

PERSPECTIVES

PFAS IN BIOSOLIDS:

What EPA's Draft Risk Assessment
Means for Industry and Municipalities



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Executive Summary

The U.S. Environmental Protection Agency (EPA) released its [2025 Draft Risk Assessment for perfluorooctanoic acid \(PFOA\) and perfluorooctane sulfonic acid \(PFOS\) in biosolids](#), identifying potential human health risks under common land application and disposal scenarios. While the draft risk assessment outlines elevated risk levels for certain exposure pathways, EPA also withdrew some prior designations, signaling an uncertain regulatory framework unlikely to be resolved anytime soon. For example, on May 14, 2025, EPA announced its intent to rescind Maximum Contaminant Levels (MCLs) for four PFAS, and extend compliance deadlines for PFOA and PFOS, with a new drinking water rule expected in Spring 2026. Later, on September 15, 2025, EPA asked a federal court to vacate portions of the 2024 drinking water rule covering those same compounds. These actions underscore the evolving nature of PFAS regulation and the challenges of anticipating federal requirements.

At the same time, in response to uncertainty at the federal level, states implemented their own measures, including sampling requirements, restrictions, and outright bans, creating a complex compliance environment. For organizations managing biosolids, these developments may lead to stricter federal standards, increased monitoring obligations, and greater liability exposure. This article summarizes EPA's draft risk assessment, provides observations on its potential impact, and highlights state-level actions. It concludes with guidance on how J.S. Held can assist clients in addressing these challenges through sampling, risk assessment, regulatory strategy, and litigation support.

EPA Draft Risk Assessment Key Takeaways

Scope and Intent

EPA's 2025 Draft Risk Assessment evaluated potential human health risks associated with biosolids containing PFOA and PFOS. The assessment is still in draft form; the public comment period closed on August 14, 2025. EPA is now reviewing submitted comments and will revise the draft before releasing a final version, which will inform future regulatory actions. The assessment focused on land application and surface disposal scenarios under the Clean Water Act framework. Although domestic manufacturing of PFOA and PFOS has been phased out, these compounds and their precursors remain present in wastewater treatment systems due to historic and ongoing use of PFAS compounds in consumer and industrial products. This persistence means that even biosolids from non-industrial sources can contain measurable PFAS concentrations.

Major Findings

EPA's analysis provides important insights into potential exposure pathways and risk magnitude:

- » **Modeled Scenarios:** EPA assessed three land application scenarios, pasture farms, crop farms, and reclamation sites, and surface disposal scenarios. These represented common practices for biosolids reuse and disposal.
- » **Risk Thresholds:** EPA's draft modeling showed biosolids containing PFOA or PFOS at concentrations around 1 part per billion could exceed acceptable cancer and non-cancer risk thresholds under certain scenarios, particularly when applied repeatedly over decades. These exceedances are scenario-dependent and do not mean that every detectable level automatically poses unacceptable risk.

- » Highest-Risk Pathways: The most significant exposure routes included:
 - » Consumption of milk from pasture-raised cows grazing on impacted forage.
 - » Drinking water sourced near unlined or clay-lined disposal sites.
 - » Eating fish from waters receiving runoff from land-applied biosolids.
- » Magnitude of Risk: EPA's deterministic modeling indicates that cancer risk levels and hazard quotients for some pathways exceeded acceptable limits by several orders of magnitude. For example, modeled milk consumption scenarios produced cancer risk estimates far above EPA's benchmark of one in one million. However, EPA's risk threshold limits are based on highly conservative assumptions with multiple built-in safety factors.
- » Limitations: The draft does not include probabilistic modeling or aggregate exposure across multiple pathways, so cumulative risks were not addressed. For incineration, EPA provided a conceptual model and discussed uncertainties, such as incomplete combustion and formation of products of incomplete combustion (PICs), but did not quantify risk because inhalation toxicity values and reliable destruction efficiency data are lacking.

Taken together, these findings suggest that even low concentrations of PFOA and PFOS in biosolids can create significant exposure risks under certain conditions, and that current management practices may require reevaluation.

Observations

EPA's modeling approach and findings indicate that future federal regulations governing biosolids could become more restrictive, particularly for land application practices. While EPA has withdrawn certain PFAS designations under CERCLA for compounds other than PFOA and PFOS, and recently moved to rescind drinking water standards for perfluorohexane sulfonic acid

(PFHxS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide-dimer acid (HFPO-DA), and perfluorobutanesulfonic acid (PFBS), followed by a court request to vacate parts of the 2024 rule, it formally added PFOA and PFOS to the CERCLA hazardous substance list in May 2024. This means releases of these chemicals can trigger federal reporting and cleanup obligations, significantly increasing potential liability for biosolids generators and land applicators. The absence of incineration data and cumulative exposure modeling points to areas where additional research and rulemaking may occur. Combined with state-level actions that vary widely, these developments signal a fragmented regulatory environment that will require proactive monitoring and strategic planning by organizations managing biosolids.

State-Level Actions on PFAS in Biosolids

While EPA's Draft Risk Assessment sets the stage for potential federal regulation, states are also shaping the PFAS compliance landscape, but state approaches vary widely. This variability matters because it creates operational complexity, cost uncertainty, and uneven liability exposure for organizations operating across multiple jurisdictions. Some states have moved aggressively toward bans and numeric standards, while others remain in an evaluative phase or rely on discretionary authority. Understanding these differences is critical for planning and risk management.

Several states have adopted measures that go beyond monitoring. Maine, for example, prohibits land application and sale of biosolids containing PFAS, reflecting a zero-tolerance stance. Connecticut enacted a statutory ban on using or selling biosolids as soil amendments if they contain PFAS. Michigan established an interim strategy with numeric thresholds:

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biosolids exceeding 100 micrograms per Kilogram (Qg/kg) of PFOS or PFOA cannot be land-applied, and those between 20 and 100 Qg/kg require reduced application rates and mitigation. These actions signal a trend toward enforceable limits rather than guidance alone.

Other states have focused on sampling and reporting. California requires PFAS sampling for any biosolids leaving a Publicly Owned Treatment Works, while Washington mandated PFAS testing for biosolids starting in 2027, with quarterly reporting through 2028. Vermont issued an interim strategy requiring PFAS testing for biosolids, soil, groundwater, and crops, along with restrictions on the application of PFAS near drinking water sources and in hydric soils. These provisions illustrate how states are integrating PFAS considerations into broader frameworks for managing residuals.

Conversely, some states, such as Idaho, Maryland, and Texas, have not adopted PFAS-specific rules but retain authority to require sampling on a case-by-case basis. This discretionary approach means compliance obligations can shift quickly in response to emerging concerns or enforcement priorities.

Observations and Implications

State actions fall into three main categories: outright bans (Maine, Connecticut), numeric thresholds (Michigan), and sampling/reporting mandates (California, Washington). Each approach carries different operational and liability implications. Bans eliminate land application options entirely. Numeric standards require costly monitoring and alternative disposal planning. Sampling mandates increase compliance burden and litigation exposure. For multi-state operators, this patchwork of rules means higher costs, greater uncertainty, and the need for proactive risk management strategies.

Implications for Stakeholders

EPA's Draft Risk Assessment and state-level actions point to a regulatory environment that is becoming more complex and less predictable. While the draft assessment identifies significant risks associated with land application and disposal of biosolids containing PFOA and PFOS, EPA's withdrawal of certain prior PFAS designations under CERCLA underscores the uncertainty surrounding future federal requirements. This evolving landscape, combined with state variability, creates challenges for planning, compliance, and risk management across multiple sectors.

Regulatory Risk

Stakeholders should anticipate potential new federal standards governing biosolids management and recognize that CERCLA liability now explicitly applies to PFOA and PFOS following their addition to the hazardous substance list in May 2024. While EPA withdrew certain designations for other PFAS compounds, this does not affect PFOA and PFOS, both remain high-priority chemicals under CERCLA. This distinction is critical because the designation enables cost recovery actions and enforcement under Superfund, significantly increasing potential liability for biosolids generators and land applicators. State measures such as Maine's prohibition on land application and Michigan's numeric thresholds indicate that compliance obligations may expand rapidly and unevenly.

Operational Impact

Organizations may face increased sampling and analytical requirements, restrictions on land application, and higher costs for disposal and treatment. States like California and Washington have already mandated PFAS testing for biosolids, and others are considering

similar measures. These requirements will drive operational changes, including the need for more robust tracking systems and contingency planning for alternative disposal options.

Litigation Exposure

As awareness of PFAS risks grows, litigation trends are expected to accelerate. Potential biosolid-related claims include landowner suits for property contamination, toxic tort actions alleging health impacts, and disputes over insurance coverage for PFAS-related liabilities. CERCLA designations, even if limited or evolving, could trigger cost recovery actions and enforcement proceedings.

Strategic Considerations

Proactive compliance and risk mitigation are essential. Stakeholders, including municipalities, utilities, insurers, and legal counsel, should begin evaluating PFAS concentrations in biosolids, assessing potential exposure pathways, and developing strategies for regulatory engagement. Early action can reduce liability, control costs, and position organizations to adapt as federal and state requirements converge. J.S. Held can assist with sampling and forensic analysis, risk characterization, regulatory strategy, and litigation support to help navigate this evolving landscape.

How Experts Can Help

The evolving regulatory landscape for PFAS in biosolids, marked by EPA's Draft Risk Assessment, the withdrawal of certain prior designations under CERCLA, recent rollbacks of PFAS drinking water standards, and varied state-level actions, creates uncertainty and risk for multiple stakeholders. Navigating these changes requires technical expertise, regulatory insight, and strategic planning. The right mix of experts can provide

multidisciplinary support to help organizations anticipate and manage PFAS-related challenges, including:

- » **Sampling and forensic analysis** - Designing and implementing PFAS sampling plans for biosolids, soil, groundwater, and surface water; evaluating sampling integrity; and conducting forensic analysis to identify PFAS sources and pathways.
- » **Risk assessment and modeling** - Performing human health and ecological risk assessments tailored to site-specific conditions; modeling exposure scenarios aligned with EPA's framework and state guidance; and assessing cumulative risks from multiple PFAS and exposure pathways.
- » **Regulatory strategy and permitting** - Interpreting federal and state PFAS regulations; supporting compliance planning; and developing mitigation strategies for biosolids management, including land application, disposal, and treatment.
- » **Litigation and insurance support** - Providing expert witness services and technical consulting in PFAS-related litigation; quantifying potential liabilities and damages; and assisting with insurance claims and cost recovery efforts.

Engage early to reduce risk, control costs, and position for compliance as federal and state requirements evolve. Early action is critical; waiting for final rules or enforcement can significantly increase liability and operational costs. Take proactive steps now to stay ahead of regulatory changes and litigation trends.

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Appendix

California

In 2020, the California State Water Resources Control Board issued Investigatory Order WQ 2020-0015-DWQ, which required that any biosolids or sludge leaving a Publicly Owned Treatment Works (POTW) facility for disposal or land application must be sampled for PFAS. This includes both Class A and Class B biosolids, as well as any sludge not meeting these classifications if it is transported offsite. The Order applies to all POTWs that process biosolids, regardless of the final destination or whether the biosolids are applied onsite or offsite. Facilities that do not generate or haul biosolids during the Order's timeframe are not required to sample, but this variance must be documented in the final report. Biosolids should be sampled at the "last point of control" before leaving the POTW. If biosolids are further processed at a central facility, the sample should be collected when leaving that facility. When possible, a dry sample should be obtained to avoid additional laboratory costs associated with wet, biphasic samples. The intent was to understand PFAS concentrations entering and leaving POTWs, including in biosolids, to inform potential regulatory actions and further investigations.

Connecticut

Connecticut Public Act 24-59 bans the use, sale, or offering for sale as a soil amendment

any biosolids or wastewater sludge that contain PFAS. This prohibition is stated in Conn. Gen. Stat. § 22a-903c, provided that no person should use, sell, or offer for sale in the state as a soil amendment any biosolids or wastewater sludge that contains PFAS.

Idaho

Idaho regulations require that sewage sludge disposal and use conform to Department-approved plans or procedures, which are evaluated for protection of water quality and public health (IDAPA 58.01.16.650). Standards for the use or disposal of sewage sludge incorporate 40 CFR Part 503, which sets pollutant limits, management practices, and operational standards, and includes monitoring and reporting requirements for pollutants in sewage sludge (IDAPA 58.01.25.380 and IDAPA 58.01.25.302). Applicants for permits must submit monitoring data that quantifies pollutants with limits established in 40 CFR Part 503. The Department may require sampling for additional pollutants on a case-by-case basis (IDAPA 58.01.25.105). There was no specific requirement in the referenced Idaho statutes or regulations mandating sampling for PFAS in biosolids or sludge, nor was there a specific regulation of PFAS contamination to soil, water, or crops. However, the Department has the authority to require sampling for additional pollutants, including PFAS, on a case-by-case basis if deemed appropriate to protect public health and the environment (IDAPA 58.01.25.302 and IDAPA 58.01.25.105).

Maine

Maine has implemented a prohibition on land application and sale of biosolids containing PFAS. Specifically, under 38 M.R.S. § 1306, the law explicitly prohibited the application or spreading of sludge generated from municipal, commercial, or industrial wastewater treatment plants, as well as compost or other agricultural

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products containing such sludge, on any land in the state. Additionally, the sale or distribution of compost or other products derived from or containing such sludge was also prohibited in 38 M.R.S. § 1306. This prohibition aligns with Maine's broader efforts to address contamination risks associated with PFAS and other hazardous substances, as reflected in related statutes such as 38 M.R.S. § 1310-B-1, which established the Land Application Contaminant Monitoring Fund. This fund is used to monitor and mitigate contamination, including PFAS, in soil and groundwater. The state uses an interim drinking water standard of 20 ppt for the sum of six PFAS.

Maryland

Maryland law authorized the Department of the Environment to require sampling and analysis of sewage sludge and discharges for any pollutant, including PFAS, if the Department determined it was necessary to assess potential impacts on public health and the environment. The Department may require permit holders to take samples, conduct laboratory analyses, and report results for any sewage sludge constituent, which can include PFAS if the Department requires (Md. Environment Code Ann. § 9-242 and COMAR 26.04.06.33). The Department was also required to develop PFAS action levels and mitigation plans for industrial discharges to POTWs, which may include monitoring and reduction strategies for PFAS contamination in water, but these requirements were specific to industrial discharges and pretreatment permits, not directly to biosolids or land application of sewage sludge (Md. Environment Code Ann. § 9-354). There was no statute or regulation that expressly required routine PFAS sampling of biosolids or sewage sludge, nor was there a specific regulation of PFAS contamination to soil, water, or crops from land-applied biosolids. However, the Department has broad authority to require sampling, analysis, and reporting of any pollutant, including PFAS,

as a condition of permits or as necessary to protect public health and the environment (Md. Environment Code Ann. § 9-242, COMAR 26.04.06.33, and Md. Environment Code Ann. § 9-331).

Michigan

Michigan implemented an Interim Strategy for biosolids containing PFOS and/or PFOA. Biosolids with greater than 100 microgram per kilogram (Qg/kg) of PFOS or PFOA were prohibited from land application. Those with 20 to 100 Qg/kg required reduced application rates, e.g., (1.5 dry tons/acre) or mitigation. Biosolids must have a combined PFOS and PFOA concentration less than 20 Qg/kg, with sampling and landowner notification required. This policy is part of Michigan's broader effort to manage PFAS contamination through its Residuals Management Program (RMP) and is enforced under Part 24 of the Michigan Administrative Rules.

Minnesota

An applicant seeking to land apply biosolids in Minnesota must sample those biosolids for pollutants, including PFAS, as required by state and federal regulations. Laboratories conducting these analyses must use methods and test procedures specified in the Code of Federal Regulations, title 40, part 503, and EPA's "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods" (SW-846) Minn. R. 7001.4340. Additionally, biosolids must meet specific standards for application, including soil conditions and pathogen reduction requirements, as outlined in Minnesota regulations Minn. R. 7041.1200, Minn. R. 7041.1300.

New Hampshire

New Hampshire law required soil testing for PFAS at land application sites for septage, specifying analysis for a 40-compound PFAS

list under EPA Method 1633 and as listed in Table 1610-1, with results reported in nanogram per gram (ng/g) (N.H. Admin. Rules, Env-Wq 1608.12). The Department of Environmental Services was authorized to design and implement a program for sampling and testing sludge or biosolid materials intended for land application, with the sampling methodology designed to provide a statistical evaluation of contaminant levels, which included PFAS (RSA 485-A:4). Additionally, the Department was required to initiate rulemaking to adopt rules specific to PFAS contamination, including soil remediation standards for PFOA, PFOS, PFNA, and PFHxS, and may require testing for other PFAS compounds (RSA 485-H:13). Ambient groundwater quality standards for PFNA and PFHxS must be adopted, and no person may violate these standards, which regulate PFAS contamination in groundwater (RSA 485-C:6). Upon written request by the Department, responsible parties must sample and test for PFAS analytes and any PFAS or PFAS precursor detectable by specified EPA methods, including EPA Method 1633 (N.H. Admin. Rules, Env-Or 614.01). The Department was also tasked with investigating, testing, and monitoring PFAS in soil, groundwater, surface water, wastewater, air, biota, and other media (RSA 485-H:8).

Rhode Island

Any applicant seeking approval from the Rhode Island Department of Environmental Management for the distribution or land application of biosolids must test those biosolids for PFAS contaminants, as defined by R.I. Gen. Laws § 46-32-2, and submit the results with the application. Operators with existing approvals must test biosolids quarterly for PFAS contaminants and submit the results to the Department. Sampling is to begin in the October-December 2025 quarter, with the first results due by December 31, 2025. The director may reject any application if approval poses an environmental threat or risk to public health, safety, or welfare (R.I. Gen.

Laws § 46-12-42). Rhode Island law required a statewide investigation of potential sources of PFAS contamination, including the monitoring of public water systems for PFAS, but did not specifically address PFAS regulation in soil, water, or crops resulting from the application of biosolids or sludge (R.I. Gen. Laws § 46-32-7).

Texas

Texas law established standards for the use and disposal of sewage sludge and biosolids, including requirements for sampling and analysis of certain pollutants and pathogens. However, it did not specifically require sampling for PFAS or regulate PFAS contamination in soil, water, or crops in the referenced statutes and regulations. Sampling and analysis requirements for land-applied biosolids were limited to enteric viruses, fecal coliform, helminth ova, inorganic pollutants, and *Salmonella*, with no mention of PFAS as a required analyte (30 TAC § 312.7). The regulations authorized the Texas Commission on Environmental Quality to impose additional or more stringent requirements on a case-by-case basis to protect human health or the environment, but, to the authors' knowledge as of this article's original publication, did not mandate PFAS-specific rules or sampling (30 TAC § 312.6). General policy provisions require that waste disposal not impair groundwater uses or pose a public health hazard, but do not establish PFAS-specific standards or monitoring requirements (Tex. Water Code § 26.401).

Vermont

Vermont issued the Vermont Interim Strategy for Mitigating PFAS Risks Associated with Residuals Management on April 1, 2024, which established the strategy to address the management of biosolids containing PFAS. Vermont regulates two classes of biosolids: Class B and Exceptional Quality (EQ). Vermont adopted a Maximum Contaminant Level of

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20 parts per trillion for five PFAS compounds in drinking water and groundwater. Testing since 2019 shows PFAS have leached into groundwater at some land application sites. The interim strategy applied to soil amendments containing EQ biosolids or short paper fiber (SPF) exceeding one cubic yard. Key provisions included:

1. Required PFAS testing for biosolids, septage, soil, groundwater, and crops.
2. Encouraged use at non-food-chain crop sites.
3. Prohibited application on hydric soils.
4. Required at least three feet to seasonal high groundwater.
5. Required 300+ feet distance from drinking water supplies.
6. No recommended use for crops for direct human consumption.
7. Quarterly electronic reporting to the Department of Environmental Conservation, including material description, amount applied, generator information, PFAS content, and recipient locations.

Washington

Facilities generating biosolids in Washington are required to sample for PFAS chemicals in accordance with guidance published by the Department of Ecology, using EPA method 1633A, no more than quarterly, starting no later than January 1, 2027, and ending by June 30, 2028. All sampling results must be provided to the department by September 30, 2028. These requirements did not apply to septic tank sludge (septage) (Rev. Code Wash. (ARCW) § 70A.226.020). By September 30, 2028, the Department of Ecology must consult with an advisory committee to ensure sufficient input on requirements and standards for sampling or testing biosolids for PFAS chemicals (Rev. Code Wash. (ARCW) § 70A.226.____ (added 2025 c 317 § 6)).



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