'Forever chemicals' found in freshwater fish, yet most states don't warn residents

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Bill Eisenman has always fished. "Growing up, we ate whatever we caught—catfish, carp, freshwater drum," he said. "That was the only real

source of fish in our diet as a family, and we ate a lot of it."

Today, a branch of the Rouge River runs through Eisenman's property in a suburb north of Detroit. But in recent years, he has been wary about a group of chemicals known as PFAS, also referred to as "forever chemicals," which don't break down quickly in the environment and accumulate in soil, water, fish, and our bodies.

The chemicals have spewed from manufacturing plants and landfills into local ecosystems, polluting surface water and groundwater, and the wildlife living there. And hundreds of military bases have been pinpointed as sources of PFAS chemicals leaching into nearby communities.

Researchers, anglers, and environmental activists nationwide worry about the staggering amount of PFAS found in freshwater fish. At least 17 states have issued PFAS-related fish consumption advisories, KFF Health News found, with some warning residents not to eat any fish caught in particular lakes or rivers because of dangerous levels of forever chemicals.

With no federal guidance, what is considered safe to eat varies significantly among states, most of which provide no regulation.

Eating a single serving of freshwater fish can be the equivalent of drinking water contaminated with high levels of PFAS for a month, according to a recent study from the Environmental Working Group, a research and advocacy organization that tracks PFAS. It's an unsettling revelation, especially for rural, Indigenous, and low-income communities that depend on subsistence fishing. Fish remain a large part of cultural dishes, as well as an otherwise healthy source of protein and omega-3s.

"PFAS in freshwater fish is at such a concentration that for anyone

consuming, even infrequently, it would likely be their major source of exposure over the course of the year," said David Andrews, a co-author of the study and researcher at EWG. "We're talking thousands of times higher than what's typically seen in drinking water."

Dianne Kopec, a researcher and faculty fellow at the University of Maine who studies PFAS and mercury in wildlife, warned that eating fish with high concentrations of PFAS may be more harmful than mercury, which long ago was found to be a neurotoxin most damaging to a developing fetus.

The minimal risk level—an estimate of how much a person can eat, drink, or breathe daily without "detectable risk" to health—for PFOS, a common PFAS chemical, is 50 times as low as for methylmercury, the form of mercury that accumulates in fish, according to the federal Agency for Toxic Substances and Disease Registry. But she emphasized, "They're both really nasty."

Just like mercury, PFAS bioaccumulate up the food chain, so bigger fish, like largemouth bass, generally contain more chemicals than smaller fish. Mercury is more widespread in Maine, but Kopec said PFAS levels near contamination sources are concerningly high.

'Fishing is a way of life'

The Ecology Center, an environmental group in Michigan, educates anglers about consumption advisories and related health impacts. But Erica Bloom, its toxics campaign director, noted that for many people out on the river, "fishing is a way of life."

Eisenman participated in an Ecology Center community-based study published this year, which tested fish from Michigan's Huron and Rouge rivers for PFAS that poured out from auto and other industry

contamination. Across 15 sites, anglers caught 100 fish samples from a dozen species, and what they found scared him.

"There were no sites that registered zero," said Eisenman, noting that some had significantly higher levels of chemicals than others. "You need to make a value judgment. I'm going to still eat fish, but I don't know if that's a good thing."

Last year, the National Academies of Sciences, Engineering, and Medicine published a sweeping report that associated PFAS exposure with health effects like decreased response to vaccines, cancer, and low birth weight.

There are thousands of PFAS, or perfluoroalkyl and polyfluoroalkyl substances, many of them used to make both household and industrial products stain-resistant or nonstick. They're in fire-retardant foam used for decades by fire departments and the military, as well as in cookware, water-repellent clothing, carpets, food wrappers, and other consumer goods.

In late October, the EPA added hundreds of PFAS compounds to its list of "chemicals of special concern." This will require manufacturers to report the presence of those PFAS chemicals in their products—even in small amounts or in mixtures—starting Jan. 1.

Sparse testing leaves blind spots

About 200 miles north of Detroit, in rural Oscoda, Michigan, state officials have warned against eating fish or deer caught or killed near the former Wurtsmith Air Force Base because of PFAS contamination.

"We have a 9-mile stretch of river system in which the state determined way back in 2012 that it wasn't safe to even eat a single fish," said Tony

Spaniola, an advocate for communities affected by PFAS. He owns a home across a lake from the shuttered military site.

In Alaska, several lakes are designated catch and release only because of PFAS contamination from firefighting foam. A study by the U.S. Geological Survey and Pennsylvania Department of Environmental Protection released in August led to a warning to avoid eating fish from the Neshaminy Creek watershed.

Nationwide, use of firefighting foam and other PFAS-loaded products by the Department of Defense alone has led to the contamination of at least 359 military bases and communities that need to be cleaned up, with an additional 248 still under investigation as of June.

But many lakes and streams haven't been tested for PFAS contamination, and researchers worry far more sites hold fish laced with high levels of PFAS.

Federal efforts to curb PFAS exposure have focused mostly on drinking water. Earlier this year, the EPA proposed the nation's first PFAS drinking water standards, which would limit contamination from six types of chemicals, with levels for the two most common compounds, PFOA and PFOS, set at 4 parts per trillion.

But the EWG researchers found that one serving of fish can be equivalent to a month's worth of drinking water contaminated with 48 parts per trillion of PFOS.

Store-bought fish caught in the ocean, like imported Atlantic salmon and canned chunk tuna, appear to have lower PFAS levels, according to FDA research.

A biomonitoring project focused on the San Francisco Bay Area's Asian

and Pacific Islander community measured PFAS levels in the blood and found higher amounts of the compounds compared with national levels. The researchers also surveyed participants about their fish consumption and found that 56% of those who ate locally caught fish did so at least once a month.

Eating a fish's filet is often recommended, as it accumulates fewer chemicals than organs or eggs, but many participants reported eating other parts of the fish, too.

California is one of many states with no fish consumption advisories in place for PFAS. Jay Davis, senior scientist at the San Francisco Estuary Institute, said that's in part because of "limited monitoring dollars" and a priority on legacy chemicals like PCBs as well as mercury left over in particularly high concentrations from gold and mercury mining.

Wesley Smith, a senior toxicologist with California's Office of Environmental Health Hazard Assessment, said the state is reviewing the latest scientific literature but needs more data to develop an advisory that is "neither too restrictive nor too permissive."

States like New Hampshire, Washington, Maine, and New Jersey have some of the most protective guidance, while other states, such as Maryland and Michigan, lag when it comes to designating fish unsafe to eat.

Advisory levels for at-risk groups—such as children and women of childbearing age—are usually lower, while "do not eat" thresholds for the general population range from 25.7 parts per billion in New Hampshire to 300 ppb in Michigan, 408 ppb in Maryland, and 800 ppb in Alabama.

"That's wicked outdated to have levels that high and consider that safe

for folks to eat," said Kopec, the University of Maine researcher.

Though it is no longer made in the U.S., PFOS remains the most commonly found—and tested for—PFAS chemical in fish today.

The primary maker of PFOS, 3M, announced it would begin phasing the chemical out in 2000. This year, the company said it would pay at least $10.3 billion to settle a class-action lawsuit brought by public water system operators. But in July, attorneys general from 22 states asked the court to reject the settlement, saying it was insufficient to cover the damages.

The military first documented health concerns surrounding PFAS chemicals in the 1970s yet continued to use firefighting foam made with them. Mandated by Congress, the Defense Department was required to stop buying retardant containing PFAS by Oct. 1 and phase it out altogether by 2024. A recently published study linked testicular cancer among military personnel to PFOS.

Tackling pollution at the source

Pat Elder, an activist and director of the environmental advocacy group Military Poisons, has tested water for PFAS up and down the East Coast, including in Piscataway Creek, which drains from Joint Base Andrews, the home of Air Force One.

In 2021, after testing fish from Piscataway Creek, Maryland officials released the state's sole PFAS fish consumption advisory to date. But Elder worries Maryland has not gone far enough to protect its residents.

"People eat the fish from this creek, and it creates an acute health hazard that no one seems to be paying attention to," Elder said.

Since then, Maryland's Department of the Environment has conducted more fish monitoring in water bodies near potential PFAS sources, as well as at spots regularly used by subsistence anglers, said spokesperson Jay Apperson. He added that the state plans to put out more advisories based on the results, though declined to give a timeline or share the locations.

Part of the challenge of getting the word out and setting location-specific consumption advisories is that contamination levels vary significantly from lake to lake, as well as species to species, said Brandon Reid, a toxicologist and the manager of Michigan's Eat Safe Fish program.

Michigan set its screening values for fish consumption advisories in 2014, and the state is in the process of updating them within the next year, Reid said.

But to see the chemicals dip to healthier levels, the pollution needs to stop, too. There is hope: Andrews, the EWG researcher, compared EPA fish sample data from five years apart and found about a 30% drop on average in PFAS contamination.

Bloom has watched this cycle happen in the Huron River in southeastern Michigan, where PFAS chemicals upstream seeped into the water from a chrome plating facility. While the levels of PFAS in the water have slowly gone down, the chemicals remain, she said.

"It's very, very hard to completely clean up the entire river," Bloom said. "If we don't tackle it at the source, we're going to just keep having to spend taxpayer money to clean it up and deal with fish advisories."

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