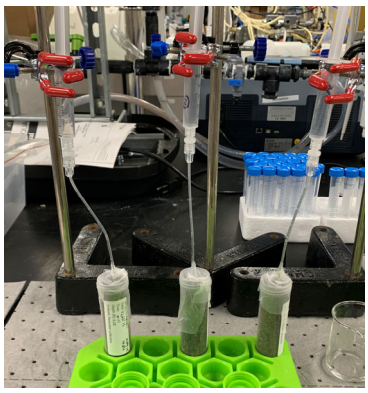
ESTCP Project ER20-5088

PFAS Leaching at AFFF-Impacted Sites: Insight into Soil-to-Groundwater Ratios

Objective: To demonstrate improved insight into per- and polyfluoroalkyl substances (PFAS) leaching through the unsaturated zone to serve as a basis for developing soil cleanup criteria. A field-based dataset relating soil characteristics and porewater leaching to underlying groundwater can validate conceptual site models and develop soil management guidelines.

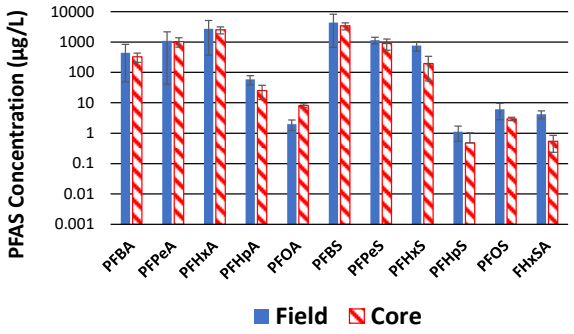
Approach: A multi-phased approach was implemented to attain insight into PFAS leaching from the unsaturated zone. At each site, a high-resolution PFAS soil sampling, static porewater sampling of the collected soil cores using "microlysimeters", and in situ measurements of PFAS concentrations using porous cup suction lysimeters was performed.



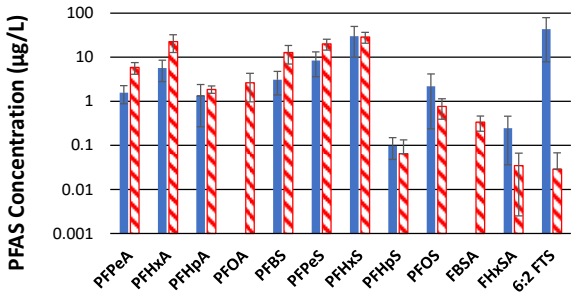
Specific Objectives:

- Evaluate/verify methods for measuring PFAS concentrations in porewater
- Assess how different site conditions impact PFAS leaching
- Evaluate the role of PFAS sorption at the air-water interface on leaching

Demonstration Site A

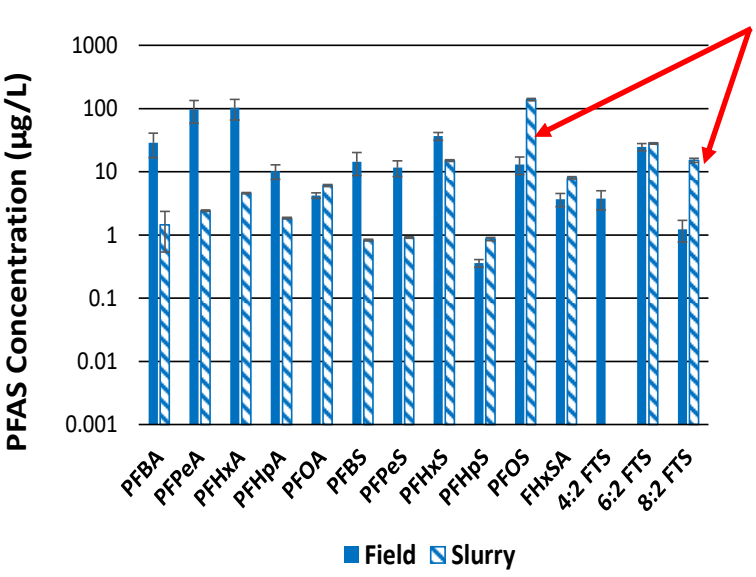


Demonstration Site B



Critical Findings:

- Reasonable (factor of 2) repeatability among lysimeters
- Precursors persist in porewater
- PFAS concentrations in core porewater typically similar to that measured in situ
  - Suggests apparent equilibrium conditions
  - Validates use of porous cup suction lysimeters for the demonstration sites
  - Exceptions during high percolation?
  - Exceptions for complex geologies?
- Notable impacts of PFAS air-water interfacial sorption



PFOS & 8:2 FTS are greater in the batch soil slurry than in porewater

Batch slurry extraction approaches may substantially overestimate PFAS leaching due to collapse of air-water interfacial area

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