Field Methods, Sample Design and Initial Data From Collection of Soil Samples and Drinking Water at Residuals Application Sites in Maine

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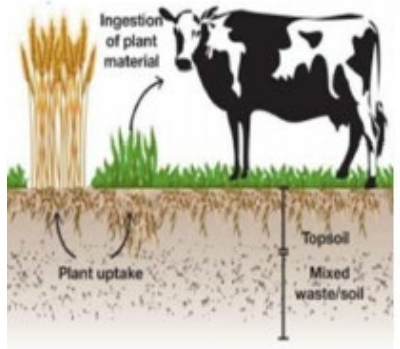
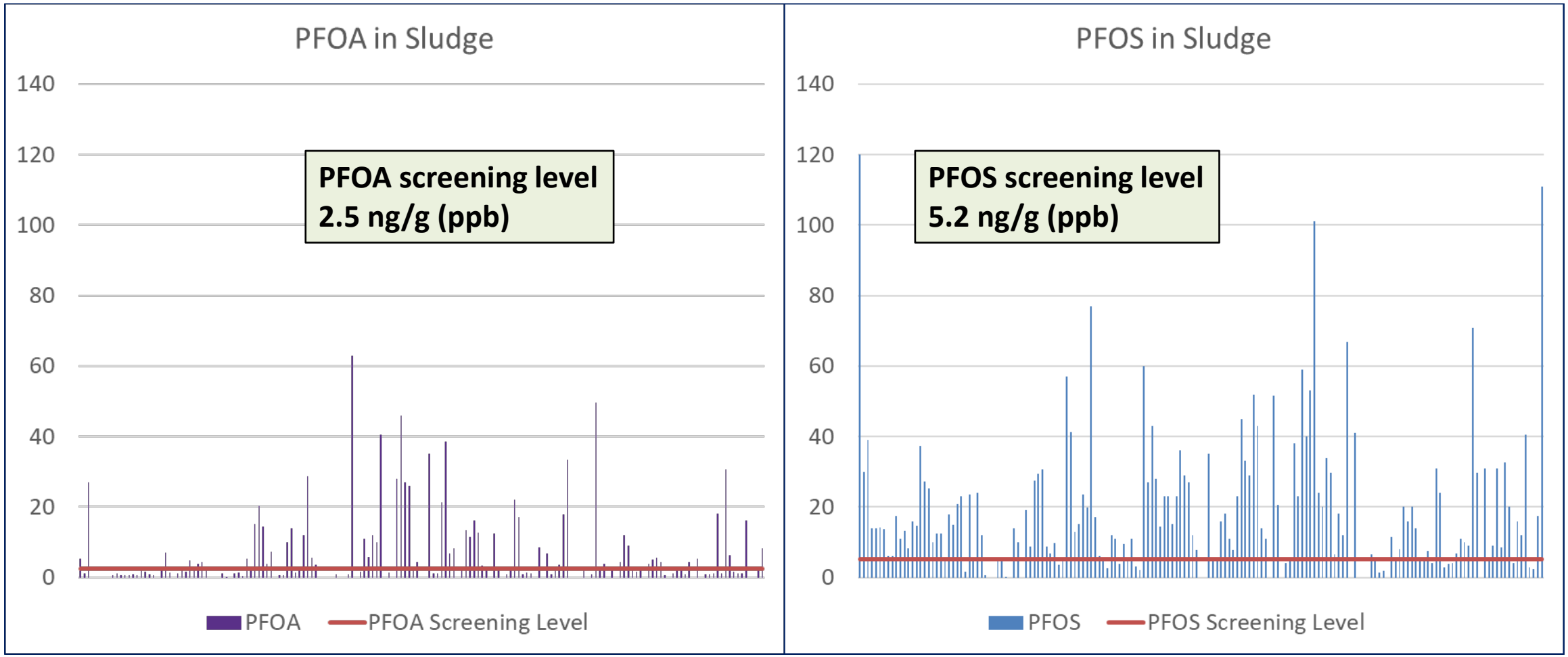
Background to Current Work

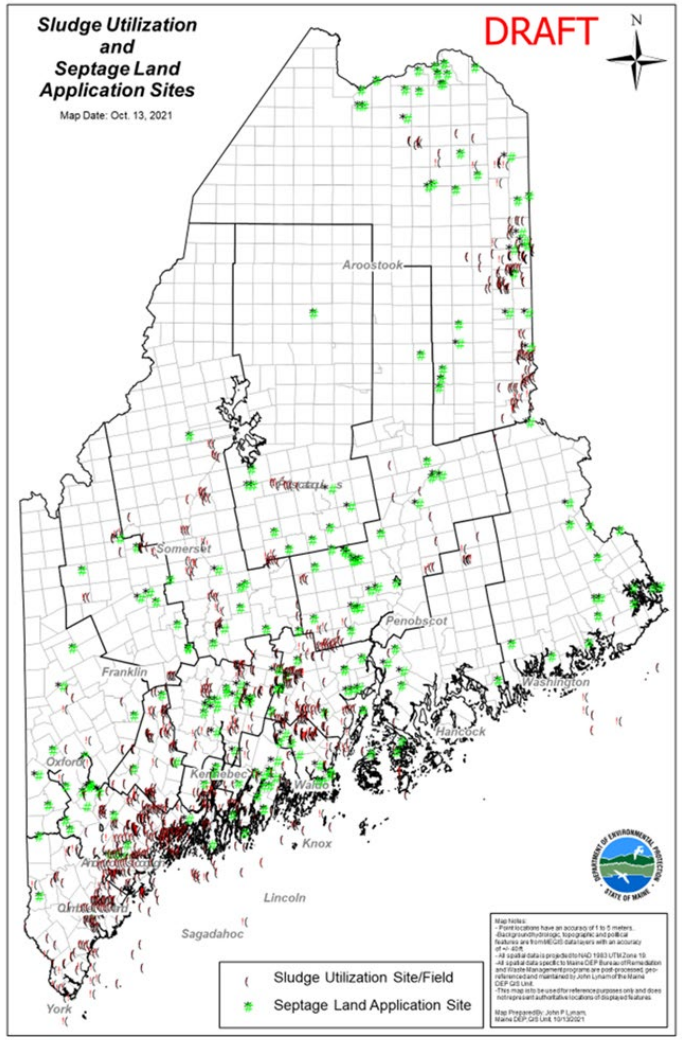
- Arundel (2016), Fairfield (2020)
- Bulk tank milk sampled by distributor
  - Not above threshold, but high enough to ask questions
- Assessed individual farms
  - Based on licenses
- Soil initially sampled, followed by water supplies
- In 2019 required testing of residuals prior to spreading



Sludge Screening Results



Recent Legislation



- Public Law 2021, Chapter 478, An Act To Investigate Perfluoroalkyl and Polyfluoroalkyl Substance Contamination of Land and Groundwater

  Requires DEP to:

  - Conduct PFAS investigation for contamination derived from application of sludge & septage
  - Approximately 700 licensed sites to assess, multiple year program of investigation
  - Soil and residential drinking water

PFAS in Drinking Water?

EPA's Health Advisory
PFOA, PFOS or PFOA+PFOS
= 70 ppt

Maine's Interim Drinking Water Std
= 20 ppt (June 2021)

for the sum of six PFAS:
PFOA
PFOS
PFNA
PFDA
PFHpA
PFxHS

Soil Sampling Approach

- Obtain representative soil values across property
- Each sample approximately 10 acres
- 10-part composite samples
- Consider loading rates, crop rotations, access timing
- Modified Method 537.1 with isotope dilution
- Full reporting list varies between laboratories

Agricultural Field Sampling Methods

- Stainless Soil Probes/Bowls
- Typically recovered 8-inch core, 4-10 inches collected based on soil density
- GPS location of each subsample

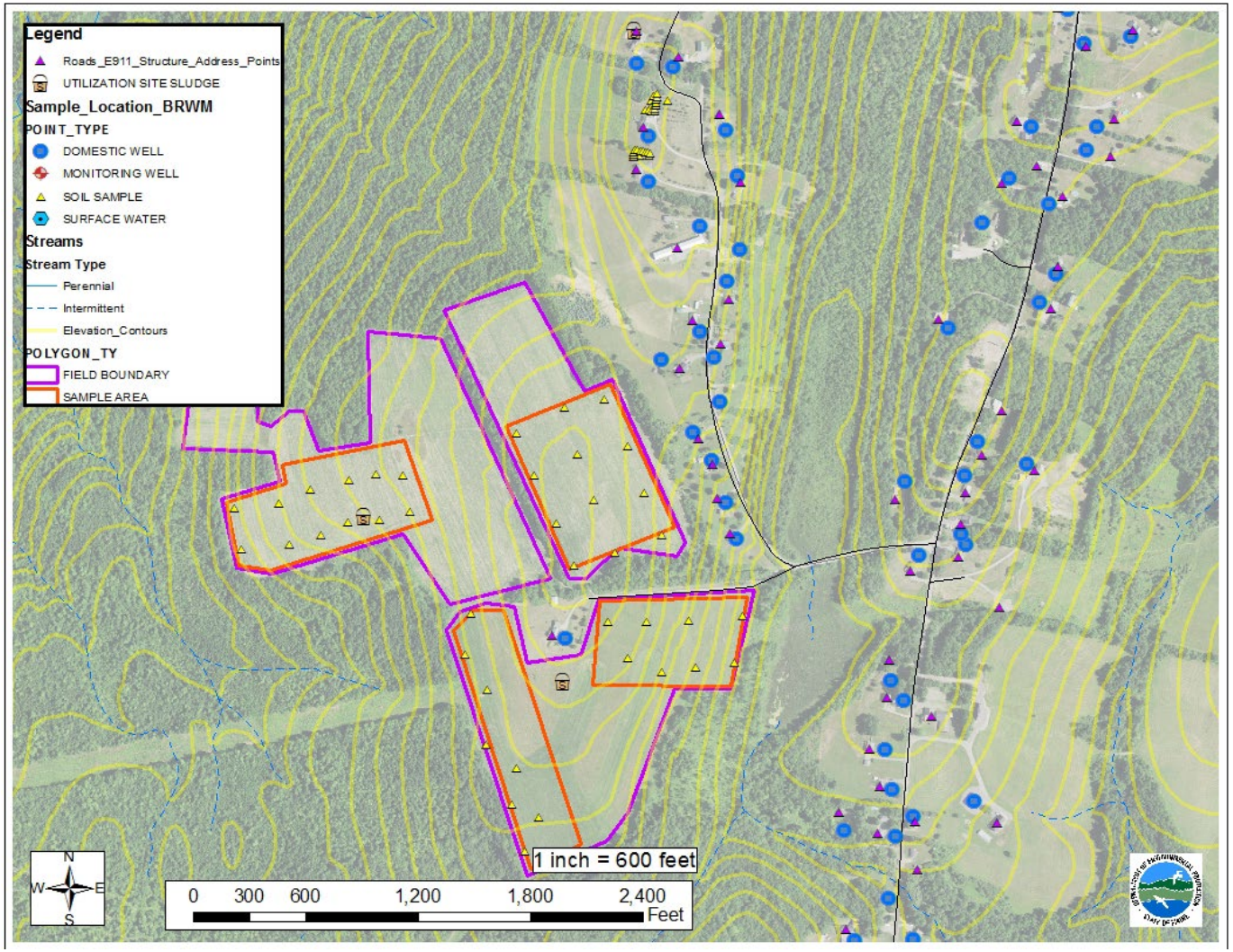
- Consider setbacks, stack areas, and slopes for areas with relatively higher/lower PFAS

Residential Well Sampling

- Focus on homes within 1/10 to ¼ mile for initial screening
- Ideally sample from pressure tank or prior to any existing treatment
- Modified Method 537.1 with isotope dilution

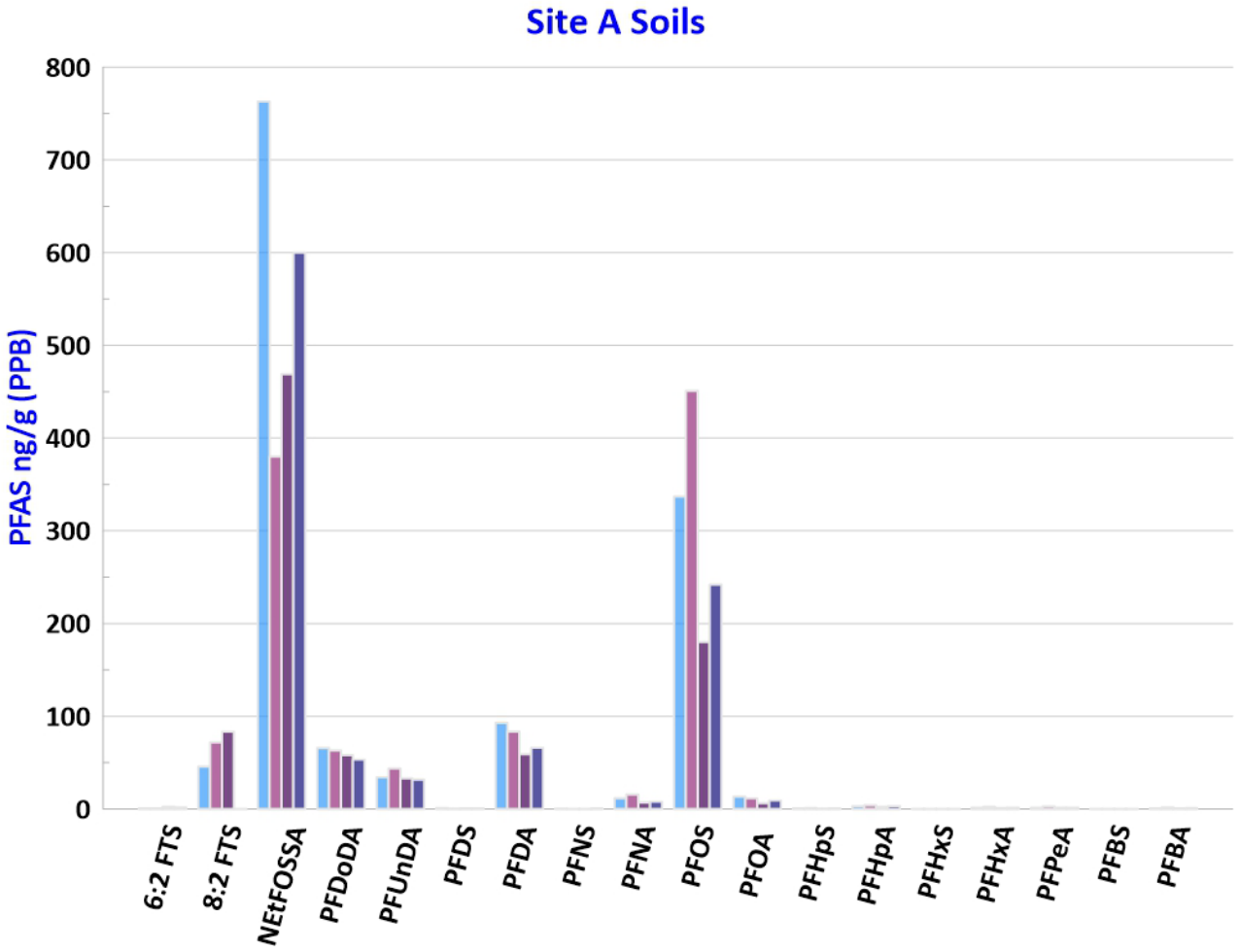
Soil to Groundwater at One Site

- Sites frequently had mix of land applied material
- Work focused on fields with similar history as those directly associated with the farms identified in 2020
- Soil Concentrations in 100s PPB
- Prevalence of precursors and long chain PFAS



Soil to Groundwater at One Site

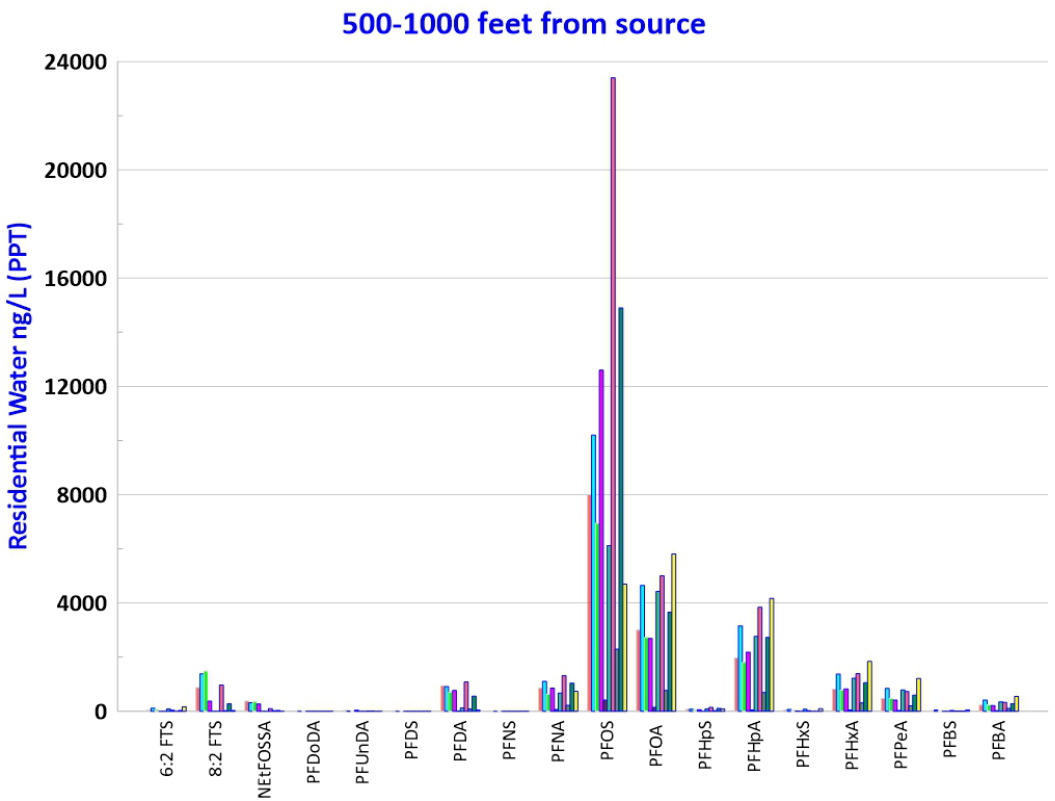
- This site typical of early fields investigated by DEP

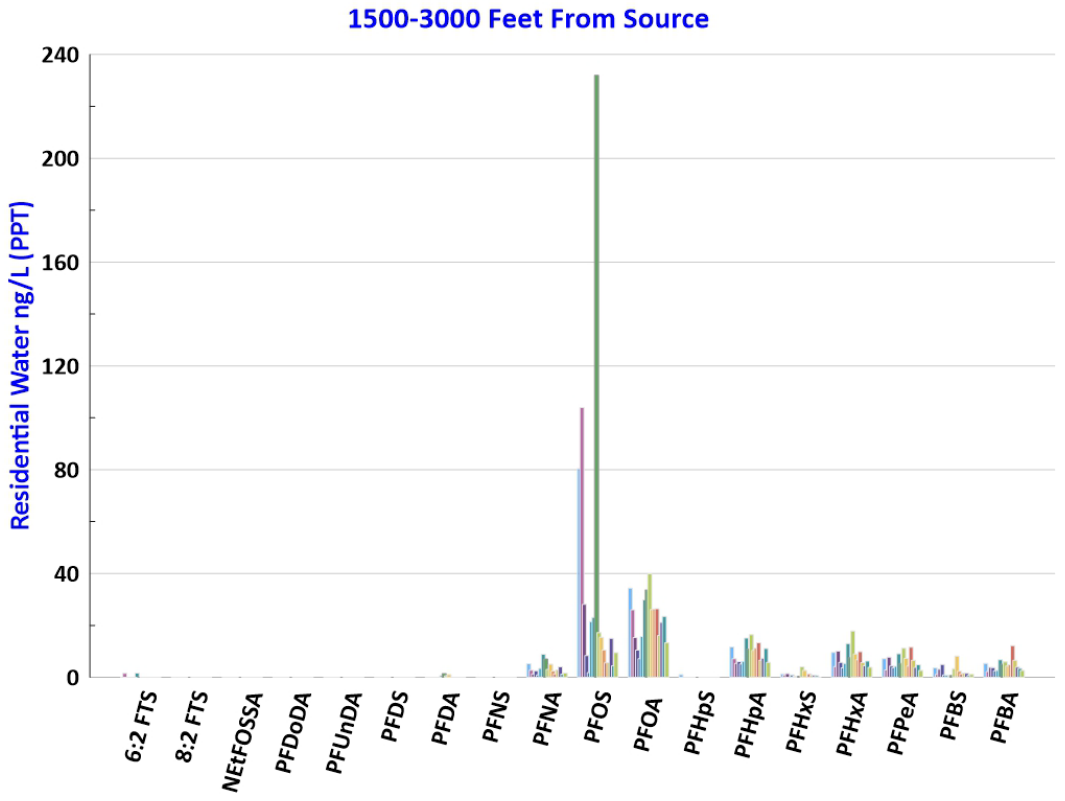


- Precursors ->Long Chain to Short Chain

Soil to Groundwater Relationships

- Site A Residential Water

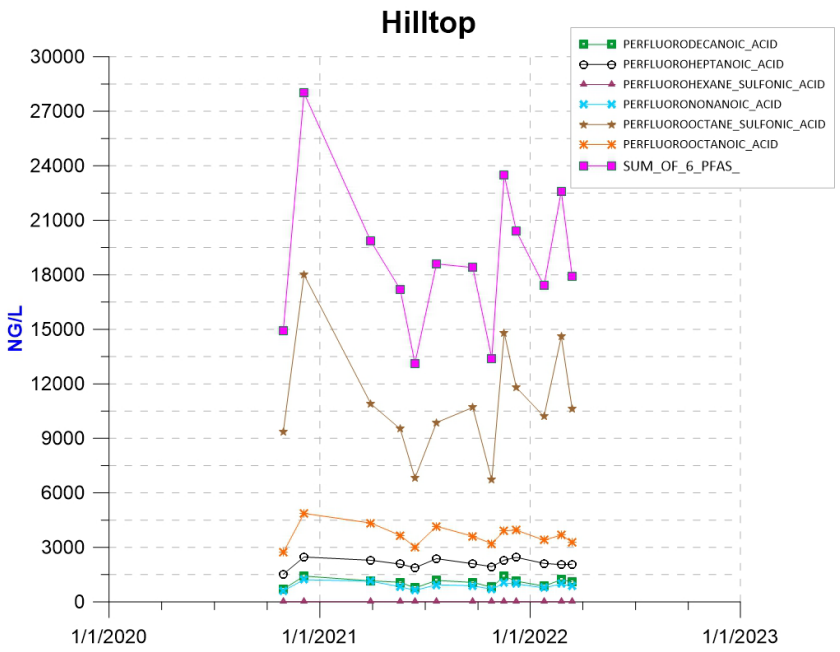


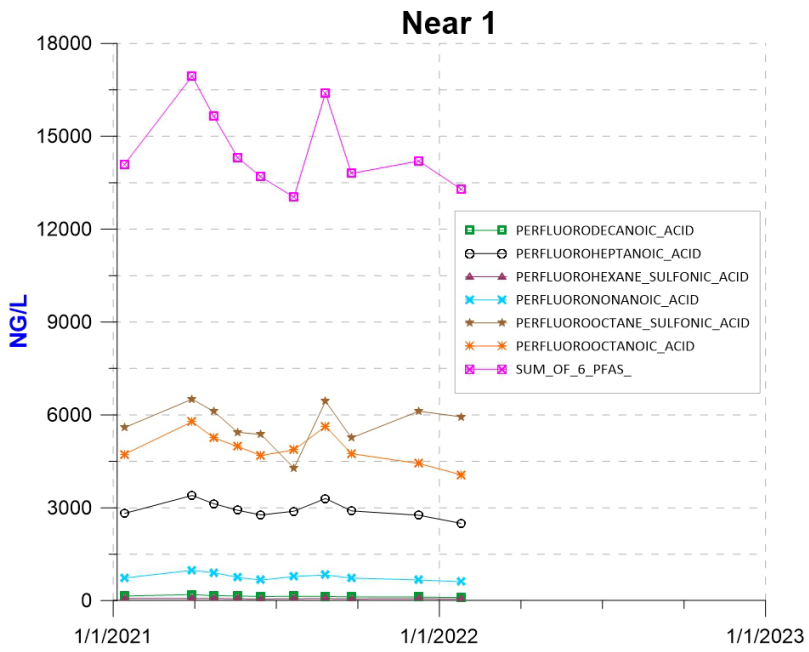


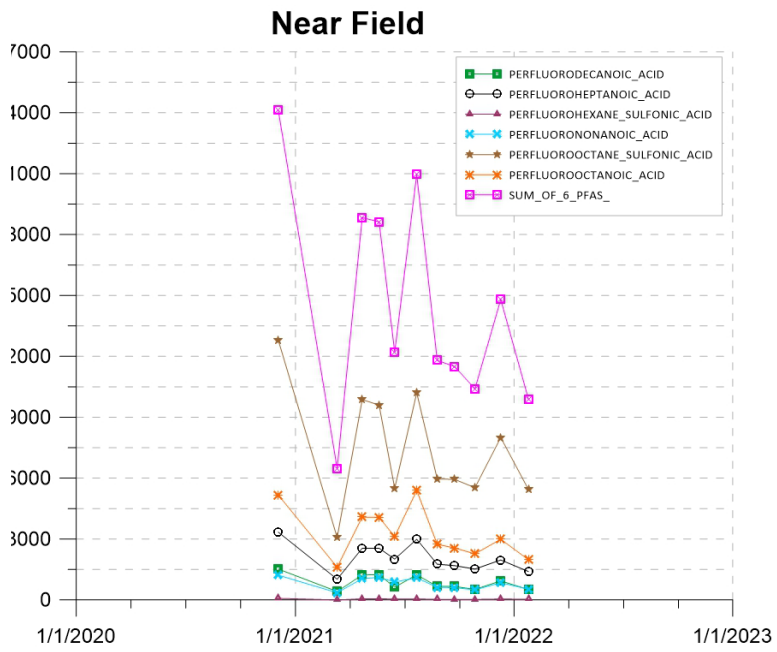
- Precursors ->Long Chain -> Short Chain

Groundwater Trends

- **Trends 500 – 1000 feet from interpreted source fields**

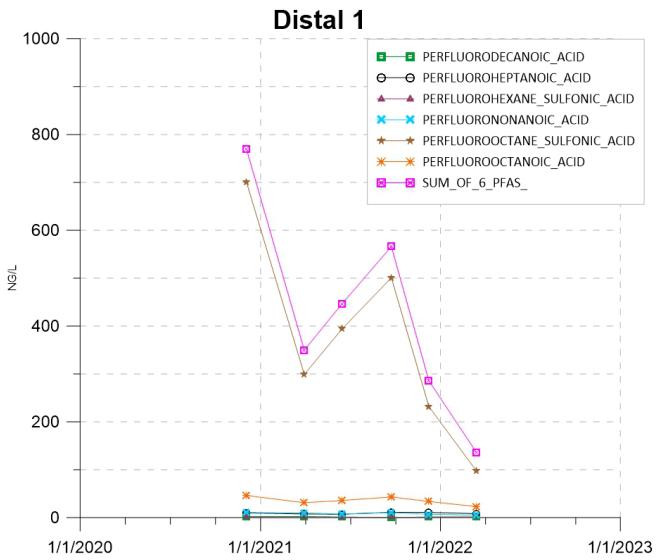


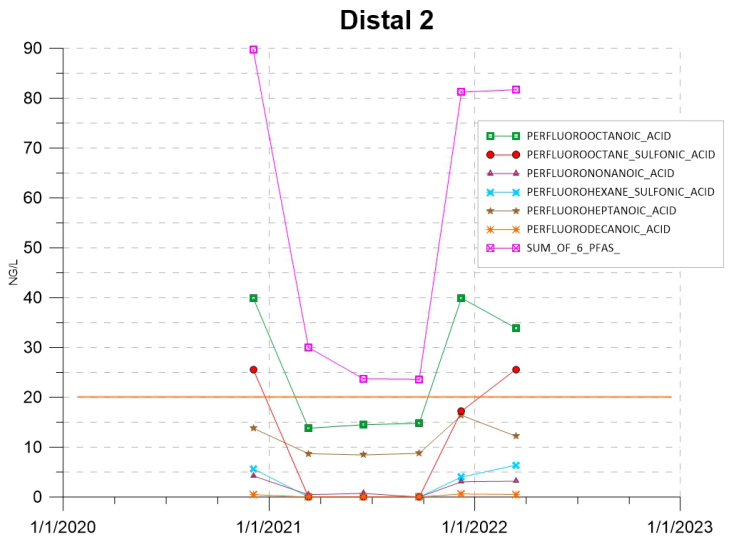


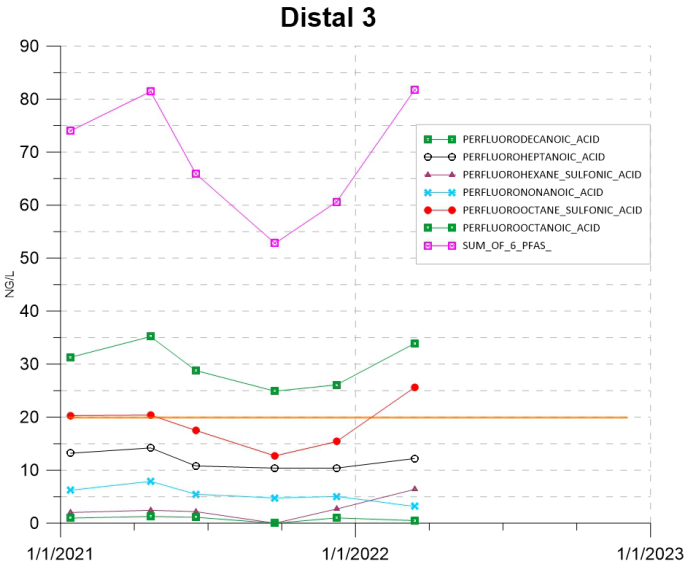


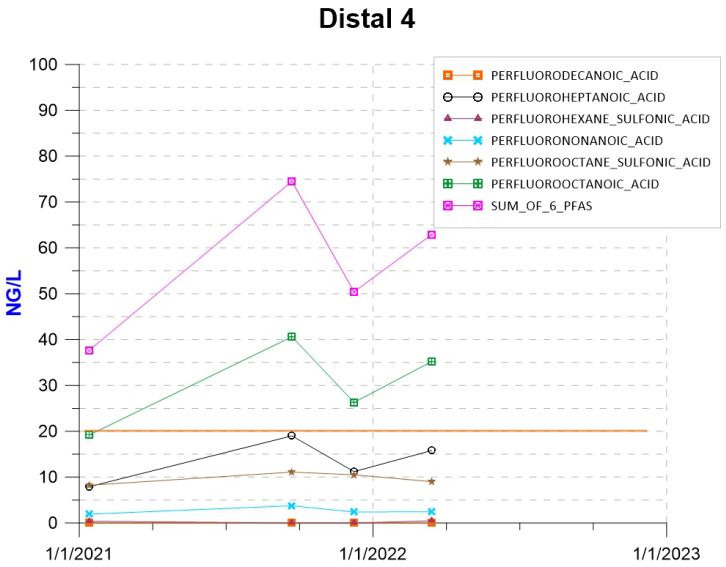
Groundwater Trends

- Trends 1500 –3000 feet from interpreted source fields

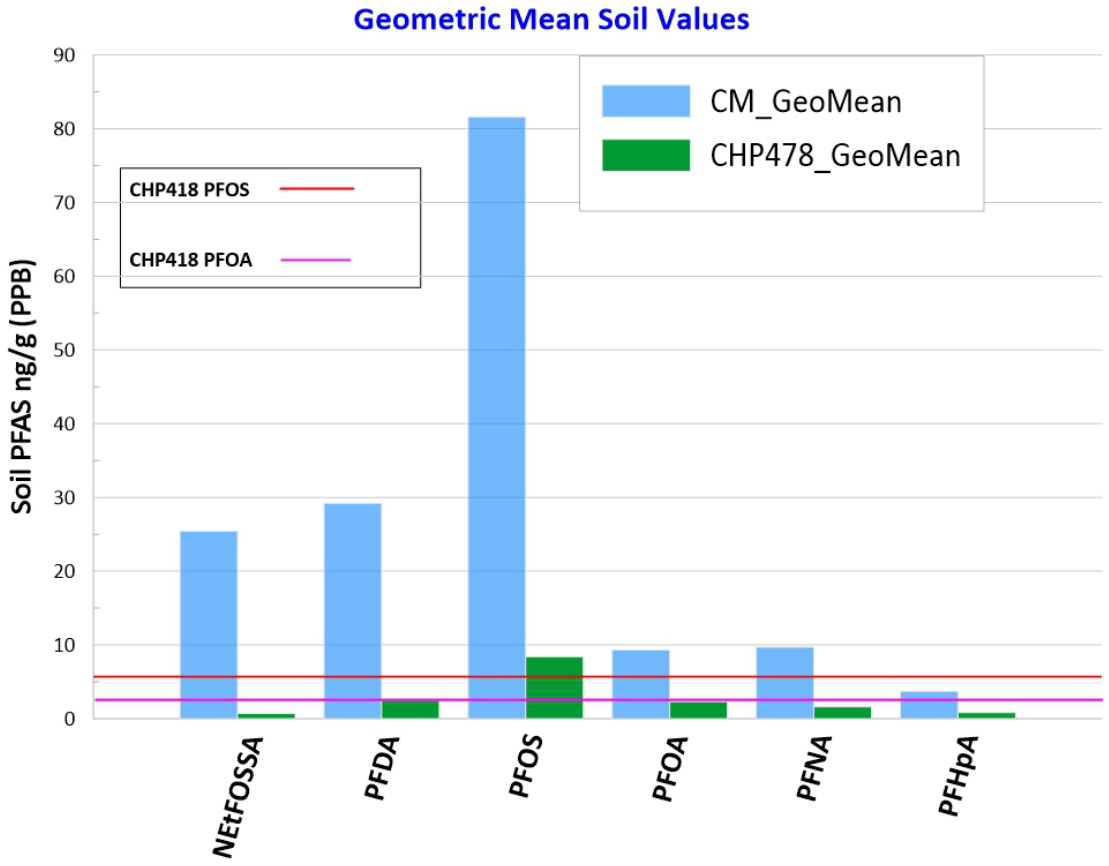


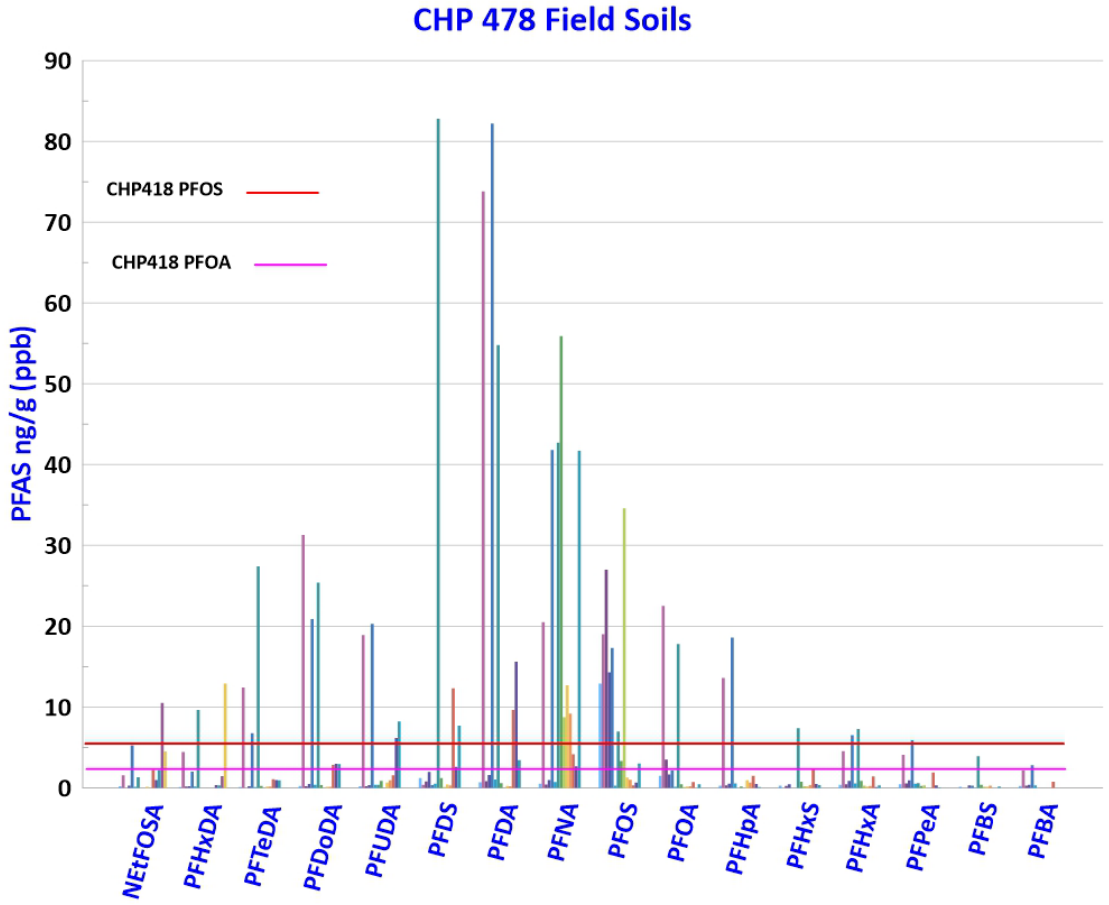






Recent Agricultural Field Data





- Based on data through early March 2022
- Additional soil sampling scheduled to begin late April as fields thaw out

Drinking Water

- Initial data statewide suggest that the Central Maine sites are not representative of statewide water supplies
- Fewer wells > 20 ppt and fewer with PFAS > 1000 for the “sum of 6” 20 ppt
- New data arriving weekly
- Assigning well counts to statewide or CM a challenge

	Wells Sampled	Wells Exceeding 20 ppt Interim Standard	Percent
2020 Central Maine Sites	456	202	44
Initial Statewide Sampling	205	34	16.5

	Wells Sampled	Wells > 1000 ppt	Percent
2020 Central Maine Sites	456	43	9.4
Initial Statewide Sampling	205	7	3.4

“CM” here denotes data from Fairfield/Benton/Oakland/Unity Township
Mostly collected 2019-2021

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