PFAS and Biosolids

EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

What are sewage sludge and biosolids?

When sewage from households and businesses is sent to a wastewater treatment plant (WWTP), the liquids are separated from the solids, producing a nutrient-rich product known as "sewage sludge." The term "biosolids" refers to nutrient-rich organic materials which undergo additional treatment processes to stabilize the materials and kill pathogens prior to being utilized as a soil amendment and conditioner. Biosolids are typically beneficially used on agriculture land, although under certain conditions biosolids can be used on forest lands, reclamation sites and public use sites. Depending on the treatment process, biosolids come in various forms, such as liquid, dewatered cake, slurry, composted materials, or dried pellets.

What are potential sources of per- and polyfluoroalkyl substances (PFAS) in sewage sludge?

Current and historical activities that can contribute PFAS to sewage sludge include

- Industrial releases (e.g., certain types of firefighting foam, pulp and paper plants, metal finishing/electroplating plants)
- Commercial releases (e.g., car washes, industrial launderers)
- Down-the-drain releases from homes (e.g., use of consumer products like after-market water resistant sprays, cosmetics, ski wax, floor finishes, laundering of stain or water-resistant textiles with PFAS coatings).
- If products containing PFAS are disposed of at a municipal solid waste landfill, because the most common disposal practice for landfill leachate is to transfer it to a WWTP, then the landfill's leachate could be a source of PFAS to a WWTP.

Studies have found PFAS in sewage sludge even at WWTPs that only receive wastewater from residential and commercial users.

What are PFAS?

Per- and polyfluoroalkyl substances (PFAS) are widely used in consumer and industrial products such as:

- ❑ Personal care products
- ❑ Clothing and carpet treatments
- ❑ Adhesives, sealants, and protective coatings
- ❑ Firefighting foam
- ❑ Food packaging
- ❑ Pesticides

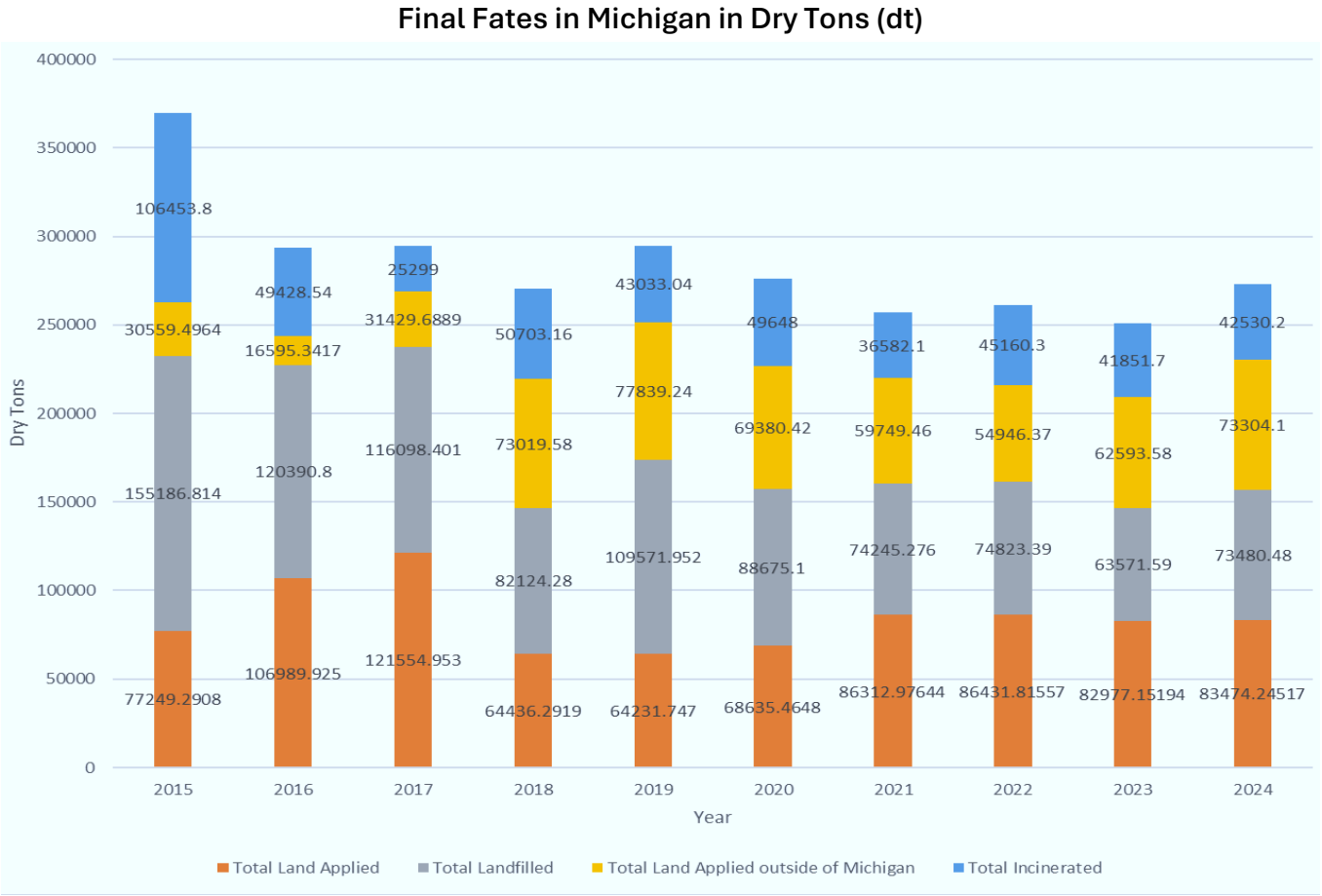
These substances are highly persistent in the environment and are frequently detected in soil, lakes and streams, and groundwater. Some PFAS are bioaccumulative and cause adverse human health effects at certain levels of exposure.

Which PFAS are monitored in Biosolids?

Currently, 28 PFAS analytes are analyzed for in biosolids. Additional information regarding PFAS analysis can be found in the MPART – PFAS Minimum Laboratory Analyte List (Michigan.gov/PFASResponse/Investigations/Sampling-Guidance/Analyte-List)

What are the alternative disposal options for WWTP biosolids if they are not land applied?

If biosolids are not beneficially used for land application, the only options left for WWTPs are to either incinerate or landfill their solids. Currently, only three facilities in Michigan have biosolids incineration stacks and therefore is not an option available to most WWTPs. Municipalities can landfill their biosolids, but there can be costly fees associated with landfilling, and some landfills may not accept biosolids. Additionally, many facilities don't have the infrastructure to dewater their biosolids (make them more solid) which may be a requirement from a landfill. The following bar graph shows the total dry tons of biosolids that were either land applied (orange bar), landfilled (grey bar), land applied outside of Michigan (yellow bar), or incinerated (blue bar).

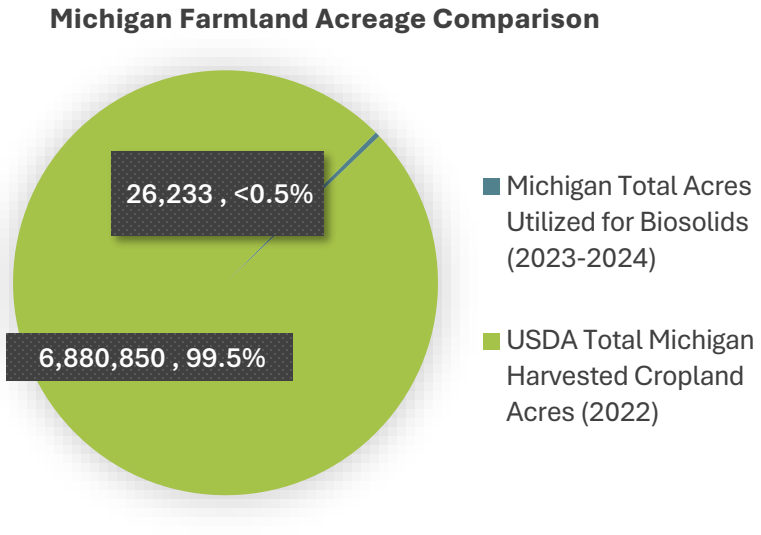


Do municipalities sell biosolids to farmers and/or landowners?

Municipalities typically pay for the hauling and land application of biosolids, providing a fertilizer alternative at zero charge to local farmers and/or landowners. Some facilities sell municipal biosolids, but this is not the typical case in Michigan. The Cadillac and Haring Township WWTPs both land apply the solids at a cost to the municipality. The New England Fertilizer Company (NEFCO) offers pelletized Class A Exceptional Quality biosolids that are sourced from the Great Lakes Water Authority (GLWA) biosolids drying facility and are delivered to farmers across the state at a cost to the farmer.

How much farmland in Michigan receives biosolids?

This pie chart shows the total Michigan harvested cropland acres reported in 2022 from United States Department of Agriculture (USDA) compared to the total acres in Michigan utilized for biosolids land application (as reported in the biosolids annual reports from October 2023 to September 2024). The percentage of acres used for biosolids is less than a half of a percent of the total acres of harvested cropland in the state.

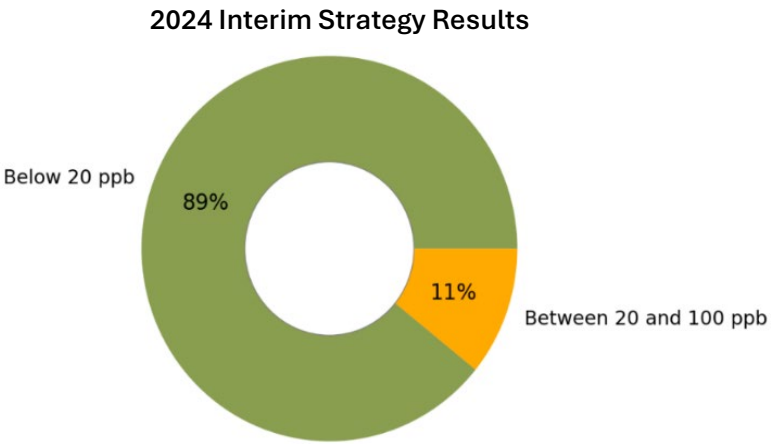


What is EGLE doing to address perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in biosolids?

EGLE implemented the Land Application of Biosolids Containing PFAS Interim Strategy first in 2021, with subsequent modifications in 2022 and 2024. This strategy put in place thresholds for how biosolids may be land applied (along with other requirements for the WWTP) based on concentrations of PFOS and PFOA with the 2024 update. All facilities that land apply Class A or Class B biosolids are required to collect one representative sample of the finished biosolids product per calendar year prior to land application. Facilities with biosolids designated as Exceptional Quality are required to collect quarterly samples of the finished biosolids product.

Tier / Threshold for PFOS and PFOA concentration	Facility Requirements
Below 20 parts per billion (ppb)	• Notify landowner and/or farmer of PFAS results
Between 20 ppb and 100 ppb	• Notify landowner and/or farmer of PFAS results • Reduce application rate to a maximum of 1.5 dry tons per acre • Sample facility discharge within 30 days • Implement a source reduction plan
Industrially Impacted (Greater than 100 ppb)	• Land application is prohibited • Sample facility discharge within 30 days • Implement a source reduction plan

Results from the 173 facilities that submitted biosolids PFAS sample results in 2024 show the majority of biosolids produced in Michigan are below 20 ppb for PFOS and/or PFOA. Cadillac WWTP, Haring Township WWTP, and the Great Lakes Water Authority (GLWA) fall in this category. The 11% of facilities with biosolids between 20 and 100 ppb are taking steps to identify the source or sources of PFOS and PFOA and implement a source reduction plan.



Please visit Michigan.gov/EGLE/About/Organization/Water-Resources/Biosolids/PFAS-Related for more information.

Where are farmers in Cadillac and Wexford County getting their biosolids?

Farmers in Cadillac and Wexford County may be getting biosolids from Cadillac, Haring Township, or from the GLWA.

What are the PFOS and PFOA levels found in biosolids from Cadillac WWTP, Haring Township WWTP, and the GLWA Water Resource Recovery Facility (WRRF)?

Cadillac and Haring Township were not required to sample biosolids for PFAS prior to 2021. All data from 2021 to present is provided in the following table. The PFOS and PFOA results from Cadillac and Haring Township are below the 2024 statewide average of 8.4 ppb and 5 ppb respectively.

GLWA data for 2018 exists due to their inclusion in an EGLE statewide study. GLWA is the largest single site wastewater treatment plant in the country and receives wastewater from 77 municipalities. While the GLWA has identified industrial sources of PFAS, historically their biosolids concentrations have been close to the statewide average due to industrial wastewater containing PFAS mixing with high volumes of wastewater from other sources such as residential and commercial establishments. Their recent biosolids concentrations are showing a decrease in PFOS concentrations to below the statewide average due to industries reducing or eliminating PFAS from their discharge.

Land Application Years

Site	2018 PFOS*	2018 PFOA*	2021 PFOS	2021 PFOA	2022 PFOS	2022 PFOA	2023 PFOS	2023 PFOA	2024 PFOS	2024 PFOA	2025 PFOS	2025 PFOA
Cadillac			<5.5	<5.5	<6.3	<6.3	<7.5	<7.5	5.1	2.3	3.5	3.5
Haring Twp					5.7	1.6			3.0	0.6		
GLWA	9.4	1.9	13.5	0.927	12	0.53	7.6	0.45	4.9	0.86	3.8	0.53

*Results are listed in parts per billion (ppb)

What investigations have there been regarding biosolids in Michigan?

EGLE has focused on identifying and controlling industrial sources of PFAS to WWTPs in order to decrease PFAS concentrations in biosolids and prohibit the land application of industrially impacted biosolids. EGLE has prioritized resources and efforts on investigating areas that are known to have received industrially impacted biosolids in the past. Biosolids in these areas had concentrations of PFOS three to four orders of magnitude (1,000x to 10,000x) greater than biosolids that have been applied in the Wexford County Area of Interest. Areas that have not received industrially impacted biosolids are not expected to have the impacts to soils, surface water, groundwater and crops as those observed at industrially impacted sites. To view the reports of sampling conducted at land application sites please visit: Michigan.gov/EGLE/About/Organization/Water-Resources/Biosolids/PFAS-Related.

Cadillac WWTP, Haring Township WWTP, and GLWA WRRF have had low levels of PFOS and PFOA in their biosolids since testing began and there is no evidence to indicate industrially impacted biosolids have been land applied to area farm fields or that land application is a source of groundwater contamination in this area.

Future updates to the Land Application of Biosolids Containing PFAS Interim Strategy?

Currently, there are no established federal criteria for PFAS in biosolids. In 2025, the United States Environmental Protection Agency (USEPA) released a Draft Sewage Sludge Risk Assessment for PFOA and PFOS. The draft risk assessment is based on risk to a farm family with 40 years of biosolids land application on their farm and nearly all of their products (e.g. food crops, animal products, drinking water) produced from the farm. The draft risk assessment does not model risk to the general public. The draft risk assessment does not contain regulatory thresholds, standards, or screening values but is a necessary step towards USEPA making a determination as to whether PFOS and PFOA in biosolids requires regulation. The period for public comments on the draft assessment has been extended to August 14, 2025. More information on the risk assessment can be found at epa.gov/biosolids/draft-sewage-sludge-risk-assessment-perfluorooctanoic-acid-pfoa-and-perfluorooctane.

Since 2018, EGLE has focused on understanding PFAS concentrations in municipal wastewater and biosolids, identifying and controlling industrial sources of PFAS to WWTPs, and ensuring biosolids that are determined to be industrially impacted are not land applied. EGLE will continue to review new information as it becomes available and make adjustments to the biosolids interim strategy as necessary to facilitate the beneficial recycling of biosolids via land application to the extent the practice is compliant with applicable criteria and our overall mission of protection of public health and the environment.

Additional Resources

Interstate Technology Regulatory Council Biosolids and PFAS Fact Sheet: pfas-1.itrcweb.org/wp-content/uploads/2023/10/Biosolids_PFAS_Fact_Sheet_Sept2023_final.pdf

USEPA Fact Sheet: Draft Sewage Sludge Risk Assessment for PFOA and PFOS: epa.gov/system/files/documents/2025-01/fact-sheet-draft-sewage-sludge-risk-assessment-pfoa-pfos.pdf

MPART Wexford Area of Interest Self Sampling: Michigan.gov/PFASResponse/Investigations/Sites-AOI/Wexford-County/Wexford-Area-of-Interest-Self-Sampling-Investigation

More Information

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