



RESEARCH SUMMARY

Validation of PFAS Measurement Methods

This summary describes IDA's statistical analyses to support the validation of a measurement method for perfluoroalkyl and polyfluoroalkyl substances (PFAS), a group of synthetic chemicals that are resistant to heat, oil and water. Known as "forever chemicals" because of their rise as a persistent and mobile pollutant, PFAS were used in the aqueous film-forming foam (AFFF) the Department of Defense developed to extinguish high-hazard liquid hydrocarbon fires. The use of AFFF resulted in the prevalence of PFAS at many military installations where the Defense Department has environmental management responsibility, prompting interest in a validated method for measuring PFAS.

Testing for individual PFAS (called analytes) provides a quantitative measure of the PFAS contamination in an environmental sample, and using a validated laboratory method is a reliable way to assess and monitor areas of interest. In 2020, when this work began, the only methods published by the Environmental Protection Agency (EPA) for measuring PFAS were for less than 30 analytes in drinking water and nonpotable water. In partnership with the EPA, the Strategic Environmental Research and Development Program (SERDP) and the

Environmental Security and Technology Certification Program (ESTCP) funded the validation of a new measurement method for 40 PFAS in eight different environmental matrices.

SERDP/ESTCP first asked IDA researchers to calculate summary statistics from data generated in a single-laboratory validation (SLV) study that served as a trial run for the method study. Allyson Buytendyk led the IDA team of

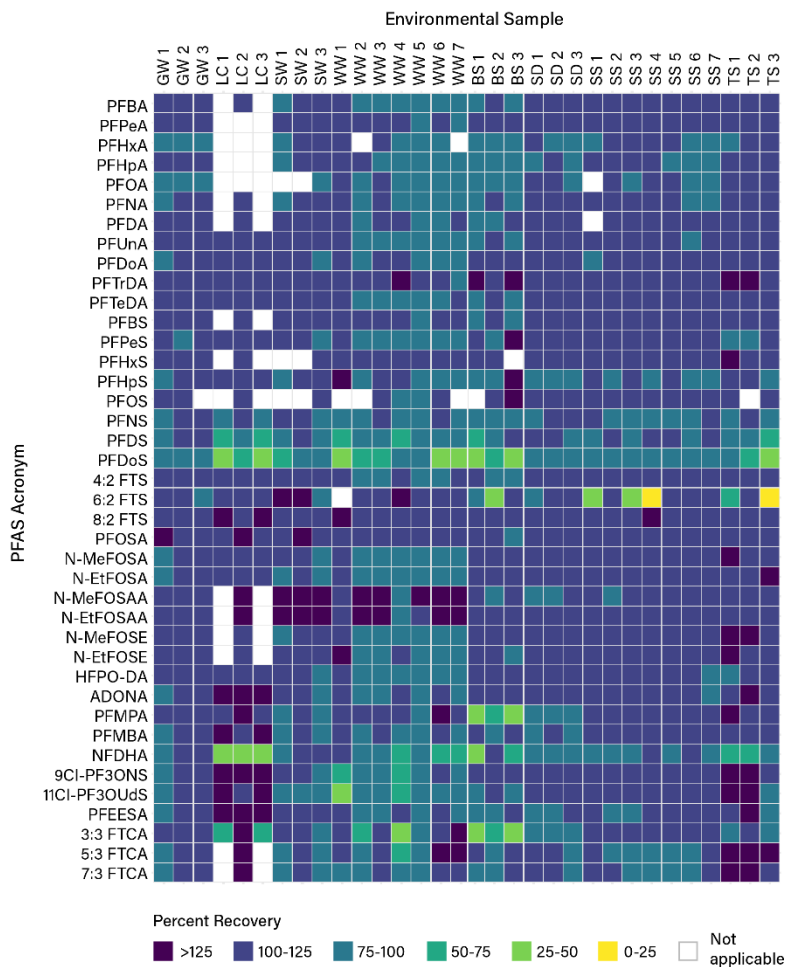
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researchers that took on this work. The team coded Python computer scripts to automatically generate statistics data tables in a way that eliminates human error.

For example, the figure shows mean percent recovery for 40 PFAS analytes from 32 environmental samples of groundwater (GW), landfill leachate (LC), surface water (SW), wastewater (WW), biosolid (BS), sediment (SD), soil (SS) and tissue (TS) matrices. Numbers reported are mean values over all subsamples for that analyte/matrix combination that are greater than the detection limit. The resulting data were used to support the government’s SLV of the novel PFAS method.

In 2022, SERDP/ESTCP asked IDA to conduct the statistical analyses for the multi-laboratory validation (MLV) study with 10 laboratories where the laboratory performance data informs the overall quality-control acceptance criteria for the measurement method. To be confident that summary statistics (means and standard deviations) were calculated correctly, the IDA team rigorously checked the data on spike concentrations and percent recoveries of the PFAS analytes in aqueous and solid type matrices and tissues.

The researchers’ analysis supported the validation of a new method for measuring trace contamination of 40 different PFAS in eight diverse environmental matrices. Using a validated laboratory procedure to quantify PFAS provides consistent and reliable measurements that offer confidence when comparing data across different samples of the same environmental matrix type.



This summary is based on [IDA Document D-22794](#) and [IDA Product 3000051](#).



Allyson M. Buytendyk (abuytend@ida.org) is a researcher in the Science and Technology Division of the IDA Systems and Analyses Center, an IDA-managed federally funded research and development center.

Allyson holds a doctorate in chemistry from Johns Hopkins University. Her fields of expertise include chemical physics, mass spectrometry, and statistical analysis.