

Michigan Pretreatment Program and Biosolids Strategies for PFAS Reduction

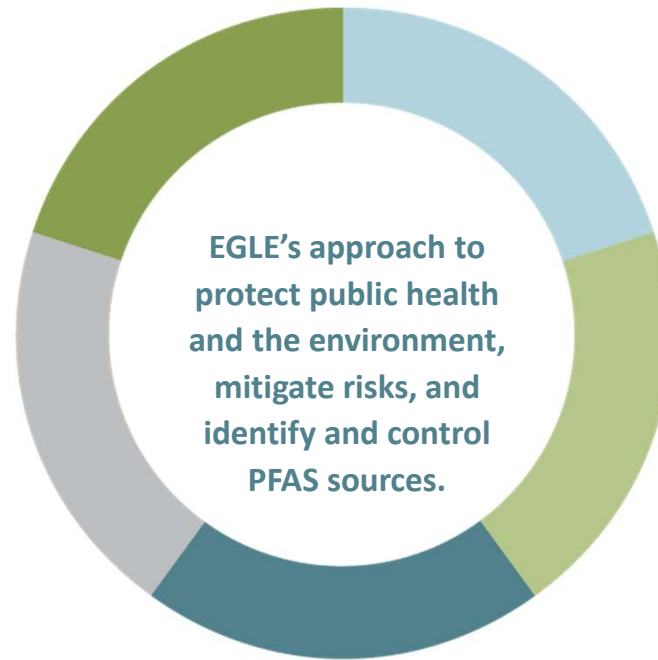
December 1, 2023

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Water Resources Division: PFAS Compliance Strategies

Public and Private Municipal Groundwater Discharges Compliance Strategy: Outlines how EGLE will prioritize, evaluate, and address PFAS from municipal groundwater discharges.

Industrial Stormwater and Industrial Direct Discharge Strategy: Requires PFAS characterization and mitigation of discharges to surface water and groundwater.



Land Application of Biosolids Containing PFAS Interim Strategy: Requires all WWTPs to sample for PFAS prior to land application.

Municipal NPDES Permitting Strategy: Includes PFAS monitoring, limits, and compliance schedules, as applicable.

Industrial Pretreatment Program PFAS Initiative: Requires all IPP WWTPs to conduct PFAS source investigation.

Michigan PFAS Criteria: Surface Water

Rule 57 Toxic Substances of the Part 4 Water Quality Standards

Natural Resource & Environmental Protection Act (NREPA) – Part 31, Water Resources Protection

PFAS	HNV* (drinking) (ng/L)	HNV* (nondrinking) (ng/L)
PFOS	11	12
PFOA	66	170
PFBS	8,300	670,000
PFHxS**	59	210
PFNA**	19	30

Industrial Pretreatment Program PFAS Initiative

- February 2018 – 95* WWTPs required to screen Industrial Users
 - Evaluate Industrial Users with potential sources of PFAS
 - Follow-up sampling of probable sources if found
 - Sample WWTP effluent if sources > screening criteria (12 ppt PFOS)
 - Sample WWTP biosolids if WWTP effluent \geq 50 ppt PFOS
 - Reports submitted 2018-2019
 - Ongoing Monitoring and Reporting for WWTPs that found PFOS

Findings: Sources of PFOS - Number by Type

Industry/Category/Type	Total Number Evaluated ¹	Number (%) Sources of PFOS by Type ²	Range Effluent PFOS exceeding screening level of 12 ppt
Landfills	64	54 (84%)	13-9,800
Metal Finishers	321	55 (17%)	19-240,000
Contaminated Sites	47	23 (49%)	14-220,000
Industries with AFFF Use	22	15 (70%)	13-65,000
Centralized Waste Treaters (CWTs)	15	13 (87%)	13-53,000
Commercial Industrial Laundries	21	6 (29%)	13-69
Chemical Manufacturers	23	6 (26%)	13-4,600,000
Paper Manufacturing, Packaging	17	6 (35%)	13-810

¹Estimated based on 2022 WWTP IPP Annual Report data for total metal finishers; others estimated based on industries surveyed and/or sampled during the IPP PFAS Initiative. Number of types per subcategory may be low since sewer users that did not meet local screening criteria may not have been sampled. The information presented in this document has been compiled from many sources including, but not limited to, compliance submittals, laboratory reports, voluntary surveys, emails, internet searches and personal communications. These sources contained variable levels of detail. This document represents our best effort to compile, organize, and summarize this information at this point in time.

²*Sources* are those exceeding the screening level of 12 ppt PFOS at least once.



Fume Suppressant Study

EPA worked with EGLE to study PFAS releases from chrome platers/chromic acid etchers.

- Subset inadvertently releasing PFOS into environment despite ban/phase-out (2015 and prior)
- Are current PFOS “replacement” fume suppressants used at chrome plating facilities contributing to elevated PFOS in discharges?

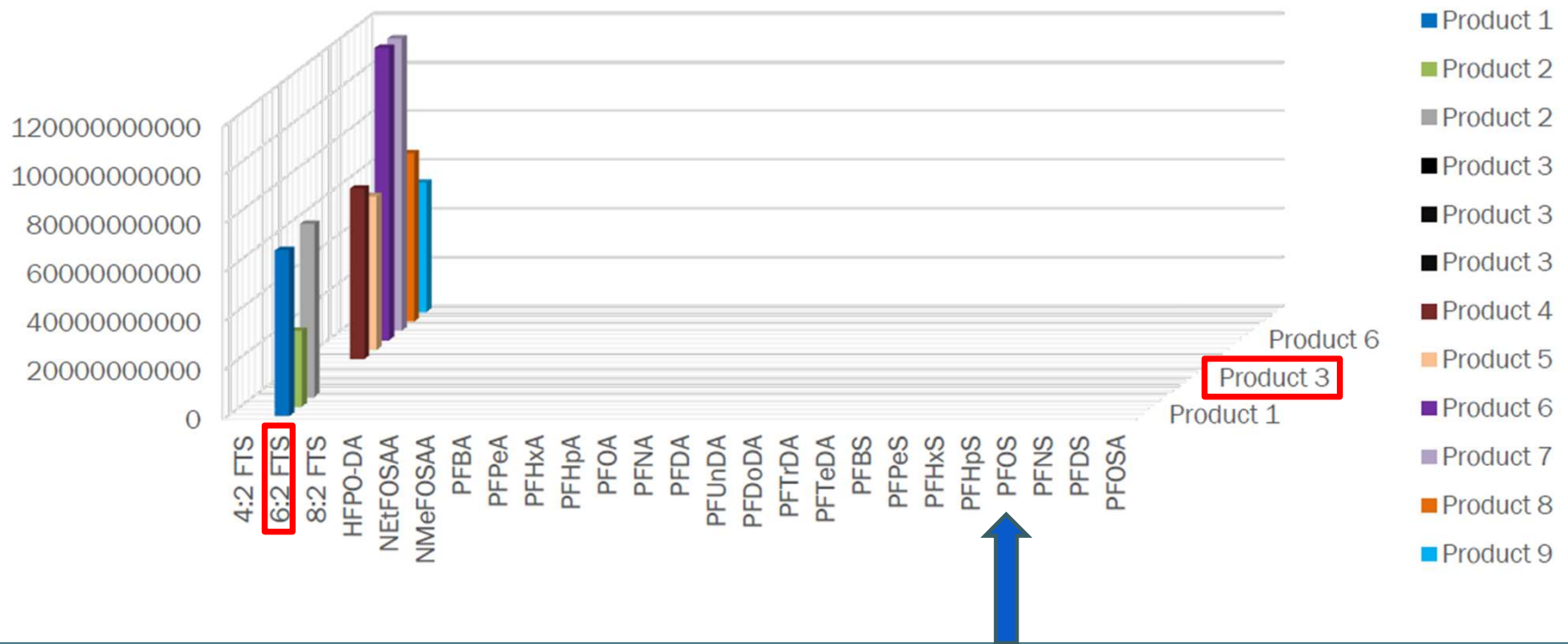
Purpose of Study

Is PFOS in chrome plater effluent linked to currently-used products?

- Analyze Fume Suppressants for PFAS
 - Is PFOS present?
 - Are precursors to PFOS present?
- Analyze Chrome Plater Effluent for PFAS (prior to any pretreatment for PFAS)
 - Compare to Currently-Used Products

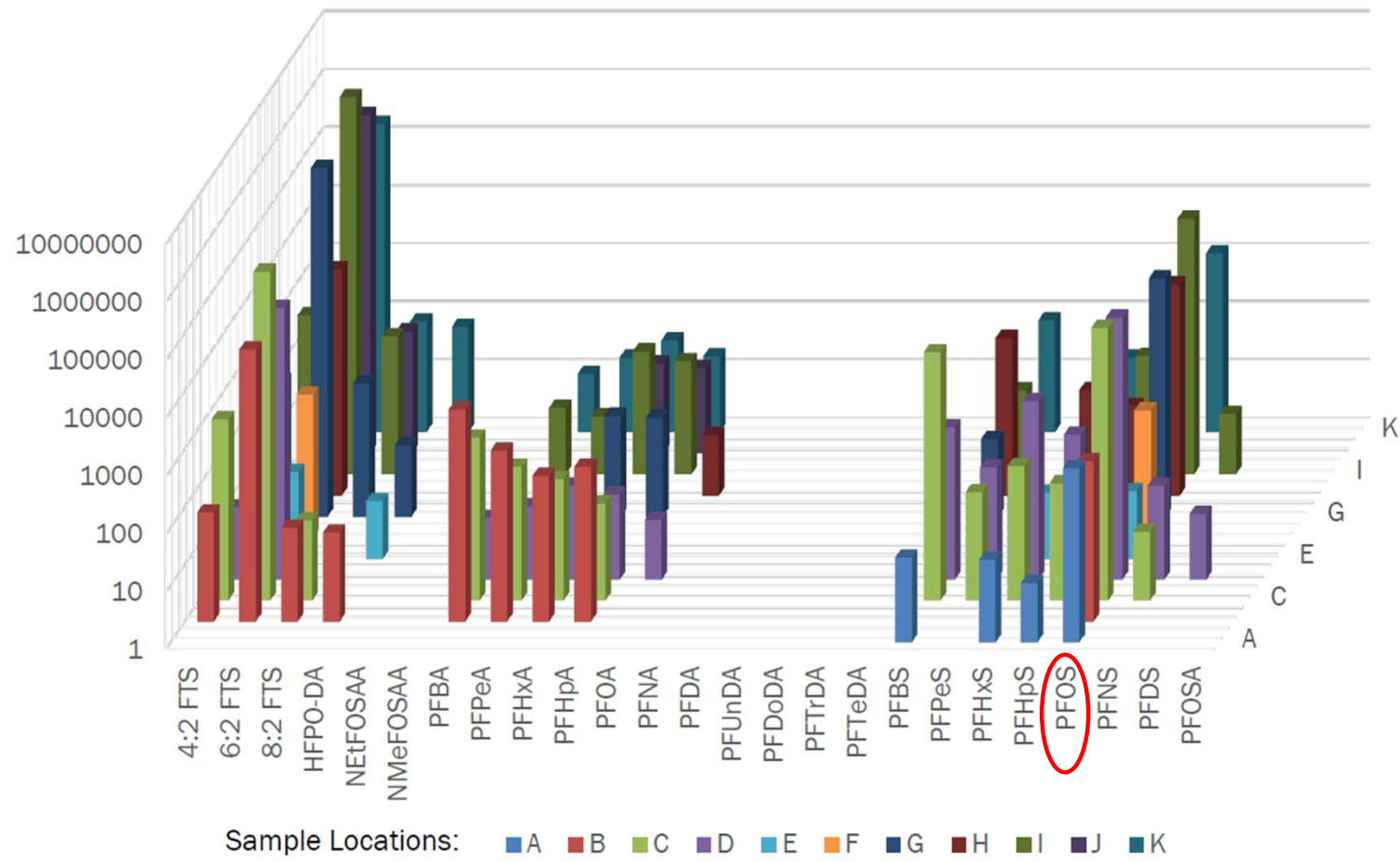
Is PFOS in Currently-Used Fume Suppressants? No

Figure 1. PFAS in Fume Suppressants, ng/L or ppt



Which PFAS are in Chrome Plater Effluent?

Figure 3: PFAS in Effluent Prior to Treatment, ppt or ng/L

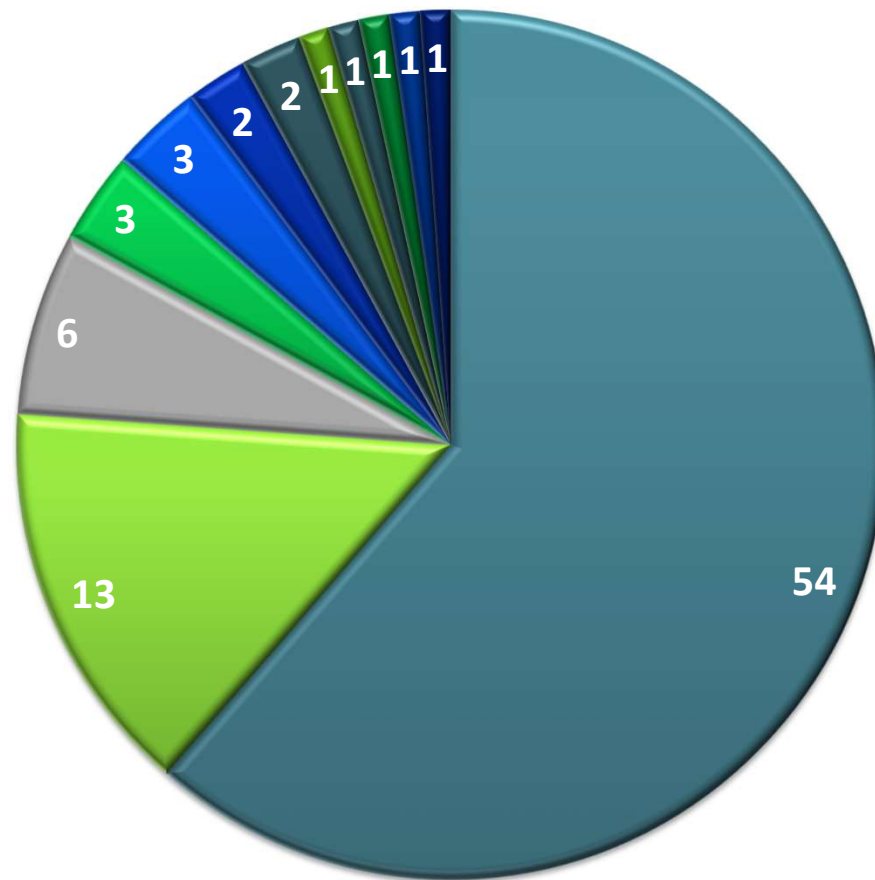


Summary-Fume Suppressant Study

- **No currently-used fume suppressants containing PFOS or PFOS precursors were found in this study**
- PFOS found in untreated effluent is likely due to historical use and the nature of “forever chemicals”
- Currently-used fume suppressants may contain other PFAS compounds, primarily 6:2 FTS

- IU GAC Only
- IU Clean/Replace/Line/Disconnect
- IU GAC & Ion Exchange Resin
- WWTP/IU Bulkheading Sewers
- IU PAC Added to Bulk Treatment Tank
- IU Benefit from Source Water GAC
- WWTP Limiting Volume Wastewater
- IU Lining Sewers
- IU Unknown Pretreatment
- IU Surface Active Foam Fractionation
- IU Super-Critical Water Oxidation
- IU In-Situ Storm Water Pretreatment

PFOS Reduction Methods Used, by Number of Industrial Users (IUs) and WWTPs*

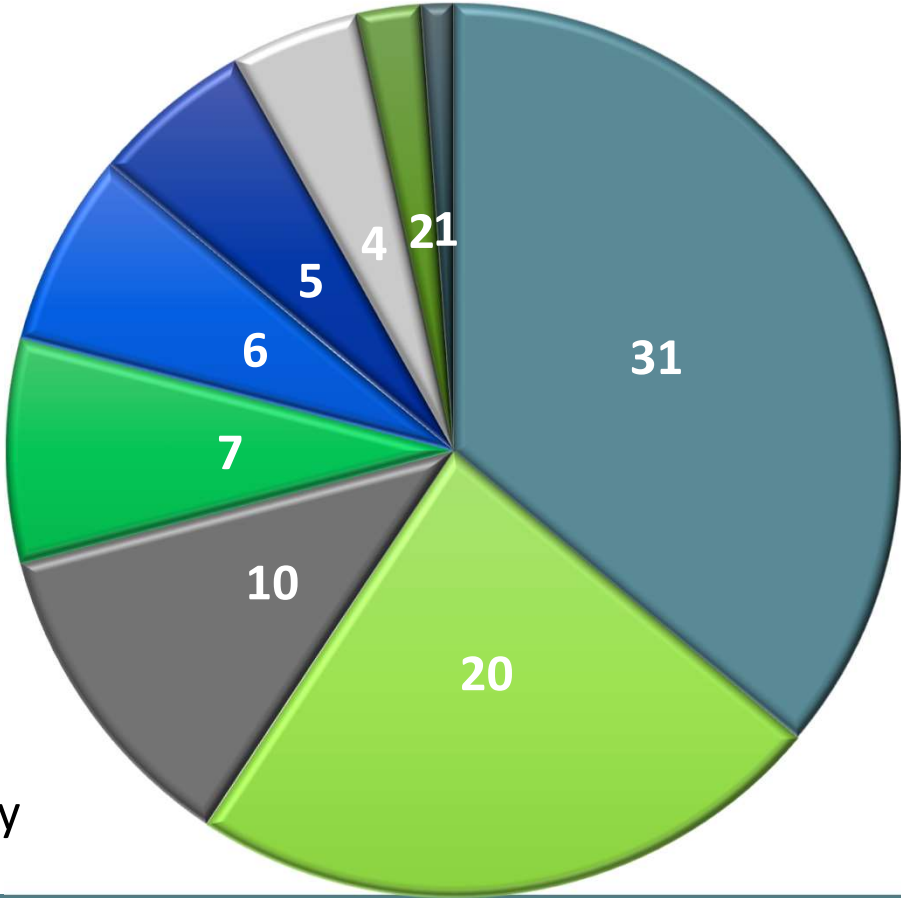


*Indirect Users Only

PFAS Pretreatment/Reduction by Industry Sector*

(Number Each Sector)

- Metal Finishers
- Contaminated Sites
- Centralized Waste Treaters
- AFFF Users
- Landfills
- Other
- Chemical Mfrs
- Paper Mfrs
- Recycling/Scrap Yards

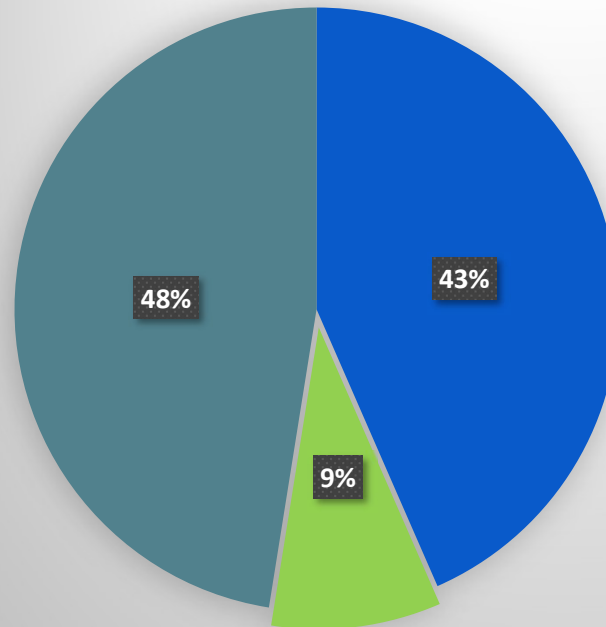
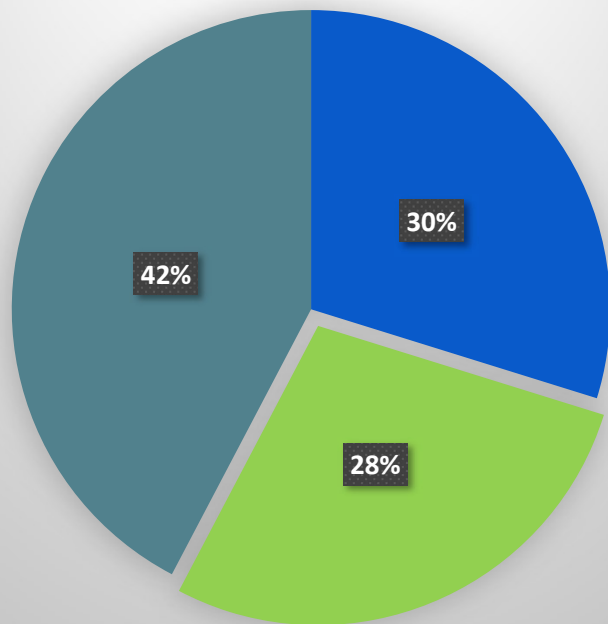


*Indirect Dischargers Only

IPP WWTP Discharge Compliance, PFOS WQV

December 2019

August 2023



- WWTP Discharge Meets PFOS Criteria but PFOS Source(s) Identified
- WWTP Discharge Does Not Meet PFOS Criteria and PFOS Source(s) Identified
- No Source(s) of PFOS Identified

Reductions in PFOS in Industrially Impacted Biosolids from WWTPs

Municipal WWTP	Highest Effluent PFOS (ppt)	Most Recent* Effluent PFOS (ppt)	PFOS Reduction in Effluent	2017/2018 Biosolids PFOS (ppb)	2021 Biosolids PFOS (ppb)	2022 Biosolids PFOS (ppb)	2023 Biosolids PFOS (ppb)	PFOS Reduction in Biosolids
WWTP #50	540	3.6	99%	983	140	16	14	99%
WWTP #14	360	4.72	99%	1060	120	86.7	27.2	97%
WWTP #57	2000	7.24	99%	1680	33	30	23	99%
WWTP #54	240	6.5	93%	387	74/180	63	NA	84%
WWTP #92	4800	3.9	99%	2150	113	NA	17	99%

EGLE refers to biosolids as being industrially-impacted when the PFOS concentration is greater than 125 ppb

Municipal WWTPs*

NPDES PFAS Permitting Strategy

- **Effluent Limits for PFOS, PFOA and/or PFBS**
 - Permits issued after **October 1, 2021**
 - Monitoring with schedules to achieve compliance with PFOS/PFOA/PFBS limits
 - Corrective Action Plans in rare cases
- **Effluent Monitoring Requirements**
 - Monthly, Quarterly, or Annual
 - Based on sources and effluent quality
- **IPP WWTPs:**
 - Establish Local Limit(s)
 - Source Reduction/Control, Compliance and Enforcement under IPP
- **Non-IPP WWTPs:**
 - Minimization Plans if needed

*IPP WWTPs; non-IPP EPA Majors;
non-IPP w/elevated biosolids

Land Application of Biosolids Containing PFAS

Interim Strategy Goals

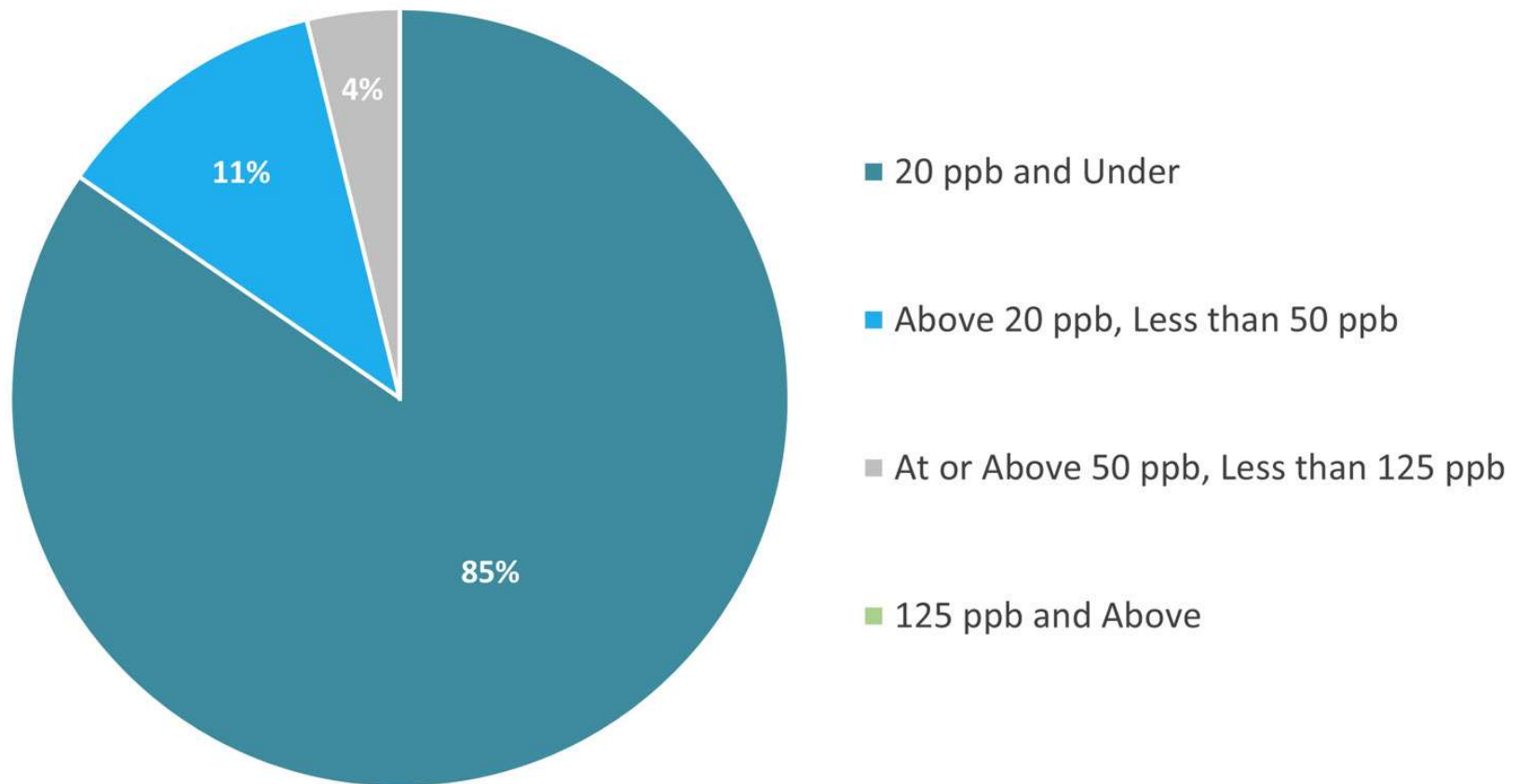
- Reduce PFAS concentrations in biosolids to the maximum extent practicable, while achieving or maintaining compliance with Surface Water Quality Values (WQV) at the wastewater treatment plant (WWTP) effluent
- Prevent land application of industrially-impacted biosolids
- Mitigate (reduce) risks moving forward
- Continue source identification and reduction efforts to drive down PFAS concentrations in impacted biosolids as quickly as possible

Land Application of Biosolids Containing PFAS

Interim Strategy Requirements

- First Implemented July 1, 2021; Updated January 1, 2024
- Refers to residuals from wastewater treatment plants (WWTPs) which undergo additional treatment to be land applied as biosolids
- Required Sampling frequency (**2024**)
 - One representative sample per calendar year prior to land application
 - For Exceptional Quality (EQ) Biosolids, quarterly monitoring
- Communication to landowners/farmers required **prior** to land application
- All sample results must be submitted to EGLE via MiEnviro Portal

2023 Biosolids Interim Strategy WWTP PFOS Levels



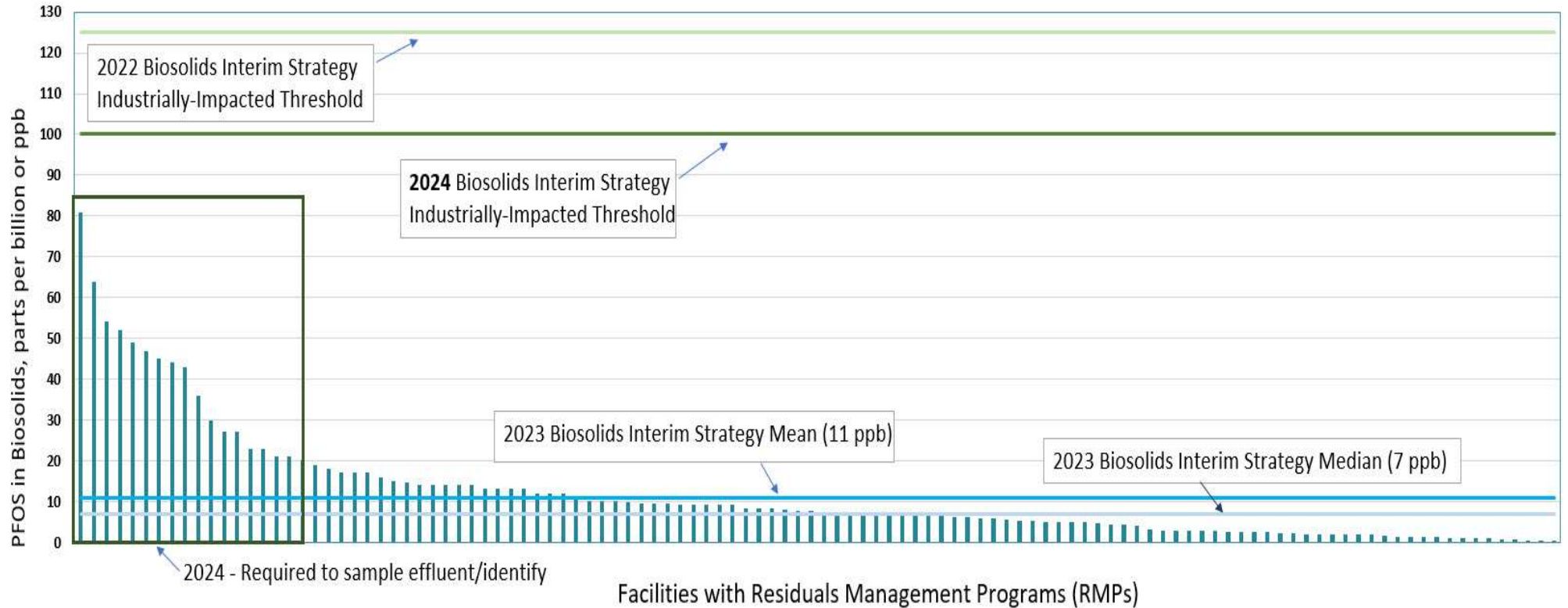
Updates to Biosolids Interim Strategy Tiers

- EGLE Plans to Update Interim Strategy in 2023
- Effective January 1, 2024
 - **PFOA added as analyte to review**
 - Based on the PFOS and/or PFOA results:
 - **Equal to or Below 20 ppb (no change)**
 - No restrictions/additional requirements
 - **Above 20 ppb – Less than 100 ppb (updated)**
 - **Required** to sample effluent and identify sources
 - **Required** to mitigate during land application rate
 - » 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



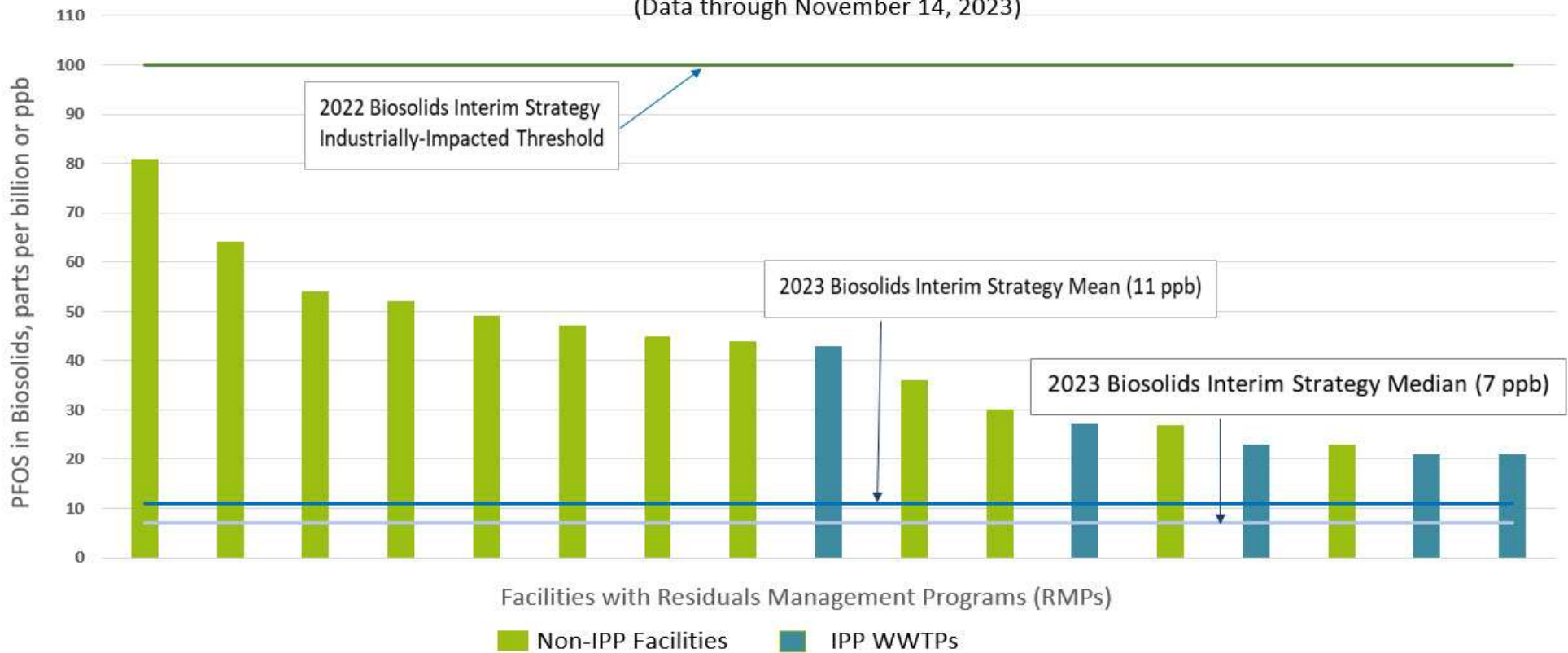
Updated Strategy Reduces Thresholds for Industrially Impacted and Mitigation Requirements

2023 Biosolids Data (Received through November 14, 2023)



Facilities with Residuals Management Programs (RMPs) and PFOS Greater than 20 ppb in 2023: IPP versus Non-IPP

(Data through November 14, 2023)



- **IPP PFAS Initiative:** [IPP PFAS Initiative Webpage](#)
- **Source Doc:** [Industrial Sources of PFOS to Municipal Wastewater Treatment Plants as identified through the Michigan Department of Environment, Great Lakes, and Energy Industrial Pretreatment program Per-and Polyfluoroalkyl Substances Initiative](#)
- **Summary Report:** [Initiatives to Evaluate the Presence of PFAS in Municipal Wastewater and Associated Residuals \(Sludge/Biosolids\) in Michigan](#)
- **Detailed Report:** [Evaluation of PFAS in Influent, Effluent, and Residuals of Wastewater Treatment Plants \(WWTPs\) in Michigan](#)
- **Permit Strategy:** [Municipal NPDES Permitting Strategy for PFAS](#)
- **Industrial Direct Discharge/Stormwater Strategy:** [Compliance Strategy for Addressing PFAS From Industrial Direct Dischargers and Industrial Stormwater Discharges](#)
- **Biosolids Strategy:** [Land Application of Biosolids Containing PFAS Interim Strategy](#)
- **Field Summary and Technical Reports:** [EGLE Biosolids PFAS Webpage](#)
- **Groundwater Discharge Strategy:** [Compliance Strategy for Addressing PFAS from Public and Private Municipal Groundwater Discharges](#)
- **Fume Suppressant Study:** [PFAS in Fume Suppressant Products at Chrome Plating Facilities](#)
- **MPART:** <https://www.michigan.gov/pfasresponse/>