

Inventory Summary

Delaware

1. Delaware Department of Natural Resources and Environmental Control

Current goal of PFAS program is discovery/occurrence characterization. Larger potential sources have been identified, but occurrence and distribution efforts continue. Some targeted sampling is occurring, and plans are being developed to expand sampling as funding permits. Sampling drinking water mostly. Started adding PFAS to fish monitoring of largemouth bass (added to a mercury study).

2. New Castle County, Delaware

In 2019, the Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR) conducted an exposure assessment (EA) from in and around the City of New Castle in New Castle County, Delaware, near New Castle Air National Guard Base.

https://www.atsdr.cdc.gov/pfas/activities/assessments/sites/new-castle-county-de.html?CDC_AA_refVal=https%3A%2F%2F

www.atsdr.cdc.gov/pfas/communities/new-castle-county-de.html

<https://www.atsdr.cdc.gov/pfas/communities/factsheet/new-castle-county-community-level-results-factsheet.html>

3. Blades, Delaware

Superfund site that is in CB watershed. The Delaware Department of Natural Resources and Environmental Control (DNREC) worked with the EPA to evaluate PFAS in the Town of Blades drinking water wells because of a history of manufacturing processes that have operated in the area. After elevated PFAS was first detected in groundwater samples collected from three Blades municipal supply wells in 2018, additional private well sampling and investigation of potential source area was conducted. On Sept. 1, 2020, the U.S. Environmental Protection Agency (EPA) announced the addition of the Blades Groundwater Site to the Superfund National Priorities List (NPL).

<https://pfasproject.com/blades-delaware/>

<https://dnrec.alpha.delaware.gov/waste-hazardous/remediation/blades-groundwater-site/>

Washington, D.C.

1. Department of Energy & Environment (DOEE)

Current goal of PFAS program is discovery/occurrence characterization. Most work has focused on drinking water in collaboration with DC Water. Recently began including PFAS as part of fish studies.

Studying PFAS from the human health component in relation to service ware within the restaurant industry.

2. Sierra Club (Nonprofit)

Sierra Club and Ecology Center tested commercially available home fertilizers consisting of biosolids for PFAS (33 target compounds and TOP assay). Reported that eight of the nine products exceeded screening limits for PFOS or PFOA set by Maine as a screening standard set for land application. Samples of Cured Bloom Soil Conditioner (Washington DC, Blue Plains Advanced Wastewater Treatment Plant, 100 percent biosolids) had the highest measured PFAS.

[Sludge in the Garden: Toxic PFAS in home fertilizers made from sewage sludge \(sierraclub.org\)](https://www.sierraclub.org/Sludge-in-the-Garden-Toxic-PFAS-in-home-fertilizers-made-from-sewage-sludge)

Maryland

1. Maryland Department of Environment (MDE); and Maryland Department of Health (MDH)- Occurrence in drinking water

Current goal of PFAS monitoring program is for discovery/occurrence characterization particularly as related to drinking water sources.

MDE has initiated an assessment of the occurrence of PFAS in drinking water from 137 selected Community Water Systems (CWS) Water Treatment Plants (WTPs), starting September 2020. Study results may trigger the need for additional finished water sampling, monitoring of raw water sources, and other actions. Levels of PFOA+PFOS greater than the EPA's HAL of 70 ppt were found in samples collected from two CWS-WTPs that withdraw and treat groundwater from an unconfined aquifer.

Link to Phase 1 Public Water System Study approach and report:

[Phase 1 Report PFAS in Maryland's Public Drinking Water Sources](https://mde.maryland.gov/programs/Water/water_supply/Documents/PFAS_PWSPFAS_Study_Fact_sheet.pdf)

https://mde.maryland.gov/programs/Water/water_supply/Documents/PFAS_PWSPFAS_Study_Fact_sheet.pdf

A PFAS Science Roundtable sponsored by UMCES in coordination with MDE was held on October 5, 2020 with over 20 scientists and PFAS experts from academia, federal agencies and the states of PA and DE. [Summary of Maryland's PFAS Scientific Roundtable](#)

2. Maryland Department of Environment (MDE) - Source evaluation

Completed a desktop mapping exercise to set priorities for monitoring using available information on industries and facilities that are more likely to be PFAS sources (e.g., firefighting, certain metal finishing industries, DoD facilities) and proximity to certain drinking water source water that is more vulnerable (unconfined and semi-confined aquifers) or surface waters. Focused on targeting locations that may have the highest relative risk of human exposures. This source evaluation was used to guide sample collection for [Phase 1 Report PFAS in Maryland's Public Drinking Water Sources](#).

Currently seeking information on WWTPs to better understand those as possible sources of release either to water (effluent) or to land (biosolids) and on facilities with industrial stormwater discharge permits.

Targeted source studies:

St. Mary's Oyster study - MDE in cooperation with Maryland's Department of Natural Resources (DNR) launched a pilot study to assess whether surface water and oysters in portions of the St. Mary's River and its tributaries near Naval Air Station (NAS) Patuxent River's Webster Field Annex have PFAS, but levels of concern were not found.

Link to information on St. Mary's pilot study measuring PFAS concentrations in oyster tissue and surface water:

https://mde.maryland.gov/programs/Water/FishandShellfish/Pages/StMarys_PFAS.aspx

Piscataway Creek Study - MDE in cooperation with DNR conducted surface water and fish sampling annually starting in 2020 to investigate foam release with both Joint Base Andrews and a fire-fighting training area as potential sources. Resulted in first fish consumption advisories in Maryland. [Piscataway Creek \(Tidal and Non-Tidal\) PFAS Study \(maryland.gov\)](#)

3. Department of Defense (DoD) Sites

The report from the PFAS Science Roundtable sponsored by UMCES in coordination with MDE, held October 5, 2020, has a summary of military facilities in Maryland and status of DoD investigations.

[Summary of Maryland's PFAS Scientific Roundtable](#)

<https://www.civilianexposure.org/report-shows-15-military-bases-in-maryland-contaminated-with-pfas/#:~:text=In%20March%2C%202018%20the%20DOD%20released%20a%20report%2C,using%20aqueous%20film-forming%20foam%20in%20routine%20fire-fighting%20exercises>

4. National Oceanic and Atmospheric Administration (NOAA)

Chesapeake Bay, MD and Charleston Bay, SC

NOAA's National Status and Trends (NS&T) Mussel Watch Program conducted regional pilot studies to assess the magnitude and distribution of contaminants of emerging concern (CEC) in shellfish and sediment from different coastal zones. Oyster tissue and surficial sediment samples collected in 2015 in the Chesapeake Bay, Maryland, and Charleston Harbor, South Carolina were analyzed for PFAS.

<https://repository.library.noaa.gov/view/noaa/20268> - pdf available

<https://coastalscience.noaa.gov/project/mussel-watch-program-assessment-chesapeake-bay-charleston-harbor/>

5. US Geological Survey (USGS) Studies

USGS Fish Tissue Studies - Fish plasma samples from two sites in the Potomac River and two in the Susquehanna River drainage basins, differing in land-use characteristics, were analyzed for PFAS:

[IJERPH | Free Full-Text | Perfluoroalkyl Substances in Plasma of Smallmouth Bass from the Chesapeake Bay Watershed \(mdpi.com\)](#)

[‘Forever chemicals’ found in Chesapeake region's freshwater fish | Fisheries | bayjournal.com](#)

USGS Maryland-Delaware-DC Water Science Center in collaboration with University of Maryland Baltimore County and MDE are studying PFAS occurrence in Maryland wet ponds. One-time sampling conducted of sediment in wet ponds used for stormwater management and analyzed for PFAS, PCBs, and metals. Data analysis ongoing.

USGS Maryland-Delaware-DC Water Science Center is leading an ongoing study to look at PFAS in wastewater treatment plants in Patapsco and Potomac watersheds. Data collection is currently ongoing.

Pennsylvania

1. USGS, Pennsylvania Department of Environmental Protection (PADEP), and Susquehanna River Basin Commission- Monitoring

Current goals of PFAS program include data collection in surface water and fish tissue to characterize PFAS in Pennsylvania surface waters, to provide information for the development of surface water criteria, and to inform permitted activities. A Sampling Plan was developed based on identifying potential sources of PFAS contamination (PSOC) and sampling from public water systems that had one or more sources within 0.5 mile of a PSOC. In addition, source evaluation efforts have targeted the Neshaminy Creek basin with surface water data collection.

[Pennsylvania Department of Environmental Protection Bureau of Safe Drinking Water PFAS Sampling Plan \(state.pa.us\)](#)

The USGS PAWSC collaborated with the PADEP and the Susquehanna River Basin Commission to collect 216 surface-water samples in a single month in September 2019. A USGS [data release](#) includes PFAS & associated quality-control (QC) data from integrated, discrete surface-water samples from 178 PADEP Surface Water Quality Network (WQN) sites and 36 QC samples. Developed PFAS sampling techniques to allow for low-level detections. Tested discrete and passive sampling methods. Potential point sources were identified by PADEP as part of the PFAS sampling plan in order to prioritize sites for PFAS sampling to general statewide occurrence data.

Based on the results of the 2019 effort, data collection is occurring monthly at a subset of sites. In addition, 50 fish tissue samples have been analyzed. Yearly fish tissue and monthly surface water data collection is planned to continue.

<https://www.usgs.gov/news/usgs-releases-first-its-kind-survey-pfas-pennsylvania-surface-waters>

<https://www.sciencebase.gov/catalog/item/5e4d5e72e4b0ff554f6d146b>

[Pennsylvania Statewide Surface Water-Quality Monitoring Network - Per- and polyfluoroalkyl Substances Sampling Preparation | U.S. Geological Survey \(usgs.gov\)](#)

[PFAS Surface Water Discrete and Passive Samples: 2019 \(state.pa.us\)](#)

Trigger levels for contaminant concentrations found in fish tissue and tiered meal advice exists for PFOS in Pennsylvania (see page 2-80 of DEP Assessment Methodology for Stream and Rivers 2021): [ASSESSMENT BOOK 2021.pdf \(state.pa.us\)](#)

Do Not Eat advisory for all fish species within the Neshaminy Creek basin: [Article Viewer \(pa.gov\)](#)

2. Pennsylvania Department of Health (PDH) and Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR)

The Agency for Toxic Substances and Disease Registry (ATSDR) is evaluating per- and polyfluoroalkyl substances (PFAS) levels in drinking water and related public health concerns near military bases in Bucks and Montgomery Counties, Pennsylvania. Firefighting foam that contained PFAS was used at these bases in the past. ATSDR evaluated PFAS levels in drinking water and the possibility of health effects from exposure. Executive summaries give details about ATSDR's evaluation of PFAS in drinking water near the former Naval Air Warfare Center located in Warminster Township, Bucks County, Pennsylvania (Warminster site) and the former Naval Air Station Joint Reserve Base (NASJRB) and the active Air Reserve Station (ARS) Willow Grove located in Horsham, Montgomery County (Willow Grove site).

[PEATT Pilot Project Final Report April 29 2019.pdf \(pa.gov\)](#)

https://www.atsdr.cdc.gov/HAC/pha/willowgrove/Evaluation_of_PFAS_in_Drinking_Water_FS-508.pdf

https://www.atsdr.cdc.gov/HAC/pha/NavalAirWarfareCenter/Naval_Air_Warfare_Center_LHC_01-20-2016_508.pdf

3. Department of the Navy, Naval Support Activity (NSA) Mechanicsburg

In January and February 2022, the Department of the Navy conducted an off-installation drinking water investigation near Naval Support Activity (NSA) Mechanicsburg for PFAS. Tested 8 drinking water wells that were found to be below the U.S. EPA Lifetime Drinking Water Health Advisory level for PFOA and PFOS.

https://www.navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/installation_map/navfac_atlant/midlant/mechanicsburg/mechanicsburg_pfas.html

Virginia

1. Virginia Department of Environmental Quality (DEQ) and the Virginia Department of Health (VDH)

The goals of statewide monitoring are focused on human health with objectives: 1) To understand the prevalence of PFAS in surface waters by sampling probabilistic sites and sites located

downstream of suspected sources. 2) To understand the temporal dynamics of PFAS by conducting repeated sampling at several long-term monitoring sites.

Chickahominy River PFAS Study is being conducted to 1) verify a locality's initial findings that PFAS concentrations in source waters are elevated in the Middle Chickahominy watershed and 2) collect environmental and drinking water data to understand the human exposure of PFAS in the Middle Chickahominy watershed.

[Elevated PFAS Levels Found in the Chickahominy River Watershed - Newsroom \(virginia.gov\)](#)

For drinking water, the 2016 EPA health advisories for PFOA and PFOS are being used to communicate risk. Risk-based screening values for environmental data (surface water and fish tissue) have been developed for the purposes of informing management decisions in a specific watershed. Target constituents are ones for which EPA has published finalized toxicity assessments: PFOA, PFOS, PFBS, and GenX.

2. Virginia Department of Environmental Quality (DEQ) – Source evaluation and sites

Potential sources have been identified by Standard Industrial Classification codes by desktop analysis. These include industrial dischargers and publicly owned treatment works receiving wastewater from industries that potentially use PFAS. The state NPDES program is developing a survey for distribution to the identified facilities to better understand current and/or historical activities and processes that may be possible sources of PFAS.

The following areas have been identified as PFAS sites in Virginia: [Fentress Air Base](#) (Fentress), [Oceana Naval Air Station](#) (Virginia Beach), [Northwest Annex](#) (Chesapeake), NASA [Wallops Island](#), and [DuPont Spruance](#) (Richmond)

Oceana Naval Air Station- The Navy initially sampled private drinking water wells in 2016 for PFOA and PFOS, and all were below the EPA's health advisory level for PFOS and PFOA.

https://www.cnic.navy.mil/content/dam/cnic/cnrma/pdfs/Environmental/Drinking_Water_and_Testing_Information/Installation_Scheduling_and_Results/Oceana/Oceana%20Factsheet_Sep2018_09212018.pdf

https://www.cnic.navy.mil/content/dam/cnic/cnrma/pdfs/Environmental/Drinking_Water_and_Testing_Information/Installation_Scheduling_and_Results/Oceana/NAS_Oceana_Basewide_PFAS_SI_Report_final.pdf

Wallops-

Since 2016, NASA has routinely conducted testing of the facility's groundwater monitoring wells and drinking water wells and the Town of Chincoteague's drinking water wells for the presence of per- and polyfluoroalkyl substances (PFAS).

<https://www.nasa.gov/feature/background-latest-information-on-pfas-at-nasa-wallops/>

West Virginia

1. WV Department of Environmental Protection and Department of Health and Human Resources

Current PFAS program is designed to aid in the identification of the potential sources of contamination and to focus on drinking water effects. The two main contamination source that were known in WV were the Chemours site and surrounding area and the Air Guard Base in Martinsburg area.

Sampled source water for all public drinking water systems with USGS conducting the sampling (Senate Concurrent Resolution 46 (SRC 46), Feb. 2020).

2. USGS Virginia and West Virginia Water Science Center

USGS is completing a study by June 2022 for WV Department of Environmental Protection to provide a PFAS public source-water supply study plan. The purpose is to inform state regulatory agencies about the distribution of PFAS contamination and potential PFAS contamination in public drinking water sources using data of known quality. Specific objectives of the PFAS public source-water supply study plan include: (1) Identifying the drinking water supplies in West Virginia that have measurable amounts of PFOS, PFOA, and related PFAS compounds in their raw source-water; (2) Determining if there are geochemical, watershed, industrial use, land use, or geohydrologic factors or processes that affect the presence of these compounds in public source-water supplies; (3) Informing state agencies and the public of any need for additional PFAS investigation, such as sampling of domestic wells; and (4) Assisting state regulatory agencies in protecting public health by providing risk-based information on statewide PFAS distribution in source water

3. Centers for Disease Control and Prevention (CDC) and the Agency for Toxic Substances and Disease Registry (ATSDR)- Berkeley County

The Shepherd Field Air National Guard Base previously used aqueous film-forming foam containing PFAS to fight fires and train workers. PFAS transport in groundwater to off-site likely affected the City of Martinsburg's Big Springs well, which supplies drinking water to City of Martinsburg and a small percentage of Berkeley County customers.

<https://www.atsdr.cdc.gov/pfas/docs/factsheet/Berkeley-County-WV-Site-Factsheet-508.pdf>

https://www.atsdr.cdc.gov/pfas/activities/assessments/sites/berkeley-county-wv.html?CDC_AA_refVal=https%3A%2F%2Fwww.atsdr.cdc.gov%2Fpfas%2Fcommunities%2FBerkeley-County-WV.html

Other Resources, Agencies, and Organizations

Federal Agencies

[FACT SHEET: Biden-Harris Administration Launches Plan to Combat PFAS Pollution | The White House](#)

U.S. federal agencies conducting research on PFAS include EPA, DoD, USDA, HHS (National Institutes of Health, National Institute of Environmental Health Sciences), ATSDR, CDC, and U.S. Food and Drug Administration, U.S. Geological Survey, U.S. Department of Transportation, Department of Homeland Security, U.S. Department of Commerce (National Institute of Standards and Technology).

Environmental Protection Agency:

EPA PFAS Plan: [PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024](#)

Draft Method 1633: [CWA Analytical Methods for Per- and Polyfluorinated Alkyl Substances \(PFAS\)](#)

Draft Method 1621: Adsorbable Organic Fluorine: [Draft Method 1621-AOF](#)

NPDES memo, Addressing PFAS Discharges in EPA-Issued NPDES Permits and Expectations Where EPA is the Pretreatment Control Authority: [Industrial Wastewater](#)

Proposed aquatic life criteria for PFOA and PFOS, released May 3, 2022; open for public comment and any new toxicity data:

[Aquatic Life Criteria - Perfluorooctanoic Acid \(PFOA\)](#)

[Aquatic Life Criteria - Perfluorooctane Sulfonate \(PFOS\)](#)

EPA uses the Unregulated Contaminant Monitoring Rule (UCMR) to collect data for contaminants suspected to be present in drinking water, but that do not have regulatory standards set under the Safe Drinking Water Act (SDWA). Monitoring results include PFAS.

<https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#3>

<https://www.epa.gov/sites/default/files/2017-02/documents/ucmr3-data-summary-january-2017.pdf>

U.S. Department of Defense

<https://www.defense.gov/Spotlights/pfas/>

[PFAS Task Force Progress Report March 2020 \(defense.gov\)](#)

<https://www.ucsusa.org/sites/default/files/attach/2018/09/a-toxic-threat-pfs-military-fact-sheet-ucs-2018.pdf>

[FY18 HASC Brief on PFOS-PFOA \(partner-mco-archive.s3.amazonaws.com\)](#)

DoD's Environmental Research Programs: [Environmental Restoration \(serdp-estcp.org\)](#)

US Geological Survey

PFAS program includes site-specific, regional, and national scale studies of PFAS occurrence and controls on distribution and research studies of fate, transport, and ecosystem/toxicity effects, as well as development of remediation technologies.

Integrated Science for the Study of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in the Environment—A Strategic Science Vision for the U.S. Geological Survey:

<https://pubs.er.usgs.gov/publication/cir1490>

[Per-and Polyfluoroalkyl Substances \(PFAS\) Integrated Science Team | U.S. Geological Survey \(usgs.gov\)](#)

National Institute of Environmental Health Sciences

[Perfluoroalkyl and Polyfluoroalkyl Substances \(PFAS\) \(nih.gov\)](#)

US Food & Drug Administration

[Per- and Polyfluoroalkyl Substances \(PFAS\) | FDA](#)

CDC's and ATSDR's

[Learn about PFAS | ATSDR \(cdc.gov\)](#)

NOAA's National Centers for Coastal Ocean Science

Goal is to deliver applied science products and services and monitoring data that elucidate the fate, transport, and toxicity of PFAS in coastal ecosystems to support effective regulatory decisions and safe use of PFAS and new alternative compounds. PFAS work has been directly driven by specific partnerships with DoD, EPA, and NIST, and primarily focused on toxicity studies in the lab. Conducted (or plan to conduct) monitoring in tidal creeks of South Carolina and Great Lakes region through the NOAA Mussel Watch Program; a 2015 study included Chesapeake Bay (see Maryland section above). Mussel Watch Program efforts in the Great Lakes are using metabolimics as indicators of PFAS exposure and stress in benthic organisms/bivalves/fish. Combining this data with land use, hydrology, and other oceanographic data can contribute to source tracking.

[NOAA Mussel Watch Program: An Assessment of Contaminants of Emerging Concern in Chesapeake Bay, MD, and Charleston Harbor, SC - NCCOS Coastal Science Website](#)

National Institute of Standards and Technology

PFAS reference materials and interlaboratory studies.

[Measurement Science of Per- and Polyfluoroalkyl Substances \(PFAS\) | NIST](#)

[NIST-PFAS Program Overview | NIST](#)

Multi-Agency

Interstate Technology and Regulatory Council (ITRC) online document, references, and training:

[PFAS — Per- and Polyfluoroalkyl Substances \(itrcweb.org\)](#)

ECOS-

Environmental Council of the States (ECOS) began compilation of information on state PFAS standards, advisories, and guidance values in 2019 and updated most recently in March 2022. Plan to update annually.

https://www.ecos.org/wp-content/uploads/2022/03/Standards-White-Paper_Updated_V3_2022_Final.pdf

Nonprofit

Environmental Working Group:

[PFAS Chemicals | Environmental Working Group \(ewg.org\)](#)

[Interactive Map: PFAS Contamination Crisis: New Data Show 2,854 Sites in 50 States \(ewg.org\)](#)

[Interactive Map: Suspected industrial discharges of PFAS \(ewg.org\)](#)

[Interactive Map: 679 Military Sites With Known or Suspected Discharges of PFAS \(ewg.org\)](#)

Northeastern University:

[The PFAS Project Lab – Studying Social, Scientific, and Political Factors of Per- and Polyfluoroalkyl Substances](#)

An *interactive map* that brings together information about known and suspected PFAS contamination sites across the United States: [PFAS Sites and Community Resources – The PFAS Project Lab](#)

Green Science Policy Institute:

Team of science and policy experts collaborates with scientists, business and government decision makers, and NGOs. [PFAS - Green Science Policy Institute](#)

PFAS Solutions:

Launched in 2019 by the Science, Technology & Research Institute of Delaware (STRIDE), a Delaware not-for-profit corporation. Laboratory in New Castle, Delaware.

[PFAS Solutions - Quality Science and Information \(pfasolutions.org\)](#)

Academia

University of Maryland Baltimore County (Lee Blaney) – PFAS research on environmental occurrence and distribution, treatment and remediation processes, and passive sampling methods.

Johns Hopkins University (Carsten Prasse) - Occurrence of PFAS in biosolids and their fate after land application including plant uptake. Additional research on treatment strategies to remove PFAS from contaminated groundwater.

Morgan State (Tom Ihde) - Estimation of biomagnified concentrations of PFAS spatially, throughout the Chesapeake Bay. Currently conducting a pilot study in collaboration with University of Maryland

Baltimore County focused on developing a new modeling approach to support consumption advisories. The initial focus of this work is quantification of contaminant levels in Blue Crab; future studies are planned for Striped Bass and Blue Catfish.

Penn State University (Heather Preisendanz; Raymond Najjar) – PFAS research on environmental occurrence and distribution, potential sources, fate and transport; field-based studies to look at impacts of agricultural sources of PFAS (biosolids and wastewater irrigation) on groundwater quality.

Reference List (PFAS-related in Chesapeake Bay Watershed; a few general reviews)

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Glossary

Aqueous film forming foam (AFFF)

A highly effective type of fire suppressant agent, intended for use for high-hazard liquid hydrocarbon fires, and containing fluorinated organic compounds. Defining feature of AFFF is that the solution produces an aqueous film that spreads across the surface of a hydrocarbon fuel to extinguish the flame and to form a vapor barrier between the fuel and atmospheric oxygen to prevent re-ignition.

Bioaccumulation/Biomagnification

Toxins can accumulate over time when organisms absorb the toxin from the environment (bioaccumulation). A predator that consumes multiple organisms that have bioaccumulated the toxin magnifies the amount of that toxin in its own body; the process of magnification continues up the food chain (biomagnification). The result of biomagnification is that the highest concentrations of the toxin are found in the tissues of apex predators.

PFAS

No universally accepted definition of PFAS. This term is used to describe all per- and polyfluoroalkyl substances, and broadly encompasses the more than 4,000 compounds known to exist within the PFAS class. In general, PFAS are characterized as having carbon atoms linked to each other and bonded to fluorine atoms at most or all of the available carbon bonding sites.

PFAAs

This term refers to perfluoroalkyl acids such as perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA), which are two of the most widely recognized PFAAs and the subject of current EPA drinking-water health advisories. PFAAs are fully fluorinated (that is, there is no hydrogen attached to carbon in the carbon chain). Although there are several PFAA structures, references to PFAAs in this document refer specifically to perfluoroalkyl carboxylates (such as PFOA) and (or) perfluoroalkyl sulfonates (such as PFOS), which have been the primary subject of research on PFAS and are measured in routine laboratory analysis. PFAAs are frequently referred to as “legacy” or “terminal” PFAAs because of their long history of use, their resistance to transformation into another compound, and their persistence in the environment.

Perfluoroalkyl substances

Fully fluorinated alkane (carbon chain) molecule. They have a chain (tail) of two or more carbons atoms with a charged functional group (head) attached at one end.

Polyfluoroalkyl substances

Partially fluorinated. The molecule has a nonfluorine atom (typically hydrogen or oxygen) attached to at least one, but not all, carbon atoms, while at least two or more of the remaining carbon atoms in the carbon chain tail are fully fluorinated. Some polyfluoroalkyl substances can break down in the environment to form terminal PFAAs and are referred to as PFAA precursors.

Surfactant

A surface-active agent that lowers the surface tension of a liquid.

Tail

The part of a molecule that is a chain of two or more carbon atoms.

Zwitterion

An ionic compound containing both positively and negatively charged groups with a net charge of zero.

Glossary adapted from:

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>.

ITRC: [PFAS — Per- and Polyfluoroalkyl Substances \(itrcweb.org\)](https://www.itrcweb.org/)