BETTER TECH FOR TOMORROW

PRESERVING TEXAS AGRICULTURE: BIOSOLIDS AND THE GROWING CONCERN OF "FOREVER CHEMICALS"

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KEY POINTS

- **The Texas agricultural** sector, which represents a significant portion of U.S. farmland, has seen widespread use of biosolids, making it a focal point in the debate over their safety.
- **Risks associated with forever chemicals** in biosolids have become a pressing issue, especially after PFAS contamination was detected in farms that used biosolids.
- **Several high-profile lawsuits** and legal resolutions in Texas underscore the severity of the issue, with farmers reporting livestock deaths and significant property damage linked directly to the use of biosolids on their land.

EXECUTIVE SUMMARY

This report examines the use of biosolids in agriculture, focusing on their environmental, economic, and health impacts, particularly in Texas. Biosolids are defined by the Meriam-Webster dictionary as "solid organic matter recovered from a sewage treatment process and used especially as fertilizer" (Merriam-Webster, n.d.). Biosolids can offer benefits such as improving soil health and reducing waste from wastewater treatment plants. However, this practice has raised concerns due to the presence of harmful substances, especially per- and polyfluoroalkyl substances (PFAS), also known as "forever chemicals." These chemicals are resistant to degradation and can accumulate in the environment, leading to potential health risks for humans, animals, and the ecosystem.

PFAS chemicals are a growing health concern that are associated with various adverse effects like cancer, high cholesterol, and birth complications. The Texas agricultural sector, which represents a significant portion of U.S. farmland, has seen widespread use of biosolids, making this practice a focal point in the debate over their safety.

Biosolid use dates back to the early 1900s, gaining momentum following federal regulatory changes, such as the Clean Water Act and the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA). Risks associated with PFAS and other pollutants in biosolids have become a pressing issue, particularly after PFAS contamination was detected in farms that used biosolids. Several lawsuits and resolutions in Texas highlight the severity of the problem, with farmers experiencing livestock deaths and property damage linked to biosolid application.

This report calls for increased transparency for Texans, proposing that the state requires that those who play an active role in manufacturing and selling biosolids are held to the same expectation of

health and safety standards as the rest of the agriculture industry. Texas is at an inflection point which will determine the path forward for farmers and the agriculture sector. Texas can foster trust within the agriculture sector by mandating that transparency is an expectation for all market participants who market, produce, and sell products for use in agriculture. A failure to act in the interest of Texans could result in long-term environmental and financial consequences, including costly legal disputes and costly land restoration efforts.

INTRODUCTION

Most farmers are good stewards of the resources used in agriculture operations. It is no surprise that early farming practices used innovative techniques to utilize the byproducts of operations. The ability to recycle and reuse materials not only has an environmental incentive, but an economic one. One notable practice is the use of human or livestock waste as a soil amendment. Methods like manure spreading or composting manure have been used to improve soil quality. When incorporated back into the soil, manure contains nutrients and organic matter that can resupply lost nutrients (EPA, n.d.-a). Composting has also been praised for the benefits of not only decreasing waste and increasing the nutrient content of soil, but also for its ability to conserve water (NRDC, 2020). The Natural Resource Defense Council states that for every 1% increase in organic matter, soil is able to hold an additional 25,000 gallons of available soil water per acre (Bryant, 2015).

Innovative techniques for agriculture have been tremendously beneficial. For example, to this day, the Green Revolution, a period in the 1960s that increased food production and combated widespread food shortages through agriculture innovations, is heralded as one of the greatest technological achievements for increasing food availability and crop production (Pingali, 2012). However, as with any new technologies or methods that modify food production, there ought to be extensive scrutiny to safeguard the health and safety of consumers.

Farmers are often the first to experience the consequences of experiments that have gone wrong. In many cases, they become the proverbial canaries in the coal mine, sounding alarms that often go unheard until the problem worsens.

Over the years, thousands of innovative agricultural ideas have emerged, each once seen as a promising solution to revolutionize farming's future. However, when introducing new farming methods or technologies (such as pesticides, monoculture practices, or fertilizer amendments), farmers are often the first to experience the consequences of experiments that have gone wrong. In many cases, they become the proverbial canaries in the coal mine, sounding alarms that often go unheard until the problem worsens. This scenario is especially true with the recent use of biosolids for agricultural land application. While farmers typically abandon practices once the negative impacts are understood, the situation with biosolids remains an ongoing challenge.

Contrary to what one may assume, the origination of the use of biosolids for land application in agriculture did not stem from demand from farmers, but rather their use began when wastewater facilities were burdened with massive piles of byproduct from the treatment process, resulting in sewage sludge. The only three ways sewage sludge is disposed of is by incineration, landfill, or land application (EPA, n.d.-h). All wastewater treatment plants generate sewage sludge and, due in large part to the increasing amount of sewage sludge generated from these plants, land application was pursued as the primary means of disposal. According to a recent report conducted by the Environmental Protection Agency (EPA), sewage sludge management is influenced by landfill capacities, access to incinerators, and demand for agriculture soil amendments (EPA, 2025).

BIOSOLIDS: HISTORY AND PUBLIC PERCEPTION

Ever since the broad public acceptance of biosolids, the majority of biosolids produced in the United States are now applied on farmlands as fertilizer (NACWA, n.d.). Biosolids are promoted in agriculture for various uses, including for grasses or grain in animal feed, wheat, soy, turfgrass, and other products (EPA, n.d.-g). Land application has been the most promoted and preferred method of disposing sewage sludge from the EPA since 1993 for a variety of reasons, primarily due to cost savings in waste disposal, as compared to other methods like landfilling or incineration. The EPA has noted several advantages for sewage sludge such as "improved soil health, carbon sequestration, and reduced demand on non-renewable resources like phosphorus" (EPA, n.d.-g).

The primary means of disposing sewage sludge from water treatment facilities includes:

1. **Incineration**, which involves the use of heat to remove water and then using combustion on the leftover solids to reduce the amount of waste (EPA, n.d.-b);

2. **Landfill dumping**, through either a monofil (accepts only wastewater treatment plant biosolids), or in a co-disposal landfill (combines biosolids with municipal solid waste) (EPA, n.d.-a; EPA, n.d.-c); or

3. **Land application,** through spreading sewage sludge on surface soil or injecting into the soil (EPA, n.d.-g).

Federal law serves as the primary catalyst for assessing the viability of biosolids for land application. This assessment began with the passing of the Marine Protection, Research and Sanctuaries Act of 1972 (MPSRA). MPSRA emphasizes land-based disposal as opposed to ocean disposal (EPA, n.d.-d). 33 U.S. Code Sec. 1401 declared that the purpose of MPRSA is to reduce harmful material into the ocean that would "unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." The next major impetus that led to increased land application of biosolids was the Clean Water Act (CWA) of 1972. The CWA was enacted to reduce individuals' exposure to toxic pathogens and decrease the presence of harmful substances in the environment by implementing tighter regulations on water treatment and disposal. While this decreased the number of harmful substances in waterways and water bodies, it indirectly led to increased byproduct (sewage sludge) from the treatment process (EPA, n.d.-e).

Given the increased waste generated from implementing the CWA, the Ocean Dumping Banning Act of 1988 followed to address the influx of waste and prevented waste disposal into water bodies (S.2030, 1988). The CWA and The Ocean Dumping Banning Act amplified the burden of waste disposal. As additional industrial and municipal waste was sent to landfills, focused efforts to scale the land application for sewage sludge took precedent. Although it was limited in scope and met with skepticism by the general public, land application of sewage sludge had existed since the early 1900s. For example, the town of Alliance, Ohio, used municipal sludge for fertilizer as early as 1907 (EPA, n.d.-e). In an attempt to garner more public acceptance for this practice, the Water Environment Foundation (WEF), previously known as Federation of Sewage and Industrial Wastes Associations, began to advocate for sewage sludge for land application. Presently, the WEF is recognized as the sewage industry's most prominent lobbying and public relations organization (Trahey, 2010).

In 1990, the WEF organized an event to determine a new, more marketable name for sewage sludge. This event was called the "Name Change Task Force," which was composed primarily of operators of sewage treatment plants. The name change became a national contest, and a plethora of names, many of which were humorous, were submitted. These included everything from "bioslurp," "black gold," "skadoo," "humanure," to "nutricake." In the end, the WEF landed on the term "biosolids." Rutgers University professor William Lutz, a former editor of the Doublespeak Quarterly Review, stated that the term "biosolids" had "one great virtue. You think of biosolids, and your mind goes blank" (Rampton, 2003). The term characteristically did not evoke anything positive or negative, and that was exactly the point.

Pressing forward, the WEF completely dissociated the term "sewage sludge" from the newly marketed "biosolids" product, going so far as to lobby the term to the Merriam-Webster dictionary to be recognized in the dictionary. The word was eventually incorporated into Merriam-Webster and the New Oxford Dictionary of English in 1988 (NEBRA, 2008).

FOREVER CHEMICALS (PFAS)

Forever chemicals (also known as PFAS) are a complex group of man-made chemicals that do not naturally exist in the environment. Since the 1950s, these chemicals have been manufactured for various uses in consumer products. An estimate from the United States Geological Survey asserts there may be more than 12,000 types of PFAS (USGS, 2024). PFAS are notoriously used for their non-stick and grease, oil, and water-resistant properties. The United States Food and Drug Administration approves the use of PFAS for cookware, food packaging, and in foodstuffs (FDA, 2025). These compounds are also used in firefighting foam, medical devices, paints, and construction materials, as well as carpets and clothes (CDC, 2024).

Chemically, PFAS are a chain of linked carbon and fluorine atoms. The carbon-fluorine bond is one of the strongest bonds in chemistry, and this is why variations of these chemicals are so resistant to degradation in the environment (NIH, 2025). Thus, PFAS are commonly referred to as "forever chemicals." More specifically, this is due to the compound's ability to bio-accumulate and bio-magnify in the environment and within animals. Bioaccumulation occurs when an environment or an organism is continually exposed to the compound, with time intensifying the concentration of the compound within the organism or environment. Biomagnification occurs when a compound can intensify as it progresses up the food chain. Additionally, PFAS are so persistent in organisms that they can be transmitted across generations, thus increasing exposure to subsequent offspring. The maternal transfer of PFAS to fetus is increasingly documented as a growing concern (Zhang et al., 2022). Individuals, animals, and the environment can be exposed to PFAS in many ways. For example, firefighters may be at an increased risk of exposure due to PFAS in firefighting foam. Chemical manufacturing and processing is another occupation that can expose individuals to high levels of PFAS. Other means of exposure occurs through consuming certain foods, drinking water, or breathing in air contaminated with PFAS (EPA, n.d.-f). Assessing the risk of health implications is largely influenced by the frequency or method of exposure (ATSDR, 2024).

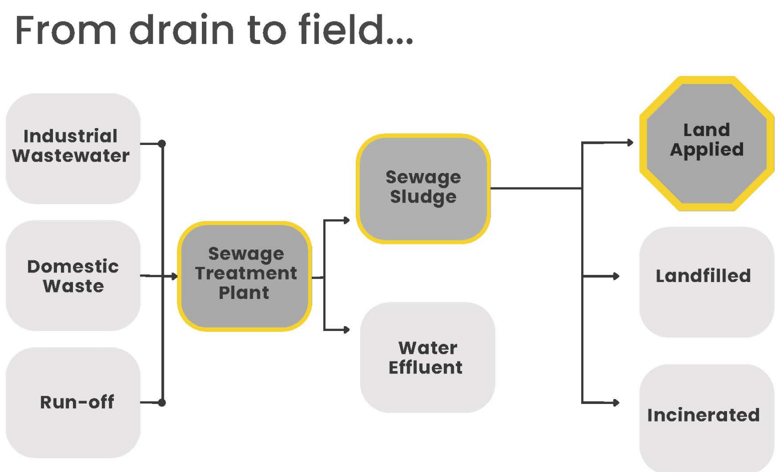
According to the Agency for Toxic Substances and Disease Registry, epidemiological evidence associates increased and routine exposure to various PFAS with the following health effects (see also **Appendix A**):

- Increases in cholesterol levels (PFOA, PFOS, PFNA, PFDA)
- Lower antibody response to some vaccines (PFOA, PFOS, PFHxS, PFDA)
- Changes in liver enzymes (PFOA, PFOS, PFHxS)
- Pregnancy-induced hypertension and preeclampsia (PFOA, PFOS)
- Decreases in birth weight (PFOA, PFOS)
- Kidney and testicular cancer (PFOA) (ATSDR, 2024).

PFAS' Presence in Sewage Sludge

The direct linkage between PFAS and biosolids has been corroborated by many studies on the federal and state level. The first state level assessment of biosolids and their linkage to PFAS began through

Figure 1
EPA Process from Drain to Land Application of Sewage Sludge



the discovery of a Maine dairy farm with a history of land-applying biosolids, which led to an investigation on the biosolids themselves. In 2021, the State of Maine found that dozens of farms using sewage sludge as fertilizer were testing positive for hazardous levels of PFAS (MDEP, n.d.). In other states such as Oklahoma and Michigan, increased PFAS exposure and contamination on agriculture land was found to be directly associated to the practice of land-applying biosolids (Felder, 2024).

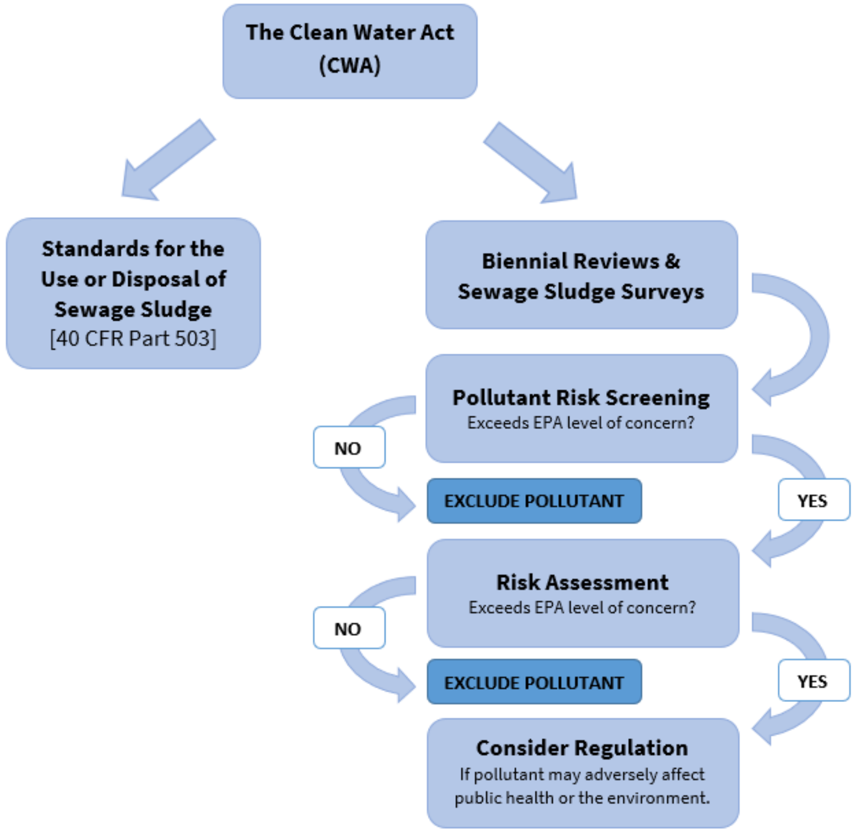
Figure 1 illustrates the various sources of water that serve as inputs in the water treatment process, along with the steps it goes through to eventually become land applied sewage sludge. PFAS enter wastewater through industrial, commercial, and domestic sources, and are not fully removed during the water treatment process, resulting in biosolids that contain PFAS. Additionally, sewage sludge, because of the organic and protein content, has been known to attract certain PFAS within the biosolids (Ulrich et al., 2016). This results in land application of sewage sludge being a significant route of PFAS exposure, specifically for agriculture.

SEWAGE SLUDGE OR "BIOSOLIDS": REGULATIONS AND OVERSIGHT

As noted, biosolids have been regulated for over 30 years. The CWA required the EPA to establish standards in order to determine prudent uses and disposal practices of sewage sludge. The standards are found in Title 40 of the Code of Federal Regulations (CFR). States are subjected to federal regulations under 40 CFR Part 503, and such regulations concern land application, incineration, or landfilling sewage sludge. 40 CFR Part 503 also determines the process for how pollutants are managed, as it requires the EPA to establish limits on found pollutants and requires periodical review of regulations to identify additional toxic substances that may exist in sewage sludge. The pollutants are assessed by analyzing the adverse effects to humans or the environment. This is based on factors such as degradation of pollutants, persistence in the environment, and the associated exposure risk. **Figure 2** depicts the review process to determine the necessity of adding additional regulations for specific pollutants. For land-applied sewage sludge, only nine pollutants are regulated by the EPA. As shown in **Figure 3**, heavy metals like arsenic, lead, and mercury are among the nine regulated metals (EPA, 2003).

Figure 2

Process of Regulating Pollutants in Sewage Sludge Under the CWA



This flowchart demonstrates the process of regulating pollutants in sewage sludge under the CWA.

Note: From the EPA, n.d. (https://www.epa.gov/biosolids/sewage-sludge-laws-and-regulations).

Figure 3

Pollutant Limits for Land Applied Sewage Sludge Established by the EPA

Pollutant	Ceiling concentration (milligrams per kilogram)
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

Note: Figure from the EPA, n.d. (https://www.epa.gov/biosolids/regulatory-determinations-pollutants-biosolids#:~:text=Six%20pollutants%20are%20regulated%20in,concentrations%20developed%20by%20the%20EPA).

40 CFR Part 503 allows for land application on food crops unless a state prohibits the use of biosolids for land application. At the federal level, biosolids are broken down into Class A and Class B. Class A biosolids meet stricter EPA guidelines for land application because of the broad usage. Class A biosolids can be used for various agricultural, public, residential, and commercial uses, per Section 503.32(b)(5). Class B biosolids contain measurable levels of pathogens and are required to follow harvesting restrictions, such as time frames limitations as to when crops can be harvested and when animals may graze land treated with Class B biosolids (40 CFR Part 503, 2018).

PFAS within Biosolids

Relying on federal regulations to manage sewage sludge is largely ineffective due to bureaucratic delays, as illustrated in **Figure 2**. Addressing state-specific needs requires a swift and adaptable approach to their unique challenges. While the EPA acknowledges health and environment risks posed by PFAS in other sectors, the agency refrains from regulating these chemicals in sewage sludge or biosolids. The stringent regulations of PFAS chemicals in other sectors create a significant disconnect, leading to the mistaken belief that since these chemicals are not tested in sludge, there is no need for state intervention in order to protect public health.

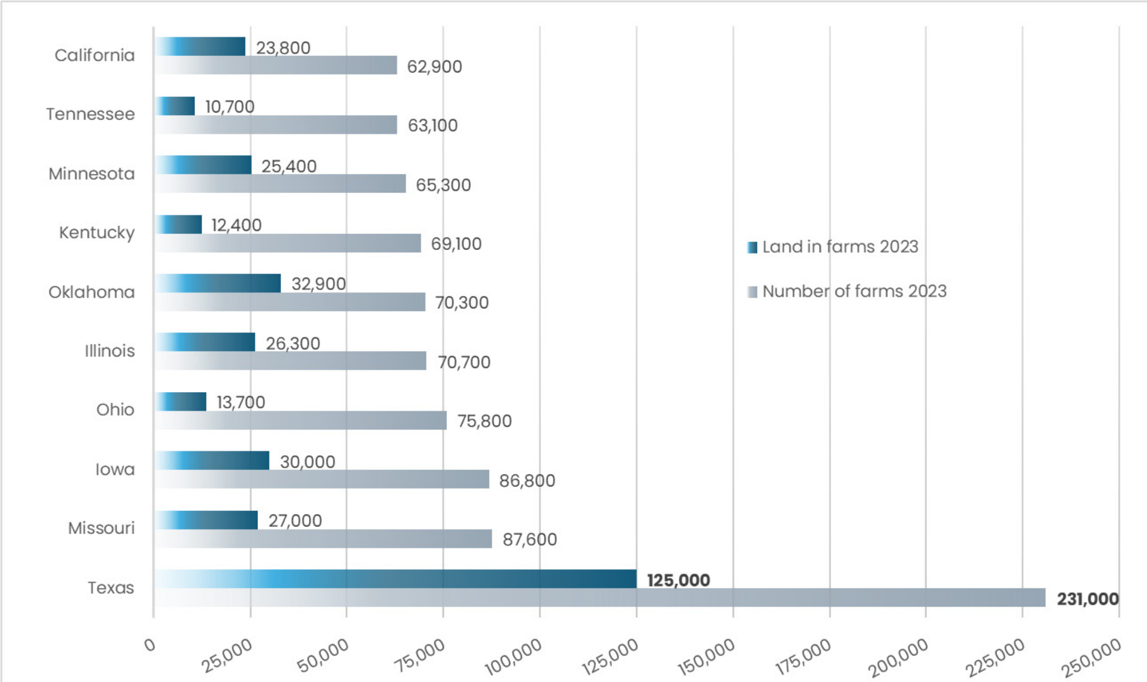
As **Figure 3** illustrates, PFAS chemicals are notably absent from the EPA's pollutant limits for land applied sewage sludge. Requirements for drinking water are set to the lowest detectable amount with current technology. This requirement stems from the EPA's determination that any amount of PFAS is extremely hazardous to human health. Despite the heavy regulation of PFAS chemicals in drinking water, the EPA has largely abstained from addressing these chemicals within biosolids. There is little oversight directly focused on the presence of PFAS in biosolids, even though these chemicals present in land applied sewage sludge enter an individual through various mediums (e.g., consuming animals that ingested PFAS contaminated biosolids). Data from multiple countries have identified significant concentrations of PFAS in biosolids, and the EPA's recent analysis of just two types of PFAS (PFOA and PFOS) found that the exposure risks of these chemicals through biosolids increased proportionally as the amount of PFAS chemicals increased in biosolids (EPA, 2025).

With a greater understanding of the potential impacts of biosolids, regulations have now been enforced on a state, national, and international level due to their environmental presence and propensity for harm. In Texas, biosolids are divided into three class designations—Class A, AB, and B—based on treatment methods. The different classes have specific treatment requirements and general requirements for management practices. There are currently treatment requirements for pollutants (heavy metals), pathogens (disease-causing bacteria and viruses), and vector attraction reduction (odor control). Similar to the relationship between biosolids and the EPA, there are no standards set in place for management of PFAS in biosolids in Texas (TCEQ, n.d.).

However, the Texas Commission on Environmental Quality (TCEQ) established oral reference doses (RfDs) for various PFAS compounds. A reference dose is defined as an estimate of a daily exposure to an individual that is likely to be without "acceptable risk" of harmful effects during a lifetime (ScienceDirect, n.d.). Acceptable risk is interpreted by the TCEQ as the acceptable individual exposure amount of a chemical to cause cancer risk (TCEQ, 2015). The TCEQ derived RfDs for 16 PFAS compounds in 2011. These values were updated in 2012 and again in 2015 to incorporate advancements in toxicity research The latest update was published in February 2023, establishes RfDs for 16 PFAS substances (TCEQ, 2023). These RfDs by the TCEQ reflect the most current scientific data available and provide regulatory authorities guidance on the safe levels of PFAS in drinking water or soil (TCEQ, 2015).

Figure 4

Top Ten States in the U.S. for the Number of Farms and Land in Farms (in 100,000 acres)



Note: Data from the United States Department of Agriculture, 2024 (https://downloads.usda.library.cornell.edu/usda-esmis/files/5712m6524/b2775h03z/ns065w04d/fnlo0224.pdf).

According to the U.S. Department of Agriculture (USDA), Texas has more than 125 million acres of farmland—constituting a total of 14% of the United States' farmland.

AGRICULTURE IN TEXAS

Agriculture is the cornerstone of the state's economy. According to the U.S. Department of Agriculture (USDA), Texas has more than 125 million acres of farmland—constituting a total of 14% of the United States' farmland. Texas leads by more than two times the second-ranked state in both the number of farms and land acreage of farmland (see **Figure 4**). With more than 231,000 farms in Texas, it is essential that the political landscape acknowledges the significant influence of Texas agriculture when shaping policies and mitigating downstream effects of negligence (USDA, 2024a).

IMPLICATIONS OF BIOSOLIDS IN TEXAS' AGRICULTURE

Biosolids are used in nearly every state throughout the United States (Homsi, 2024). In 2018, Texas ranked second out of the entire U.S. in amount of biosolids used or disposed (see **Figure 5**). The National Biosolids Data Project 2018 survey showed that Texas disposed of more than 473,000 dry metric tons of biosolids in that year alone (NBDP, n.d.), causing serious problems for farmers, livestock, and the environment.

For example, farmers in Grandview, Texas, filed a lawsuit in February of 2024 against Synagro Technologies, Inc., the largest biosolids manufacturer in the United States. The suit alleges that the manufacturing and distribution of biosolids resulted in the contamination of the farmers' properties with PFAS. The use of biosolids within the area has also coincided with unusual deaths of cattle and other livestock. The farmers are seeking prevention of further injury and reasonable compensation for the

Case Study: "Biosolids in Agriculture: The Strife not with Mother Nature, but Man-Made Chemicals"

Tony Coleman and James Farmer, two ranchers in Johnson County, Texas, observed strong odors emanating from a neighboring property, where large piles of fertilizer were present. Following a heavy rain, runoff from this site contaminated their land and ponds. Dead fish began appearing in their ponds where their livestock drank from.

The neighbor purchased biosolids, a byproduct of treated sewage sludge, from Synagro, the company contracted by the city of Fort Worth to manage its wastewater facility starting in 2020. Biosolids were marketed as a cost-effective, environmentally friendly alternative to traditional fertilizers. However, complaints about chemical odors, dead fish, and livestock illnesses began to surface in the area.

In response to these concerns, the Environmental Crimes Investigator in Johnson County initiated an investigation. It was found that biosolids contained various hazardous chemicals, including per- and polyfluoroalkyl substances (PFAS), which are known as "forever chemicals" due to their persistence in both the environment and the human body.

The Environmental Protection Agency (EPA) has set a limit of four parts per trillion (ppt) for PFAS in drinking water, a concentration equivalent to four drops in 20 Olympic-sized swimming pools. Exposure to PFAS has been linked to a range of health problems, including kidney and testicular cancer, thyroid disease, and reproductive issues.

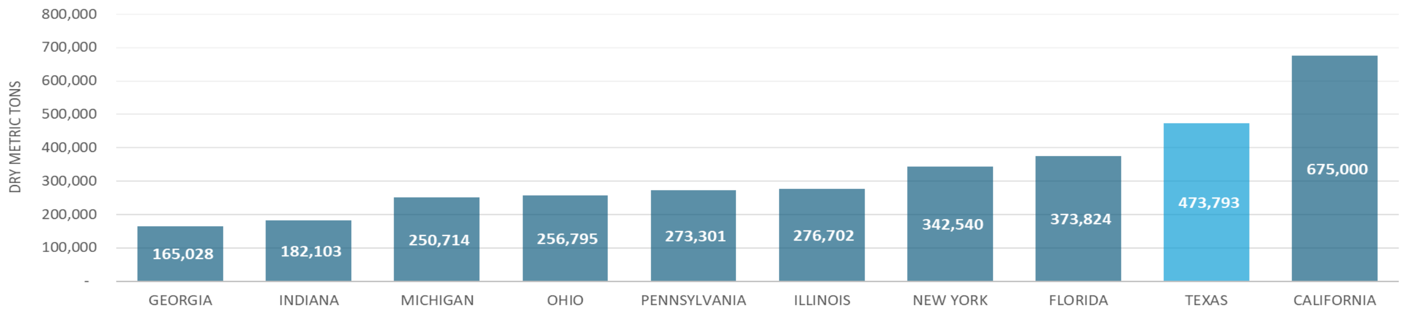
In response to further reports of livestock deaths, a farmer in Grandview, Texas, contacted a Johnson County commissioner regarding the death of a stillborn calf. Subsequent testing revealed that the liver of the calf contained 610,000 ppt of PFOS, a type of PFAS, far exceeding the EPA's hazardous level.

Synagro, the largest recycler of biosolids in the U.S., serves over 1,000 municipalities and markets its product as safe for agricultural use. However, increasing evidence about the presence of PFAS in biosolids has raised concerns about their safety for use as fertilizer.

Note: Original commentary by Aliyah Formont, published in The Cannon (https://www.texaspolicy.com/biosolids-in-agriculture-the-strife-not-with-mother-nature-but-man-made-chemicals/).

Figure 5

Top Ten States in the U.S. for Biosolids Used and Disposed in 2023 (dry metric tons)



Note: Data from the National Biosolids Data Project, n.d. (https://www.biosolidsdata.org/national-summary).

damage caused to their livelihoods, properties, and overall health (*Farmer v. Syangro, 2024*). Several other lawsuits at the federal level have surfaced as well, including farmers from Grandview, Texas lawsuit against the EPA. Also filed in February of 2024, the suit claims that the EPA has failed to uphold the duties of the agency by improperly managing biosolids—more specifically, abstaining from evaluating the risks of PFAS in biosolids at all. The lawsuit states, "EPA's failure has enabled the land application of PFAS-laden sewage sludge on millions of acres of land, harming Plaintiffs and people across the country by exposing them to PFAS and depriving them of the procedures guaranteed to them by the Clean Water Act for timely identification and regulation of harmful substances in sewage sludge" (*Farmer v. EPA*, 2024, p. 6).

Throughout Texas, local counties are filing resolutions claiming that biosolids are contributing to PFAS contamination in the agriculture sector. The first such resolution was initially filed by Johnson County, Texas, on March 25, 2024, and called for the prohibition of land-applying biosolids (County of Johnson, 2024). Since Johnson County's resolution, several counties have filed similar resolutions calling for state action. For example, Ellis County called to "suspend the practice of selling, distributing, disposing, or releasing biosolids from its wastewater treatment [facilities]" (County of Ellis, 2024).

Though testing has shown the presence of these chemicals within biosolids, the use of biosolids in the agriculture sector is still widely used. This is for various reasons, including the convenience factor the fact that these products are cheaper, sometimes given to farmers at no cost, than the competing traditional fertilizers. Similarly, water providers and waste water treatment facilities have a large incentive to promote and continue to use biosolid manufacturers because of their cost savings, as opposed to paying for land disposal or incineration (Treat, 2021).

The situation in Grandview, Texas, serves as a stark reminder of the dangers of a lack of accountability and expectation of transparency for consumers. These toxic chemicals are linked to cause substantial harm to properties, livestock, and health. While biosolids may seem economically appealing in the short term, the long-term risks are too great to ignore. There may be the underlying economic incentive of cost savings for municipalities disposal methods to continue the use of biosolids, but mounting legal actions and evidence of agricultural damage continues to escalate the future financial burden. For example, in October of 2024, after the USDA's multi-agency workshop to find long-term solutions to PFAS in agriculture, acting administrator Marlen Eve stated, "Currently, our data shows that PFAS is an environmental hazard that does not come from agriculture, but, producers need efficient, cost-effective ways to deal with the challenges when it is detected in our agricultural soils and waters" (USDA, 2024b). Pursuing commonsense transparency measures will not only protect Texas farmers and consumers, but by taking meaningful action now, Texas can avoid the costly process of land restoration and legal disputes in the long term. Texas can and should lead by example: protecting its agricultural industry and the health of its people, while ensuring a more transparent future for all.

POLICY RECOMMENDATIONS

Policy solutions should reflect the importance of the agriculture sector to the state. Rather than setting a mandate, such legislation should instead focus on setting an expectation that transparency is a fundamental right of consumers. Those who supply products to the agriculture sector should be held to the same standards of safety that agriculture is across Texas and the rest of the United States.

We recommend the following policy prescriptions:

1. **Establish PFAS Limits for Biosolids in Texas.**
   The current practice of Texas playing the waiting game for federal agencies to find resolve for PFAS is no longer an option. Texas has a role in protecting communities' health and ability to prosper. Texas should introduce state-level regulations on its own accord to best address the biosolids issue at hand. Texas should set permissible PFAS concentration limits utilizing the TCEQ reference doses to establish thresholds in biosolids that align with current, best-understood science and adapt as science evolves.

2. **Implement Comprehensive PFAS Testing in Biosolids.**
   In the effort to increase transparency, Texas should require regular, mandatory testing of all biosolids for per- and polyfluoroalkyl substances (PFAS) before they are applied to agricultural lands. Testing protocols should be standardized, and results should be publicly accessible to ensure transparency and accountability.

3. **Strengthen Accountability for Biosolid Producers.**
   Companies responsible for manufacturing and distributing biosolids should be held accountable. For too long, biosolid products have been marketed as safe for agriculture use. This should no longer be the case, and companies should be required to disclose potential risks and establish accountability mechanisms. This should include public data bases where consumers, farmers, and communities can easily access information on biosolid contents.

CONCLUSION

Consumers have a right to know what is in the products they purchase and consume. Texas must take action to ensure transparency in the agricultural products marketed to consumers, consequently enabling them to make informed decisions about their health and safety.

Across the U.S., several states are closely examining the actions of Maine, which became the first state to implement an outright ban of biosolids. Connecticut followed and in October of 2024, the sale and use of biosolids was prohibited. Meanwhile, states such as Michigan, Wisconsin, New York, Massachusetts, Oklahoma, and Colorado are actively taking measures to address biosolids, including adopting interim strategies to limit biosolid concentrations, developing legislation that sets maximum PFAS levels in fertilizers, and introducing requirements for basic warning labels on products derived from biosolids.

By making transparency a fundamental requirement for these products, Texas will take a significant step toward creating a healthier, more transparent agricultural system, benefiting both consumers and producers across the state. ■

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APPENDIX A: HEALTH EFFECTS ASSOCIATED WITH PFAS EXPOSURE

The following table outlines the health effects associated with increased and routine exposure to various per- and polyfluoroalkyl substances (PFAS), based on epidemiological evidence from the Agency for Toxic Substances and Disease Registry. This appendix highlights the specific PFAS compounds linked to various health effects, as identified in studies on routine exposure (ATSDR, 2024).

Health Effect	PFAS Compounds
Increases in cholesterol levels	Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonic acid (PFOS), Perfluorononanoic acid (PFNA), Perfluorodecanoic acid (PFDA)
Lower antibody response to some vaccines	Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonic acid (PFOS), Perfluorohexane sulfonic acid (PFHxS), Perfluorodecanoic acid (PFDA)
Changes in liver enzymes	Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonic acid (PFOS), Perfluorohexane sulfonic acid (PFHxS)
Pregnancy-induced hypertension and preeclampsia	Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonic acid (PFOS)
Decreases in birth weight	Perfluorooctanoic acid (PFOA), Perfluorooctane sulfonic acid (PFOS)
Kidney and testicular cancer	Perfluorooctanoic acid (PFOA)

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