MEDEP Collection of Agricultural Field Soil Samples and Residential Drinking Water at Residuals Application Sites Across Maine

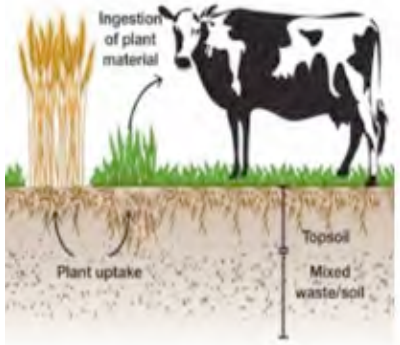
Chris Evans

Senior Environmental Hydrogeologist

Maine DEP, Bureau of Remediation and Waste Management

Background to Current Work

- In 2019 required testing of residuals prior to spreading
- 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



Residuals Testing

- Biosolids Land Application Programs and Composters
  - Notified March 22, 2019
  - Required sampling plan by April 12, 2019
  - Required sampling by May 7, 2019
- Paper Mill Residual Land Application Programs
  - Notified April 16, 2019
  - Required updated sampling plan by May 6, 2019
  - Required sampling by June 3, 2019

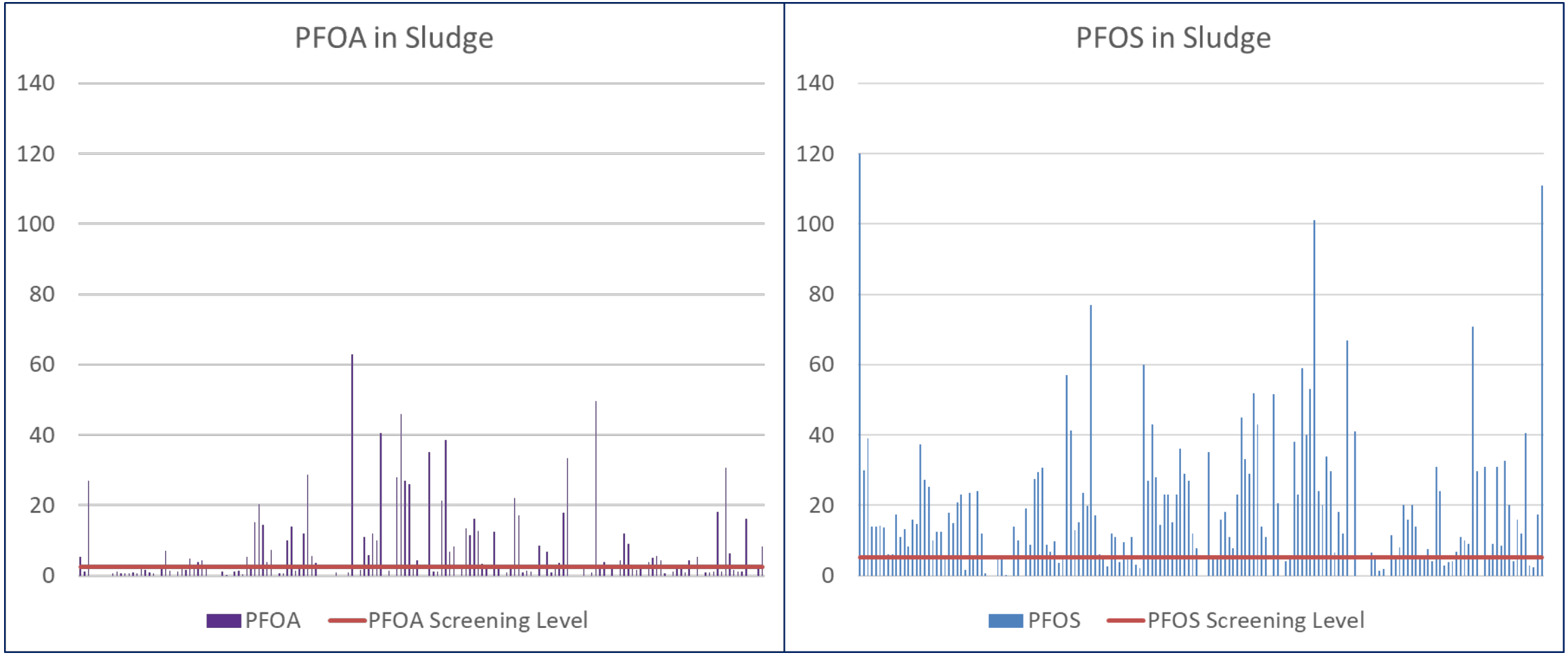
- No land application of biosolids/paper mill residuals or distribution of biosolids compost until approved by DEP

PFAS Screening Levels for Residuals

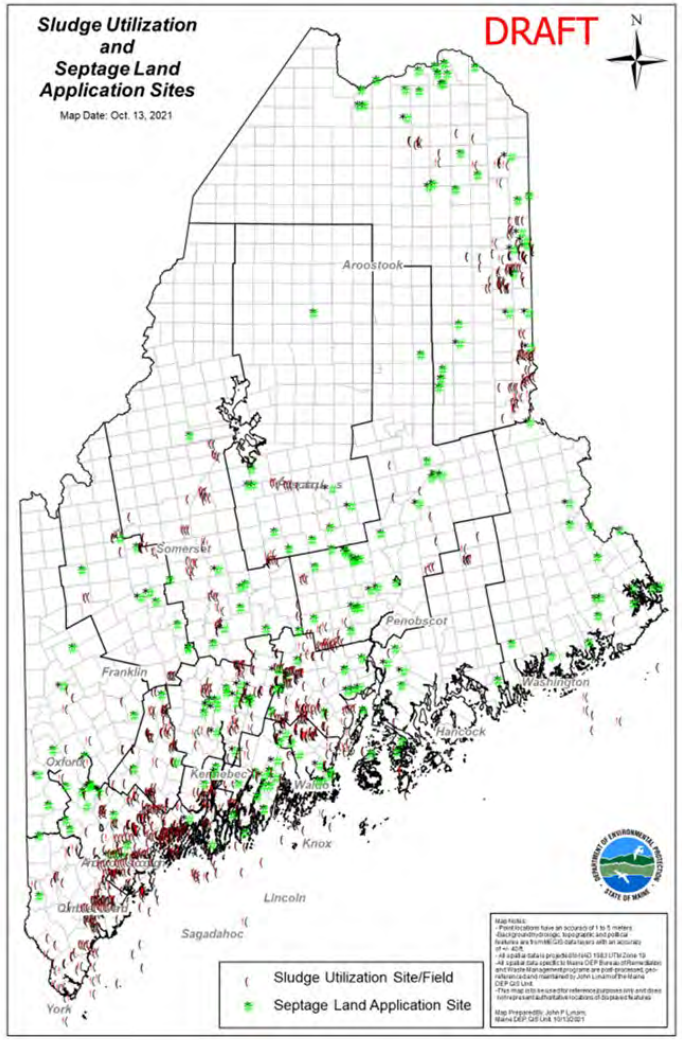
- Chapter 418, Appendix A
- Adopted July 8th, 2018
- Beneficial Use Screening Concentrations

Compound	ng/g
PFBS	1,900
PFOA	2.5
PFOS	5.2

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

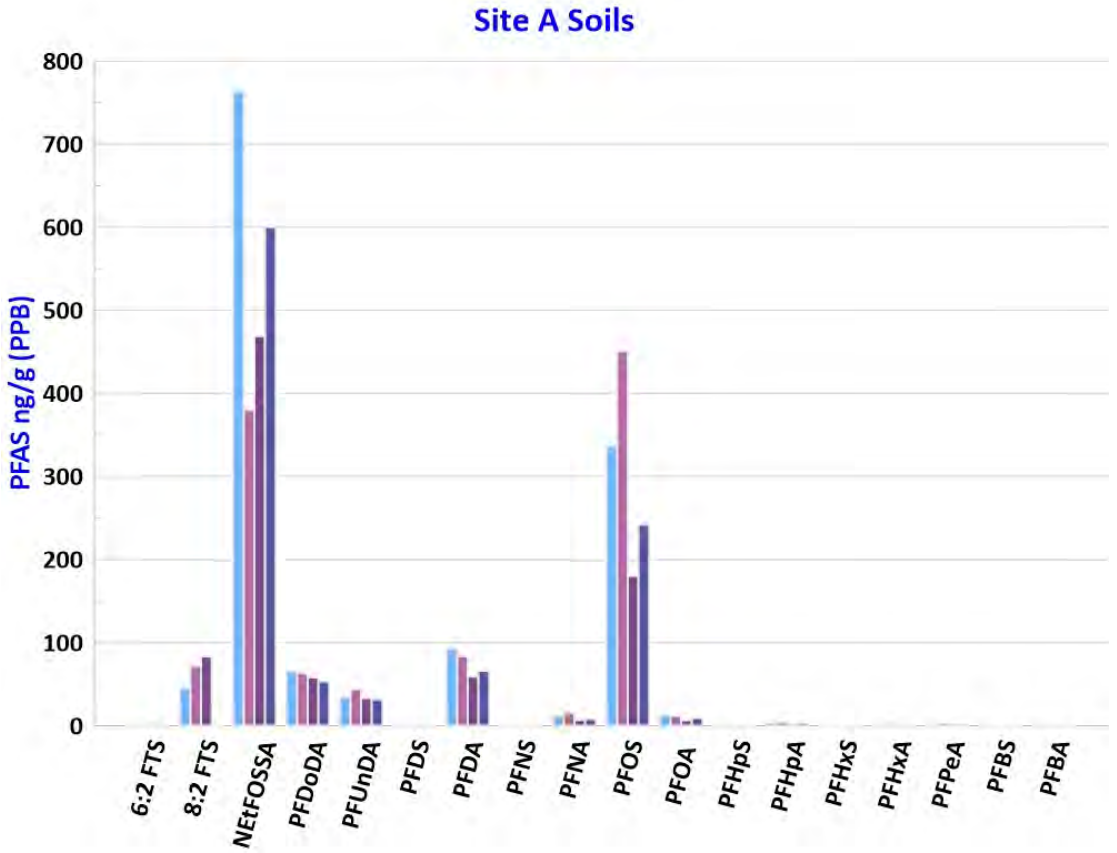
- Composite 10+ sub-samples to single lab sample

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

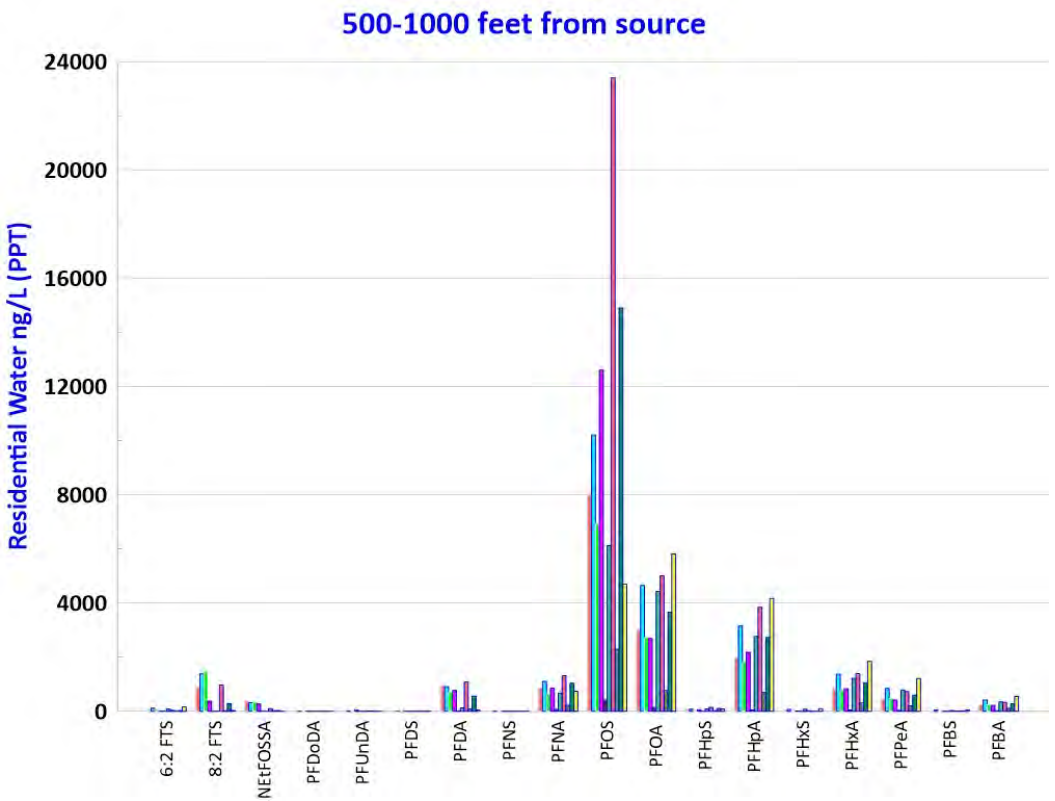
- Sites frequently had mix of land applied material
- Work focused on fields with similar history as those directly associated with the farm identified in 2020
- Soil Concentrations in 100s PPB
- Prevalence of precursors and long chain PFAS

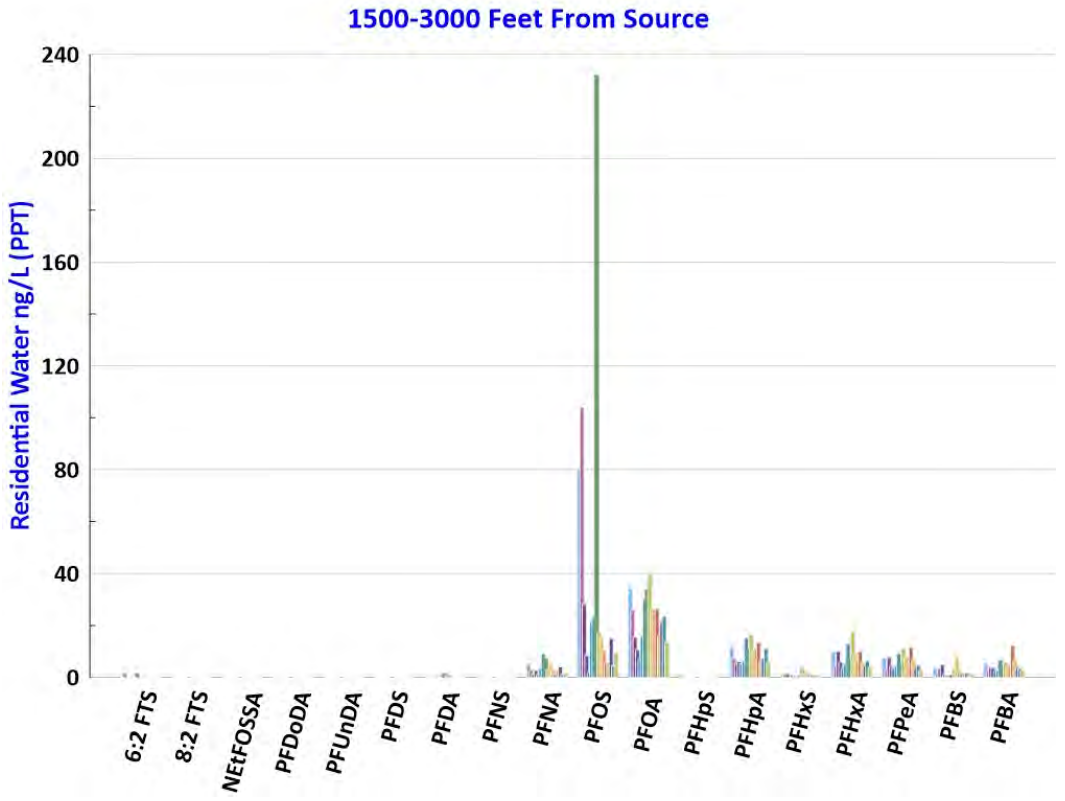


- Precursors ->Long Chain to Short Chain

Soil to Groundwater Relationships

- Site A Residential Water





- Precursors ->Long Chain -> Short Chain

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

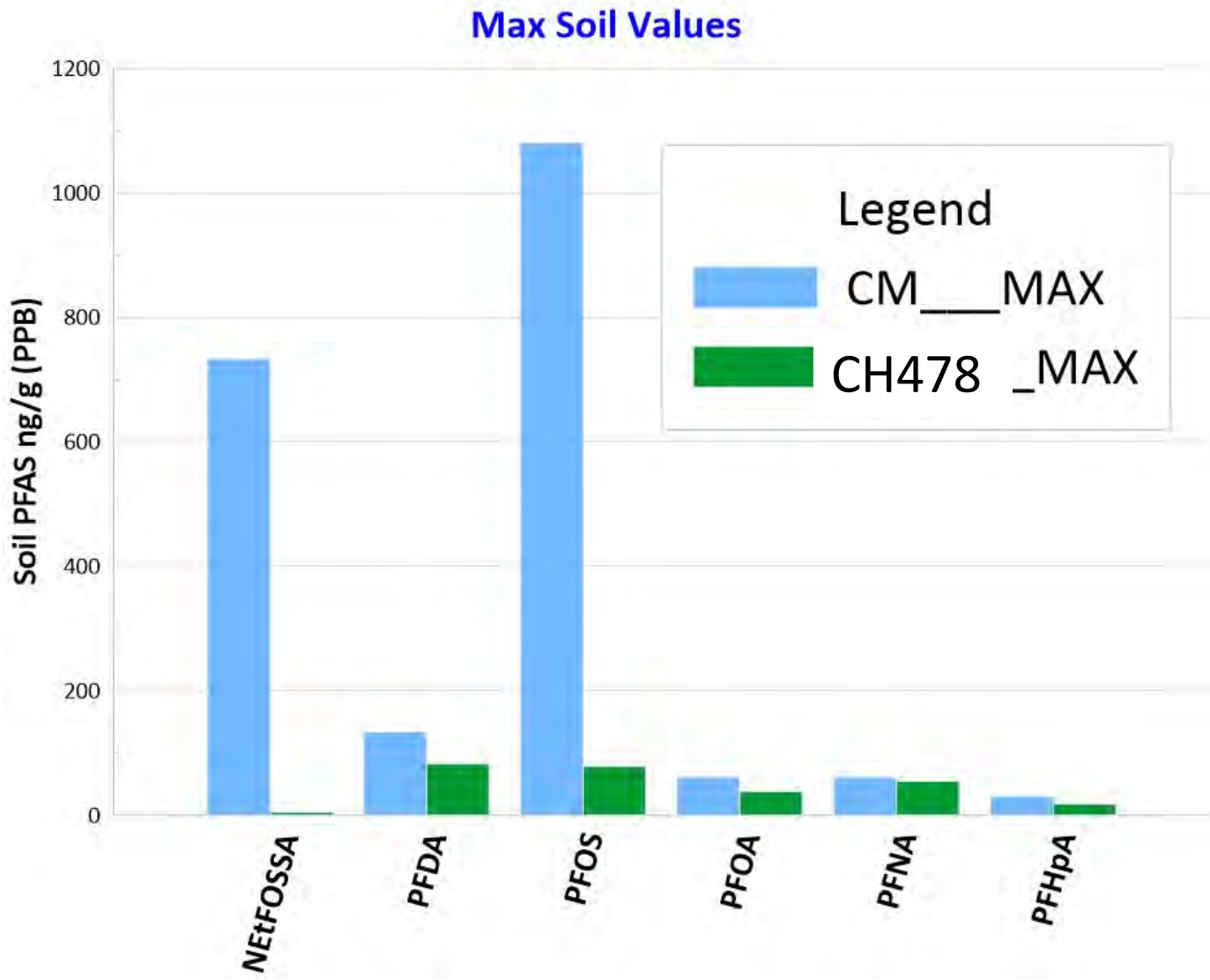
	Wells Sampled	Wells Exceeding 20 ppt Interim Standard	Percent
2020 Central Maine Sites	456	202	44
Initail Statewide Sampling	205	34	16.5

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

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

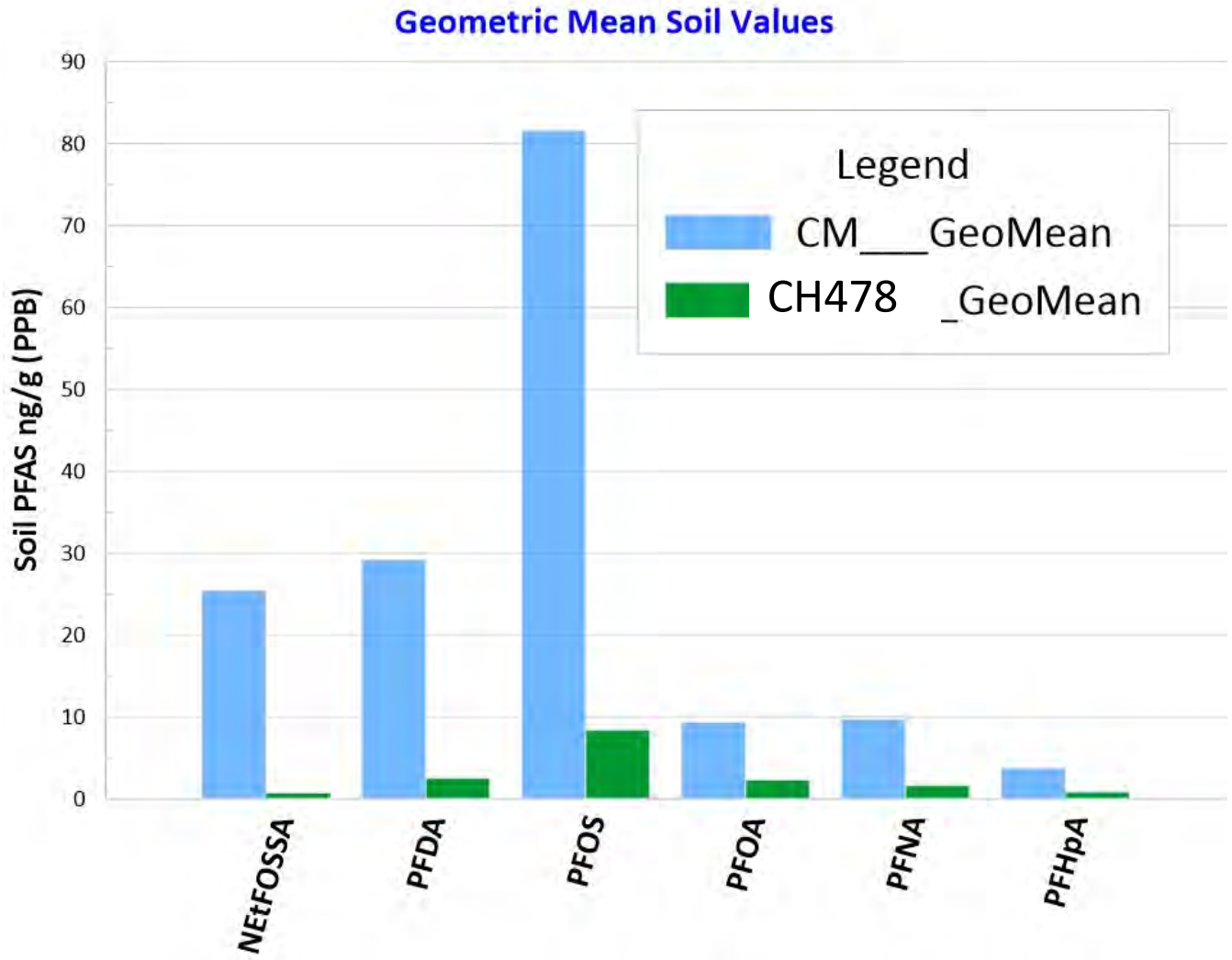
Agricultural Field Data

- Initial data statewide suggest that the central Maine sites are not representative of all land-applied fields
- Based on 21 statewide results and 60-63 from central Maine sites

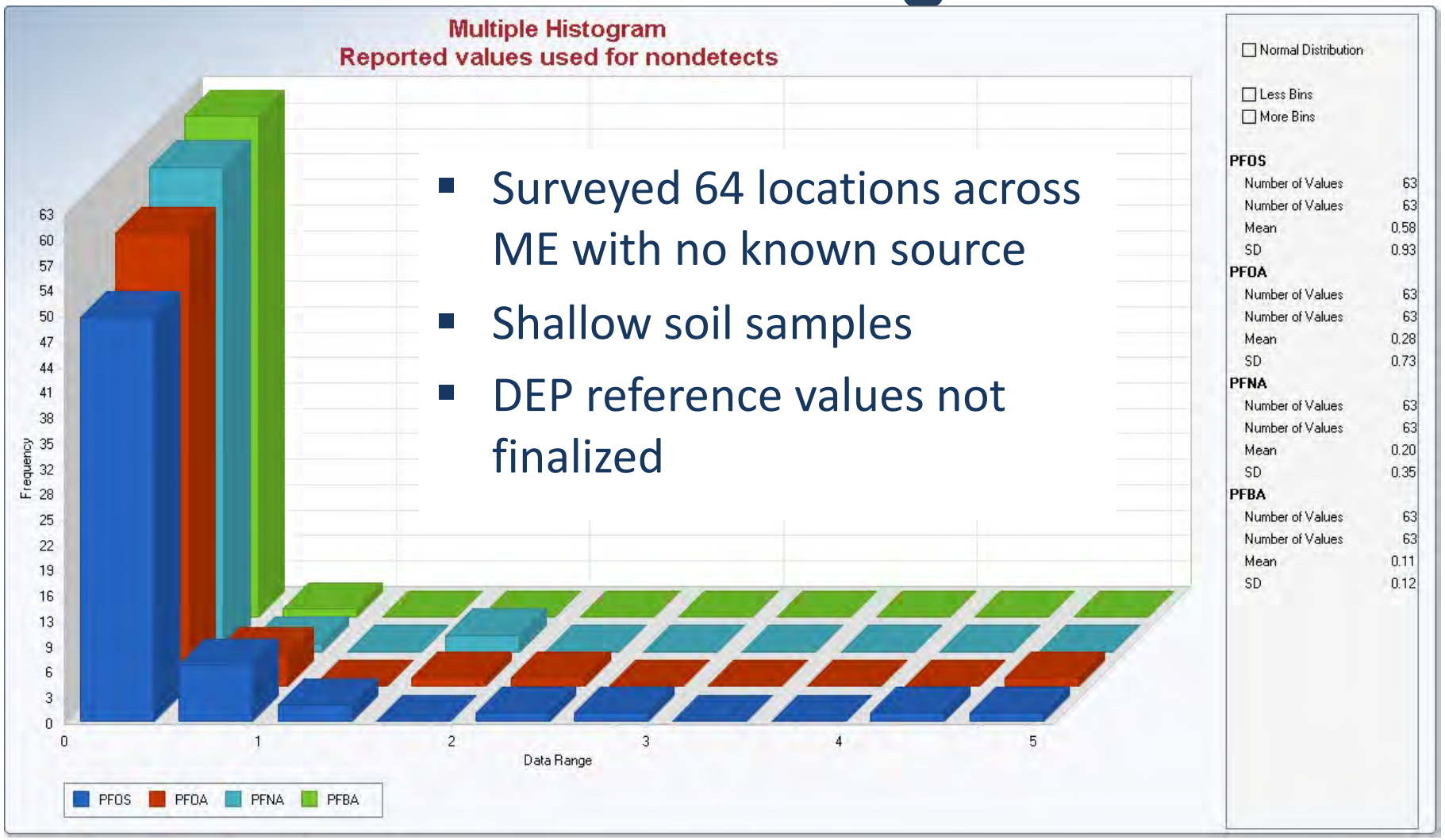


Agricultural Field Data

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



Soil Background



- Surveyed 64 locations across ME with no known source
- Shallow soil samples
- DEP reference values not finalized

PFAS ID	MEAN (ppb)
PFOS	0.58
PFOA	0.28
PFNA	0.20
PFBA	0.11

Contact:

Chris Evans

Gordon.c.evans@maine.gov

(207)-441-5181

www.maine.gov/dep