About Forever Chemicals

Why PFAS are so impervious, and who is most at risk from the forever chemicals

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Maine passes first PFAS biosolids ban, taking stand against forever chemicals

Brooks Hays
10-13 minutes

In Maine, some farms have been forced to pull milk from the shelves after discovering their cows had been drinking water and eating feed contaminated with PFAS, or forever chemicals. Photo by Scott Bauer/Agricultural Research Service

BANGOR, Maine, May 4 (UPI) -- Maine has become the first state to ban fertilizer using sewage sludge containing "forever chemicals" -- synthetic compounds found in items from food wrappers to carpeting that fail to break down in the environment.

The move, along with a ban approved last year on all PFAS-containing products, puts Maine at the forefront of the fight against per- and polyfluoroalkyl substances, which have been linked to a variety of health problems, including cancer and high cholesterol.

The chemicals accumulate over decades, filtering into soil, water, plants and animals -- and eventually into people's bloodstreams.

"Maine is one of the few states that is really taking this problem seriously and taking action to address the issue," Jared Hayes, a policy analyst with the Environmental Working Group, told UPI.

Sludge spreading in the 70s

The practice of sludge spreading started in the 1970s as a cheap way for farmers to replenish nutrients in soil.

State programs and wastewater treatment companies encouraged the practice, and officials assured farmers that the sewage-derived fertilizer was safe and free of heavy metals and other harmful toxins.

What farmers didn't know was that some sludge being applied to their fields contained PFAS, a class of compounds first developed by 3M and Dupont, which have been used in a litany of products and materials to boost resiliency against fire, water, grease, stains and more.

In the 1990s, evidence began to emerge that some of the chemicals were harmful, even at low levels. In addition to cancer and high cholesterol, PFAS exposure has been linked to liver and kidney damage, disrupted fetal development and lowered vaccine efficacy.

"Farmers who spread these materials were not aware of the potential risks, because the state was not aware of the risks," Tricia Rouleau, the farm network director at Maine Farmland Trust, told UPI in an email.

Working with PFAS in the environment

Because of the stubborn persistence of forever chemicals, even farms that were never treated with tainted sludge have been affected.

Earlier this year, Misty Brook Farm, an organic farm in Albion, Maine, owned by Brendan and Katia Holmes, was forced to pull milk and other dairy products from grocery shelves after tests revealed elevated PFAS levels in their cows.

"Last summer we were able to test some fields and some feed we made on those fields with a small grant from [Maine Organic Farmers and Gardeners Association]," Katia Holmes told UPI in an email. "The results didn't seem bad on the soil and feed."

"When we found out our neighbor's well tested really high for PFAS we decided to get our well and milk tested," she said. "At the same time we tested some feed we recently purchased from another local farm."

Though Misty Brook Farm's water came back clean, test results suggest Holmes' cows absorbed high levels of perfluorooctane sulfonate, or PFOS, from hay grown on a farm where the land was treated with sludge.

"The milk and the feed tested really high for PFOS," Holmes said. "The brought-in feed was the source of contamination that spiked the count in the milk."

Misty Brook Farm is one of nearly a dozen farms impacted by elevated PFAS levels, but that list is expected to grow as Maine's Department of Environmental Protection, and its Department of Agriculture, Conservation, and Forestry, continue to test fields, wells and waterways -- in addition to concerned farmers conducting their own tests.

Though Misty Brook Farm's products are now PFAS-free, Holmes was forced to buy a whole new herd of milk cows.

Widespread damage at a large cost

Maine's state legislature recently passed a bill allocating more than $100 million to help farmers like the Holmes who face financial hardships because of PFAS contamination. The bill now awaits signing by Maine's governor, Janet Mills.

"There is going to be a need for a lot of financial support for farmers going forward," Holmes said. "There will be a lot of land that needs to be taken out of food production and a lot of livestock that are not fit for consumption. Some farms have been in the family for generations. This is a huge loss."

State researchers are testing more than 700 high risk sites, land that was treated with large amounts of biosolids. Areas near paper mills and tanneries, which have long deployed the chemicals, are at especially high risk.

An online map published on the state's Environmental and Geographic Analysis Database shows all of the places where permits for "land application of lime-stabilized wastewater treatment plant sludge and septage" were issued.

Based on testing efforts in Maine, Michigan, Ohio and other states, the Environmental Working Group estimates at least 5% of the nation's farmland has been treated with biosolids containing PFAS.

That 5% includes Fred Stone's Maine dairy farm, ground zero for PFAS contamination in Maine.

In 2016, a federal testing program revealed elevated PFAS levels in the water from several participating towns in Southern Maine. Authorities traced the chemicals to a municipal well on Stonebridge Farm in Arundel. Subsequent tests revealed spiking PFAS levels in the farm's soil, drinking water and milk.

For nearly 20 years, Stone had been applying wastewater sludge to the land his family has farmed for more than a century. Despite early assurances that the test results were an isolated aberration, not a sign of a larger problem, the contamination ultimately ruined Stone's diary farm.

Stone was forced to euthanize a contaminated herd of dairy cows and install an expensive filtration system that ultimately failed to adequately reduce PFAS levels. Unable to produce clean milk, Stone lost his contract with Oakhurst Dairy and now subsists on a combination of welfare and familial generosity.

Stone has yet to qualify for aid from the state, but the tragedy of Stoneridge Farm has ensured other farmers impacted by PFAS have a bit more support.

Legislative action

Two years after the contamination was found, Stone shared his story with newspapers and state legislators, forcing policy makers to consider that the problem could be much bigger than a single dairy farm.

Maine State Rep. Jessica Fay told UPI that she and her colleagues started learning about the challenges of PFAS screening in 2018. Not long after, Fay began crafting legislation to ban PFAS in food packaging.

She said that, even then, she didn't quite grasp the scope of the problem.

"I didn't comprehend in early 2018, or indeed until the Fred Stone info became public in early 2019, how widespread PFAS contamination might be in Maine, or really that it was a significant health hazard," Fay said.

"And until I really began to dig into the science and the history of PFOA and the regulatory procedures at FDA because of the food packaging bill, I didn't really see the big picture," she said

Maine's state agencies and legislature are now taking a much more proactive approach to PFAS contamination, but legislators, regulators and farmers are still plagued by uncertainty.

"We don't know what levels of PFAS in what agricultural products are safe for consumption," Fay said. "We have identified the contamination, but we don't know yet exactly what it means. We're doing the work of research and science at the same time that we're discovering the contamination."

Newer PFAS as bad as the old?

While much remains unknown about PFAS contamination, that the chemicals can harm human health is undenied.

"We've known for 20 years that these chemicals harm liver tissue and other organs in rats and other animals," Dr. Leda Chatzi told UPI.

"Now we have a growing body of evidence that supports the same in humans," said Chatzi, a professor of population and public health sciences at the University of Southern California.

Chatzi is the co-author of a newly published study highlighting the links between PFAS exposure and liver damage in humans.

In the United States, most of the earliest PFAS compounds started being phased out by chemical companies in the early aughts after pressure from the federal government. But these legacy PFAS were quickly replaced by new generations of PFAS compounds.

Chemical makers, trade groups and even wastewater treatment companies argue that these newer chemicals are safer, and that the ill effects of legacy PFAS are limited to a small number of compounds and a handful of isolated industrial sites.

In Maine, waste management companies, and even some farmers, oppose LD 1911, claiming an outright ban on biosolids goes too far. Small amounts of PFAS are safe, one pro sludge-spreading group called the Maine Work Boots Alliance argues.

"The industry can argue that there are isolated PFAS that are associated with specific disorders, but that is only because that is how we've done research, studying just one, two or three specific PFAS compounds at a time," Chatzi said.

Chatzi has helped conduct research showing the dosage of a mixture of PFAS is much more predictive of human health impacts than exposure to any specific compound.

In other words, it's not one or two PFAS compounds that pose the risk, but the flood of PFAS chemicals, both legacy or emerging, that continue to accumulate in the environment.

"All of these chemicals have very similar structures, and they are very highly correlated," Chatzi said. "We need to take these chemicals very seriously. We don't know need more PFAS in our lives."

More leadership needed

Researchers are doing their best to illuminate the human costs of PFAS proliferation, but there is only so much a university laboratory -- or even a state agency -- can do.

When researchers and regulators talk about PFAS, they invariably mention the lack of federal leadership.

"A lot of this feels like it really belongs on the plate of the EPA and federal government, because it's really a national, even a global issue," Fay said.

"EPA is in the very, very early stages of starting to create PFAS discharge limits for some of these industries," Melanie Benesh, legislative attorney with the Environmental Working Group, told UPI. "But the agency is moving really, really slowly."

But strict limits on PFAS pollution, at least at the federal level, remain years away. In the meantime, it's almost guaranteed that there are going to be more PFAS in everyone's lives.