

Minnesota Biosolids PFAS Strategy

Per and poly-fluoroalkyl substances (PFAS), a group of more than 5,000 human-made chemicals, have been used widely throughout the United States in industrial processes and in consumer products. The Minnesota Biosolids PFAS Strategy (Strategy) will provide a better understanding where and what types of PFAS are being discharged to municipal wastewater treatment facilities (WWTFs) and support source identification and reduction efforts that are already under way at many WWTFs. It will help guide biosolids land application decisions and allow farmers and landowners to make informed decisions related to land application of biosolids.

The following is a summary of the components of the Strategy:

- **PFAS sampling:** For any biosolids from a WWTF that are intended to be land applied, analysis of PFAS compounds will be required prior to land application;
- **Required actions:** The amount of PFAS in the sample may require the WWTF to apply at a reduced application rate or may prohibit land application;
- **Reduction efforts:** The amount of PFAS in the sample may require the WWTF to begin or expedite existing PFAS source identification and reduction efforts; and
- **Communication:** The WWTF must communicate information to landowners, farmers, and the Minnesota Pollution Control Agency (MPCA) about the level of PFAS in biosolids and source identification and reduction efforts underway.

The MPCA made a draft of the Strategy available for public review from Nov. 12 – Dec. 12, 2024. As a result of the feedback received, MPCA made clarifications and changes including minor adjustments to the tier levels, clarifying sampling and notification requirements, and adding additional communication to the landowner and farmers.

Background

WWTFs receive PFAS contained in wastewater from industrial, commercial, and residential sources and, therefore, can be a conduit for PFAS entering the environment. This results in PFAS leaving the WWTF in the wastewater effluent and biosolids. Biosolids are nutrient-rich organic materials generated during the treatment of domestic sewage sludge at municipal WWTFs. Biosolids can be land applied after undergoing additional treatment and testing to minimize risk to human health or the environment. Treatment processes differ at each WWTF, resulting in various forms of biosolids such as liquids, cakes, or dried pellet-like products.

Land applying biosolids has many benefits like providing organic matter, macro, and micronutrients to soil, carbon sequestration, providing an economical way to manage biosolids, and conserving landfill space. About 20% of the biosolids generated in Minnesota are land applied on cropland and reclaimed lands. Biosolids land application occurs on less than 0.1% of cropland in Minnesota.

When land applied, PFAS in biosolids has the potential to move in the environment, potentially contaminating soils, surface and groundwater, or be up taken by crops. State and federal requirements set strict requirements on the concentrations of metals that can be in biosolids and where, when, and how much can be applied. There are prohibitions on applying near homes, wells, lakes, wetlands, and on steep slopes. WWTFs must have trained and certified personnel doing this work. Each site must be reviewed and approved by the MPCA before biosolids can be land applied.

The 2023-2024 Minnesota Legislature directed the MPCA to develop and begin implementing a strategy to test PFAS in biosolids that are applied to land. Based on work completed in other states like Michigan, low levels of

PFAS are expected to be found in the majority of the biosolids land applied in Minnesota. This Strategy is an important first step to understand if there are any biosolids in Minnesota that contain elevated levels of PFAS.

While some PFAS compounds are linked to health impacts, the potential human health risk of PFAS exposure due to biosolids land application is not clearly known nor are there any state or federal regulations pertaining to PFAS and biosolids. The information we learn from this effort, as well as additional sources of information including the U.S. Environmental Protection Agency's (EPA) pending Risk Assessment of Pollutants in Biosolids¹, will help to inform future MPCA actions pertaining to biosolids and PFAS.

Reducing PFAS from WWTFs

The most efficient and economical way to reduce PFAS coming from WWTFs is to reduce the PFAS coming in from industrial, commercial, and residential sources. Efforts to identify and reduce sources of PFAS being discharged into the wastewater system along with PFAS product bans such as Amara's Law, will reduce the amount of PFAS received by WWTFs. Work to prevent PFAS from entering WWTFs will result in lower levels of PFAS in the WWTP's effluent and biosolids.

In addition to this Strategy, the MPCA is taking the following steps to reduce PFAS in our surface and drinking waters:

- Implementing PFAS product prohibitions through [Amara's Law](#);
- Implementing the [PFAS Blueprint](#);
- PFAS source reduction work, per the [PFAS Monitoring Plan](#);
- Supporting EPA's effort of a risk-based evaluation of PFAS in biosolids;
- Collaborating with other states on PFAS Biosolids strategies;
- Implementing PFAS water quality standards applicable for drinking water; and
- Developing a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) wastewater permitting strategy.

Eighty-three WWTFs throughout Minnesota have conducted influent PFAS sampling completed as part of the PFAS Monitoring Plan. They are using monitoring data to identify and reduce PFAS coming into their facilities through PFAS pollutant minimization plans (PMP). Two additional rounds of influent PFAS sampling were collected in late 2024. Select facilities conducted biosolids sampling in fall 2024. This data will inform and further prioritize source identification and reduction work.

Strategy implementation details

The following process for sampling and response actions, based on sample results, apply to all WWTFs that intend to apply biosolids to land. This process is in addition to the current rules and regulations applicable to managing biosolids and ongoing efforts to reduce PFAS in municipal wastewater.

This Strategy is similar to those implemented in other states and partially based on the state of Michigan's Industrial Pretreatment Initiative and the studies of 42 municipal WWTFs². Using a similar approach, Michigan greatly reduced PFOS contributions to WWTFs through their source identification and reduction efforts with industrial contributors. Michigan saw reductions of PFOS in the effluent of facilities, as much as 99% reductions measured from four facilities.²

¹ [EPA's biosolids PFAS risk assessment webpage](#)

² [SUMMARY REPORT: Initiatives to Evaluate the Presence of PFAS in Municipal Wastewater and Associated Residuals \(Sludge/Biosolids\) in Michigan](#)

Sampling

WWTFs that land apply any biosolids in Minnesota must collect at least one biosolids sample and analyze it for PFAS, prior to land application. WWTFs may choose to do additional sampling. If it determines that it's necessary, the MPCA also may request additional samples.

The sample must be a representative sample of biosolids that are to be land applied and must be analyzed for 40 PFAS compounds using draft EPA Method 1633A. The sample results must be received prior to land application. Detailed sample collection requirements and guidance will be provided to WWTFs. The MPCA will work with WWTFs on their facility-specific sampling plan and timing of sample collection to ensure results are available prior to land application for cropping year 2026 which starts September 1, 2025. Sampling guidance will address the number of significant figures and how to consider the data if multiple samples are collected. All monitoring data submitted to the MPCA, if requested, is public information.

Response actions based on sample results

If the sample results show that PFAS is present in the biosolids, the WWTF must take the actions below. These actions are tiered and increase in stringency for higher levels of PFAS. The actions are intended to be protective of potential human health risks by assisting WWTF operators and farmers and landowners through the decision-making process of how and when land application may occur and whether source identification and reduction efforts should be implemented.

Tier 4: PFOA or PFOS concentrations ≥ 125 $\mu\text{g}/\text{kg}$

If a WWTF biosolids sample contains perfluorooctanic acid (PFOA) or perfluorooctane sulfate (PFOS) of 125 $\mu\text{g}/\text{kg}$ or greater, the following apply:

- The biosolids are considered industrially impacted;
- Land application is not allowed and the WWTF must arrange for alternative management of biosolids. Alternative management of biosolids most likely includes landfilling and/or transferring to another facility. The options available, viability, and cost of these alternatives will vary widely for each WWTF and may require transportation of the biosolids to an out-of-state facility;
- The WWTF must notify the MPCA within 10 days of receiving the test results;
- The WWTF must initiate or, if it's already begun, expedite existing source identification and reduction work. If a PFAS Pollutant Management Plan (PMP) has not been created and implemented, by 180 days, the facility must create, submit to the MPCA, and implement a PFAS PMP;
- The WWTF must sample its wastewater plant effluent and have it analyzed for PFAS, if not already required by its NPDES/SDS permit; and
- The MPCA may also consider additional site-specific requirements.

Tier 3: PFOA or PFOS concentrations 51-124 $\mu\text{g}/\text{kg}$

If a WWTF biosolids sample contains PFOA or PFOS between 51 and 124 $\mu\text{g}/\text{kg}$, the following apply:

- Prior to land application, the WWTF must provide the PFAS analytical results to the landowner and farmer (if different than the landowner) along with the MPCA contact information and additional information related to PFAS work in Minnesota. The MPCA will provide a template for the notification which will also include educational information on PFAS and where to find additional information regarding PFAS;
- The WWTF must initiate or, if it's already begun, continue with source identification and reduction work. If a PFAS Pollutant Management Plan (PMP) has not been created and implemented, within 180 days, the facility must create, submit to the MPCA, and implement a PFAS PMP;

- The WWTF must sample its wastewater plant effluent and have it analyzed for PFAS, if not already required by its NPDES/SDS permit;
- If land applied, the WWTF must reduce the loading of land applied biosolids to 1.5 dry tons per acre or provide an alternative risk mitigation strategy for the MPCA’s review and approval;
- If land applied, the WWTF must track the cumulative application rates on each land application site and report this information to the MPCA; and
- If appropriate, the WWTF must plan for alternative management options for biosolids.

Tier 2: PFOA or PFOS concentrations 21-50 µg/kg

If a WWTF biosolids sample contains PFOA or PFOS between 21 and 50 µg/kg, the following apply:

- Prior to land application, the WWTF must provide the PFAS analytical results to the landowner and farmer (if different than the landowner). The MPCA will provide a template for the notification which will also include educational information on PFAS and where to find additional information regarding PFAS.
- Prior to land application, the WWTF must provide MPCA contact information and additional information related to PFAS work in Minnesota. The MPCA will make a template available containing this information; and
- If land applied, track cumulative application rates on each land application site and report this information to the MPCA.

Tier 1: PFOA or PFOS concentrations ≤ 20 µg/kg

If a WWTF biosolids sample contains PFOA or PFOS less than 20 µg/kg, the WWTF must let the landowner and farmer (if different than the landowner) know that PFAS sampling was conducted and the results are available from the WWTF, if requested.

Exceptional Quality (EQ) Biosolids

Biosolids produced as EQ Biosolids are sold in bags and containers for domestic use. These products are held to higher standards for metal concentrations and must meet specific pathogen and vector attraction reductions options. Facilities who wish to obtain or maintain the EQ designation for biosolids must have a sum of PFOA and PFOS of 20 µg/kg or less. Compliance with this threshold must be demonstrated with quarterly sample results. If the combined sum of PFOA and PFOS is greater than 20 µg/kg, the facility must follow recommendations in the appropriate Tier above on approved land application sites or arrange for alternative management of the biosolids.

Timeline

In early 2025, the MPCA will develop sampling guidance and work with WWTFs on their facility-specific sampling plan and timing. Starting in September 2025, all WWTFs that land apply any biosolids will be required to collect and analyze a representative sample of biosolids for PFAS that are intended to be land applied. Biosolids PFAS requirements will be added to wastewater discharge (NPDES/SDS) permits as they are reissued. In the case that a PFAS analysis result requires additional actions, but the requirements haven’t been added to the permit yet, the MPCA will work with permit holders on an individual basis to ensure that proper follow up steps are taken.

Next steps

The MPCA will begin implementing the final Strategy in early 2025. We will continue to reevaluate PFAS in biosolids as the science evolves, as more is learned, or if state or federal requirements change. Days before finalizing this Strategy, EPA published a biosolids risk assessment. Due to the timing, this Strategy does not reflect the content of that risk assessment, but the MPCA will continue to evaluate this Strategy and make adjustments, as appropriate.