

Minnesota Biosolids PFAS Strategy for land application of biosolids

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 help to better understand where and what types of PFAS are being discharged to municipal wastewater treatment facilities (WWTFs), support source identification and reduction efforts that are already under way at many WWTFs, 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.

Background

WWTFs receive PFAS contained in wastewater from industrial, commercial, or residential contributors and, therefore, can be a conduit for PFAS entering the environment. These PFAS contributions can then result 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 include providing organic matter and providing 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 minelands. 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 ground water, and/or be up taken by crops. State and federal requirements set strict requirements on the amount 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, and wetlands, and on steep slopes. WWTFs must have trained and certified personnel doing this work. Each site must be reviewed and approved by 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. WWTFs with industrial or commercial contributions may result in elevated levels of PFAS in their biosolids. 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. This information will help to inform future actions.

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. MPCA will continue to consider additional sources of information, including the work U.S. Environmental Protection Agency (EPA) is completing via a Risk Assessment of Pollutants in Biosolids¹ to establish health risk-based values for PFAS compounds. The MPCA expects that EPA's risk assessment will provide information to guide future revisions of the Strategy.

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, or residential contributors. 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, both in Region V and other Regions, 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. These facilities are using monitoring data to identify and reduce PFAS coming to their system through PFAS pollutant minimization plans (PMP). Two additional rounds of influent PFAS sampling are being collected in quarters three and four of 2024. Select facilities will also conduct biosolids sampling in Fall 2024. This data will inform and further prioritize source identification and reduction work.

Strategy implementation details

The MPCA is proposing the following process for sampling and response actions based on sample results that would apply to all WWTFs that intend to apply biosolids to land. This process is in addition to the other requirements applicable to managing biosolids and ongoing efforts to reduce PFAS in municipal wastewater.

This proposed Strategy is similar to those implemented in other states and partially based on the Industrial Pretreatment Initiative and the studies of 42 municipal WWTFs completed by the state of Michigan². Using similar approaches, 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 in each year that they intend to land apply, prior to land application. The sample must be a representative sample of biosolids that are to be land applied and must be analyzed using draft EPA Method 1633. The sample results must be received prior to land application. Detailed sample collection requirements will be provided to WWTFs.

Response actions based on sample results

If the sample results show that PFAS is present in the biosolids, the Strategy lays out actions the WWTF must take. 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 $\mu\text{g/kg}$

If a WWTF biosolids sample contains perfluorooctanoic acid (PFOA) or perfluorooctane sulfate (PFOS) of 125 $\mu\text{g/kg}$ 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;
- The WWTF must notify MPCA within 24 hours 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 50 $\mu\text{g/kg}$ -124 $\mu\text{g/kg}$

If a WWTF biosolids sample contains PFOA or PFOS between 50 and 124 $\mu\text{g/kg}$, the following apply:

- The WWTF must notify MPCA and the landowner and farmer (if different than the landowner) within 24 hours of receiving the test results. Prior to land application, the WWTF must provide the PFAS analytical results to the landowner and farmer along with the MPCA contact information and additional information related to PFAS work in Minnesota. The MPCA will make a template available containing this information;
- 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, 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;
- If the farmer or landowner agree to continue with land application, the WWTF must reduce the loading of land applied biosolids to 1.5 dry tons per acre or provide an alternative risk mitigation strategy;
- 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 20-49 µg/kg

If a WWTF biosolids sample contains PFOA or PFOS between 20 and 49 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) within 10 days. 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 ≤ 19 µg/kg

If a WWTF biosolids sample contains PFOA or PFOS less than 19 µg/kg, there are no additional PFAS requirements. Land application of biosolids is required to follow current land application regulations consistent with Minn. R. 7041.

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 reduction options. Facilities who wish to obtain or maintain the EQ designation for biosolids must have a sum of PFOA and PFOS of 19 µg/kg or less. Compliance with this threshold must be demonstrated with quarterly sample results. If the combined sum of PFOA and PFOS is 20 µg/kg or greater, the facility must follow recommendations in the appropriate Tier above on approved land application sites or arrange for alternative management of the biosolids.

Timeline

Starting in September 2025, all WWTFs that land apply any biosolids will be required to collect and analyze a representative sample of biosolids that are intended to be land applied. These actions will be added to wastewater discharge (NPDES/SDS) permits as they are reissued. In the case that a facility gets a PFAS result that requires additional actions, but the language hasn'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 to minimize PFAS.

Next steps

The MPCA is gathering feedback on this proposal. We're encouraging submittal of feedback via the Public Comment page on the MPCA's website <https://www.pca.state.mn.us/get-engaged/public-comments>. The MPCA will release and begin implementing the final strategy early 2025.