

Kennebec Valley Council of Governments Planning Day



Updates on the PFAS Investigation in Maine

March 2, 2023

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Bureau of Remediation & Waste Management

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Protecting Maine's Air, Land and Water

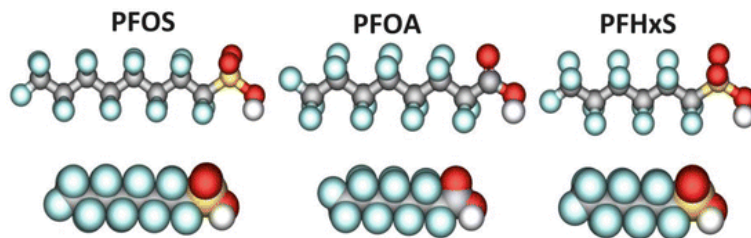
Agenda

- **What is PFAS**
- **Where did it come from**
- **Where are we finding it**
- **Soil and groundwater investigation and current status**
- **Other DEP PFAS efforts**
- **Resources available**

What are PFAS?

PFAS = per- and polyfluoroalkyl substances

- 32 MRS §1732, 38 MRS §1614 → Any member of the class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom
- Used in consumer products – grease and water repellent, heat resistant due to a strong C-F bond = very difficult to break



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**Industrial
Uses**

**Chemical
Industry**

**Medical
Utensils**

**Plastics &
Rubber**

**Metal
Industry**

**Sealants
and
Adhesives**



**Building and
Construction**

**Energy
Sectors**

**Electronic
Industry**

**Textile
Industry**

Automotive

Mining

**Semiconductor
Industry**

Sources: <https://riversideca.gov/press/understanding-pfas> and <https://pubs.rsc.org/en/content/articlehtml/2020/em/d0em00291g>

Why be Concerned about PFAS?

Called “*Forever Chemicals*” because they take a long time to break down in the environment

According to the US CDC, health impacts MAY include:

Increased cholesterol levels

Changes in liver enzymes

Decreased vaccine response in children

Increased risk of high blood pressure or pre-eclampsia in pregnant women

Small decreases in infant birth weights

Increased risk of kidney or testicular cancer



Where are we Finding PFAS in Maine?

In ground and surface waters, soils, plants, and wildlife

Originates from:

- Contaminated/remediation sites
- Federal facilities
- Active/closed landfills
- Active business operations
- Agricultural operations
- Biosolids land application sites



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Residuals in Maine

- The Maine Residuals Program includes land application of sludge and septage
- Administered through Residuals Management Unit, which falls under the Materials Management Division, Bureau of Remediation and Waste Management
- Lots of legislative activity in Maine
 - Interim Drinking Water Standard of 20 ppt for sum of 6 PFAS (PFOA, PFOS, PFNA, PFHxS, PFHpA, PFDA)
 - Soil and Groundwater Investigation
 - Ban of Land Application of Sludge
 - Products Reporting
 - And much more not part of this presentation!



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Soil and Groundwater Investigation

Public Law 2021, Chapter 478: *An Act To Investigate PFAS Substance Contamination of Land and Groundwater*

- Effective October 18, 2021
- DEP must establish and implement a soil and groundwater evaluation to identify contamination derived from **licensed** land applications of **sludge and septage**
- Half of all sites must be completed by 2024; all by 2025



Standards and Screening Levels

- Maine's interim drinking water standard
20 ppt for sum of 6 PFAS
(PFOA, PFOS, PFNA, PFHxS, PFHpA, PFDA)
- EPA Health Advisories

PFAS Compound	New Health Advisories
PFOA	0.004 ppt (Interim)
PFOS	0.02 ppt (Interim)
GenX	10 ppt (Final)
PFBA	2,000 ppt (Final)

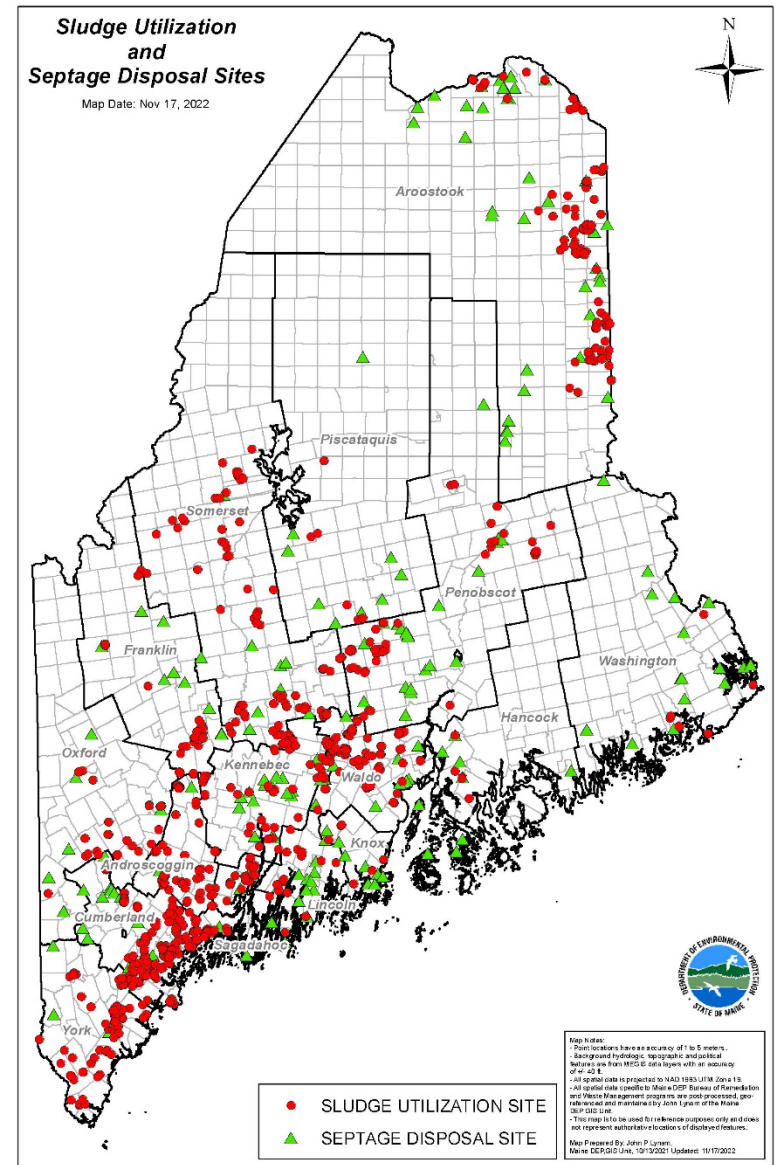
For PFOA and PFOS the interim advisory falls below current laboratory reporting levels. Current laboratory methods can't reliably determine if PFOA or PFOS are present at these interim levels



PFAS

Soil and Groundwater Investigation

- Sites often include multiple fields/locations crossing municipal boundaries, lots of acreage
- Some sites were used by multiple generators – and sludge from multiple sources may have been applied to one location
- Land ownership and lot size changes



Prioritizing Sampling Locations

- Sludge sites are grouped into four Tiers:
 - Volume of sludge land applied
 - Anticipated presence of PFAS in sludge
 - Proximity of known receptors
- Tier I sites just about complete; working on Tier II
- Septage sites are managed separately
 - Septage site investigations began summer 2022
 - Expect to be completed by 2024



Residuals Investigation - Report

Home → Spills & Site Cleanup → PFOA and PFOS

Contacts
Emergency Spill Response
Resources and Publications
Programs
Monitoring and Reporting
Laws
Rules

Per- and Polyfluoroalkyl Substances (PFAS)

Click on the topics below to expand each section.

- [What is PFAS? +](#)
- [Where is PFAS in Maine? +](#)
- [What is Maine doing about PFAS? +](#)
- [PFAS in Products +](#)
- [What is EPA doing about PFAS? +](#)
- [How can PFAS be removed from the environment? +](#)
- [Data and Guidance +](#)



Hide: Updates and Timeline -

Fairfield-Area PFAS Investigation

- For information about current [deer consumption advisories](#), contact [Maine DIFW](#)

January 13, 2023 - [Status of Maine's PFAS Soil and Groundwater Investigation at Sludge and Septage Land Application Sites MAINE \[PDF\]](#)

January 13, 2023 - [Report on Land Application of Septage Pursuant to P.L. 2021 Chapter 641 \[PDF\]](#)

January 5, 2023 - [Report on the Designation of Uncontrolled Hazardous Substance Sites \[PDF\]](#)



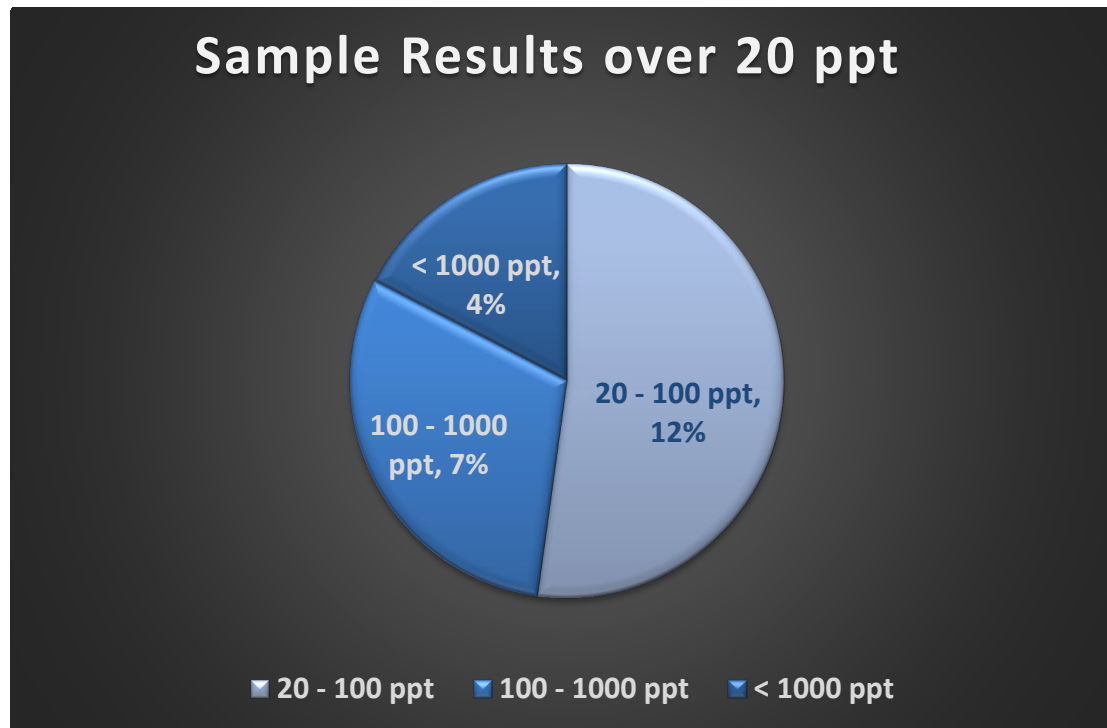
Residuals Investigation - Progress

- 1,037 licensed “sites” for investigation
 - Increase - 700 originally estimated
 - Includes sludge and septage
 - Changes to land ownership sites over years and decades
- 15% Groundwater sampling completed
- 14% Soil sampling completed
- ~ 308 residential water treatment systems installed



Residuals Investigation – Groundwater

- 77% Groundwater wells sampled lower than Maine's interim standard
- Remaining 23% as follows:



Residuals Investigation - Soil

- ~ 400 **soil samples** collected so far
- No enforceable PFAS soil standard or one number to explain what PFAS in soil levels mean
- Screening levels typically based on use and function of soil
- Screening levels for residential use, recreational use, redevelopment
- DEP does not have screening levels for agricultural use



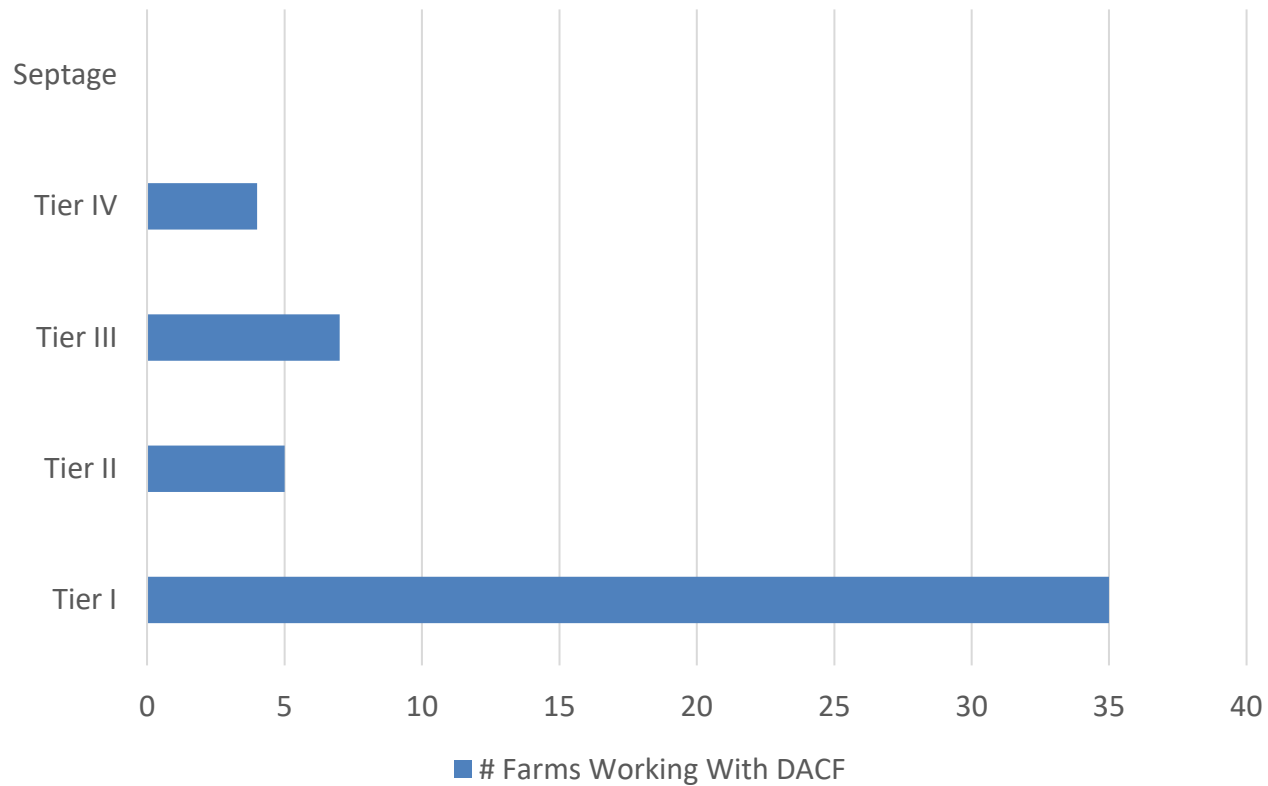
Residuals Investigation - Trends

- Soil concentrations at investigation sites generally higher than Maine's background levels
- PFOA and PFOS only 2 PFAS found in > 75% of soil samples collected
- PFAS contamination of water supplies generally observed in close proximity (w/in 1/10th of a mile) to licensed land application fields
- No obvious seasonal trends observed in water wells monitored > 1 year
- Much more to learn!



Residuals Investigation - Farms

- 56 Farms working with Dept. of Agriculture
- 50 associated with Sludge/Septage Sites



Residuals Investigation - Farms

- 7,600 farms in Maine
- Vast majority likely not impacted
- Every farm is different
- Making progress dropping PFOS in milk and beef cattle
- Not all PFAS are the same
 - PFOA doesn't readily accumulate in beef
 - Little uptake in asparagus, garlic, potatoes, grains, corn, etc.



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Sludge Land Application Ban

- Public Law 2021, Chapter 641
- Effective August 8, 2022
- Prohibits the land application of sludge and sludge derived products as well as the sale and distribution of sludge derived products (e.g., composts and fertilizers) in Maine
- Doesn't include septage – Report on septage completed Jan 15, 2023



Image Credit: [flickr](#)

Sludge Land Application Ban

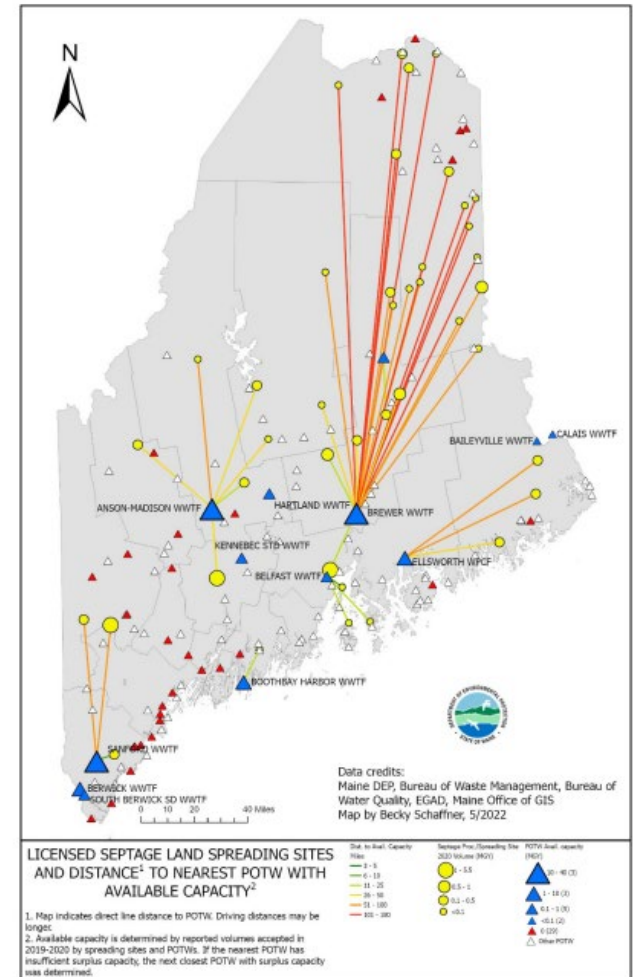
- Impacts
 - Disposal options limited and costly
 - Landfill capacity an issue
 - Sludge residuals do have nutrient value which is beneficial for agriculture, so cost of replacing that can be high for farmers
 - Confusion from public as to what exactly is banned



Image credit: [flickr](#)

Septage and Land Application

- ~ 10.5M gallons or 16% of all septage waste generated in Maine is estimated to be land applied
- Why is septage treated differently than sludge?
 - Land application only available method for managing septage in certain remote parts of Maine
 - Different level of impact based on initial data



Removing PFAS from the Environment

Treatment, Destruction, Disposal Technologies

Destruction

- Gasification and Pyrolysis *
- Incineration *
- Super critical water oxidation (SCWO) *
- Electrochemical Oxidation *
- Mechanochemical degradation *
- Hydrothermal Processing *
- Continuous Flow Liquid-Phase Plasma Discharge *

Treatment & Concentration

- Granular Activated Carbon, (GAC)
- Ion Exchange (IX)
- Reverse Osmosis
- Foam fractionation
- Phytoremediation *

Disposal & Beneficial Use

- Landfilling
- Land application
- Composting*

*Starred items are still in research stage and not ready for full scale operation



Managing PFAS Waste in Maine

Collection, Concentration, Destruction

DEP staff are actively meeting with companies and academia to learn and evaluate several types of technologies to see how they may best and appropriately fit into what is needed in Maine and at reasonable cost.

- Evaluating options for Milk, Sludge, Septage, Manure, Leachate
- Working on facilitating relationships relating to infrastructure and multiple sectors for solutions
- Trying to match methods for collection and concentration with destruction



Addressing Laboratory Capacity

Public Law 2021, Chapter 635 Part AA Sections AA-1 and AA-2: (State Supplemental Budget ending FYs 6/30/2022 and FY 6/30/2023)

- Effective April 20, 2022
- Sets aside \$3.2M from the General Fund “for the purpose of assisting Maine Laboratories with equipment purchases that will increase capacity for sample testing and analysis of PFAS”
- DEP has selected 2 grantees; some \$ remaining – may issue additional RFA



Other DEP PFAS Efforts

- Landfills that collect and manage leachate are required to test
- Closed landfill testing – monitoring wells and/or nearby water supplies
- Bureau of Water Quality
 - Effluent sampling at municipal and industrial wastewater treatment plants
 - Sampling of surface water, freshwater and marine fish tissue, and mussel, clam, and lobster
- PFAS in products – notification required and bans



What's the Bottom Line Here?

- Uncertainty – PFAS are “emerging contaminants”
 - Regulatory framework from Federal/State governments in flux
 - Still a lot to be understood about health impacts and exposure
 - Need to understand better how PFAS moves through the environment, and how to remove, treat, and destroy it
- What we know
 - Tools are available to help the public find information
 - Owners, buyers and businesses need to assess potential risks based on planned uses and functions of property
 - Lots of research and funding being put toward PFAS, solutions are coming



DEP Tools and Resources

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Environmental Protection

Search DEP

About ▾ Air Quality ▾ Land Resources ▾ **Spills & Site Cleanup ▾** Sustainability ▾ Waste Management ▾ Water Quality ▾

Home → Spills & Site Cleanup → PFOA and PFOS

- Contacts
- Emergency Spill Response
- Resources and Publications
- Programs
- Monitoring and Reporting
- Laws
- Rules

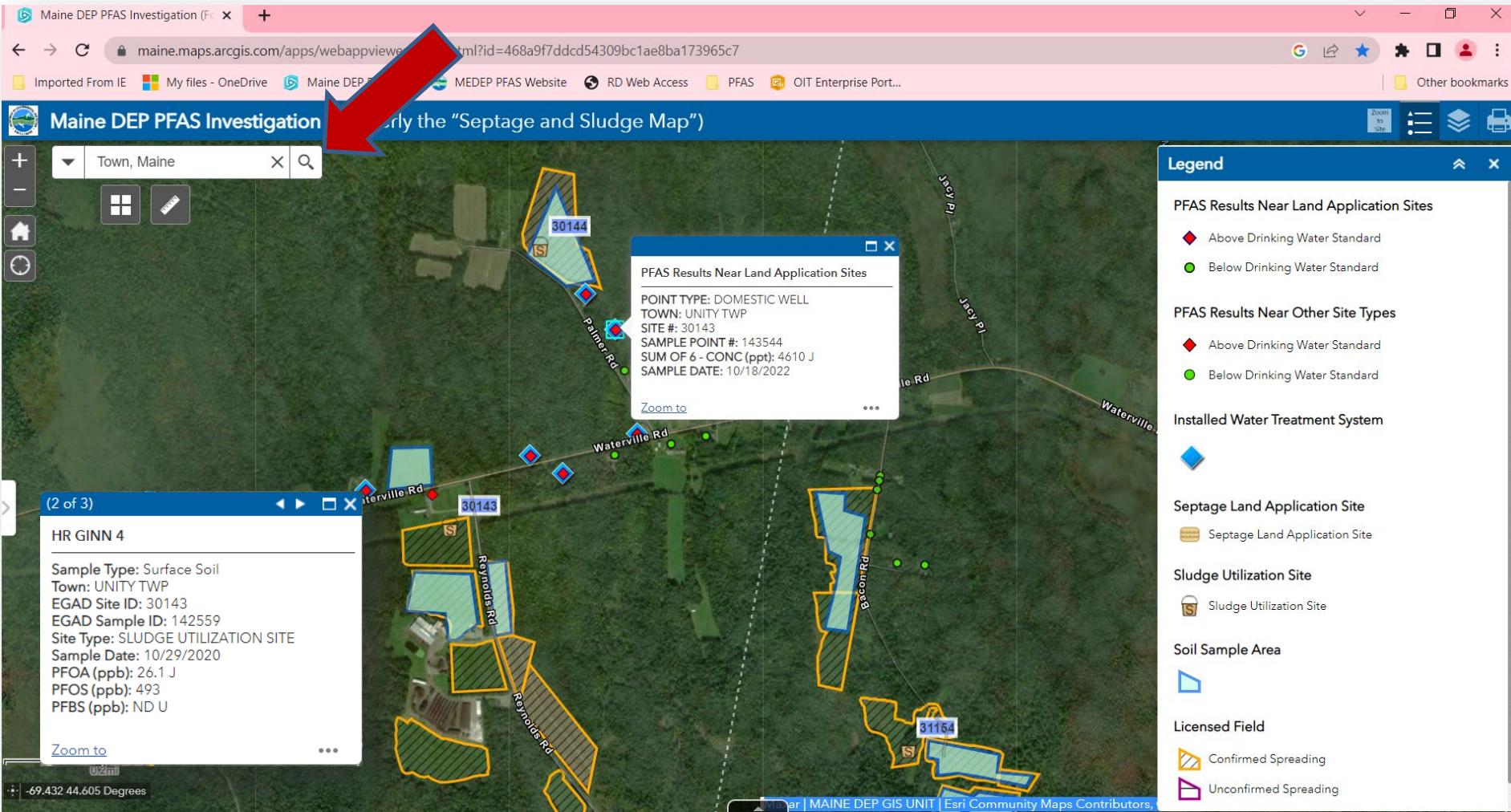
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- [How can PFAS be removed from the environment? +](#)
- [Data and Guidance +](#) 
- [Updates and Timeline +](#)
- [More Information +](#)



Maine DEP PFAS Investigation Map



Guidance for Self-Testing

PFAS Water Sampling for Homeowners

Can I sample my own water?

Sampling your drinking water for per- and polyfluoroalkyl substances (PFAS) can be challenging due to the prevalence of PFAS in consumer products such as water-resistant clothing, boots, gloves, sunscreen, lotions, cosmetics, and food packaging. All of these products may contain PFAS and can contaminate samples. To ensure a quality, representative sample, make sure your sample area is free of any PFAS-containing material.

How much does it cost?

The cost of PFAS analysis typically ranges between \$250 and \$500, depending on the laboratory.

Can I be reimbursed?

The DEP will reimburse the cost of this testing up to a certain amount only if sampling was conducted in general accordance with the DEP's sampling guidance, a Maine-accredited and DEP-approved laboratory was used, you provide the laboratory results to the DEP for review, and the source of PFAS can be tied to a DEP-licensed sludge or septage land application site or other remediation-type site as verified by the DEP.

How do I find a laboratory?

Maine does not have in-state laboratories accredited to conduct PFAS testing. The DEP has compiled a list of Maine Laboratories that will subcontract for these services. [Maine Laboratories that Subcontract Residential PFAS Analysis for Water.](#)



MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION
www.maine.gov/dep

What do I ask for from the lab?

1. Explain that you want to self-test your own drinking water for PFAS.
2. Ask for "Method 537.1, modified with isotope dilution." The compound list should include a list of 28 PFAS.

Note: To prevent contamination of your sample, make sure your hands are free of lotion and thoroughly washed. Do not wear waterproof clothing. Use nitrile gloves.

3. Ask that the laboratory reports include all quality control information. This is generally referred to as a "Level 2 Report."
4. Ask the laboratory for an [electronic deliverable data \(EDD\)](#) in DEP's latest format. This is important if you wish to seek reimbursement.



A Homeowner's Guide to Soil Sampling for PFAS

Can I sample my soil for PFAS?

Maine DEP has developed this guidance to help homeowners identify methods for conducting soil sampling on their property. Homeowners may wish to conduct their own sampling based on the information in this guidance, but the DEP encourages homeowners to work with an environmental professional to ensure that they get the most useful site-specific results possible. Collecting a soil sample that is representative of an entire property, field, soil pile, or garden area is not as simple as it may appear. The most suitable method for sampling any given area is likely to differ depending on the intended use of the area as well as the overall geography and environment in that location.

Maine DEP highly recommends farms generating products for commercial sale/profit hire an environmental professional to design a site-specific sampling plan to collect soil samples based on the specific needs of the farm. An environmental professional is someone qualified and properly trained to collect representative PFAS samples. Please see ["Additional Resources"](#) below for information pertaining to farming.

How do I find a laboratory?

The DEP has compiled a list of Maine laboratories that will subcontract for these services. [Maine Laboratories that Subcontract Residential PFAS Analysis for Water and Soil.](#) Maine does not yet have in-state laboratories accredited to conduct PFAS testing.

The cost of PFAS soil analysis typically ranges from \$400 to \$500 per sample, depending on the laboratory. If an environmental professional is used to collect your samples, there will be additional fees.

This guidance document is recommended for use by homeowners and residents in Maine interested in understanding more about PFAS in the soil around their homes.



What do I ask for from the lab?

1. Request sample containers to analyze soil for PFAS.
2. Ask the lab to use "Method 537.1, modified with isotope dilution" to test your soil for PFAS. The compound list should include a list of 28 different PFAS.
3. Ask that the laboratory reports include all quality control information. This is generally referred to as a "Level 2 Report."
4. Ask the laboratory for an [electronic data deliverable \(EDD\)](#) in DEP's latest format. This is helpful if you require technical assistance from state agencies.

The laboratory will send you clean sample containers, usually 4-ounce or 250-mL in size for you to put your soil sample into and labels for the container(s). You need to fill most of the container with soil.



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www.maine.gov/dep



Contact:

General PFAS Inquiries: pfas.dep@maine.gov
PFAS Product Reporting Inquiries: pfasproducts@maine.gov

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