

PFAS Sampling Activities in the U.S. Geological Survey National Networks

Per- and Polyfluoroalkyl Substances

Per- and polyfluoroalkyl substances (PFAS), frequently called “forever chemicals,” are used for a wide variety of industrial purposes and are often found in common household and industrial items such as firefighting foams, non-stick cookware, and water-resistant materials. The contamination of water, air, and soil by PFAS is a national and global issue due to their widespread occurrence in multiple applications and resistance to biodegradation and other traditional treatment processes. Research indicates that many PFAS can be emitted to the atmosphere and transported and deposited long distances from the source (Tokranov and others, 2021).

The U.S. Geological Survey (USGS) Water Resources Mission Area received funding to implement a national-scale sampling effort to assess PFAS occurrence. To follow agency directives, the National Water Quality Network (NWQN) added PFAS sample monitoring for both surface water and groundwater, and also added PFAS monitoring to selected sites in the National Atmospheric Deposition Program (NADP).

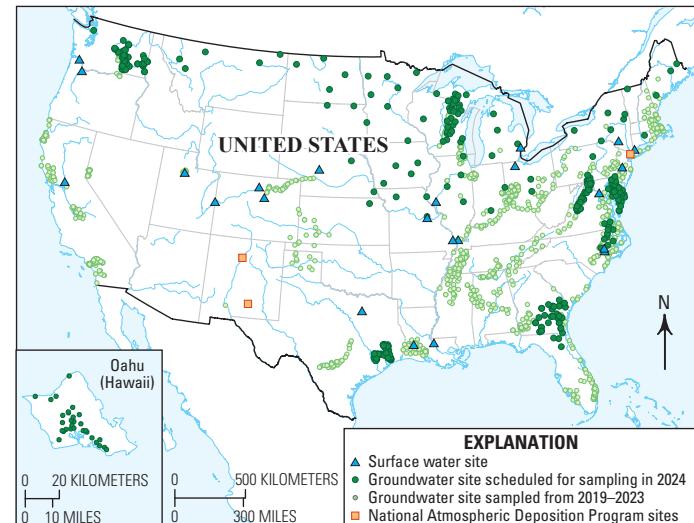
Surface Water Sampling

To understand the distribution of PFAS and factors affecting its occurrence in surface water, 23 surface-water sites were selected for sampling by the NWQN beginning in February of 2023. Currently, samples are collected from these 23 sites between 12 to 22 times per year and analyzed at the USGS National Water Quality Laboratory (NWQL).



U.S. Geological Survey (USGS) hydrologic technician processing per- and polyfluoroalkyl substances samples from the Delaware River at Trenton, NJ (USGS station 01463500). Photograph by Pamela Reilly, USGS.

For more information, please contact the National Network Coordinators at: waternetworks@usgs.gov



Per- and polyfluoroalkyl substances sampling sites in the U.S. Geological Survey (USGS) National Networks.

Groundwater Sampling

More than 1,200 PFAS groundwater samples have been collected for PFAS analysis from 2019 through 2024. Eight trend networks (groups of 20–30 wells) targeting shallow groundwater or domestic wells are sampled annually, as well as one network targeting public supply wells. Typically, each of the wells are sampled once for 28 PFAS compounds to determine initial occurrence information and to provide a baseline for future analysis of PFAS trends. Samples are sent to a contract laboratory in Orlando for analysis, with a subset of samples sent to the USGS NWQL.

Atmospheric Monitoring

Sampling and measurement of PFAS at sites sponsored by the NADP began in 2020 and confirmed the presence of measurable concentrations of PFAS in wet atmospheric deposition (precipitation). In 2024, the USGS supported measurements of PFAS at three NADP sites that are part of the National Trends Network (NTN). Weekly precipitation samples are collected at NTN sites, then shipped and analyzed for chemical constituents at the Wisconsin State Laboratory of Hygiene at the University of Wisconsin-Madison. The data are then used to produce atmospheric deposition maps that are used to assess the effectiveness of the Clean Air Act.

Reference Cited

Tokranov, A.K., Bradley, P.M., Focazio, M.J., Kent, D.B., LeBlanc, D.R., McCoy, J.W., Smalling, K.L., Steevens, J.A., and Toccalino, P.L., 2021, Integrated science for the study of perfluoroalkyl and polyfluoroalkyl substances (PFAS) in the environment—A strategic science vision for the U.S. Geological Survey: U.S. Geological Survey Circular 1490, 50 p., <https://doi.org/10.3133/cir1490>.