

# Maine Property Tax School



## **PFAS: An Emerging Contaminant and Consequences for Maine**

August 4, 2022

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MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

*Protecting Maine's Air, Land and Water*

# DEP Presentation Overview

- 3 presentations today relating to property valuation, use and function
  - Per- and Poly- fluoroalkyl Substances (PFAS)
  - Oil Spills and Contamination
  - Voluntary Response Action Program (VRAP) and Brownfields Redevelopment



# PFAS Presentation Objectives

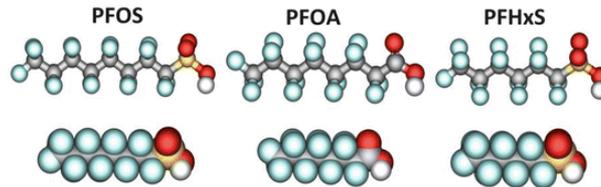
- Overview of PFAS
- Overview of laws and guidelines
- Maine's statewide PFAS evaluation
- What does it mean if PFAS is found in water/soil
- Other PFAS laws and their impacts
- DEP tools available to public
- What's the bottom line?



# What are PFAS?

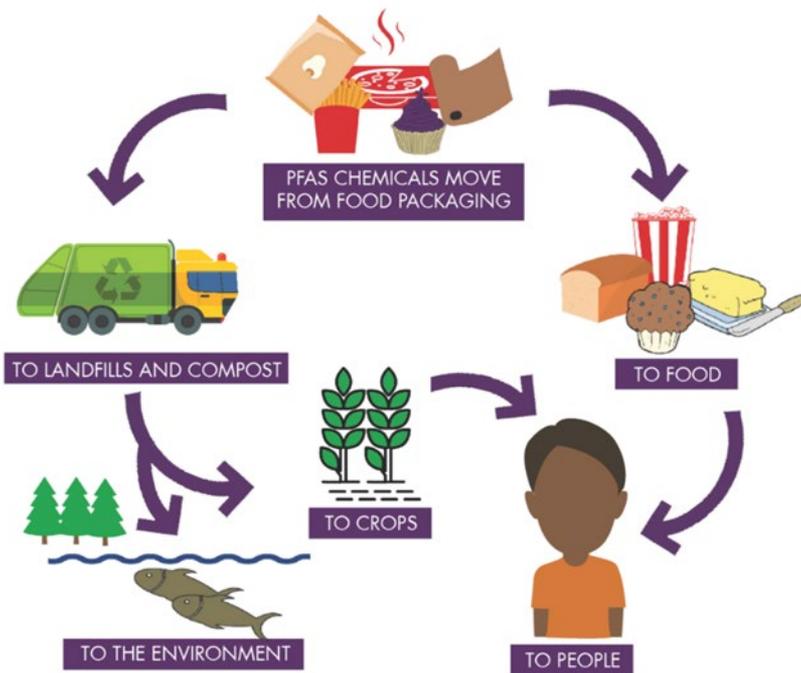
**PFAS = per- and poly fluoroalkyl substances**

- 32 MRS §1732, 38 MRS §1612 → 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 due to a strong C-F bond which is very difficult to break



# Where are PFAS?

- Found in Maine in:
  - Ground and Surface Water
  - Active/Closed Landfills
  - Sludge/Septage Land Application Sites
  - Contaminated/Remediation Sites (AFFF often the source)
- In some places impacts to:
  - Drinking Water
  - Agriculture
  - Fish & Wildlife



# 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



# 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

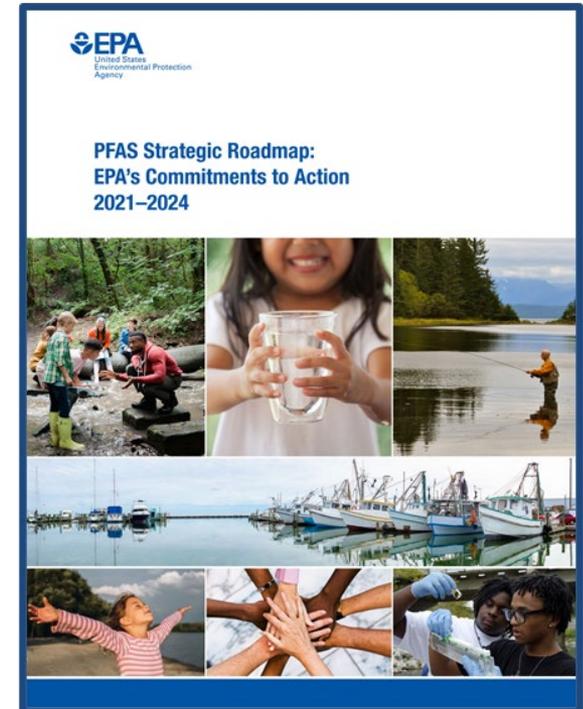
- Landfilling
- Land application
- Composting\*

\*Starred items are still in early phases of research and not ready for full scale implementation



# EPA/Federal Actions

- Currently no EPA (Federal) laws/rules for PFAS
- EPA released the EPA Strategic Roadmap in October 2021 
- EPA will begin to develop guidelines and rules through 2024 and beyond
- Shifting landscape will impact all states including Maine – creating some uncertainty



# Key EPA Guidelines

- In 2016 EPA issued a Health Advisory (HA) in drinking water for PFOA + PFOS not to exceed 70 ppt
- On **June 15, 2022** EPA issued new HA's as follows:

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

EPA anticipates releasing a draft MCL for these PFAS end of 2022

# Key Maine Laws for PFAS

## Maine's 130<sup>th</sup> legislature (2021-2022)

Interim Drinking Water Standard	Resolve 2021, Chapter 82
Soil and Groundwater Evaluation	Public Law 2021, Chapter 478
Sludge and Sludge Products Ban	Public Law 2021, Chapter 641
Statute of Limitations for Injuries or Harm From PFAS	14 MRS §752-F
Uncontrolled Substances	38 MRS §1362 (1)(H)
PFAS in Food Packaging	32 MRS §1733 (3-B)
PFAS in Products	38 MRS §1614

# PFAS and Drinking Water in Maine

**Maine Public Resolve, 2021, Chapter 82, Effective June 21, 2021:** *Resolve to Protect Consumers of Public Drinking Water by Establishing MCLs for Certain Substances and Contaminants*

**Maine's Interim  
Drinking Water Std  
= 20 ppt  
for the sum of six PFAS:  
PFOA, PFOS, PFNA, PFDA, PFHpA & PFHxS**

Final Rule to be developed by Maine Drinking Water Program by **June 1, 2024**

# PFAS and Screening Levels in Maine

- Screening levels
  - Soils
  - Recreational fishing
  - Milk
  - Beef
  - Dairy (to hay, to corn)
- Developed in coordination with Maine CDC and Maine DACF
- Likely to be updated soon

**MAINE PFAS SCREENING LEVELS** June 2021

Soil Remedial Action Guidelines (mg/kg)						
Compound	Leaching to Groundwater	Residential	Commercial Worker	Park User	Recreator Sediment	Construction Worker
PFBS	7.1	1,700	22,000	4,900	5,700	51,000
PFOS	0.0036	1.7	22	4.9	5.7	5.1
PFOA	0.0017	1.7	22	4.9	5.7	5.1

Soil Beneficial Use (ng/g, dry weight)		Recreational Angler RAGs (mg/kg wet weight)	
Compound	Beneficial Use	Compound	Fish Tissue
PFBS	1,900	PFBS	52
PFOS	5.2	PFOS	0.052
PFOA	2.5	PFOA	0.052

Interim Drinking Water Standard (ng/l or ppt)	
Compound	Residential
PFOS + PFOA + PFHpA + PFNA + PFHxS + PFDA	20

Milk (ng/l or ppt)		Beef (ng/g)	
Compound	Action Level	Compound	Action Level
PFOS	210	PFOS	3.4

Dairy - PFOS Crop-Specific Soil Screening Levels (ng/g dry weight)			
	Soil to Hay to Milk Screening Level	Soil to Corn-Silage to Milk Screening Level	Soil to Hay and Corn-Silage to Milk Screening Level
Grass-Based Farm	6.8	120.0	6.4
Average Maine Farm	13.8	54.8	11.0

**Helpful Conversions:** 0.000001 ppm = 0.001 ppb = 1 ppt

Parts Per Million (ppm)	Parts Per Billion (ppb)	Parts Per Trillion (ppt)
1 milligram/kilogram (mg/kg) = 1 ppm	1 microgram/kilogram (µg/kg) = 1 ppb	1 nanogram/kilogram (ng/kg) = 1 ppt
1 milligram/liter (mg/l) = 1 ppm	1 microgram/liter (µg/l) = 1 ppb	1 nanogram/liter (ng/l) = 1 ppt
1 microgram/gram (µg/g) = 1 ppm	1 nanogram/gram (ng/g) = 1 ppb	1 picogram/gram (pg/g) = 1 ppt

<sup>1</sup> Maine Department of Environmental Protection (Maine DEP), [Maine Remedial Action Guidelines \(RAGs\) for Contaminated Sites](#), effective May 1, 2021.

<sup>2</sup> Maine DEP, [Maine Solid Waste Management Rules: Beneficial Use of Solid Wastes, 06-096 C.M.R. ch. 418](#), Appendix A, last amended July 8, 2018.

<sup>3</sup> Maine DEP, [Maine RAGs for Contaminated Sites](#), effective May 1, 2021.

<sup>4</sup> [Resolve 2021, ch. 82, Resolve, To Protect Consumers of Public Drinking Water by Establishing Maximum Contaminant Levels for Certain Substances and Contaminants](#), Emergency, effective June 21, 2021.

<sup>5</sup> Maine Center for Disease Control and Prevention (CDC), [Action Levels for PFOS in cow's milk](#), Memorandum to Rachael Fiske, Maine Department of Agriculture, Conservation and Forestry (DACF), from Andrew Smith, SM, ScD and Thomas Simones, PhD, Maine CDC, March 28, 2017.

<sup>6</sup> Maine CDC, [Action levels for PFOS in beef for use in determining whether beef at a farm is adulterated](#), Memorandum to Nancy McBrady, Maine DACF, from Andrew Smith, SM, ScD and Thomas Simones, PhD, Maine CDC, August 4, 2020.

<sup>7</sup> Maine CDC, [Deviation of PFOS soil screening levels for a soil-to-fertilizer-to-cow's milk agronomic pathway](#), September 16, 2020.

**MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION** [www.maine.gov/dep](http://www.maine.gov/dep)

# Soil and Groundwater Evaluation

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

- Effective October 18, 2021
- Requires DEP to establish and implement a soil and groundwater evaluation to identify contamination derived from licensed land applications of **sludge and septage**
- DEP estimates over 700 application sites statewide - thousands of data points, several decades of licensing information
- Half of all sites must be completed by 2024; all by 2025



# Soil and Groundwater Sites

- Sludge and septage sites:
  - May consist of multiple fields/locations crossing municipal boundaries
  - May have had multiple sources of sludge/septage applied to one location
  - May have changes in ownership since and changes in use and function of land since original license
  - Many land application sites have active agricultural operations



# Prioritizing Site Evaluations

- Septage sites are managed separately - evaluation underway
- Sludge sites are grouped into four Tiers - Tier I underway 86% complete
  - Volume of sludge land applied
  - Anticipated presence of PFAS in sludge
  - Proximity of known receptors
- Information about locations of sites can be found at the DEP website

## Anticipated Evaluation Timeline

Tier I – 2021 through 2023

Tier II – 2023-2024

Tiers III and IV – 2024-2025



# PFAS Evaluation Process

- Review licenses/annual reports
- Develop site sampling and analysis plans (SAP)
- Schedule sampling events – coordinate with landowners
- Conduct sampling event/deliver samples to lab
- Obtain/review lab results
- Communicate results to landowner
- Evaluate need for treatment/bottled water
- Determine whether need stepped out investigation



# Soil and Groundwater Evaluation

**Where groundwater for a private drinking well is found to exceed Maine's interim drinking water standard, DEP will provide bottled water until such time as a filtration system can be installed.**

***DEP's top priority is to ensure that Maine residents have safe drinking water.***

# What we are Learning - GW

- Over 906 private groundwater well samples taken statewide:

## PRELIMINARY Groundwater Results (Sludge-only) as of July 6, 2022

Location	< 20 ppt	20 – 100 ppt	100 – 1000 ppt	> 1000 ppt
Fairfield Area (Fairfield, Unity Twp, Benton, Oakland)	60%	20%	12%	8%
Statewide non-Fairfield Area	80.5%	9%	6.5%	3%
Statewide (ALL)	69%	15.5%	9.5%	6%

- Results not uniform throughout Maine
- Lots to learn – only includes sludge sites so far



# What does this all mean?

- Drinking water:
  - Private drinking water wells associated with DEP sites are sampled by Maine DEP or designee. If Maine's interim standard is exceeded – residents receive bottled water until installation of PFAS treatment system.
  - Public water systems and water lines are managed by the Maine Drinking Water Program in (DHHS). DHHS will work with operators of these water systems/lines to ensure water is safe to drink.
  - Effective and widely accepted treatment options are available and used for filtering PFAS from water.



# What does this all mean?

- Soil:
  - Soil sampling results are tricky to explain as there is no one standard or number to use for evaluation
  - Maine Screening levels contemplate a variety of uses:
    - Residential
    - Recreational
    - Construction worker and Commercial worker
    - Leaching to Groundwater
    - Soil Beneficial use



# Value of Land/homes after PFAS?

- Understanding soil sample results are largely dependent on use and function of property:
  - Typical home or residential living
  - Recreational use/hunting/fishing
  - Farm/agricultural use
  - Commercial/industrial use
  - Siting of new developments/Construction
- Frequency and duration of sludge application
- Proximity to residences and other receptors



# PFAS and Clean up Site Designation

- Site designation may occur in some circumstances for contaminated properties
  - Maine's Uncontrolled Sites Law
  - EPA/Federal Comprehensive Environmental Response Compensation and Liability Act (CERCLA)
- Landscape is changing relating to these programs and integration of PFAS as a contaminant – may impact future valuation



# Maine and Uncontrolled Sites

An area or location at which hazardous substances are or were handled or otherwise came to be located *and* where the DEP Commissioner determines the site poses a threat or hazard to the health, safety or welfare of any person or to the natural environment *and* that action is necessary to abate, clean up or mitigate that threat or hazard



# Maine and Uncontrolled Sites

- 38 MRS §1362 (1)(H): *An Act Regarding Uncontrolled Hazardous Substance Sites*, Effective October 18, 2021
- Definition of hazardous substance now consistent with Federal CERCLA Section 101(33) definition for “pollutant or contaminant”
- Allows a Maine site with PFAS to be designated as an uncontrolled site
  - Implications - PFAS contamination can be a reason for designation of a site as an uncontrolled site
  - This has not yet happened, but it could



# Federal CERCLA Sites

- EPA is looking to include PFAS under CERCLA beyond as a pollutant or contaminant by listing certain PFAS as CERCLA Hazardous Substances
  - Require reporting of PFOA and PFOS releases, enhance the availability of data, and ensure agencies can recover cleanup costs.
  - Issue advance notice of proposed rulemaking on various PFAS under CERCLA to seek public input on whether to similarly seek CERCLA designation of other PFAS.
- Both anticipated in proposed rule some time in 2022.



# Ban on Land Application of Sludge

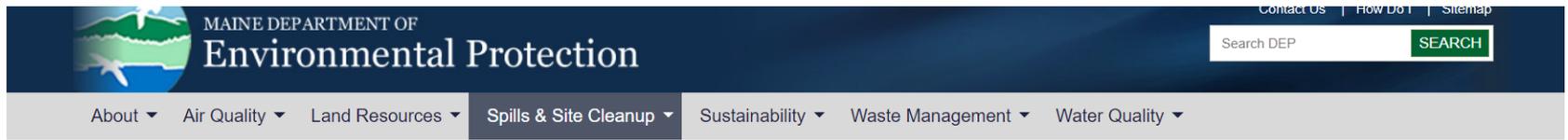
**Public Law, 2021, Chapter 641, Effective August 8, 2022:**  
*An Act To Prevent the Further Contamination of the Soils and Waters of the State with So-called Forever Chemicals*

- Prohibits the land application of sludge or sludge derived products as well as the sale and distribution of sludge derived products (e.g., composts and fertilizers)
- Report on feasibility of enacting a ban on land application of septage – due January 2023
- What to do with sludge/septage on property or in piles



# DEP Tools for the Public

- A lot of information on the [DEP website](#)



[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.

[Overview](#) +

[Where is PFAS in Maine?](#) +

[What is Maine doing about PFAS?](#) +

[What is EPA doing about PFAS?](#) +

[Data and Guidance](#) +

[Updates and Timeline](#) +

[More Information](#) +

### Contact Us

General inquiries regarding PFAS should be directed to David Madore, Deputy Commissioner and Communications Director, [David.Madore@maine.gov](mailto:David.Madore@maine.gov), 207-287-5842. You can also contact the Department directly by e-mail at: [pfas.dep@maine.gov](mailto:pfas.dep@maine.gov)

- If you are a resident living near a DEP-licensed sludge or septage land application site, please [inquire here about getting your well tested](#).



# DEP Sludge/Septage Mapper

Home → Spills & Site Cleanup → PFOA and PFOS

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# Guidance for Self-Testing

- Guidance for Self-testing
  - Water
  - Soil
  - How to interpret laboratory data

## 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.



## 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 seepage 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](#).

### 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.



# DEP Sludge/Septage Mapper

## [Hide: Data and Guidance](#) -

[Maine PFAS data \(2007-2022\)](#) as of March 7, 2022. For questions regarding this data, please email [pfas.dep@maine.gov](mailto:pfas.dep@maine.gov)

 [Maine Sludge and Septage Mapper](#) and [Maine PFAS Mapper](#), please direct any feedback to [pfas.dep@maine.gov](mailto:pfas.dep@maine.gov)

[PFAS Screening Levels](#) June 2021

[PFAS Water Sampling for Homeowners](#)

[PFAS Soil Sampling for Homeowners](#)

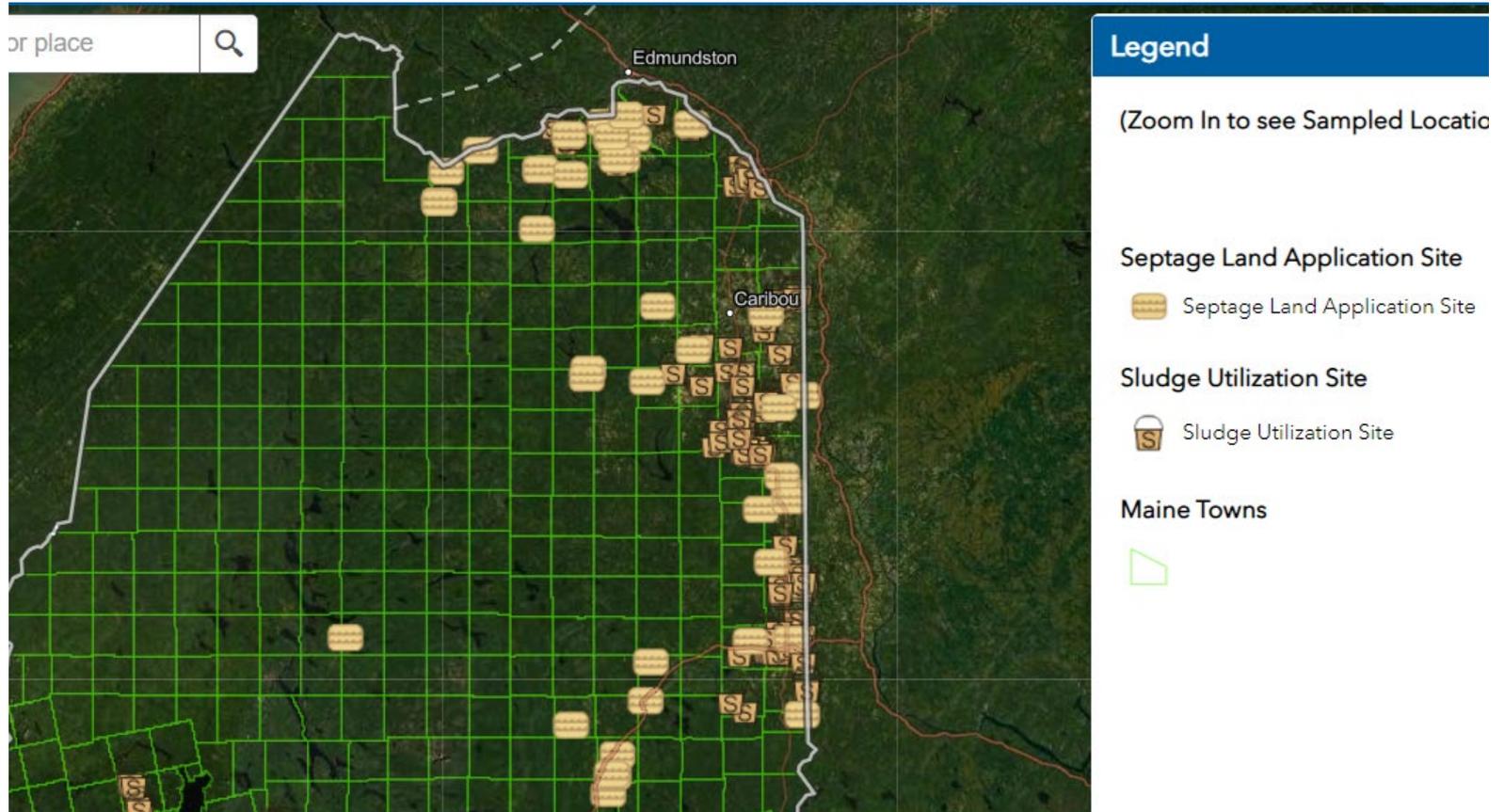
[Information for PFAS Self-testers](#)

[How to Read and Interpret my PFAS Laboratory Data Report](#)

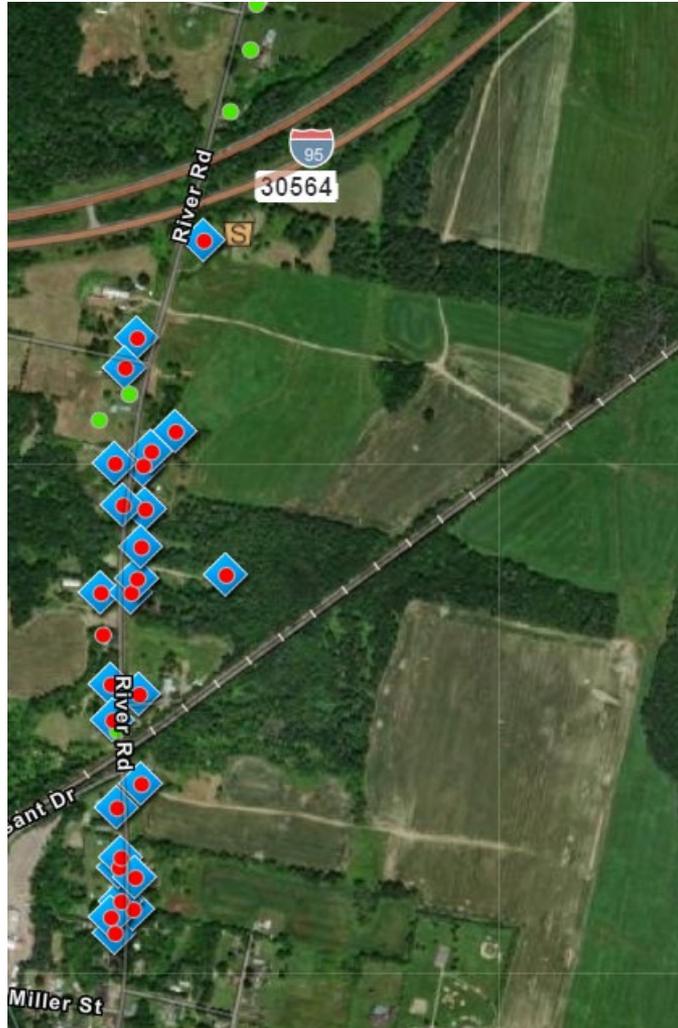
[Background Levels of PFAS and PAHs in Maine Shallow Soils, Study Report dated April 2022](#)



# DEP Sludge/Septage Mapper



# DEP Sludge/Septage Mapper



## PFAS Drinking Water Test Results

- Above Drinking Water Standard
- Below Drinking Water Standard

## Installed Water Treatment System



## Septage Land Application Site

- Septage Land Application Site

## Sludge Utilization Site

- Sludge Utilization Site

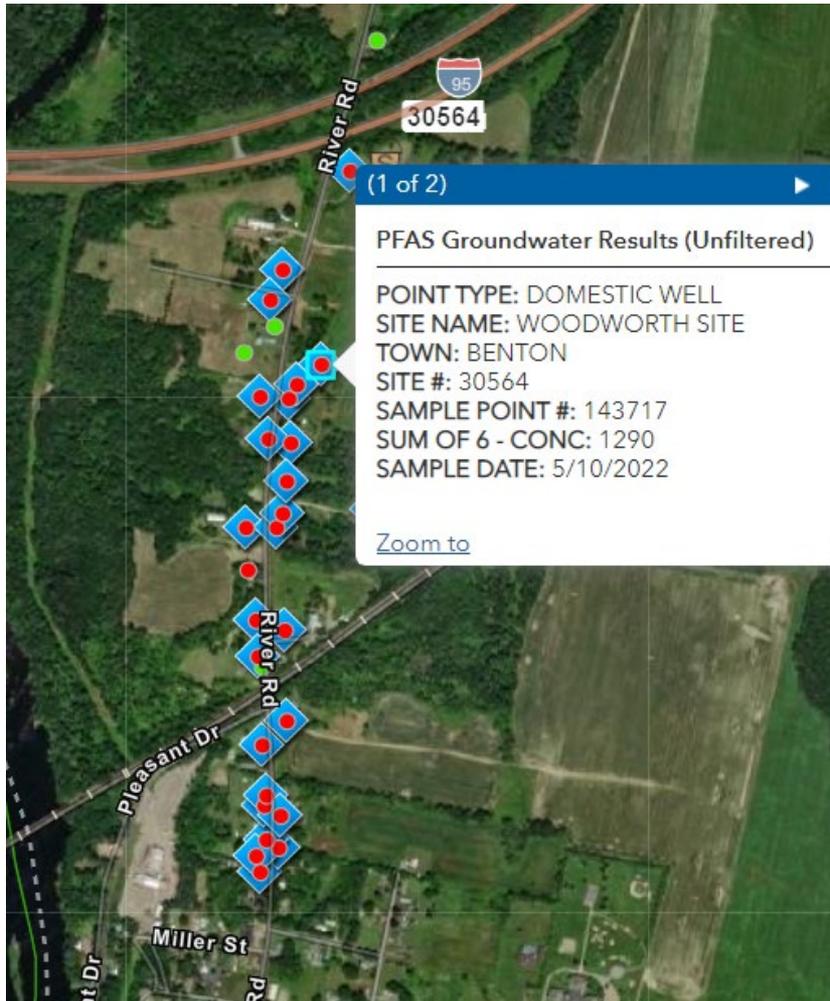
## Licensed Field

- Confirmed Spreading
- Unconfirmed Spreading

## Maine Towns



# DEP Sludge/Septage Mapper



## Drinking Water Test Results

- Above Drinking Water Standard
- Below Drinking Water Standard

## Installed Water Treatment System

## Septage Land Application Site

- Septage Land Application Site

## Sludge Utilization Site

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## Licensed Field

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## Maine Towns



# Key Contact Information for PFAS

<b>Maine DEP</b>	<b>Statewide Soil and Water Evaluation (Sludge/Septage) Contaminated Sites and other PFAS Sources Soil and Water Data Fate and Transport of PFAS in the Environment Treatment, Concentration, Disposal, Destruction PFAS in Products and Food Packaging</b>
<b>Maine DACF</b>	<b>Agriculture and Farms Food and Agricultural products (Milk, beef, etc.) Agricultural Fund for Income Replacement Management of Agricultural Waste</b>
<b>Maine CDC/Drinking Water Program</b>	<b>Health Implications and Exposure to PFAS Fish Advisories Public Water Systems, Lines Schools, Daycare facilities, Nursing homes</b>
<b>Maine IF&amp;W</b>	<b>Wildlife Advisories– Deer, Turkeys, etc. Management of Wildlife wastes</b>

# Broadened Statute of Limitations

- **14 MRS 752-F: *An Act Regarding the Statute of Limitations for Injuries or Harm Resulting from PFAS***
- Private claims now may begin on the date the plaintiff discovers or reasonably should have discovered the PFAS harm or injury (not when it was applied or released which could have been decades ago)



**The Governor and Attorney General of Maine have committed to pursuing legal claims on behalf of the state. Stay tuned!**

# What's the Bottom Line Here?

- Temporary uncertainties – “emerging contaminants”
  - Regulatory framework from Federal/State governments in flux
  - Health impacts– still a lot to be understood
  - Continuing research on exposure pathways and fate and transport of PFAS in the environment
- What we do know
  - Tools are available to help the public find information
  - Owners, buyers and businesses need to assess potential risks based on use and function
  - No clear answers or silver bullet at this time





Contact:

[Contact us at: pfas.dep@maine.gov](mailto:pfas.dep@maine.gov)

[www.maine.gov/dep/spills/topics/pfas/index.html](http://www.maine.gov/dep/spills/topics/pfas/index.html)

*[www.maine.gov/dep](http://www.maine.gov/dep)*

