

# PFAS:

## Per & Polyfluoroalkyl Substances

JANUARY 2026



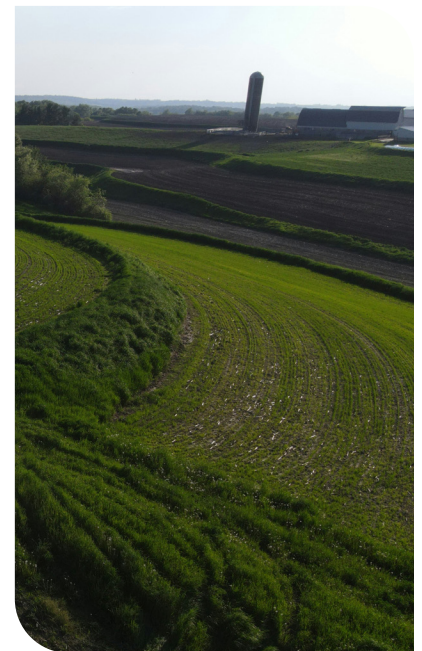
## Background <sup>1, 2</sup>

Per- and Polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals developed in the 1940s and used extensively in a wide array of products. PFAS are found in cookware, carpets, clothing, textiles, paper, packaging, firefighting foam, electronics, household products, medical articles, and more. Carbon-fluorine bonds that are present in all PFAS are among the strongest known chemical bonds, giving PFAS a unique ability to resist heat, water, and grease. These sought-after traits also come with downsides: PFAS break down very slowly and can accumulate in people, animals, organisms, and the environment over time. PFAS have been observed to readily transport over long distances and impact groundwater, surface water, and soil. Exposure to certain PFAS (particularly those described as long-chain) may have negative impacts on human health and the environment. As such, PFAS research is ongoing, and there are initiatives to replace certain PFAS with safer alternatives.

## PFAS and the farm? <sup>3, 4, 5, 6, 7, 8, 9</sup>

PFAS may be inadvertently introduced to farms via water, biosolids, or through proximity to industrial releases or facilities (e.g., military installations) that use aqueous firefighting foams. It is worth noting that in 2021, pesticides packaged in certain fluorinated containers also tested positive for PFAS. The Environmental Protection Agency (EPA) determined this to be an isolated incident and worked with the manufacturer to stop sales. EPA continues to study fluorinated containers and has advised pesticide manufacturers to seek alternative containers (e.g., steel drums, non-fluorinated containers) when available.

Farmland across the country is likely to contain background levels of PFAS from atmospheric deposition and precipitation. However, levels of PFAS contamination will vary widely depending on the history of soil applications. The highest levels tend to be associated with land that received biosolids. Biosolids are the treated, semi-solid, nutrient-rich sludge produced during wastewater processing. Biosolids meet EPA standards and can be land applied as a soil conditioner or fertilizer. Biosolids, like commercial fertilizer, contain macronutrients such as nitrogen, phosphorus, and potassium (N, P, K). Biosolids can be an appealing substitute for commercial fertilizers, as they cost a fraction of the price and are often supplied at no cost to the farmer. However, this economic replacement is not without risk. The widespread use of PFAS ensures their presence in wastewater. Unfortunately, PFAS are not broken down during wastewater treatment; instead, they concentrate in the sludge. PFAS, if present in biosolids, can infiltrate both ground and surface water and accumulate in soil. In turn, crops and livestock raised on the farm may uptake PFAS from the soil and water.



The EPA estimates that biosolids are applied to **less than 1%** of U.S. fertilized cropland each year. Not all farms where biosolids containing PFAS have been applied are expected to pose a risk. The actual PFAS risk will vary by farm based on the biosolid used, geography, climate, soil conditions, the types of crops grown and their nutrient needs, and other factors. It is difficult to predict how much PFAS will end up in a specific crop. Influences may include soil type, PFAS concentration in the soil and water, individual plant properties, soil nutrients, precipitation, and irrigation water. Overall, it is recognized that certain locations and specific farming operations may warrant greater concern about PFAS when contaminated biosolids are applied.

Of note, leafy greens and hay/pasture are particularly vulnerable to PFAS uptake, while root vegetables such as carrots and beets exhibit a moderate transfer rate. Grains such as wheat, oats, and corn generally show low to moderate PFAS uptake. Further, corn grain has much lower uptake than corn silage.

## Should the farm be tested for PFAS? <sup>10, 11, 12</sup>

Testing is often unnecessary and should be carried out only after careful consideration. The prevalence of PFAS in the environment, including items such as clothing and gloves, poses a high risk of cross-contamination during sampling. Testing methods are so sensitive that they can detect tiny amounts of PFAS; thus, even the slightest cross-contamination can lead to a false positive.

### **1. Drinking Water: Experts suggest that any well that provides drinking water for human consumption should be tested for PFAS contamination.**

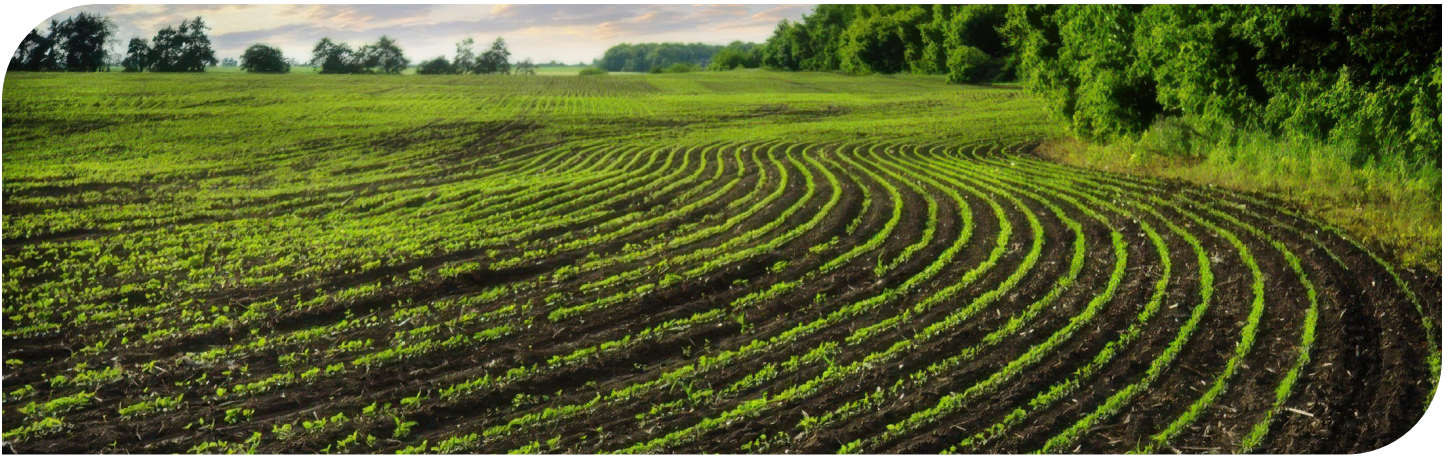
- Check with the state's department of environmental quality or health department to learn about any free testing programs or to receive a directory of certified laboratories.

### **2. Soil: Determine if there has been a cause for potential PFAS contamination on the land. If no cause is identified, sampling and testing are generally not warranted.**

- Have biosolids or PFAS-contaminated manure been applied to the land by current or prior owners?
- Is land adjacent to or in proximity to a known PFAS site or area of interest (such as a military base)?
- Is there ground or surface water contamination nearby?



If it is determined that sampling may be warranted, discuss further with trusted advisors (e.g., a local extension coordinator, a USDA service center, or other state and local experts) before proceeding. You will need to understand if soil testing would help assess potential risks to a specific property. Testing soil PFAS concentrations can provide information on potential risks to crops and livestock on the land. However, there are currently no "safe thresholds" from federal agencies for PFAS in agricultural soils, so it may be challenging to determine how soil concentrations translate into risk. Furthermore, many factors affect the presence and magnitude of risks to humans posed by elevated PFAS concentrations in soil, so knowing the PFAS concentration in soil alone would not fully determine the potential for human health risks.



## What should the farmer know before using biosolids? <sup>13, 14, 15, 16, 17</sup>

Biosolids can be beneficial to soil health when free from harmful levels of contaminants. Work with your biosolids supplier and other local experts (e.g., the state environmental agency) to determine PFAS levels in the biosolids and better assess the risks to your property. As of 10/31/25, there is no national requirement to test biosolids for PFAS, but some states do require testing. In January 2025, the EPA released [\*“Draft Sewage Sludge Risk Assessment for Perfluorooctanoic Acid \(PFOA\) and Perfluorooctane Sulfonic Acid \(PFOS\)”\*](#) for public comment. Once the policy is finalized, there will likely be significant regulatory and operational changes for land-applying biosolids.

Until that time, the University of Georgia Extension recommends that farmers review this basic information with their biosolids vendor before using the product.

### **1. Wastewater plant permit information should be readily available and include:**

- Required buffers around streams and wells
- Metal and nutrient content of the biosolids
- Results of soil testing
- Calculations for the correct agronomic rate and how much biosolids will be applied to a particular field, and
- Documentation for the quantity of biosolids applied to each field.

### **2. Review the information on the concentration of metals, and PFAS if available, in the biosolids**

Furthermore, growers considering the use of biosolids should closely review their general and environmental liability policies. In recent years, PFAS-specific exclusions have begun to be added to insurance policies. These exclusions may appear in both the general liability and environmental liability policies. Some insurance companies have indicated they never covered PFAS (as a component of pollution exclusions) but are now adding new language to provide greater clarity for customers on what is and is not covered. Other companies are adding exclusions specific to biosolids and materials generated by wastewater, animal waste, and human waste treatment.

# Biosolids on the Farm Check List



Understand the growing complexity surrounding the use of biosolids on agricultural land, with respect to PFAS concerns.



Review insurance policies for exclusion language specific to PFAS, biosolids, or materials generated by wastewater, animal waste, and human waste treatment.

If there is no specific language, but the policy includes pollution exclusions, consider discussing the matter with the insurance provider to gain a greater understanding and clarity.



Obtain copies of the vendor's applicable biosolids documents and review them.



Wells that provide drinking water for human consumption should be tested for potential PFAS contamination, along with other routine testing.

Check with the state's department of environmental quality or health department to learn about any free testing programs or to receive a directory of certified laboratories.



Determine if there has been a cause for potential PFAS contamination on the land?

- Have biosolids or PFAS-contaminated manure been applied to the land by current or prior owners?
- Is land adjacent to or in proximity to a known PFAS site or area of interest?
- Is there ground or surface water contamination nearby?

*If no cause is identified, soil sampling and testing are generally not warranted.*



If soil sampling appears to be warranted, discuss further with trusted advisors (e.g., a local extension coordinator, a USDA service center, or other state and local experts) before proceeding. You need to understand if soil testing would help assess potential risks at your specific property.

# Endnotes

- 1 [Our Current Understanding of the Human Health and Environmental Risks of PFAS | US EPA](https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas). Accessed 10/28/25. <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>
- 2 [Per- and polyfluoroalkyl substances \(PFAS\) - ECHA](https://echa.europa.eu/hot-topics/perfluoroalkyl-chemicals-pfas#). Accessed 10/28/25. <https://echa.europa.eu/hot-topics/perfluoroalkyl-chemicals-pfas#>
- 3 [What Does PFAS Mean To My Farm - PFAS Contamination in Agriculture](https://www.canr.msu.edu/pfas/what-does-pfas-mean-on-my-farm). Accessed 10/30/25. <https://www.canr.msu.edu/pfas/what-does-pfas-mean-on-my-farm>
- 4 [EPA Releases Draft Risk Assessment to Advance Scientific Understanding of PFOA and PFOS in Biosolids | US EPA](https://www.epa.gov/newsreleases/epa-releases-draft-risk-assessment-advance-scientific-understanding-pfoa-and-pfos). Accessed 10/30/25. <https://www.epa.gov/newsreleases/epa-releases-draft-risk-assessment-advance-scientific-understanding-pfoa-and-pfos>
- 5 [FAQ: Land Application of Biosolids](https://www.michigan.gov/egle/faqs/water-quality-protection/land-application-of-biosolids). Accessed 10/30/25. <https://www.michigan.gov/egle/faqs/water-quality-protection/land-application-of-biosolids>
- 6 [Per-and Polyfluoroalkyl Substances FAQ | Farmers.gov](https://www.farmers.gov/protection-recovery/pfas/faq#). Accessed 10/30/25. <https://www.farmers.gov/protection-recovery/pfas/faq#>
- 7 [FAQ: How are PFAS Issues Managed on the Farm?](https://extension.psu.edu/faq-how-are-pfas-issues-managed-on-the-farm) Accessed 10/30/25. <https://extension.psu.edu/faq-how-are-pfas-issues-managed-on-the-farm>
- 8 [FAQ: PFAS and biosolids/land application](https://www.michigan.gov/pfasresponse/faq/categories/pfas-and-biosolids). Accessed 10/25/25. <https://www.michigan.gov/pfasresponse/faq/categories/pfas-and-biosolids>
- 9 [Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety - ScienceDirect](https://doi.org/10.1016/j.envint.2019.04.008). Accessed 11/3/25. <https://doi.org/10.1016/j.envint.2019.04.008>
- 10 [What Does PFAS Mean To My Farm - PFAS Contamination in Agriculture](https://www.canr.msu.edu/pfas/what-does-pfas-mean-on-my-farm). Accessed 10/31/25. <https://www.canr.msu.edu/pfas/what-does-pfas-mean-on-my-farm>
- 11 [Contact us about Ground Water and Drinking Water | US EPA](https://www.epa.gov/ground-water-and-drinking-water/forms/contact-us-about-ground-water-and-drinking-water-0). Accessed 10/31/25. <https://www.epa.gov/ground-water-and-drinking-water/forms/contact-us-about-ground-water-and-drinking-water-0>
- 12 [Frequent Questions and Answers: Draft Sewage Sludge Risk Assessment for PFOA and PFOS | US EPA](https://www.epa.gov/biosolids/frequent-questions-and-answers-draft-sewage-sludge-risk-assessment-pfoa-and-pfos). Accessed 10/31/25. <https://www.epa.gov/biosolids/frequent-questions-and-answers-draft-sewage-sludge-risk-assessment-pfoa-and-pfos>
- 13 [Beneficial Reuse of Municipal Biosolids in Agriculture | CAES Field Report](https://fieldreport.caes.uga.edu/publications/SB27/beneficial-reuse-of-municipal-biosolids-in-agriculture). Accessed 10/31/25. <https://fieldreport.caes.uga.edu/publications/SB27/beneficial-reuse-of-municipal-biosolids-in-agriculture>.
- 14 [FAQ: Why Aren't PFAS Compounds in Land-Applied Biosolids Regulated by EPA?](https://extension.psu.edu/faq-why-arent-pfas-compounds-in-land-applied-biosolids-regulated-by-epa) Accessed 10/31/25. <https://extension.psu.edu/faq-why-arent-pfas-compounds-in-land-applied-biosolids-regulated-by-epa>
- 15 [Frequent Questions and Answers: Draft Sewage Sludge Risk Assessment for PFOA and PFOS | US EPA](https://www.epa.gov/biosolids/frequent-questions-and-answers-draft-sewage-sludge-risk-assessment-pfoa-and-pfos). Accessed 10/31/25. <https://www.epa.gov/biosolids/frequent-questions-and-answers-draft-sewage-sludge-risk-assessment-pfoa-and-pfos>
- 16 [Not covered: Insurers add PFAS exclusions to commercial liability policies - WPR](https://www.wpr.org/news/insurers-pfas-exclusions-commercial-liability-policies-wisconsin). Accessed 11/3/25. <https://www.wpr.org/news/insurers-pfas-exclusions-commercial-liability-policies-wisconsin>
- 17 [Sewage fertilizer can cause illness and harm the environment. Why are some Oklahoma officials resistant to a ban? - Investigate Midwest](https://investigatamidwest.org/2025/04/23/sewage-fertilizer-can-cause-illness-and-harm-the-environment-why-are-some-oklahoma-officials-resistant-to-a-ban/). Accessed 11/3/25. <https://investigatamidwest.org/2025/04/23/sewage-fertilizer-can-cause-illness-and-harm-the-environment-why-are-some-oklahoma-officials-resistant-to-a-ban/>