

Biosolid Regulation in the Great Lakes and Lake Champlain Regions: A Case Study

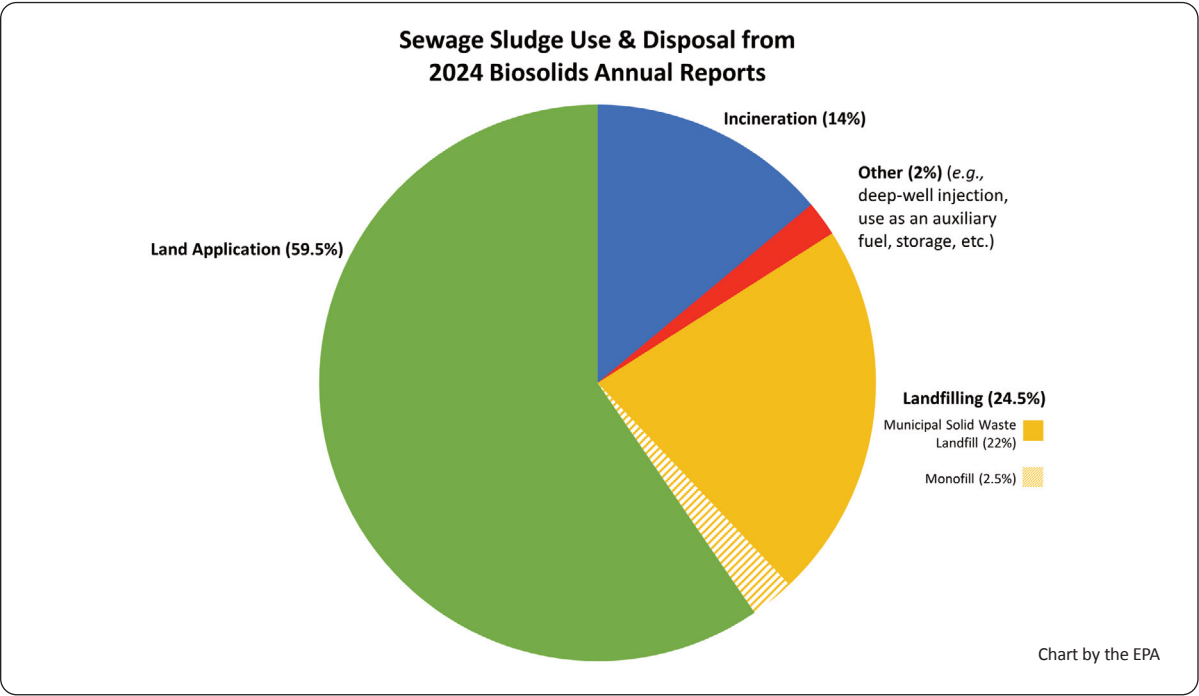


Introduction

When wastewater treatment plants (WWTPs) treat wastewater, the WWTP separates the liquid waste from the solids. This process produces a semi-solid, nutrient-rich product known as sewage sludge. In the United States, sewage sludge can be disposed of through land application, landfilling (either in a sewage sludge-only monofill (i.e., surface disposal) or a municipal solid waste (MSW) landfill), or incineration.

The terms “biosolids” and “sewage sludge” are often used interchangeably. The U.S. Environmental Protection Agency (U.S. EPA) uses the term biosolid to specifically refer to sewage sludge that has been treated to comply with the EPA’s regulation related to sewage sludge- “Standards for the Use or Disposal of Sewage Sludge” or 40 C.F.R. Part 503. This sewage sludge will be applied to land as a fertilizer or soil conditioner. Land application is the most common disposal method for biosolids. Depending on the presence of certain pollutants in the sewage sludge, it may be applied to farms, golf courses, and even home gardens.

The most common type of land application is agricultural land application. Biosolids are frequently applied to crops such as grasses and grains used for animal feed, as well as to wheat, soybeans, and turfgrass, among other agricultural products. Applying sewage sludge to land can provide several environmental benefits, including enhanced soil health, increased carbon sequestration, and reduced reliance on non-renewable resources such as phosphorus. This practice also produces lower greenhouse gas emissions compared to many other waste management methods.



However, sewage sludge can contain per- and polyfluoroalkyl substances – known as PFAS - because wastewater treatment plants have difficulty breaking PFAS down. PFOA, or perfluorooctanoic acid, is a commonly found PFAS used to make products like nonstick cookware. PFOS, or perfluorooctane sulfonate, is a commonly found PFAS used to make products resistant to stains, grease, soil, and water. A 2025 study of PFAS in Indiana found that “[l]and application of PFAS-containing biosolids, and potential tile-drain discharge and run off, are of particular concern.” (Hoskins, et al. 2025). This is concerning because PFOA and PFOS are known to negatively affect human health. PFOA and PFOS can cause cancer, build up in organ tissue, and impact development. Additionally, studies suggest that humans are harmed by lower amounts of PFOA and PFOS than other wildlife.

This case study will cover recent U.S. EPA and state actions related to controlling the use of PFAS-contaminated biosolids.

Federal Action

The federal Clean Water Act authorized the U.S. EPA to regulate pollutants in sewage sludge that threaten human and environmental health. Accordingly, the EPA conducts risk assessments to determine what threat, if any, pollutants pose. A 1992 risk assessment prompted the EPA to set limits for the presence of certain metals, like arsenic and lead, in sewage sludge. Meanwhile, a 2003 risk assessment found that dioxins did not exceed acceptable health risk thresholds, leading the EPA to decline to regulate their presence. These two risk assessments created a framework for the EPA to apply to PFOA and PFOS.

The U.S. EPA released a [Draft Sewage Sludge Risk Assessment](#) on January 14, 2025 that centers on the risks of consuming products, like milk or chicken, that are contaminated with PFOA or PFOS from nearby sewage sludge disposal sites. The Draft Risk Assessment reveals contaminated milk, water, fish, beef, and eggs generally pose the highest risk to human health. However, their risk levels also depend on the amount consumed, sewage sludge disposal method, climate, and other environmental conditions. A public comment period for the Draft Risk Assessment was open until August 14, 2025. The next step for the U.S. EPA will be to complete a Final Risk Assessment, which the EPA will use to inform any potential regulatory action.

Rather than evaluating the health risks to the general population, the Draft Risk Assessment centers on a hypothetical farm family. This farm family gets all of their food from their farm, where they apply PFOA- or PFOS-contaminated sewage sludge as a fertilizer. This allows PFOA and PFOS to contaminate the crops growing in their fields, livestock grazing on their fields, and even the water of their nearby pond and well. Therefore, consuming anything from their farm could potentially pose a health risk to the farm family.

The Draft Risk Assessment reveals PFOA-contaminated products generally pose higher health risks to the farm family than PFOS-contaminated ones. The PFOA-contaminated products that pose the highest risk to the farm family are milk, water, beef, and eggs. PFOA-contaminated milk even exceeds the EPA's acceptable health risk thresholds when the concentration of PFOA is lower than detectable levels. The health risks posed by PFOS-contaminated products are generally lower and vary more with changes to environmental factors, like the climate. Fish and milk are the only PFOS-contaminated products that consistently exceed the EPA's acceptable risk threshold.

The Draft Risk Assessment also considers the potential risks of living near a sewage sludge landfill by calculating the risks of drinking PFOA- or PFOS-contaminated groundwater. When the landfill is unlined or clay-lined, enough PFOA contaminates the groundwater to exceed the EPA's cancer risk threshold. PFOS, on the other hand, does not exceed any acceptable health risk threshold, no matter whether the landfill is lined or unlined. However, the EPA predicts PFOS-contaminated water would exceed health risk thresholds if there were slightly higher concentrations in the sewage sludge.

In its calculations, the EPA assumes the sewage sludge contains only one part per billion of PFOA or PFOS. But sewage sludge commonly contains higher levels of PFOA and PFOS. For example, the state of Maine found that the 2022 average PFOA concentration in sewage sludge was 6.6 parts per billion, while the average PFOS concentration was 19.3 parts per billion. This suggests that the health risks of consuming contaminated products are likely even higher than the EPA estimates. Additionally, the Draft Risk Assessment evaluates each product's risk in isolation, not considering any combined impact from consuming more than one product or chemical. While this allows for better understanding of the risks of specific products, it also may lead to an underestimation of overall risk. However, because the consumption of single products is enough to exceed acceptable health risks, the combination of risks would not impact the EPA's ultimate conclusions.

State Strategies

To date, only two states have completely banned the use of PFAS-contaminated biosolids: Maine and Connecticut. Maine banned the land application of biosolids in 2022 under [Public Law 2021, Chapter 641](#), An Act To Prevent the Further Contamination of the Soils and Waters of the State with So-called Forever Chemicals. Connecticut does not allow land application of its WWTPs' sewage sludge. Rather, most sewage sludge is incinerated. However, products made from sewage sludge, like pelletized biosolid-based fertilizers and soil amendments, are sold in Connecticut. As a result, the state passed [Public Act No. 24-59](#), An Act Concerning the Use of PFAS in Certain Products, in 2024. The law became effective October 1, 2024 and bans the use, sale, or offering for sale as a soil amendment any biosolids or wastewater sludge that contains PFAS.

While outright bans have not been enacted, several states in the Great Lakes and Lake Champlain regions have taken steps to regulate biosolids in their states, mostly in the form of interim strategies. These strategies are discussed below.

Michigan

The Michigan Department of Environment, Great Lakes, and Energy released a 2024 update to its interim strategy for *Land Application of Biosolids Containing PFAS*. The interim strategy requires wastewater treatment plants to sample biosolids for PFAS once a year. The results of this sampling must then be communicated with landowners before applying biosolids. Additional requirements may be imposed based on the concentration of PFOA or PFOS found in the biosolids. Biosolids with a concentration of 100 µg/kg or higher are considered “industrially impacted” and cannot be applied to land. The 2024 update lowered this threshold from 125 µg/kg. Additionally, wastewater treatment plants must sample the biosolids source effluent and implement a source reduction plan.

Biosolids with a concentration of PFOA or PFOS between 20-100 µg/kg are considered “elevated.” This category is a consolidation of two tiers from the previous interim strategy. Elevated biosolids can be applied to land but not at a rate greater than 1.5 dry tons per acre. Wastewater treatment plants must also still sample the biosolids source effluent and implement a source reduction plan. Finally, the interim strategy imposes no additional requirements for biosolids with a concentration below 20 µg/kg.

The interim strategy also sets requirements for PFAS in Exceptional Quality biosolids. Exceptional Quality biosolids are held to higher standards for contaminant levels and are therefore subject to fewer land application restrictions. Accordingly, Exceptional Quality biosolids must have a combined concentration of PFOA and PFOS lower than 20 µg/kg. This concentration is evaluated through quarterly sampling.

Michigan Resources:

[Michigan Biosolids PFAS-related Information and Links](#)

[PFAS and Biosolids Fact Sheet](#)

Minnesota

On January 17, 2025, the Minnesota Pollution Control Agency (MPCA) released the *Minnesota Biosolids PFAS Strategy*. Beginning September 1, 2025, wastewater treatment facilities will be required to sample for PFAS in biosolids before applying them to land. Wastewater facilities must collect one sample every cropping year (September 1 to August 31) and analyze it for forty types of PFAS. Another document, MPCA's *Biosolids PFAS Sampling, Analysis and Reporting Guidance*, provides a more detailed description of these sampling requirements. The results of this sampling then determine what actions a wastewater facility must take. MPCA divided these actions into four tiers based on the concentration of PFOA or PFOS found in the biosolids. In the highest tier (a concentration of 125 µg/kg or more), the wastewater facility is not allowed to apply biosolids to land. The wastewater facility must also implement a PFAS pollutant management plan and sample its effluent for PFAS. In the middle two tiers, wastewater facilities can apply biosolids to land, but they must first provide the PFAS sampling results to the landowner. Additional requirements vary between the two tiers. Finally, if the concentration of PFOA or PFOS is 20 µg/kg or less, the wastewater facility must only inform the landowner that PFAS sampling was conducted and that those results are available upon request.

The PFAS Strategy also set requirements for PFAS in Exceptional Quality biosolids. Exceptional Quality biosolids have lower contaminant levels and therefore may be applied to land with less restrictions. Accordingly, MPCA requires Exceptional Quality biosolids to have a combined concentration of PFOA and PFOS that is 20 µg/kg or less. This concentration is evaluated through quarterly sampling.

Finally, MPCA recognized that the most efficient way to reduce PFAS in biosolids is to limit the amount of PFAS entering wastewater facilities. Therefore, MPCA is also working to reduce PFAS presence through PFAS product bans, collaboration with other states, and PFAS source reduction.

Minnesota Resources:

[Minnesota Biosolids PFAS Strategy \(2025\)](#).

New York

On September 7, 2023, the New York Department of Environmental Conservation (DEC) adopted an interim strategy for managing the recycling of biosolids containing PFAS. Biosolid recycling includes land application and use in compost. Effective October 20, 2023, facilities that accept biosolids must sample them for PFAS and report the results to DEC. After this initial sampling, the frequency of future sampling will be determined by the amount of biosolids recycled, potential PFAS sources, and previous sampling results. The results of the PFAS sampling also determine what additional actions facilities must take. If the concentrations of PFOA and PFOS are both 20 µg/kg or less, no additional actions are required. However, if the concentration of PFOA or PFOS is between 20-50 µg/kg, DEC will require additional sampling. If the concentration remains above 20 µg/kg for over a year, then DEC will take steps to restrict biosolid recycling. Finally, if the concentration of PFOA or PFOS is 50 µg/kg or more, DEC will prohibit recycling until the concentration is below 20 µg/kg.

New York Resources:

[Biosolids Recycling in New York State — Interim Strategy for the Control of PFAS Compounds \(2023\).](#)

Vermont

Beginning April 1, 2024, the Vermont Department of Environmental Conservation (DEC) adopted an interim strategy for managing the land application of Exceptional Quality (EQ) biosolids and short paper fiber (SPF) containing PFAS. Since 2019, DEC has required PFAS testing for the soil and groundwater of biosolid application sites. If the groundwater PFAS concentrations were above the Vermont Groundwater Enforcement Standards (20 ppt for a combination of five PFAS), then land application was prohibited, and the landowner had to develop a corrective action plan. The interim strategy represents additional requirements for the land application of EQ biosolids and SPF. Under the interim strategy, land application cannot occur on hydric soil, within 300 feet of a drinking water supply, and where the seasonal high groundwater depth is less than 3 feet. Additionally, land application is not recommended on crops grown for human consumption.

DEC also requires quarterly reports on the type, amount, rate, and PFAS content of the material applied. The PFAS content is tested quarterly, and if the concentrations are above DEC’s screening levels, then the DEC imposes additional requirements. First, a soil sample must be taken from the application site before the EQ biosolids/SPF is applied. If the soil PFAS concentration exceeds DEC’s screening levels, then land application is prohibited. However, if the soil PFAS concentration is below DEC’s screening levels, the land-applier must calculate the post-application PFAS soil content. This calculation must be submitted in the required quarterly report.

DEC’s PFAS Screening Levels

PFAS Compound	Concentration (µg/kg)
PFOS	3.4
PFOA	1.6
PFHpA	.84
PFNA	.44
PFHxS	.38

Vermont Resources:

[Interim Strategy for Mitigating PFAS Risks Associated with Residuals Management \(2024\).](#)

Wisconsin

In 2024, the Wisconsin Department of Natural Resources (DNR) revised its interim strategy for the land application of biosolids containing PFAS to include industrial sludges. As part of the Wisconsin Pollutant Discharge Elimination System permitting process, DNR had begun requiring wastewater treatment facilities to sample biosolids and sludges for PFAS. The interim strategy provides guidance to wastewater facilities on how and when biosolids and sludge can be land applied based on the combined PFOA and PFOS concentrations of the biosolids/sludge.

If the total PFOA and PFOS concentration is 150 µg/kg or more, DNR will not approve new land application sites. Wastewater facilities should also sample their effluent and develop a PFAS source reduction program so that they can continue land application in the future.

If the total concentration is 50-150 µg/kg, wastewater facilities can apply the biosolids/sludge to land, but the application should be at a rate less than 1.5 dry tons per acre. The wastewater facility may also land apply biosolids/sludge if the total concentration of PFOA and PFOS is 20-50 µg/kg; however, the wastewater facility should consult with DNR if the proposed application rate is 8 tons per acre or more. For both these tiers, the wastewater facility should provide the sampling results to the landowner before land application. The wastewater facility should also track the cumulative application rates, sample effluent, and undertake source reduction efforts. Finally, if the combined concentration is below 20 µg/kg, no additional requirements are imposed.

Wisconsin Resources:

[Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS \(2024\).](#)

State Legislation

Several Great Lakes states have also introduced legislation in 2025 to address the risk of PFAS in biosolids. Each of these proposed bills is described briefly below.

State	Bill #	Description	Status
IN	HB 1153	Establishes regulations for the use of biosolids, requires testing and setting limits for their use in land applications. Prohibits a person from applying biosolids, industrial waste products, or pollutant-bearing waters that contain a concentration of more than 100 parts per billion of one or more PFAS chemicals to land. Provides that a person that applies biosolids, industrial waste products, or pollutant-bearing water to land shall submit samples to the department of environmental management (department) for testing. Requires a person that applies biosolids, industrial waste products, or pollutant-bearing water to land to provide notice of the concentration of PFAS chemicals to all impacted landowners. Requires the department to test biosolids, industrial waste products, and pollutant-bearing water for PFAS chemicals. Requires the department to share data with different state agencies.	No action since 1/21/25

NY	A.6192	Establishes a five-year moratorium on biosolid land application to manage PFAS contamination.	Substituted by SB.5759C (below)
NY	SB.5759C	Amends article 27 of the environmental conservation law by adding a new title 8 establishing a 5 year moratorium on the land spreading, sale, and distribution of biosolids Establishes a person who violates the provisions of this legislation shall be liable for a penalty of up to twenty-five hundred dollars for each such violation, and an additional penalty of up to five hundred dollars each day the violation continues.	Passed Senate, Delivered to Assembly
PA	HB 1116	Requires the Department of Environmental Protection to conduct a study of PFAS chemicals in biosolids.	Referred to Environmental & Natural Resource Protection, April 3, 2025
VT	H.292	Prohibits the land application, sale, and landfill disposal of biosolids and similar wastes containing PFAS chemicals.	2/20/2025 - Read first time and referred to the Committee on Environment
VT	H.425	Requires a regional management plan for septage, sludge, and biosolids, focusing on safe disposal, cost-effectiveness, and minimizing health risks.	2/27/2025 - Read first time and referred to the Committee on Environment
VT	H.303	Prohibits the land application of septage, sludge, and biosolids, as well as the sale of compost or other agricultural products containing or produced from these materials	2/21/2025 - Read first time and referred to the Committee on Environment
WI	A.B.50	Expands PFAS testing, cleanup, and grant programs, establishing rules and standards for PFAS in water and sludge, and creating liability exemptions under specific conditions for property owners impacted by PFAS discharges. Requires biomonitoring studies and promotes environmental justice in PFAS disposal.	7/2/2025- Bill laid on the table
WI	S.B.45	Expands PFAS testing, cleanup, and grant programs, establishing rules and standards for PFAS in water and sludge, and creating liability exemptions under specific conditions for property owners impacted by PFAS discharges. Requires biomonitoring studies and promotes environmental justice in PFAS disposal.	Partial Veto

Resources

U.S. Environmental Protection Agency, [Basic Information about Sewage Sludge and Biosolids](#)

U.S. Environmental Protection Agency, [Land Application of Biosolids](#)

U.S. Environmental Protection Agency, [Draft Sewage Sludge Risk Assessment for Perfluorooctanoic Acid \(PFOA\) and Perfluorooctane Sulfonic Acid \(PFOS\) CASRN 1763-23-1 \(2025\)](#)

Hoskins, et al., Indiana Statewide PFAS Assessment, [Institute for a Sustainable Future Documents Paper 2 \(2025\)](#)

[Status of Maine's PFAS Soil and Groundwater Investigation at Sludge and Septage Land Application Sites \(2025\)](#)

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