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Watertown takes in millions of gallons of landfill runoff. Environmental groups worry that's bringing in toxic PFAS chemicals

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The city of Watertown's wastewater treatment plant on William T. Field Drive. Jonathon Wheeler/Watertown Daily Times

WATERTOWN — Each year, thousands of trucks filled with the liquid runoff collected at major landfills across New York are driven into Watertown, taken to the city's sewage treatment plant, processed and discharged into the Black River.

Some environmental advocates are concerned that means thousands of gallons of PFAS, some of which are known to be highly toxic to humans and the environment, are being dumped into the Black River.

According to data reported to the New York Department of Environmental Conservation between 2019 and 2023, the Watertown wastewater treatment plant on William T. Field Drive took in an average of 11.9 million gallons per year of runoff, also called leachate, from the Development Authority of the North Country's landfill in Rodman, about 56% of all runoff from that landfill.

The plant also took in an average of 10.1 million gallons of runoff per year from the Seneca Meadows landfill in Seneca County, about 15% of that landfill's runoff. The plant took in 4 million gallons a year from Ontario County's landfill, and 18,000 gallons a year from the Bristol Hill landfill in Oswego County.

Rebecca Martin, an environmental advocate from the Hudson Valley who has created the Hudson and Mohawk Rivers Leachate Collaborative, said those gallons of runoff are contaminated, and there's no evidence that modern sewage treatment plants, which have been built to handle human waste, are effectively removing PFAS from the wastewater they're processing. The U.S. Environmental Protection Agency has identified methods to remove PFAS chemicals from wastewater, but those methods are new, expensive and not commonly used in sewage treatment.

"Landfills are delivering leachate to sewage treatment plants made to manage waste, human waste, and not to filter toxic chemicals," Martin said. "It's not even clear what PFAS chemicals are being picked up by the sludge in these systems and then discharged into our water bodies, in this case rivers that serve as drinking water supplies."

Jen Epstein, lead writer of a 2024 analysis of landfill leachate treatment processes in the Hudson and Mohawk rivers, said that landfills collect some of the highest concentrations of PFAS chemicals, including thousands of unregulated and under-studied compounds whose impacts on

the human body and the environment aren't fully understood or regulated.

What are PFAS?

PFAS, long name per- and polyfluoroalkyl substances, are a class of manmade chemicals that saw increasing industrial use after World War II. PFAS were and are used in nonstick cookware, Scotchgard furniture protectant, waterproofing for clothes, firefighting foam and many other thousands of products. They're colloquially called "forever chemicals," because they do not easily break down.

After the first generation of chemicals was identified as potentially toxic, companies started to move toward next-generation chemicals. Newer PFAS include a class of so-called "Gen X" chemicals. Some of this new generation of PFAS have been added to drinking water standards lists as substances of concern.

Health concerns around PFAS contamination hit a new pitch in the 2010s, when evidence of significant groundwater contamination was found in a handful of communities, including one village in Rensselaer County. Those compounds, PFOA and PFOS, quickly became a point of concern for health researchers and public health officials.

Evidence of PFAS contamination shows in nearly every surface and ground water source that's been tested in the U.S., including in Lake Ontario and the St. Lawrence River. Fort Drum was found to have significant contamination in part of its drinking water well field, forcing the U.S. Army installation to rely on outside water supplies until a multi-million dollar well digging project was completed last year.

Some PFAS can have devastating health effects if taken into the human body. Identified toxins include PFOA and PFOS, which the federal government requires water systems to monitor for, as well as the new generation of PFAS chemicals meant to replace PFOA and PFOS. Studies have shown that these substances, when taken into the body, can be tied to decreased fertility, developmental delays, increased cancer risks, a suppressed immune system, interference with hormonal balance, and other issues.

Experts have stressed that it's not entirely clear what other impacts the chemicals have on the human body, as research is in fairly early stages and focused on only a handful of identified compounds. There are some 15,000 different PFAS that have been produced and tracked by the EPA, and some PFAS interact with one another to create previously unknown formulations.

Early regulation efforts

New York and Vermont, having independently identified problematic PFAS contamination, have pushed the federal government to regulate the chemicals more closely, require water systems to test for and remediate the substances, and encourage a wide-scale phase out of the chemicals across the nation.

Regulations have come in fits and starts. Federal regulations currently limit acceptable levels of just two compounds, PFOA and PFOS, in drinking water. At the state level, New York requires water systems to check for PFOA and PFOS, and when either of those chemicals is detected, the state further requires water systems to check for all PFAS currently known.

New York has also banned PFAS in food packaging, and lawmakers have moved to enact wider bans on the substance in clothing, cookware and other applications.

But Epstein said U.S. chemical regulations aren't very good at catching new and emerging threats. Chemicals go unregulated until a problem is identified, and manufacturers are incentivized to make marginal changes to their chemical formulations when a compound is regulated, she said.

"Because of our chemical regulations, new PFAS are approved without going through study," she said.

Additionally, PFAS and other precursor compounds that are disposed of in a landfill can combine and create new compounds not previously seen, tested or used by humans.

Treatment process

Watertown formally calls its sewage treatment plant the City of Watertown Pollution Control Plant.

Aaron T. Harvill, the city's Water Department superintendent, explained that the plant has two treatment processes: a trickling filter and an activated sludge system. Both rely on microorganisms, bacteria, fungi, viruses and phages to eat the solid waste sent through the system.

A preliminary filter catches larger solids like the "flushable" wipes that aren't sewage system friendly, small items and trash that enter the system before the soiled water is sent through the trickling filter and activated sludge systems. Wastewater is also treated with ferric chloride to remove phosphorous, and a disinfection solution during the warmer summer months when bacterial growth is accelerated.

The result is a mix of biosolids at the end, a mixture of digested human waste, food and other solid compounds that have been digested and integrated with the system's microorganisms. Some of this is reused at the processing plant for further waste processing, some is treated and turned into fertilizer for farm fields, and some is taken back to local landfills.

Most of the time, that system is processing wastewater from the city's own sewer system. Angel French, chief operator of the Pollution Control Facility, said more than 98% of what goes through the city system is domestic wastewater, and less than 2% comes from "significant industrial users," including the trucked-in leachate. The city also takes some effluent from other municipalities that don't have their own treatment plants.

"The revenue from leachate is over $2 million per year, which offsets operational costs," Harvill said. "Any surplus is added to the sewer fund to offset emergency expenses and defray capital project costs."

Harvill said leachate taken in at the city pollution plant is tested for heavy metals, PFAS and other pollution, and can be rejected if deemed unsafe.

French said that the city has only rejected leachate about five times since 2012, which happened during planned maintenance or interruptions to the plant's biological processes.

“Importantly, leachate has never been refused due to exceedances of discharge limits,” French said.

Once accepted, the leachate is allowed through the treatment plant along with the regular flow of city wastewater. It’s not treated differently in any way, and the water that once settled through layers of garbage in landfills is now poured into the river, mixed with the biosolids that will be trucked off to farms or other landfills or reused.

Biosolids used on farmland are held to a state-set standard for PFOA and PFOS, but other compounds are not regulated. The city also tests both its water intake and wastewater effluent pipes following the EPA Method 1633, the current Environmental Protection Agency testing standard that asks municipalities to track 20 PFAS and 20 other compounds of concern.

The city’s drinking water is in compliance with EPA standards, although officials are working on a $58 million project to address two disinfection byproducts. In 2020, the city was placed under an EPA consent order to correct levels of the two byproducts. They are total trihalomethanes, or TTHM, and haloacetic acids, or HAA5, created during the disinfection process when they react with organic material from the city’s water supply. The city water is drawn from the Black River.

Levels of those two substances have dropped back down below the EPA threshold, but the project is still required. Neither of those substances are PFAS.

French said that the city’s wastewater effluent discharged into the Black River, and the biosolids the facility produces, test very low for PFOA and PFOS. French said that’s driven by the comparatively low volume of industrial waste processed at the pollution control facility.

“I have attended several conferences focused on PFOS/PFOA removal, and while the emerging technologies in this field are promising, their application at wastewater plants is still limited and developing,” he said. “I fully support efforts to reduce PFOS and PFOA in the environment; however, the responsibility for addressing PFAS contamination should rest with the industries that manufactured and released these chemicals, not with local communities that had no role in creating the problem.”

There is a way to remove PFAS chemicals at the consumer side of the water system: granular-activated carbon filters like Brita or ZeroWater filters, ion-exchange resin systems commonly used in under-sink filter systems, and reverse osmosis filters common to countertop or whole-home filters. The EPA found that all these "point-of-use" filters are effective at greatly reducing PFAS in water, but have to be maintained to remain effective.

The EPA guidance stresses that it's not yet clear that home filters alone are enough to bring identified toxic PFAS down to the levels required by federal drinking water standards, and the federal department is still working with filter manufacturers to update certification standards to reflect updated EPA standards.

Environmental worries

Martin, the advocate from the Hudson Valley, said the current treatment methods, with large gaps for new and unregulated chemicals to slip through, are built on an old way of thinking about environmental protection.

"This approach, it's built on the flawed idea that 'the solution to pollution is dilution,'" she said, referencing an environmental adage that has been challenged in recent years. "We know that PFAS chemicals are actually multiplying because of this process. What goes out is more of the PFAS chemical than what comes in."

Martin said she challenges the use of terms like "pollution control plant" or "wastewater treatment plant" to refer to the systems in place in Watertown and most other cities. These plants are built to clean up human waste and city runoff, not concentrated landfill runoff or chemical-laden leachate.

There are ways to treat PFAS in wastewater before it is released to the environment. The EPA says that current research has proven three treatment processes work at taking PFAS out of wastewater; using granular activated carbon, ion exchange resin and high-pressure membrane systems. All three are fairly expensive processes to install and maintain, and the EPA says that the most effective method is heavily case-specific.

The Watertown wastewater treatment plant has none of these technologies installed.

The long-term impacts on the environment and people who rely on water contaminated by PFAS isn't clear, but the reach of the chemicals is. Lake Ontario and the St. Lawrence River both have higher-than-average concentrations of PFAS chemicals — a recent Canadian Broadcasting Corp. report found that Lake Ontario and the St. Lawrence River are some of the most contaminated water bodies in that country.

Bridget Wright is the executive director of Save the River, the Waterkeeper Alliance organization dedicated to protecting the upper St. Lawrence River. She said her organization first started testing for PFAS in the river in 2022, after the wider national Waterkeeper network started tracking the substances.

"They've had their eye on it for longer than us, they started doing testing and found that from all their testing across the U.S., 83% of tests had at least one of the PFAS chemicals," Wright said.

She said Save the River employed volunteers to test eight different spots in the upper St. Lawrence River over two years, and every spot tested came back positive for PFAS contamination both years.

A Save the River report from 2023 found that there is a relatively consistent amount of PFOA, one of the regulated PFAS, found in testing sites from Cape Vincent north to Hammond. Out of a list of 10 PFAS of concern, eight were confirmed to be present in the river.

PFOS, one of the federally regulated PFAS shown in trials to cause health problems, was recorded in high quantities in French Creek Bay, Millens Bay and at the Patterson Boat Launch in Ogdensburg. The EPA restricts PFOS to 4 parts per trillion in drinking water. The Patterson launch had a concentration of 7.4 parts per trillion, Millens Bay had a recorded concentration of 4.8 parts per trillion, and French Creek Bay had a recorded concentration of 4.1 parts per trillion.

One substance, shorthand 6:2 FTS, a next-generation PFAS used in firefighting foams and a replacement for PFOS, was recorded in extraordinarily high concentrations in Millens Bay — 560.1 parts per trillion. That substance was recorded at below 1 part per trillion, potentially not present at all, at all other testing sites along the river.

There is no EPA regulation on safe exposure levels for 6:2 FTS, but a report from this summer found some weak evidence among existing academic studies to suggest 6:2 FTS could affect the thyroid in pregnant people and their children. That report found no research into the substance's effect on cancer rates, and all studies analyzed accounted only for oral ingestion of the substance, not considering other environmental exposures.

Wright said the St. Lawrence River and Lake Ontario are getting PFAS chemicals from the entire Great Lakes system — a massive system that captures runoff from some of the most populated and industrially active communities in the U.S. and Canada, and home to some of the very earliest manufacturers of PFAS chemicals.

Solution to pollution

Wright said Save the River has become focused on three major sources of PFAS in the river; wastewater treatment plants, landfills and industrial pollution. Wright said the group advocated for the state to pass new laws to regulate PFAS, their use and how they're disposed of.

"One bill we were pushing, it did not pass, but the smaller ones popped up in its place," she said.

The state legislature considered a handful of PFAS policies this year, including a five-year ban on the use of biosolids sourced from wastewater treatment plants, which did not pass, and a series of restrictions on which products can use the substances, some of which did pass.

Wright said there are still plenty of products available on the market that use PFAS chemicals — usually newer generation formulations that aren't regulated by the state or federal government. Even dental floss, especially kinds marketed as "glide" or "easy slide," contains PFAS.

"They're starting to make new products that don't have PFAS, so now there's floss that doesn't have it, but you have to look for it," Wright said.

There's no clear path to a solution for the PFAS already released into the environment, or for a near-future change to how landfill leachate is treated. Martin and Epstein said they believe the clear first step is to stop allowing leachate to come through city treatment plants, and more

broadly to convince the state legislature to more closely regulate PFAS. But more broadly, the issue of PFAS contamination, and other kinds of industrial environmental pollution, can't be easily resolved.

"We've got this backwards understanding of allowing chemicals into the environment before we know what they are and what the harms are, and we've got this consumption culture where we buy things and then toss them away, filling up landfills that have to be managed somehow," Epstein said.

One group, the Seneca Lake Guardian group, has been pushing for the closure of the Seneca Meadows landfill, a major producer of leachate in New York and one of the larger sources of leachate processed in Watertown. Yvonne Taylor, vice president of the group, said the massive landfill poses a serious health risk in its immediate area, and a serious risk to the communities downstream of its effluent.

"This landfill is the single largest source of methane emissions in New York, and it produces nearly 60 million gallons of PFAS-laden leachate a year," Taylor said.

That first step of closing the state's largest upstate landfill, Taylor said, would be a boon not just to the Finger Lakes, but all of New York.

Research on the effects of the newer generation of PFAS is ongoing, but that research is slow and reliant on federal support that isn't as strong as it used to be. The Trump administration recently cut all 10 of the grants it had awarded for research into PFAS in food sources and methods to reduce PFAS in the environment.

Wright noted that the EPA, led by former New York gubernatorial candidate Lee M. Zeldin, has moved to roll back regulations on four next-generation PFAS, and delayed the implementation of regulations on PFOA and PFOS. Water systems don't need to be compliant with the EPA's limits on PFOA and PFOS until 2031.

“Things could be a bit different if Zeldin hadn’t been appointed to run the EPA,” Wright said. “These restrictions were coming in, he loosened them, and now certain manufacturers can’t be held accountable because he loosened the restrictions.”

Wright said the situation seems to change rapidly — from a decade ago when PFAS were just emerging as cause for concern, to now, when efforts to restrict them are progressing unevenly.

“You never know where things will stand a year from now,” she said.

Alex Gault