

PFAS Are in Every Bite of Freshwater-Caught Fish

Analysis by [Dr. Joseph Mercola](#)

✓ Fact Checked

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STORY AT-A-GLANCE

- › Freshwater fish in the U.S. has been rendered so toxic by environmental pollutants that even eating one fish a year could be dangerous
- › EWG researchers analyzed data from more than 500 fish fillets collected across the U.S. from 2013 to 2015
- › The fish fillets, collected from U.S. streams, rivers and lakes, had a median level of total PFAS of 9,500 nanograms per kilogram
- › Fish from the Great Lakes were even more toxic, coming in with a median PFAS level of 11,800 nanograms per kilogram
- › Consuming a single serving of freshwater fish annually equates to a month of drinking water contaminated with PFOS – one type of PFAS – at a concentration of 48 parts per trillion
- › In addition to freshwater fish, toxic PFAS are widely found in air, surface water, groundwater, drinking water, soil and other types of food, food packaging, personal care products and more

Once a healthy mainstay of native diets, freshwater fish in the U.S. have been rendered toxic by environmental pollutants. Even eating one fish a year could be dangerous, due to the high levels of per- and polyfluoroalkyl substances, or PFAS, they contain.

The research, conducted by scientists with the Environmental Working Group (EWG), revealed that consuming a single serving of freshwater fish annually equates to a month

of drinking water contaminated with PFOS – one type of PFAS – at a concentration of 48 parts per trillion.

Given that people in many vulnerable U.S. communities still depend on freshwater fish as a key part of their diets, public health could be at risk. “These test results are breathtaking,” Scott Faber, EWG’s senior vice president for government affairs, said in a news release. “Eating one bass is equivalent to drinking PFOS-tainted water for a month.”¹

Freshwater Fish Turned Toxic

For the study, EWG researchers analyzed data from more than 500 fish fillets collected across the U.S. from 2013 to 2015.² The fish fillets, collected from U.S. streams, rivers and lakes, had a median level of total PFAS of 9,500 nanograms per kilogram. Fish from the Great Lakes were even more toxic, coming in with a median PFAS level of 11,800 nanograms per kilogram.³

“People who consume freshwater fish, especially those who catch and eat fish regularly, are at risk of alarming levels of PFAS in their bodies,” study author and EWG senior scientist, David Andrews, Ph.D., explained. “Growing up, I went fishing every week and ate those fish. But now when I see fish, all I think about is PFAS contamination.”⁴

Levels of PFAS in freshwater fish were 280 times higher than PFAS levels detected by the U.S. Food and Drug Administration in tests of seafood samples and processed foods from grocery stores. Further, the data suggest that eating a single serving of freshwater fish could expose you to a similar amount of PFAS as consuming store-bought fish daily for a year.⁵

Why You Don’t Want to Eat Fish Contaminated With PFAS

PFAS are estimated to be in the blood of more than 98% of Americans.⁶ While production of PFOA ended in 2015, DuPont and other companies have substituted similar chemicals in the production of nonstick cookware and other products. In May

2015, more than 200 scientists from 40 countries signed the Madrid Statement, which warns about the harms of PFAS and documents the following potential health effects of exposure:⁷

Liver toxicity	Disruption of lipid metabolism and the immune and endocrine systems
Adverse neurobehavioral effects	Neonatal toxicity and death
Tumors in multiple organ systems	Testicular and kidney cancers
Liver malfunction	Hypothyroidism
High cholesterol	Ulcerative colitis
Reduced birth weight and size	Obesity
Decreased immune response to vaccines	Reduced hormone levels and delayed puberty

Known as “forever chemicals” because they’re so persistent in the environment, PFAS are common contaminants not only in freshwater fish but also in other food, food packaging and personal care products. Even at very low doses, drinking water contaminated with PFAS has been linked to immune system suppression and an increased risk of certain cancers. Reproductive and developmental problems are also linked to PFAS.⁸

Tens of Thousands of PFAS Polluters in the US

EWG compiled a map that shows the location of 41,828 industrial and municipal sites in the U.S. known to, or suspected of, using or releasing PFAS.⁹ Among them are landfills and wastewater treatment plants, airports and areas where [firefighting foam](#) has been used.

Firefighting foam liberally used by the South Dakota Air National Guard and Sioux Falls Fire Department decades ago is the source of significant pollution to the drinking water of Sioux Falls, South Dakota, residents. Nineteen municipal wells representing 28% of the city's water coming from the Big Sioux aquifer were shut down in 2018 as a result.¹⁰

“For decades, polluters have dumped as much PFAS as they wanted into our rivers, streams, lakes and bays with impunity. We must turn off the tap of PFAS pollution from industrial discharges, which affect more and more Americans every day,” Faber said.¹¹

Also in 2018, the Department of Defense reported that at least 126 drinking water systems near military bases were also contaminated with PFAS, due to their use in firefighting foam.¹² According to a 2016 Harvard study, meanwhile, 16.5 million Americans have detectable levels of at least one kind of PFAS in their drinking water, and about 6 million Americans are drinking water that contains PFAS at or above the EPA safety level.¹³

Yet, according to EWG, more than 200 million Americans may be drinking water containing PFAS at a concentration of 1 part per trillion (ppt) or higher.^{14,15} EWG has endorsed making 1 ppt the standard upper safe level for PFAS in drinking water.

“We know drinking water is a major source of exposure of these toxic chemicals,” vice president for science investigations at EWG, Olga Naidenko, Ph.D., said. “... PFAS pollution is affecting even more Americans than we previously estimated. PFAS are likely detectable in all major water supplies in the U.S., almost certainly in all that use surface water.”¹⁶

PFAS Are Everywhere, Linked to the Atomic Bomb

PFAS do not break down in water or soil and can be carried over great distances by wind or rain, according to the U.S. Department of Health and Human Services' Agency for Toxic Substances and Disease Registry (ATSDR).¹⁷

PFAS have since been found in air, surface water, groundwater, drinking water, soil and food, and humans can be exposed via all of these sources. Unbeknownst to many, it all

started during the quest for an atomic bomb. Marko Filipovic, Department of Environmental Science and Analytical Chemistry (ACES) at Stockholm University, explained:¹⁸

“In the early 1940s, during World War II, the Manhattan project required new inert materials for separation of uranium isotopes via gas diffusion from their corrosive hexafluorides. Fluorinated materials were uniquely suited for the task. The Manhattan project gave great momentum to the development of new fluorine based chemicals.

Ever since, the fluorine industry has grown exponentially and a large variety of poly- or per-fluorinated organochemicals have become ingredients in the products of everyday life.

The success story of per- and polyfluoroalkyl substances (PFASs) started thus with the accidental synthesis of new chemicals and chemists serendipitously discovering the extraordinary physical-chemical properties of these new materials.”

PFAS Contaminates Farmland

PFAS on farmland is another major issue, one that’s been called a “slow-motion disaster.”¹⁹ The source of the contamination on many agricultural lands is biosolids – toxic human waste sludge – that’s marketed as an affordable fertilizer. Maine is the first state to comprehensively test for PFAS on farmland due to the spreading of sewage sludge, but it shouldn’t be the last. In the U.S., half of wastewater sludge gets applied to the land.²⁰ According to The Maine Monitor:²¹

“Consequently, Maine has had to pioneer policy actions, moving to implement recommendations of a year-long PFAS task force. The next policy step must be passage of LD 1911, which would ban land application of sludge and the land application or sale of compost derived from sludge.

Two dozen companies and municipalities are licensed to convert sludge into compost, despite the state's own finding that 89% of finished compost samples exceeded the screening level for PFOA, a common PFAS compound.

... Dr. Lani Graham, a retired physician and former director of Maine's Bureau of Public Health, likens PFAS to lead contamination, being another 'long developing environmental disaster' with echoes of the tobacco and opioid public health crises.

PFAS manufacturers, such as DuPont and 3M, followed a similar corporate playbook. Despite internal research from the 1960s onward revealing the toxicity and longevity of PFAS compounds, the corporations continued production, knowingly exposing workers and contaminating water supplies."

Even Chocolate Cake Is Contaminated With PFAS

If you don't eat freshwater fish, it doesn't mean you're safe from PFAS exposure in your food. Far from it. PFAS accumulates in soil and water and is transferred into your food. Proof of this can be seen in food testing, which in 2017 found [PFAS chemicals in 10 of the 91 foods](#) tested.

Chocolate cake had the highest amount – 250 times above the advisory limit for drinking water. (There's currently no limit for food.) Nearly half of the meat and fish tested also contained double the advisory limit for water. Leafy greens grown within 10 miles of a PFAS plant also contained very high amounts.²²

As you might expect, PFAS also accumulate in your body, with devastating effects. For instance, middle-aged women who had higher blood levels of PFAS were at the greatest risk of developing high blood pressure compared to their peers who had lower levels.²³

How to Avoid PFAS

In addition to avoiding freshwater fish, you can cut down on PFAS exposure by making informed decisions about your food, cookware, housewares and more. Here are several strategies that can help. You may find additional helpful tips in EWG's "Guide to Avoiding PFAS."²⁴

Pretreated or stain-repellent treatments – Opt out of these treatments on clothing, furniture and carpeting. Clothing advertised as "breathable" is typically treated with polytetrafluoroethylene, a synthetic fluoropolymer.

Products treated with flame retardant chemicals – This includes furniture, carpet, mattresses and baby items. Instead, opt for naturally less flammable materials such as leather, wool and cotton.

Fast food and carry-out foods – The containers are typically treated.

Microwave popcorn – PFAS may be present in the inner coating of the bag and may migrate to the oil from the packaging during heating. Instead, use "old-fashioned" stovetop non-GMO popcorn.

Nonstick cookware and other treated kitchen utensils – Healthier options include ceramic and enameled cast iron cookware, both of which are durable, easy to clean and completely inert, which means they won't release any harmful chemicals into your home.

Personal care products containing PTFE, "fluoro" or "perfluoro" ingredients such as Oral B Glide floss – The EWG Skin Deep database is an excellent source to search for healthier personal care options.²⁵

Unfiltered tap water – Unfortunately, your choices are limited when it comes to avoiding PFAS in drinking water. Either you must filter your water or get water from a clean source. Although you may think that opting for bottled water is safe, PFAS are not regulated in bottled water, so there's absolutely no guarantee that it'll be free of these or other chemicals.

Unlike a high-quality carbon filtration system, most common water filters available in supermarkets will not remove PFAS. The New Jersey Drinking Water Quality Institute recommends using granulated activated carbon “or an equally efficient technology” to remove PFC chemicals such as PFOA and PFOS from your drinking water. Activated carbon has been shown to remove about 90% of these chemicals.²⁶

Sources and References

- [1, 3, 4, 5, 8, 11 EWG January 17, 2023](#)
- [2 Environmental Research March 1, 2023](#)
- [6 Environ Health Perspect. 2007 Nov; 115\(11\): 1596–1602](#)
- [7 Environ Health Perspect 123:A107–A111, Madrid Statement](#)
- [9 EWG, Suspected industrial discharges of PFAS](#)
- [10 Rapid City Journal November 4, 2018](#)
- [12 ProPublica June 20, 2018](#)
- [13 Environmental Science and Technology Letters August 9, 2016, Results and Discussion, Abstract](#)
- [14, 16 EWG October 14, 2020](#)
- [15 Environ. Sci. Technol. Lett. 2020, 7, 12, 931–936](#)
- [17 Politico May 14, 2018](#)
- [18 Fate of perfluoroalkyl acids in the aquatic environment with a focus on mass balance studies May 2015](#)
- [19, 20, 21 The Maine Monitor March 13, 2022](#)
- [22 PBS June 3, 2019](#)
- [23 Hypertension, June 13, 2022](#)
- [24 EWG’s Guide to Avoiding PFAS](#)
- [25 Environmental Working Group Skin Deep Database](#)
- [26 New Jersey Drinking Water Quality Institute, Recommendation on Perfluorinated Compound Treatment Options for Drinking Water, June 2015](#)