources PFAS to WWTPs found (so far)

Metal Finishers: Significant sources **16 - 240,000** ppt PFOS
Of ~248 Metal Finishers in Michigan,

- **53** with PFOS > WQS
- Of these, **39** with PFOS \geq 50 ppt



- Primarily Decorative & Hard Chrome Platers using fume suppressants (Cr +6)
- Some Anodizing (Chrome conversion coatings, fume suppression (sulfuric acid), Teflon coating?)
- Also, groundwater from former plating sites (infiltrating to sanitary sewers or groundwater cleanup sites)

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Sources PFAS to WWTPs found (cont'd)

- Sites where **AFFF** used (Air Force Bases, refineries, fire stations, etc.):
PFOS **240 - 45,000** ppt
- **Paint manufacturers/former sites**: PFOS **6,047** ppt
- **Landfill leachate**: PFOS **non-detect - 4000** ppt
- **Paper Mfg/former sites**: PFOS **20 - 150+** ppt
- **Centralized Waste Treaters (CWTs)**: PFOS **13 - 650** ppt
- **Industrial Laundry facilities**: PFOS **29 - 50** ppt
- **Medical Products** (implants, patches, tubing): **25** ppt

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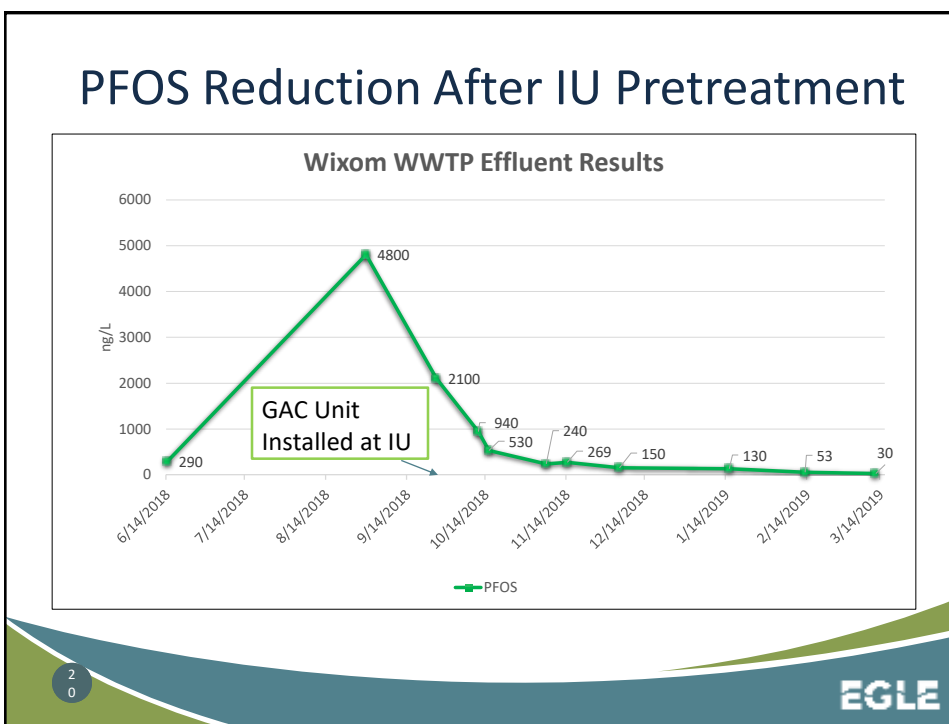
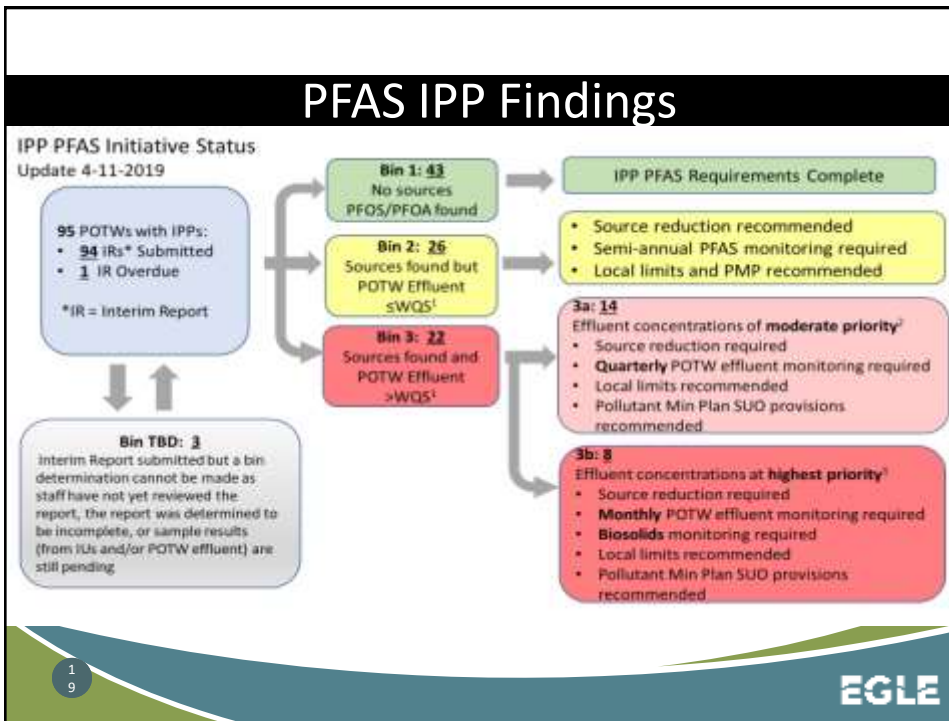
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Source Control

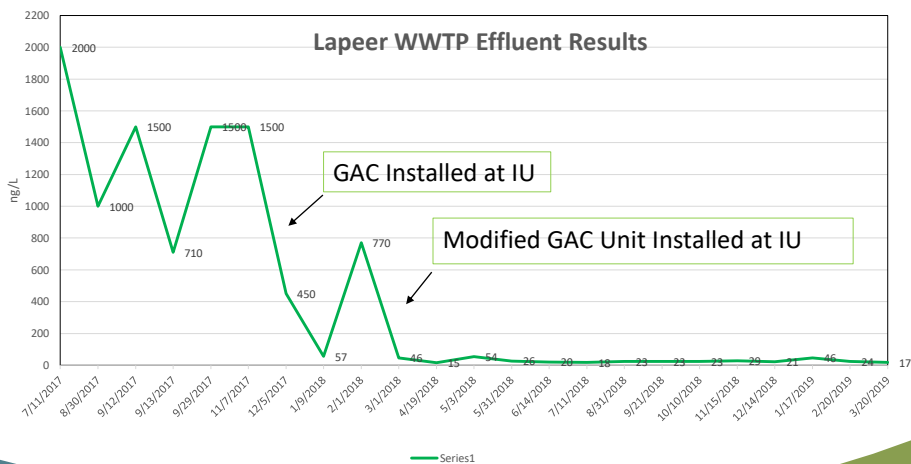
- Cleaning & Replacing tanks/equipment/scrubbers
 - Some reductions
- Treatment – Granular Activated Carbon
 - Significant Reductions
 - Maintenance Concerns/issues
 - High costs
 - Sample results lag – miss breakthrough?
 - Metals such as iron interfere with GAC
 - Use of PFOS replacement products (PFAS) – burn through carbon quicker?
- Pollutant Minimization Plans and local limit development

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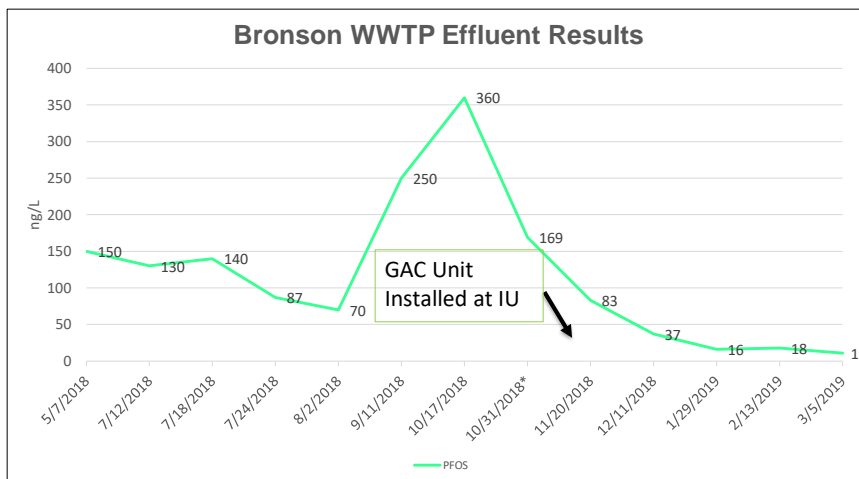
PFOS Reduction After IU Pretreatment



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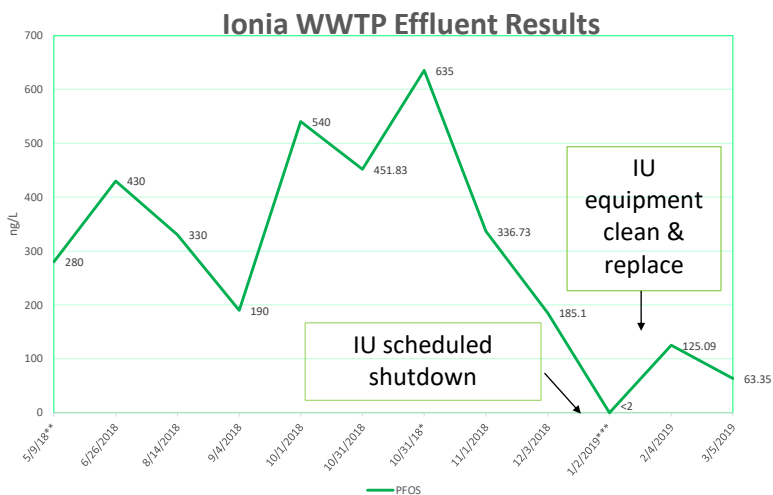
PFOS Reduction After IU Pretreatment



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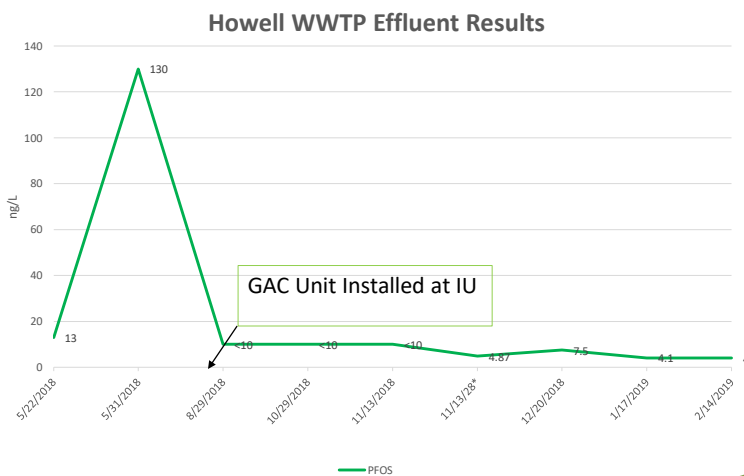
PFOS Reduction After IU Clean/Replace



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PFOS Reduction After IU Pretreatment



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Michigan Waste and Recycling Association (MWRA) PFAS Landfill Leachate Project Technical Report

- Joint effort between DEQ/WMRPD and MWRA (Landfill Industry Group)
- Leachate Collection and PFAS analysis from 35 active landfills & cells
- PFOS and PFOA data reported and tabulated by landfill
- Comparison of data to national and international studies
- Broad-brush Study: Not an analysis of the impact of leachate on specific WWTPs
- Does not assess closed landfills/cells or groundwater

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MWRA Findings

Table 4-3
Michigan vs. Worldwide PFOA and PFOS Leachate
Concentrations Ranges

Region	PFOA (ppt)	PFOS (ppt)
Michigan*	16 to 3,200	9 to 960
United States	30 to 5,000	3 to 800
Europe	ND to 1,000	ND to 1,500
Australia	17 to 7,500	13 to 2,700
China	281 to 214,000	1,150 to 6,020
Worldwide Range	ND to 214,000	ND to 6,020

* Based on leachate analyses from 32 MWRA-member landfills participating in this statewide study and leachate data obtained on MWaters.com.

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**National
Pollutant
Discharge
Elimination
System (NPDES)
Permits
& PFAS**

For IPP WWTPs:

- PFOS/PFOA monitoring
 - Bin 1: 4x/5 yrs (w/additional monitoring requirements)
 - Bin 2: 2x/yr
 - Bin 3a: 4x/yr
 - Bin 3b: 12x/yr
- PMPs for PFOS/PFOA
 - Bin 3: all
 - Bin 2: upon trigger
 - Reporting may overlap w/IPP requirements

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**Direct
Dischargers
&
PFAS**

- WRD Monitoring Probable PFOS Sources
- Some Sources found
- Consent Order Process (Interim Step)
- Later, NPDES Permit with Monitoring, PMP
- Treatment installed at several locations

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Statewide Biosolids Study

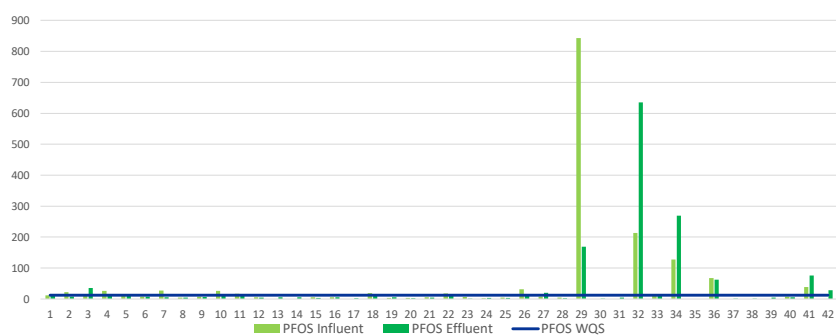
- Sample Effluent, Influent, & Biosolids from 41 WWTPs
 - Oct – Nov 2018
 - 20 Largest
 - 3.0 – 9.0 MGD (8 WWTPs)
 - 0.5 – 3.0 MGD (8 WWTPs)
 - 0.2 – 0.4 MGD (5 WWTPs)
 - Various treatment processes
 - Some w/ no industrial users
- Screen select fields from WWTPs with high conc. of PFOS in biosolids
 - Spring 2019
 - Wixom, Ionia and Bronson
 - Revisit City owned field in Lapeer (complete)
 - Follow-up based on results
- Sample fields from WWTPs with “typical/low” PFOS concentrations in biosolids
- Identify data gaps
- In lieu of criteria, develop guidance to assist with biosolids management decisions

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2018 Statewide Study WWTP Influent and Effluent Data

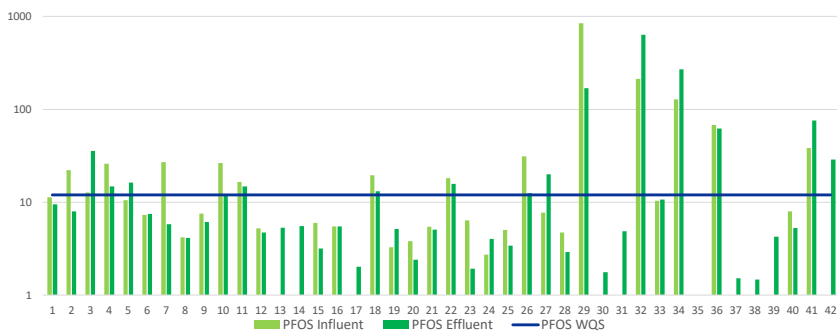


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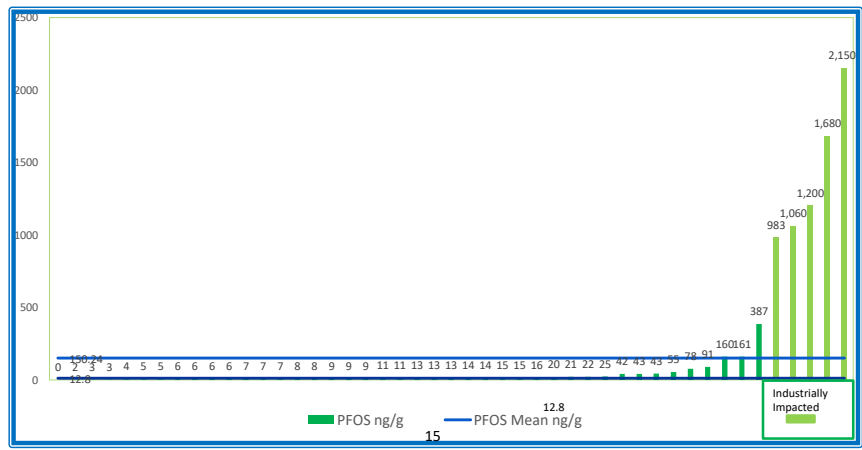
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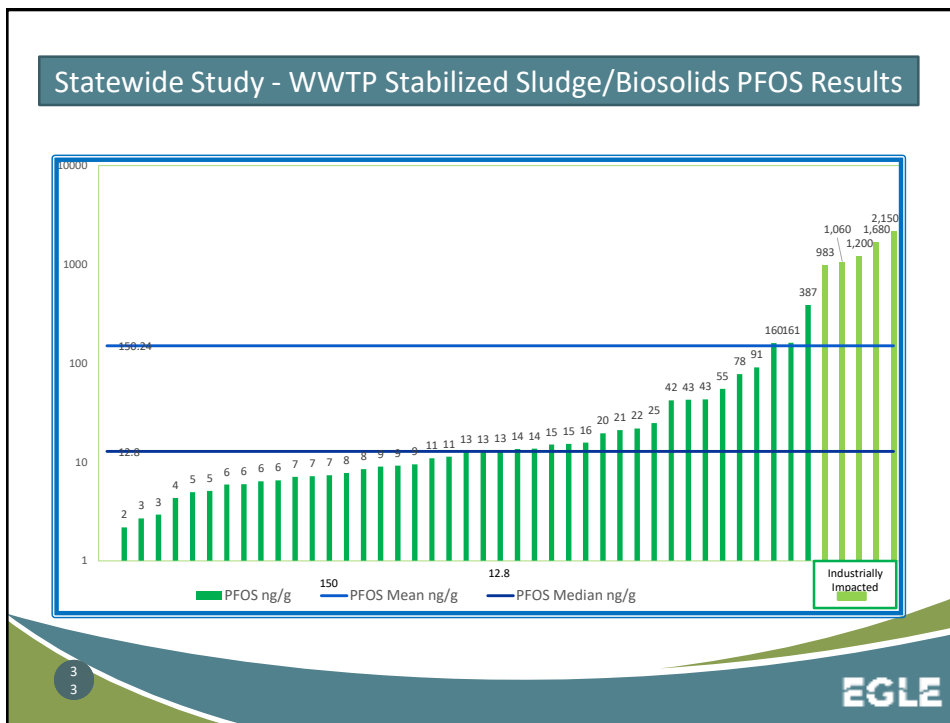
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2018 Statewide Study WWTP Influent and Effluent Data



Statewide Study - WWTP Stabilized Sludge/Biosolids PFOS Results



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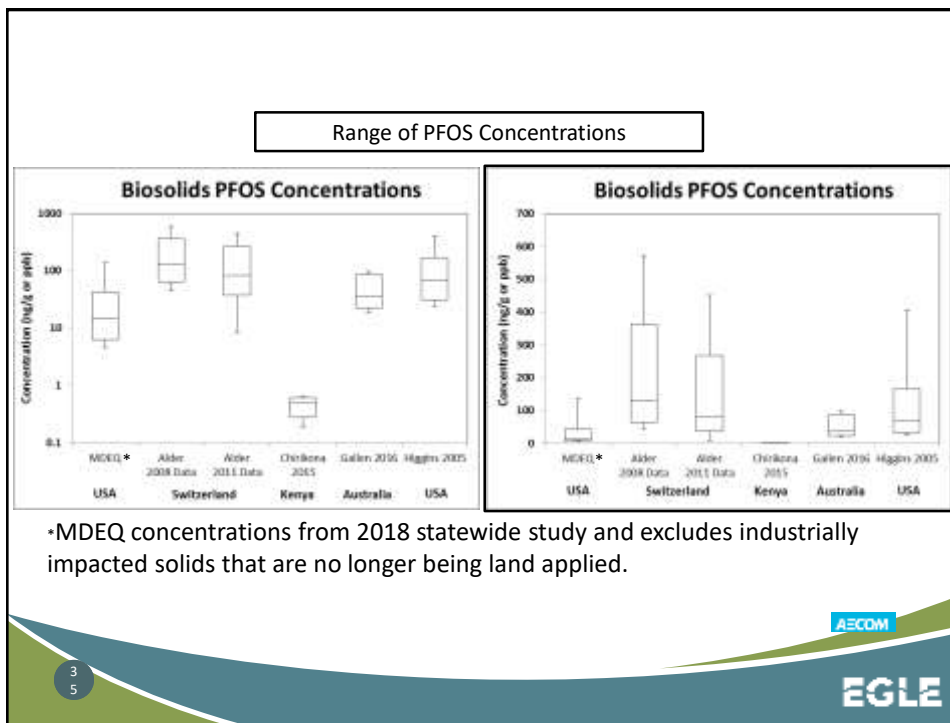
PFAS in Sludge /Biosolids - When is it considered industrially impacted?

No regulatory Limit - Looking to EPA to lead

- WWTP's biosolids/sludge w/highly elevated PFOS concentrations
- WRD determination – suspension of residual management program
- Determination whether “industrially impacted” is based on a number of factors
 - Review of land application studies with high PFAS concentrations (Decatur, Alabama)
 - Literature review of known concentrations of PFAS in biosolids

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Land Application Site Screening

- Field selection procedure to prioritize fields for screening
- April 2019 – Field Screening
 - Land App sites used by WWTPs with high PFOS concentrations
 - Revisit City owned field in Lapeer (complete)
 - Land app sites used by WWTPs with low/typical PFOS concentrations ranges
 - Soils, drain tiles, swales, surface waters
 - Follow-up if necessary

0 0.15 0.3

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Biosolids – *Next Steps*

- Compile / analyze results from IPP initiative and the statewide WWTP biosolids sampling
- Continue Biosolids MPART / stakeholder group meetings
- Land Application Site investigations, compile /analyze results
- Develop guidance for land application of biosolids

www.Michigan.gov/PFASresponse

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