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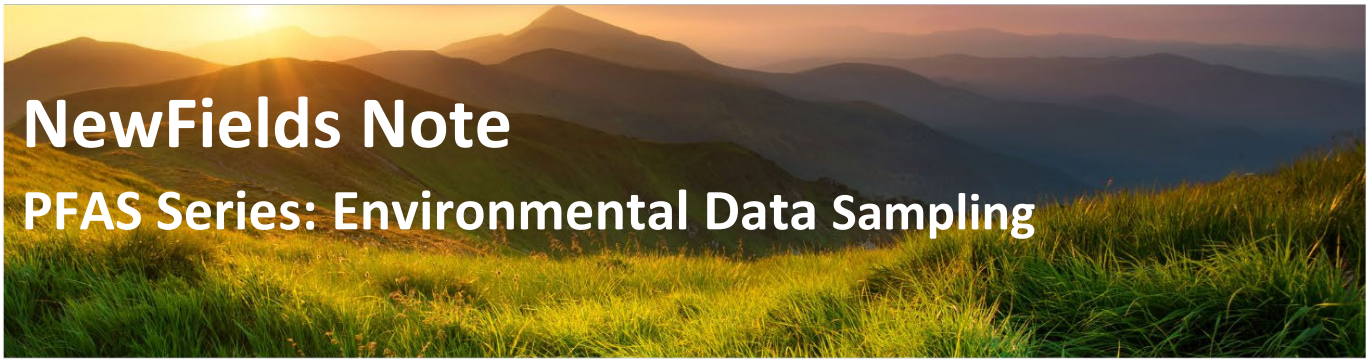

NewFields Note

PFAS Series: Environmental Data Sampling

NewFields Note: Technical information in a condensed, easily digestible format that is intended to promote environmental science education, knowledge transfer, and empowerment … *one note at a time.*

Collecting sufficient **environmental data samples** for an investigation of per- and polyfluoroalkyl substances (PFAS) can be challenging. PFAS do not behave like more commonly studied contaminants at Oil and Gas (O&G) sites, such as hydrocarbons. They have unique physiochemical properties that affects their behavior in the environment. First, many PFAS structures are surfactants, meaning they have a hydrophilic (water seeking) head, and a hydrophobic (water avoiding) tail. Second, many PFAS structures are anions (i.e., they are negatively charged) at environmental pH. Collectively, these properties mean they are very water soluble, and can travel great distances in groundwater.

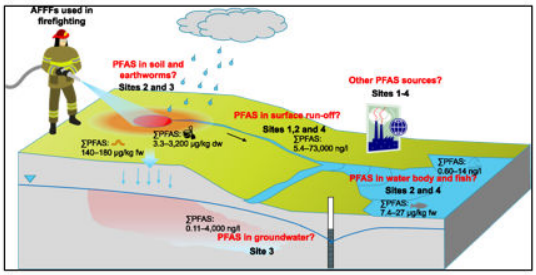

Image credit: Reinikainen et al., 2022, The occurrence, distribution and risks of PFAS at AFFF-impacted sites in Finland, Science of the Total Environment, Volume 829: 10

Deciding where to sample for PFAS at an O&G site should be based upon the Conceptual Site Model, specifically, one that identifies known or suspected source areas, overland, surface water, and groundwater flow paths, and sensitive receptors. At O&G sites, source areas are largely associated with aqueous film-forming foam (AFFF) storage and use. They may include fire training areas, fire response areas, areas where hoses were cleaned out or fire suppression systems were tested, and areas where AFFF was stored. *Broadly speaking, sample collection should include soil and groundwater samples from the source area(s), samples along the groundwater flow path connecting the source area(s) to any identified sensitive receptors, and the sensitive receptors, themselves. It is also beneficial to collect soil and groundwater samples to define regional background which may include up or cross-gradient of source area(s) and/or up or cross-gradient of where contamination may potentially impact the sensitive receptor(s).*

The types of samples can vary between locations. In addition to surface soil and/or soil core samples from the vadose zone in the source area, groundwater samples from the shallowest groundwater depth in the source area are suggested. Outside the source area, it may not be necessary to collect surface soil or soil core samples from the vadose zone *unless* overland flow and infiltration is suspected. Multiple groundwater samples along the flow path should be collected, from the shallowest possible groundwater point, with the goal of illustrating the extent of attenuation of PFAS concentrations. Soil and groundwater samples should also be collected from or proximate to any sensitive receptors. If additional source areas are identified, source area samples and samples along that source area's flow path would be recommended.

For additional information, please contact your NewFields Technical Lead. Or send us an email at Science_Info@newfields.com!

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