PFAS Contamination of Drinking Water Far More Prevalent Than Previously Reported

New Detections of 'Forever Chemicals' in New York, D.C., Other Major Cities

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CONTENTS

ABOUT EWG

The Environmental Working Group is the nation’s most effective environmental health research and advocacy organization. Our mission is to conduct original, game-changing research that inspires people, businesses and governments to take action to protect human health and the environment. With your help—and with the help of hundreds of organizations with whom we partner—we are creating a healthier and cleaner environment for the next generation and beyond.

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New laboratory tests commissioned by EWG have for the first time found the toxic fluorinated chemicals known as PFAS in the drinking water of dozens of U.S. cities, including major metropolitan areas. The results confirm that the number of Americans exposed to PFAS from contaminated tap water has been dramatically underestimated by previous studies, both from the Environmental Protection Agency and EWG's own research.

Based on our tests and new academic research that found **PFAS widespread in rainwater**, EWG scientists now believe PFAS is likely detectable in all major water supplies in the U.S., almost certainly in all that use surface water. EWG's tests also found chemicals from the PFAS family that are not commonly tested for in drinking water.

Of tap water samples from 44 places in 31 states and the District of Columbia, only one location had no detectable PFAS, and only two other locations had PFAS below the level that independent studies show pose risks to human health. Some of the highest PFAS levels detected were in samples from major metropolitan areas, including Miami, Philadelphia, New Orleans and the northern New Jersey suburbs of New York City.

In 34 places where EWG's tests found PFAS, contamination has not been publicly reported by the Environmental Protection Agency or state environmental agencies. Because PFAS are not regulated, utilities that have chosen to test independently are not required to make their results public or report them to state drinking water agencies or the EPA.

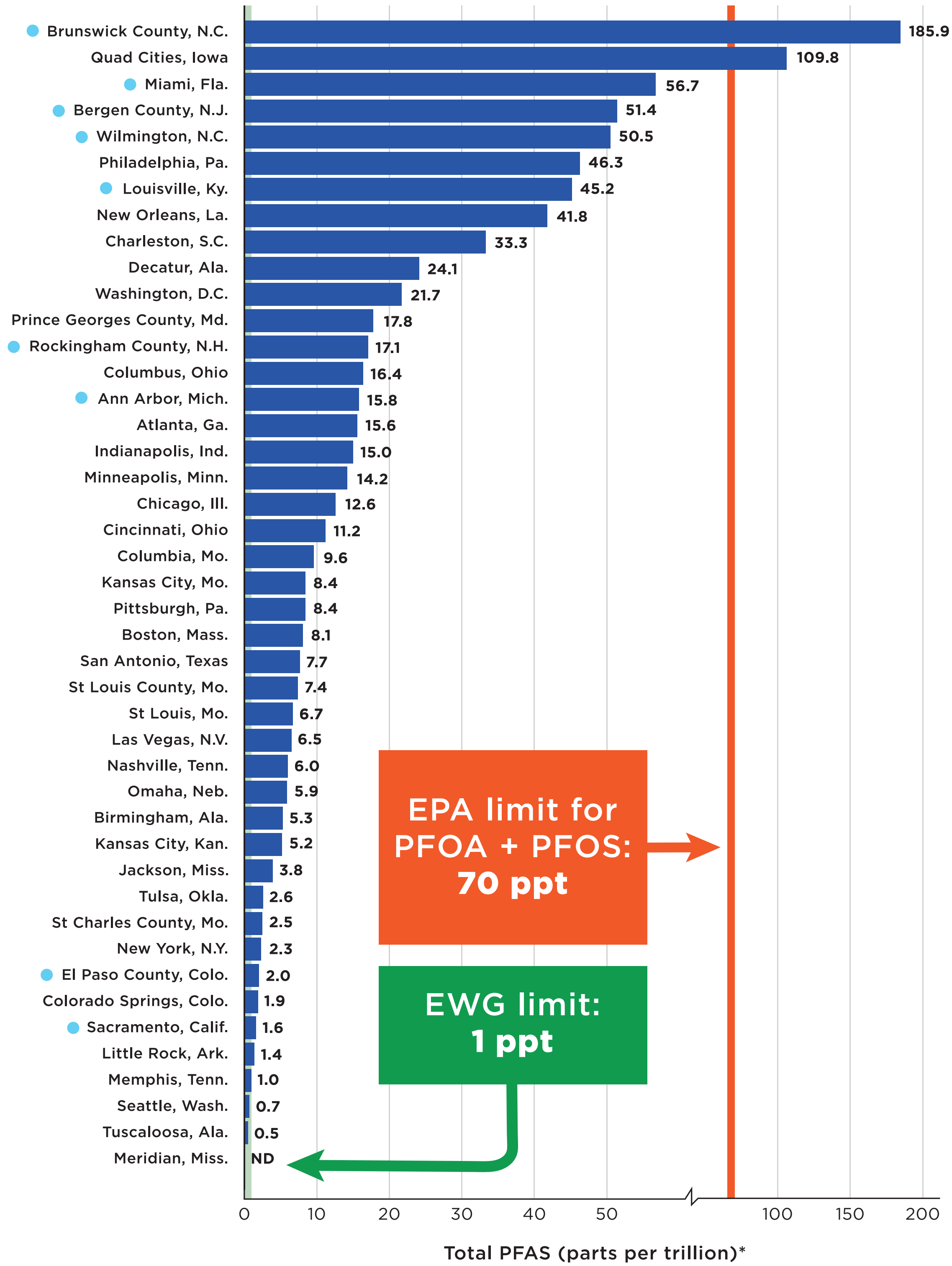
EWG's samples—collected by staff or volunteers between May and December 2019—were analyzed by an accredited independent laboratory for 30 different PFAS chemicals, a tiny fraction of the thousands of compounds in the family of per- and polyfluoroalkyl substances.

An EPA-mandated sampling program that ended in 2015 tested for only a few types of PFAS and required utilities to report only detections of a higher minimal level. The EPA also only mandated testing for systems serving more than 10,000 people, whereas EWG's project included a sample from a smaller system excluded from the EPA program. Because of those limitations, the EPA reported finding PFAS at only seven of the locations where EWG's tests found contamination.

In the 43 EWG samples where PFAS was detected, the total level varied from less than 1 part per trillion, or ppt, in Seattle and Tuscaloosa, Ala., to almost 186 ppt in Brunswick County, N.C. The only sample without detectable PFAS was from Meridian, Miss., which draws its drinking water from wells more than 700 feet deep.

The samples with detectable levels of PFAS contained, on average, six or seven different compounds. One sample had 13 different PFAS at varying concentrations. The list of the 30 PFAS compounds we tested for, and the frequency with which they were detected, is detailed in the appendix.

EWG Tests Found Toxic PFAS Chemicals in Tap Water in 31 States and D.C.



Source: EWG, from samples taken between May and December 2019.

* "Total PFAS" is the sum of detections of 30 different types of PFAS.

● PFAS previously reported by EPA or State

Samples were taken by EWG staff or local volunteers and analyzed by an independent accredited laboratory using a modified version of EPA Method 537. Details of all samples taken at each site and the precise sampling dates are in the tables in the

'FOREVER CHEMICALS'

PFAS are known as "forever chemicals" because once released into the environment they do not break down, and they build up in our blood and organs. Exposure to PFAS **increases the risk of cancer**, **harms the development of the fetus** and **reduces the effectiveness of vaccines**. Biomonitoring studies by the federal **Centers for Disease Control and Prevention** show that the blood of nearly all Americans is contaminated with PFAS.

The most notorious PFAS compounds are PFOA, formerly used by DuPont to make Teflon, and PFOS, formerly an ingredient in 3M's Scotchgard. Those compounds have been phased out under pressure from the EPA, but they persist in drinking water, people and the environment. In EWG's tests, PFOA was detected in 30 of 44 samples, and PFOS in 34 samples. The two compounds represented approximately a quarter of the total PFAS level in each sample.

EWG has **mapped** PFAS contamination of drinking water or ground water in almost 1,400 sites in 49 states. Previously, our **analysis** of unpublished EPA data estimated that water supplies for 110 million Americans may be contaminated with PFAS—an estimate that could be much too low, based on our new findings.

The EPA was first alerted to the problem of PFAS in drinking water in 2001 but in almost 20 years has failed to set an enforceable, nationwide legal limit. In 2016, the agency issued a non-enforceable lifetime health advisory for PFOA and PFOS in drinking water of 70 ppt. Independent scientific studies have recommended a safe level for PFAS in drinking water of 1 ppt, which is **endorsed by EWG.**

In the absence of a federal standard, states have started to set their own legal limits.

New Jersey was the first to set to a maximum contaminant limit for the compound PFNA, at 13 ppt, and has proposed standards of 13 ppt for PFOS and 14 ppt for PFOA. Some other states have now set or proposed limits or guidelines for PFAS in drinking water, including California, Connecticut, Massachusetts, Michigan, Minnesota, New Hampshire, New York, North Carolina and Vermont.

EWG TESTS UNCOVER CONTAMINATION MISSED BY EPA

EWG's results are in sharp contrast to **nationwide sampling by most public water systems** mandated by the EPA between 2013 and 2015. In the EPA tests, 36 of 43 water systems tested reported no detectable PFAS, including New York, Chicago, Philadelphia, Boston and Washington, D.C. The EPA's Unregulated Contaminant Monitoring program included only six PFAS compounds, and the minimum reporting limits were from 10 ppt to 90 ppt, obscuring the full scope of PFAS contamination.

Since the EPA program ended there has been no further nationwide testing of public water systems for PFAS. Some states, including New Jersey, Michigan, Pennsylvania and California, have conducted additional sampling and made the results public. And some local communities, including **Ann Arbor, Mich.**, and **Wilmington, N.C.**, regularly test for PFAS and release the results.

But other communities have been less forthcoming with PFAS test data. The **Philadelphia Water Department** states that it is "proactively testing for PFAS in source water and has not detected concentrations above EPA's advisory level." EWG's tests of Philadelphia water show total PFAS concentrations at nearly 50 ppt.

Our results are meant to highlight the ubiquity of PFAS and the vulnerability of the nation's drinking water supply to PFAS contamination. They underscore what an expert at the Water and Environmental Technology Center at Temple University, in Philadelphia, said about PFAS contamination: **"If you sample, you will find it."**

EWG's tests represent a single sample from each water system and may not represent what is coming out of a tap today. Results from a single sample form a snapshot of what was found in tap water at a specific site. They are likely representative of the water in the area where the sample was taken but are not intended to identify specific water systems. The cities and counties listed may be served by multiple public water systems, serving various proportions of the area's population.

The compounds in EWG's study are a small fraction of the entire PFAS class of thousands of different chemicals—**more than 600 are in active use**—including the new generation of so-called short-chain PFAS chemicals. Chemical companies claim that short-chain PFAS are safer than the long-chain predecessors they replaced, but the EPA allowed them on the market without adequate safety testing, and the new chemicals may pose even more serious problems.

A recent **study** by a team of scientists at Auburn University reported that short-chain PFAS are "more widely detected, more persistent and mobile in aquatic systems, and thus may pose more risks on the human and ecosystem health" than the long-chain compounds. The researchers also **noted** that existing drinking water treatment approaches for the removal of long-chain PFAS are less effective for short-chain PFAS. **Scientists at the University of Wisconsin-Madison** found PFAS, primarily the shorter-chain types, in all 37 rainwater samples they collected from around the country.

OPTIONS FOR DRINKING WATER SYSTEMS TO ADDRESS PFAS CONTAMINATION

There is no simple and inexpensive technology for removing PFAS from drinking water effectively. Selecting drinking water treatment options to remove PFAS typically requires a case-by-case evaluation to identify the best option and to design and install a treatment facility.

Current options for drinking water treatment technologies to remove PFAS include granular activated carbon, ion exchange and reverse osmosis.

Of these, granular activated carbon, or GAC, is the most common, with many water treatment facilities already using it to remove other contaminants. The design of the GAC filter and how often the carbon is exchanged can affect performance significantly.

Some of the systems we tested already use GAC filters, including those serving Ann Arbor, Mich., and the Quad Cities, in

Iowa. Reverse osmosis is the most effective PFAS removal technology, but it is also the most expensive. Ion exchange is a newer technology for PFAS removal, with a limited number of current installations.

The type of PFAS present, such as long- or short-chain, their concentrations and the potential presence of other contaminants all are factors that determine which treatment technology will be most effective or appropriate. Studies have shown that perfluorinated sulfonates, such as PFOS, are more effectively removed than perfluoroalkyl acids, such as PFOA, and that longer-chain PFAS are more effectively removed by GAC than shorter-chain.

Studies have demonstrated that reverse osmosis treatment is effective for removal of all types of long and shorter-chain PFAS we tested for, including PFOS, PFOA, PFBS, PFHxS, PFHxA and PFNA. This technology can also be combined with GAC to achieve higher removal rates or maintain the efficacy of the sensitive reverse osmosis membranes. However, water-treatment-plant-size reverse osmosis systems are expensive, require significant expenditures of energy and waste a lot of water, a problem in water-scarce areas.

Operating and maintenance costs are also important components to consider as part of the design of a long-term treatment plant, as are options for the disposal of PFAS removed from drinking water. Identifying safe ways to dispose of "forever chemicals" creates a new set of challenges. Once loaded with PFAS, GAC and ion exchange resins require disposal and could end up in incinerators or landfills and create contamination issues for local communities. PFAS-loaded wastewater produced from reverse osmosis must be treated before disposal.

IF PFAS IS DETECTED IN YOUR WATER

This project demonstrates the far-reaching PFAS contamination of U.S. drinking water, showing the urgent need for wider testing.

Judging from information from state health agencies, testing labs, and scientific researchers, the most effective choice for **in-home treatment of PFAS-tainted tap water** is a reverse osmosis system that combines an activated carbon filter with a reverse osmosis membrane.

Although some bottled water companies voluntarily meet industry standards for PFAS, there is no government requirement for PFAS testing of bottled water, no public information about potential PFAS contamination of water supplies that manufacturers use for production of bottled water, and no guarantee that the levels of PFAS in bottled waters are lower than those of tap water. For example, in 2019, the Massachusetts Department of Public Health **advised** pregnant women, nursing mothers and infants to avoid drinking certain brands of bottled water due to their high levels of PFAS contamination.

Use EWG's **tip sheet** to learn more about other products, materials, or activities that may be sources of exposure to PFAS in your home or local environment and how to avoid them. For more information about PFAS and what EWG is doing to combat this contamination crisis, visit our **"Forever Chemicals" website.**

WHAT POLICYMAKERS SHOULD DO

Federal and state policymakers should set science-based drinking water standards for PFAS in tap water, reduce ongoing PFAS discharges into water supplies, end non-essential uses of PFAS, require reporting of ongoing PFAS discharges into water supplies, ensure that PFAS wastes are properly disposed of, and expand PFAS monitoring efforts. Congress recently enacted **legislation that will expand PFAS reporting and monitoring**, but lawmakers have so far failed to set drinking water standards for most states, restrict ongoing PFAS releases into drinking water supplies, or clean up legacy PFAS contamination.

Guide to PFAS Chemicals

CHEMICAL	ABBREVIATION	DETECTION LIMIT, PARTS PER TRILLION
Perfluorooctane sulfonic acid	PFOS	0.4
Perfluorooctanoic acid	PFOA	0.3
Ammonium 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)propanoate	GenX	0.5
10:2 Fluorotelomer sulfonic acid	10:2 FTSA	1.0
4:2 Fluorotelomer sulfonic acid	4:2 FTSA	1.0
6:2 Fluorotelomer sulfonic acid	6:2 FTSA	1.0
8:2 Fluorotelomer sulfonic acid	8:2 FTSA	2.0
4,8-dioxa-3H-perfluorononanoate	ADONA	0.3
Perfluorooctane sulfonamide	FOSA	0.5
N-ethyl perfluorooctane sulfonamido acetic acid	N-EtFOSAA	1.0
N-methyl perfluorooctane sulfonamido acetic acid	N-MeFOSAA	1.0
Perfluorobutanoic acid	PFBA	2.0
Perfluorobutane sulfonic acid	PFBS	0.3
Perfluorodecanoic acid	PFDA	0.9
Perfluorododecane sulfonic acid	PFDoDA	0.3
Perfluorododecanoic acid	PFDoDS	0.5
Perfluorodecane sulfonic acid	PFDS	0.6
Perfluoroheptanoic acid	PFHpA	0.4
Perfluoroheptane sulfonic acid	PFHpS	0.4
Perfluorohexanoic acid	PFHxA	0.4
Perfluorohexadecanoic acid	PFHxDA	0.3

CHEMICAL	ABBREVIATION	DETECTION LIMIT, PARTS PER TRILLION
Perfluorohexane sulfonic acid	PFHxS	0.4
Perfluorononanoic acid	PFNA	0.4
Perfluorononane sulfonic acid	PFNS	0.6
Perfluorooctadecanoic acid	PFODA	0.5
Perfluoropentanoic acid	PFPeA	2.0
Perfluoropentane sulfonate	PFPeS	0.4
Perfluorotetradecanoic acid	PFTeDA	0.3
Perfluorotridecanoic acid	PFTrDA	0.4
Perfluoroundecanoic acid	PFUnA	0.4

Frequency of PFAS Detections by Chemical

CHEMICAL	NUMBER OF SAMPLES WHERE CHEMICAL WAS DETECTED[1]	RANGE DETECTED[2], PARTS PER TRILLION
PFOS	34	0.4–14
PFOA	30	0.4–14
GenX	6	0.5–31
6:2 FTSA	2	2.1–15
FOSA	21	0.4–1.9
PFBA	32	1.8–72
PFBS	27	0.5–5.0
PFDA	3	0.5–0.9
PFHpA	26	0.5–24
PFHxA	31	0.4–36
PFHxS	23	0.5–7.3
PFNA	10	0.5–1.9
PFPeA	31	0.5–39
PFPeS	3	0.4–1.6

CHEMICALS NOT DETECTED IN ANY SAMPLE:					
4:2 FTSA	ADONA	PFDoDA	PFHpS	PFODA	PFTrDA
8:2 FTSA	NEtFOSAA	PFDoDS	PFHxDA	PFTeDA	PFUnA
10:2 FTSA	NMeFOSAA	PFDS	PFNS		

1 Number of detections out of 44 water samples

2 Range of concentrations for individual PFAS in samples where the compound was detected.

APPENDIX: FULL RESULTS

Ann Arbor, Mich.

Sample Date: 6/18/2019

Sample collected from Ann Arbor within the likely service area of the Ann Arbor community water system.

TOTAL	15.8 ppt
PFOS	0.8 ppt*
PFOA	0.4 ppt*
PFBA	5.0 ppt*
PFBS	0.9 ppt*
PFHpA	1.3 ppt
PFHxA	2.6 ppt
PFPeA	4.8 ppt*

Atlanta, Ga.

Sample Date: 12/2/2019

Sample collected from Atlanta within the likely service area of the Atlanta community water system.

TOTAL	15.6 ppt
PFOS	2.0 ppt
PFOA	2.3 ppt
PFBS	2.3 ppt
PFHpA	0.9 ppt*
PFHxA	3.2 ppt
PFHxS	1.4 ppt*
PFPeA	3.5 ppt

Arrived at the lab with slightly elevated temperature

Bergen County, N.J.

Sample Date: 8/6/2019

Sample collected from Bergenfield within the likely service area of United Water New Jersey.

TOTAL	51.4 ppt
PFOS	5.3 ppt
PFOA	14.0 ppt
FOSA	0.6 ppt*
PFBA	5.1 ppt
PFBS	3.2 ppt
PFDA	0.5 ppt*
PFHpA	4.4 ppt
PFHxA	6.0 ppt
PFHxS	2.9 ppt
PFNA	1.9 ppt
PFPeA	7.0 ppt
PFPeS	0.5 ppt*

Birmingham, Ala.

Sample Date: 11/8/2019

Sample collected from Birmingham within the likely service area of the Birmingham Water Works Board.

TOTAL	5.3 ppt
PFOS	0.7 ppt*
PFOA	0.5 ppt*
PFBA	2.5 ppt*
PFBS	0.7 ppt*
PFHxA	0.4 ppt*
PFPeA	0.5 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Boston, Mass.

Sample Date: 7/30/2019

Sample collected from Boston within the likely service area of the Boston Water and Sewer Commission.

TOTAL	8.1 ppt
PFOS	1.0 ppt*
PFOA	1.8 ppt*
FOSA	0.7 ppt*
PFBS	0.5 ppt*
PFHpA	1.0 ppt*
PFHxA	1.5 ppt*
PFPeA	1.6 ppt*

Charleston, S.C.

Sample Date: 5/13/2019

Sample collected from Charleston within the service area of the Charleston Water System.

TOTAL	33.3 ppt
PFOS	6.3 ppt
PFOA	4.7 ppt
PFBA	2.9 ppt*
PFBS	3.3 ppt
PFHpA	2.4 ppt
PFHxA	5.3 ppt
PFHxS	1.9 ppt
PFNA	0.9 ppt*
PFPeA	5.6 ppt*

Brunswick County, N.C.

Sample Date: 10/22/2019

Sample collected from Leland within the likely service area of the Brunswick County Water System.

TOTAL	185.9 ppt
PFOS	14.0 ppt
PFOA	9.3 ppt
GenX	31.0 ppt
FOSA	0.5 ppt*
PFBA	16.0 ppt
PFBS	5.0 ppt
PFDA	0.9 ppt*
PFHpA	24.0 ppt
PFHxA	36.0 ppt
PFHxS	7.3 ppt
PFNA	1.3 ppt*
PFPeA	39.0 ppt
PFPeS	1.6 ppt*

Chicago, Ill.

Sample Date: 8/20/2019

Sample collected from Chicago within the likely service area of the City of Chicago community water system.

TOTAL	12.6 ppt
PFOS	2.3 ppt
PFOA	2.0 ppt
6:2 FTSA	2.1 ppt*
PFHpA	0.9 ppt*
PFHxA	3.3 ppt
PFHxS	0.7 ppt*
PFPeA	1.3 ppt*

Arrived at the lab with slightly elevated temperature

Concentration detected was above the limit of detection but below the limit of quantitation.

Cincinnati, Ohio

Sample Date: 11/5/2019

Sample collected from Cincinnati within the likely service area of the Cincinnati Public Water System.

TOTAL	11.2 ppt
PFOS	0.5 ppt *
GenX	4.8 ppt
FOSA	0.5 ppt*
PFBA	3.8 ppt*
PFPeA	1.5 ppt*

Colorado Springs, Colo.

Sample Date: 11/4/2019

Sample collected from Colorado Springs within the likely service area of Colorado Springs Utilities.

TOTAL	1.9 ppt
PFBA	1.9 ppt*

Columbia, Mo.

Sample Date: 11/6/2019

Sample collected from Columbia within the likely service area of the Columbia community water system.

TOTAL	9.6 ppt
PFOS	1.4 ppt*
PFOA	0.7 ppt*
FOSA	0.4 ppt*
PFBA	3.7 ppt*
PFBS	0.5 ppt*
PFHpA	0.5 ppt*
PFHxA	0.9 ppt*
PFHxS	0.5 ppt*
PFPeA	1.1 ppt*

Columbus, Ohio

Sample Date: 11/4/2019

Sample collected from Columbus within the likely service area of the Columbus Public Water System.

TOTAL	16.4 ppt
PFOS	2.0 ppt
PFOA	2.4 ppt
FOSA	1.0 ppt*
PFBA	4.8 ppt
PFBS	1.2 ppt*
PFHpA	0.7 ppt*
PFHxA	1.5 ppt*
PFHxS	0.9 ppt*
PFPeA	2.0 ppt

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Decatur, Ala.

Sample Date: 11/8/2019

Sample collected from Decatur within the likely service area of the Decatur community water system.

TOTAL	24.1 ppt
PFOS	2.1 ppt
PFOA	2.4 ppt
PFBA	6.6 ppt
PFBS	2.6 ppt
PFHpA	1.0 ppt*
PFHxA	5.9 ppt
PFHxS	0.6 ppt*
PFPeA	2.9 ppt

El Paso County, Colo.

Sample Date: 11/4/2019

Sample collected from Colorado Springs within the likely service area of the Security Water District.

TOTAL	2.0 ppt
FOSA	0.6 ppt*
PFBS	0.5 ppt*
PFHxA	0.5 ppt*
PFPeA	0.5 ppt*

Indianapolis, Ind.

Sample Date: 11/5/2019

Sample collected from Indianapolis within the likely service area of Citizens Water—Indianapolis.

TOTAL	15.0 ppt
PFOS	1.4 ppt*
PFOA	1.4 ppt*
PFBA	3.3 ppt*
PFBS	1.6 ppt*
PFHpA	0.8 ppt*
PFHxA	2.6 ppt
PFHxS	0.5 ppt*
PFPeA	3.3 ppt

Jackson, Miss.

Sample Date: 11/7/2019

Sample collected from Jackson within the likely service area of the City of Jackson community water system.

TOTAL	3.8 ppt
PFOS	0.6 ppt*
PFBA	3.2 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Kansas City, Kan.

Sample Date: 11/6/2019

Sample collected from Kansas City, Kan., within the likely service area of the Kansas City Board of Public Utilities.

TOTAL	5.2 ppt
PFOS	0.5 ppt*
FOSA	0.6 ppt*
PFBA	3.5 ppt*
PFPeA	0.6 ppt*

Kansas City, Mo.

Sample Date: 11/6/2019

Sample collected from Kansas City, Mo., within the likely service area of the Kansas City community water system.

TOTAL	8.4 ppt
PFOS	0.4 ppt*
PFOA	0.5 ppt*
FOSA	0.5 ppt*
PFBA	4.8 ppt
PFHpA	0.6 ppt*
PFHxA	0.6 ppt*
PFHxS	0.6 ppt*
PFPeA	0.5 ppt*

Las Vegas, Nev.

Sample Date: 8/10/2019

Sample collected from Las Vegas within the likely service area of the Las Vegas Valley Water District.

TOTAL	6.5 ppt
PFOS	0.5 ppt*
PFOA	0.5 ppt*
FOSA	1.6 ppt*
PFBA	1.8 ppt*
PFBS	0.5 ppt*
PFHxA	0.8 ppt*

Arrived at the lab with slightly elevated temperature

Little Rock, Ark.

Sample Date: 11/7/2019

Sample collected from North Little Rock within the likely service area of Central Arkansas Water.

TOTAL	1.4 ppt
FOSA	1.4 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Louisville, Ky.

Sample Date: 7/29/2019

Sample collected from Louisville within the likely service area of Louisville Water Company.

TOTAL	45.2 ppt
PFOS	2.6 ppt
PFOA	7.7 ppt
GenX	22.0 ppt
PFBA	3.4 ppt*
PFBS	1.5 ppt*
PFHpA	1.2 ppt*
PFHxA	2.9 ppt
PFHxS	0.8 ppt*
PFNA	0.6 ppt*
PFPeA	2.5 ppt

Memphis, Tenn.

Sample Date: 11/7/2019

Sample collected from Memphis within the likely service area of Memphis Light, Gas and Water.

TOTAL	1.0 ppt
FOSA	1.0 ppt*

Meridian, Miss.

Sample Date: 11/7/2019

Sample collected from Meridian within the likely service area of the City of Meridian community water system.

TOTAL	ND

Miami, Fla.

Sample Date: 7/19/2019

Sample collected from Miami within the likely service area of the Miami Dade Water and Sewer Authority.

TOTAL	56.7 ppt
PFOS	12.0 ppt
PFOA	4.6 ppt
GenX	0.5 ppt*
FOSA	0.9 ppt*
PFBA	12.0 ppt
PFBS	4.1 ppt
PFHpA	3.1 ppt
PFHxA	6.5 ppt
PFHxS	2.2 ppt
PFNA	0.8 ppt*
PFPeA	10.0 ppt

Minneapolis, Minn.

Sample Date: 6/4/2019

Sample collected from Minneapolis within the likely service area of the Minneapolis community water system.

TOTAL	14.2 ppt
PFOS	0.5 ppt*
PFOA	0.8 ppt*
PFBA	11.0 ppt
PFBS	0.5 ppt*
PFHpA	0.5 ppt*
PFHxA	0.9 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Nashville, Tenn.

Sample Date: 11/8/2019

Sample collected from Nashville within the likely service area of Nashville Water Department #1.

TOTAL	6.0 ppt
PFOA	0.5 ppt*
FOSA	1.9 ppt
PFBA	2.4 ppt*
PFBS	0.6 ppt*
PFPeA	0.6 ppt*

New Orleans, La.

Sample Date: 7/7/2019

Sample collected from New Orleans within the likely service area of the New Orleans Carrollton Waterworks.

TOTAL	41.8 ppt
PFOS	2.9 ppt
PFOA	1.9 ppt
GenX	7.3 ppt
6:2 FTSA	15.0 ppt
PFBA	9.6 ppt
PFBS	1.7 ppt
PFHpA	0.8 ppt*
PFHxA	1.3 ppt*
PFHxS	0.7 ppt*
PFNA	0.5 ppt*

New York, N.Y.

Sample Date: 7/10/2019

Sample collected from New York within the likely service area of the New York City System.

TOTAL	2.3 ppt
PFOS	0.6 ppt*
PFOA	0.6 ppt*
FOSA	0.7 ppt*
PFHxA	0.5 ppt*

Omaha, Neb.

Sample Date: 8/18/2019

Sample collected from Omaha within the likely service area of the Metropolitan Utilities District.

TOTAL	5.9 ppt
PFOS	0.8 ppt*
PFBA	3.4 ppt*
PFHpA	0.7ppt*
PFHxA	0.6 ppt*
PFHxS	0.5 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Philadelphia, Pa.

Sample Date: 8/27/2019

Sample collected from Philadelphia within the likely service area of the Philadelphia Water Department.

TOTAL	46.3 ppt
PFOS	5.3 ppt
PFOA	7.7 ppt
FOSA	1.3 ppt*
PFBA	5.5 ppt
PFBS	3.4 ppt
PFDA	0.8 ppt*
PFHpA	3.3 ppt
PFHxA	7.1 ppt
PFHxS	1.8 ppt
PFNA	1.8 ppt
PFPeA	8.3 ppt

Prince George's County, Md.

Sample Date: 7/22/2019

Sample collected from Prince George's County within the service area of the Washington Suburban Sanitary Commission.

TOTAL	17.8 ppt
PFOS	2.1 ppt
PFOA	2.4 ppt
PFBA	2.8 ppt*
PFBS	1.2 ppt*
PFHpA	1.4 ppt*
PFHxA	3.3 ppt
PFHxS	1.0 ppt*
PFNA	0.5 ppt*
PFPeA	3.2 ppt

Pittsburgh, Pa.

Sample Date: 11/4/2019

Sample collected from Pittsburgh within the likely service area of the Pittsburgh Water and Sewer Authority.

TOTAL	8.4 ppt
PFOS	1.3 ppt*
PFOA	1.6 ppt*
PFBA	2.3 ppt*
PFBS	0.7 ppt*
PFHpA	0.7 ppt*
PFHxA	1.0 ppt*
PFPeA	0.9 ppt*

Quad Cities, Iowa

Sample Date: 8/8/2019

Sample collected from Davenport within the likely service area of Iowa-American Water Company—Davenport.

TOTAL	109.8 ppt
PFOS	3.0 ppt
PFOA	2.6 ppt
PFBA	72.0 ppt
PFBS	3.5 ppt
PFHpA	0.9 ppt*
PFHxA	1.5 ppt*
PFHxS	0.9 ppt*
PFNA	0.5 ppt*
PFPeA	25.0 ppt

The Quad Cities refers to the region that includes Davenport and Bettendorf, Iowa, and Rock Island, Moline, and East Moline, Ill.

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Rockingham County, N.H.

Sample Date: 11/21/2019

Sample collected from Rye within the likely service area of the Rye Water District.

TOTAL	17.1 ppt
PFOS	3.3 ppt
PFOA	4.3 ppt
FOSA	0.7 ppt*
PFBA	1.9 ppt*
PFBS	1.9 ppt
PFHpA	1.3 ppt*
PFHxA	1.3 ppt*
PFHxS	1.0 ppt*
PFPeA	1.4 ppt*

Sacramento, Calif.

Sample Date: 5/15/2019

Sample collected from Sacramento within the likely service area of the City of Sacramento community water system.

TOTAL	1.6 ppt
PFOS	0.7 ppt*
PFOA	0.4 ppt*
FOSA	0.6 ppt*

San Antonio, Texas

Sample Date: 8/13/2019

Sample collected from San Antonio within the likely service area of the San Antonio Water System.

TOTAL	7.7 ppt
PFOS	2.0 ppt*
PFOA	1.0 ppt*
FOSA	0.6 ppt*
PFBS	1.4 ppt*
PFHxA	0.7 ppt*
PFHxS	1.2 ppt*
PFPeA	0.9 ppt*

Collection date estimated based on sample shipping documentation.

Seattle, Wash.

Sample Date: 7/10/2019

Sample collected from Seattle within the likely service area of Seattle Public Utilities.

TOTAL	0.7 ppt
FOSA	0.7 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*

St. Louis, Mo.

Sample Date: 11/5/2019

Sample collected from St. Louis within the likely service area of the St. Louis City community water system.

TOTAL	6.7 ppt
PFOS	0.5 ppt*
PFBA	3.8 ppt*
PFHpA	0.6 ppt*
PFHxA	0.7 ppt*
PFHxS	0.6 ppt*
PFPeA	0.6 ppt*

St. Louis County, Mo.

Sample Date: 11/5/2019

Sample collected from St. Ann within the likely service area of the Missouri American St. Louis County and St. Charles County community water system.

TOTAL	7.4 ppt
PFOS	0.6 ppt*
PFOA	0.5 ppt*
PFBA	3.8 ppt*
PFHpA	0.6 ppt*
PFHxA	0.7 ppt*
PFHxS	0.5 ppt*
PFPeA	0.5 ppt*

St. Charles County, Mo.

Sample Date: 11/5/2019

Sample collected from St. Charles within the likely service area of the St. Charles community water system.

TOTAL	2.5 ppt
PFBA	1.9 ppt*
PFPeA	0.6 ppt*

Tulsa, Okla.

Sample Date: 11/6/2019

Sample collected from Tulsa within the likely service area of the Tulsa community water system.

TOTAL	2.6 ppt
FOSA	0.7 ppt*
PFBA	1.9 ppt*

Tuscaloosa, Ala.

Sample Date: 11/8/2019

Sample collected from Tuscaloosa within the likely service area of Tuscaloosa Water and Sewer.

TOTAL	0.5 ppt
PFBS	0.5 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*

Washington, D.C.

Sample Date: 7/22/2019

Sample collected from Washington within the service area of D.C. Water and Sewer Authority.

TOTAL	21.7 ppt
PFOS	3.3 ppt
PFOA	3.0 ppt
PFBA	3.4 ppt*
PFBS	1.8 ppt
PFHpA	1.6 ppt*
PFHxA	3.2 ppt
PFHxS	1.2 ppt*
PFNA	0.6 ppt*
PFPeA	3.6 ppt

Wilmington, N.C.

Sample Date: 6/27/2019

Sample collected from Wilmington within the likely service area of the Cape Fear Public Utility Authority—Wilmington.

TOTAL	50.5 ppt
PFOS	1.2 ppt*
PFOA	1.9 ppt
GenX	10.0 ppt
PFBA	8.3 ppt
PFBS	1.7 ppt
PFHpA	4.1 ppt
PFHxA	10.0 ppt
PFHxS	0.9 ppt*
PFPeA	12.0 ppt
PFPeS	0.4 ppt*

**Concentration detected was above the limit of detection but below the limit of quantitation.*