

Freshwater fish significantly more contaminated with toxic forever chemicals than saltwater fish and shellfish

January 18 2023, by Michael Hawthorne,



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Eating just one freshwater fish a year can dramatically increase the amount of toxic forever chemicals coursing through a person's blood,

according to a new study that reflects more than a half-century of pollution contaminating the Great Lakes and rivers nationwide.

The alarming finding is based on an analysis of hundreds of fish caught by the U.S. Environmental Protection Agency since 2013. Though the EPA has concluded some of the chemicals are harmful at any level, the agency hasn't drawn attention to its fish sampling or warned Americans they could be in danger.

Nearly every fish tested by the EPA was tainted with perfluorooctane sulfonate or PFOS, a forever [chemical](#) used for decades in Scotchgard stain-resistant fabrics, firefighting foam and food packaging manufactured by Minnesota-based 3M.

PFOS builds up in [human blood](#), doesn't break down in the environment and triggers health problems such as [liver damage](#), impaired fertility, immune system disorders, thyroid disease, increased [cholesterol levels](#) and reduced vaccine effectiveness. Long-term exposure also might cause cancer.

"These findings point to the urgent need to eliminate more releases of these chemicals into the environment," said David Andrews, a senior scientist at the nonprofit Environmental Working Group and one of the authors of the new study. "We don't want this problem to get any worse, especially knowing how long it's going to take for it to get better."

A single serving of [freshwater fish](#) during a year is equivalent to drinking water laden with 48 parts per trillion of PFOS for a month, Andrews and his colleagues concluded in their peer-reviewed study, published Tuesday in the journal *Environmental Research*.

To put that number into context, the nationwide median of PFOS in drinking water is estimated to be less than 5 ppt. The highest

concentration detected in Chicago drinking water so far is 2.8 ppt.

In June, the EPA announced there is effectively no safe exposure to PFOS and a related chemical, PFOA.

Exposure from eating fish is of particular concern for Native Americans, certain immigrant communities and low-income Americans who depend on lakes and rivers for a significant portion of their diet, Andrews noted, citing other studies.

Freshwater fish in the United States appear to be significantly more contaminated than seafood. The median concentration of forever chemicals in the EPA testing was 278 times higher than what the Food and Drug Administration found during the past four years in saltwater fish, shrimp, lobster, clams and oysters.

The highest level of PFOS detected in Great Lakes fish—64,400 parts per trillion—came from white perch caught in Lake Erie near Monroe, Michigan, a Chicago Tribune review of EPA data found.

Yellow perch in Lake Michigan near Holland, Michigan, and Whiting were tainted with 22,900 ppt and 12,500 ppt, respectively. The level in walleye caught off the Door County peninsula in Wisconsin: 11,500 ppt.

EPA sampling in the Great Lakes during 2013 through 2015 did not include fish from Illinois waters. But in 2010 the agency found 19,000 ppt of PFOS in brown trout caught off North Avenue Beach in Chicago.

Disturbing levels also have been detected in the nation's rivers and streams.

Northwest of Madison, the EPA found 74,200 ppt in smallmouth bass caught in the Wisconsin River. Upstream from Cave-in-Rock in deep

southern Illinois, channel catfish pulled from the Ohio River had a whopping 135,000 ppt of PFOS.

Closer to Chicago, the agency found 25,500 ppt in channel catfish from the Fox River in Lake Barrington. The level in smallmouth bass from the Kankakee River near Bourbonais: 9,530 ppt.

Unlike other [toxic substances](#) such as mercury or PCBs, worrisome concentrations of forever chemicals aren't limited to specific types of fish, EPA data shows. PFOS and related compounds—known as per- and polyfluoroalkyl substances or PFAS—bind to fish tissue and can't be cooked or trimmed out.

"Mercury, for example, tends to be higher in bigger, older fish," said Gavin Dehnert, an emerging contaminants researcher at Wisconsin Sea Grant who, along with several Indigenous tribes in the Upper Midwest, recently launched another study of PFAS in the region's lakes, rivers and fish. "With PFAS you can have high levels in panfish, common carp or smelt, tiny fish that are near the bottom of the food chain."

Andrews speculated one reason why the EPA hasn't publicized its test results is because fish are an important source of protein and other nutrients. Burdening Americans with PFAS isn't worth the trade-offs, he said.

EPA officials did not respond to questions Monday, a federal holiday honoring the Rev. Martin Luther King Jr.

PFAS still aren't regulated in the United States. The Biden administration is proposing to list PFOS and PFOA as hazardous substances under federal law, which would make it easier to force polluters to clean up contaminated sites at their own expense. Other rule-making is expected to establish the first enforceable limits on the

chemicals in drinking water.

Updated fish consumption advisories aren't on the administration's agenda, though some states, including Michigan, Minnesota and Wisconsin, caution people to limit or avoid eating certain fish based on PFOS contamination. Illinois officials only recently began surveying the state's lakes and rivers for the forever chemical.

EPA fish sampling in the lower 48 states suggests current advisories aren't protective enough.

Faced with hundreds of lawsuits, 3M announced last month it will stop making all PFAS by 2025, a quarter century after the company phased out PFOS, PFOA and several related compounds the global conglomerate pioneered after World War II. Scientists are finding replacements for PFOS and PFOA, introduced during the 2000s, are just as harmful, if not more so.

High levels of PFOS still being found in fish shows how persistent the chemical is in the environment.

"People are getting PFAS from so many different places, from their diet and from water," said Christy Remucal, an associate professor of civil and environmental engineering at the University of Wisconsin who researches forever chemicals but was not involved in the new study.

"You never want to hear that these chemicals whose names you can't pronounce are in the water you're drinking or the [fish](#) you're eating," Remucal said. "Some people panic and some people decide they can't avoid it so why worry. That makes communicating the risks very challenging."

More information: Nadia Barbo et al, Locally caught freshwater fish

across the United States are likely a significant source of exposure to PFOS and other perfluorinated compounds, *Environmental Research* (2022). [DOI: 10.1016/j.envres.2022.115165](https://doi.org/10.1016/j.envres.2022.115165)

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Citation: Freshwater fish significantly more contaminated with toxic forever chemicals than saltwater fish and shellfish (2023, January 18) retrieved 18 May 2024 from <https://medicalxpress.com/news/2023-01-freshwater-fish-significantly-contaminated-toxic.html>

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