integral INSIGHT FOR AN EVOLVING WORLD

Integral's New PFAS Regulation Dashboard

An Interactive Resource

Logan Uselman, Ph.D., P.G.
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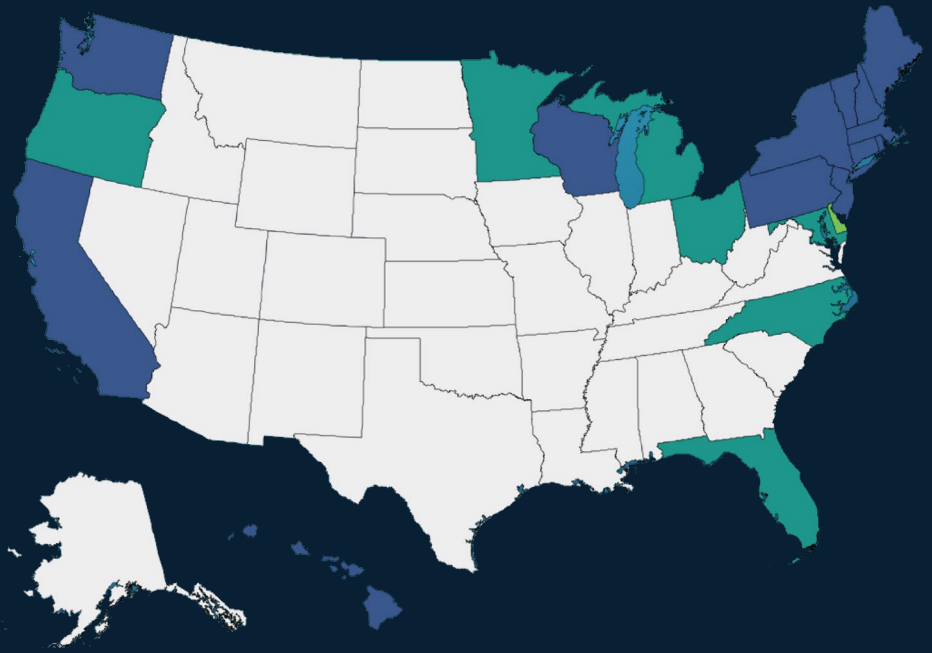
Alexandra Meyers, MPH, BCES

June 24, 2024



Who are we?

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UI/UX interface
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Outline

- What are PFAS?
- How did we get here?
- Why are we tracking regulations?
- How can you access and manipulate the dashboard?
- Now that you have all the information, what do you do with it?

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What are PFAS?

- Per- and polyfluoroalkyl substances → PFAS
- Man-made chemicals manufactured since 1940s
- Group of ~15,000 synthetic chemicals

https://paustenbachandassociates.com/services/pfoa-and-pfos/

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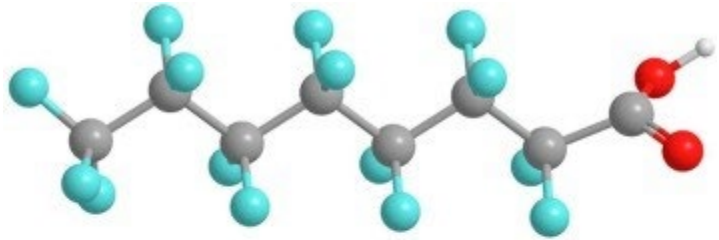
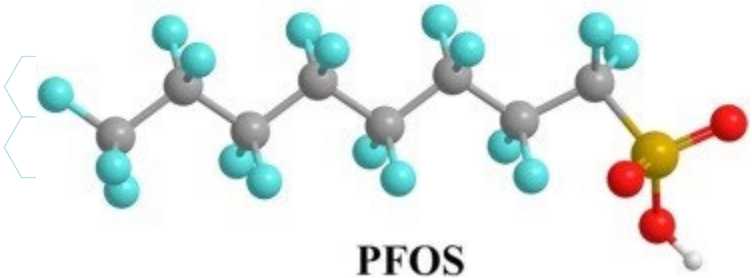


PFOA



PFOS

https://paustenbachandassociates.com/services/pfoa-and-pfos/

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How did we get here?

1974 — Safe Drinking Water Act

2006 — EPA brokers voluntary phase out of PFOA and PFOS

2009 — EPA issues Provisional HAs for PFOA and PFOS

PFAS Type	Limit (ppt)
PFOA	400
PFOS	200

PFAS Type	Limit (ppt)
PFOA + PFOS	70

PPM	Parts Per Million
PPB	Parts Per Billion

1 PPM = 1 mg/L [milligrams per Liter]

1 PPB = 1 µg/L [micrograms per Liter]

1 PPT = 1 ng/L [nanograms per Liter]

1 PPM = 1,000 PPB = 1,000,000 PPT

https://mytapscore.com/blogs/tips-for-taps/how-to-interpret-water-testing-units

HA = Health Advisory

How did we get here?

1974 — Safe Drinking Water Act

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PFAS Type	Limit (ppt)
PFOA	400
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2016 — EPA publishes Lifetime HAs for PFOA and PFOS

PFAS Type	Limit (ppt)
PFOA + PFOS	70

2019 — EPA publishes PFAS Action Plan

https://mytapscore.com/blogs/tips-for-taps/how-to-interpret-water-testing-units

HA = Health Advisory

How did we get here?

EPA publishes PFAS Strategic Roadmap

EPA updates HAs

Final Interim

PFAS Type	Limit (ppt)
PFOA	0.004
PFOS	0.02
GenX	10
PFBS	2,000

EPA proposes NPDWR MCLs

PFAS Type	Limit (ppt)
PFOA	4.0
PFOS	4.0
PFNA, PFHxS, PFBS, GenX	1 HI

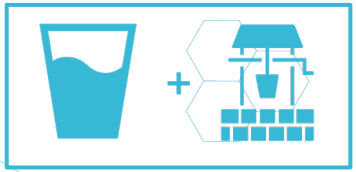
EPA sets final NPDWR MCLs

PFAS Type	Limit (ppt)
PFOA	4.0
PFOS	4.0
PFHxS	10
PFNA	10
GenX	10
Mixtures containing two or more PFNA, PFHxS, PFBS, GenX	1 HI

All state water systems must meet federal MCLs for PFAS

HA = Health Advisory
HI = Hazard Index
MCL = Maximum Contaminant Level
NPDWR = National Primary Drinking Water Regulation

How do states compare?



VS.

*Not drawn to scale

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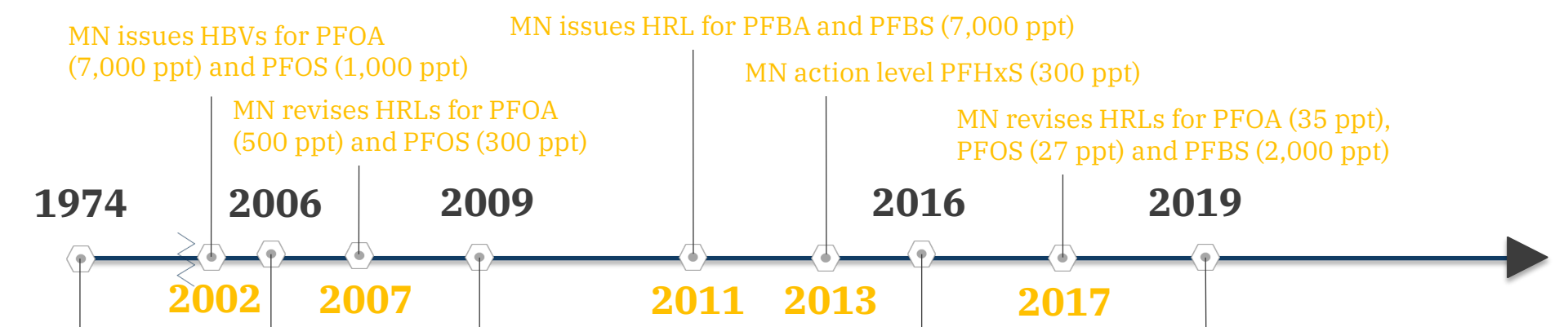

Safe Drinking Water Act

EPA brokers voluntary phase out of PFOA and PFOS

MN revises HRL for PFOA (300 ppt) and PFBA (7,000 ppt)

EPA issues Provisional HAs for PFOA and PFOS

PFAS Type	Limit (ppt)
PFOA	400
PFOS	200

EPA publishes Lifetime HAs for PFOA and PFOS

PFAS Type	Limit (ppt)
PFOA + PFOS	70

MN revises HRLs for PFOS (15 ppt) and PFHxS (47 ppt)

EPA publishes erim PFAS Action Plan tion for Addressing Groundwater Contaminated with PFOA and PFOS

PFAS Type	Limit (ppt)
PFOA + PFOS	40

HA = Health Advisory
HBV = Health Based Value
HRL = Health Risk Limit

MN issues HBV for PFHxA (200 ppt)

MN revises HRL for PFOA (0.0079 ppt) and PFOS (2.3 ppt)

2021 **2022** **2023** **2024** **2029**

EPA publishes PFAS Strategic Roadmap

EPA updates HAs

PFAS Type	Limit (ppt)
PFOA	0.004
PFOS	0.2
GenX	10
PFBS	2,000

Interim

Final

MN revises HRL for PFBS (100 ppt)

EPA proposes NPDWR MCLs

PFAS Type	Limit (ppt)
PFOA	4.0
PFOS	4.0
PFNA, PFHxS, PFBS, GenX	1 HI

EPA sets final NPDWR MCLs

PFAS Type	Limit (ppt)
PFOA	4.0
PFOS	4.0
PFHxS	10
PFNA	10
GenX	10
PFNA, PFHxS, PFBS, GenX	1 HI

All state water systems must meet federal MCLs for PFAS

HA = Health Advisory
HBV = Health Based Value
HRL = Health Risk Limit

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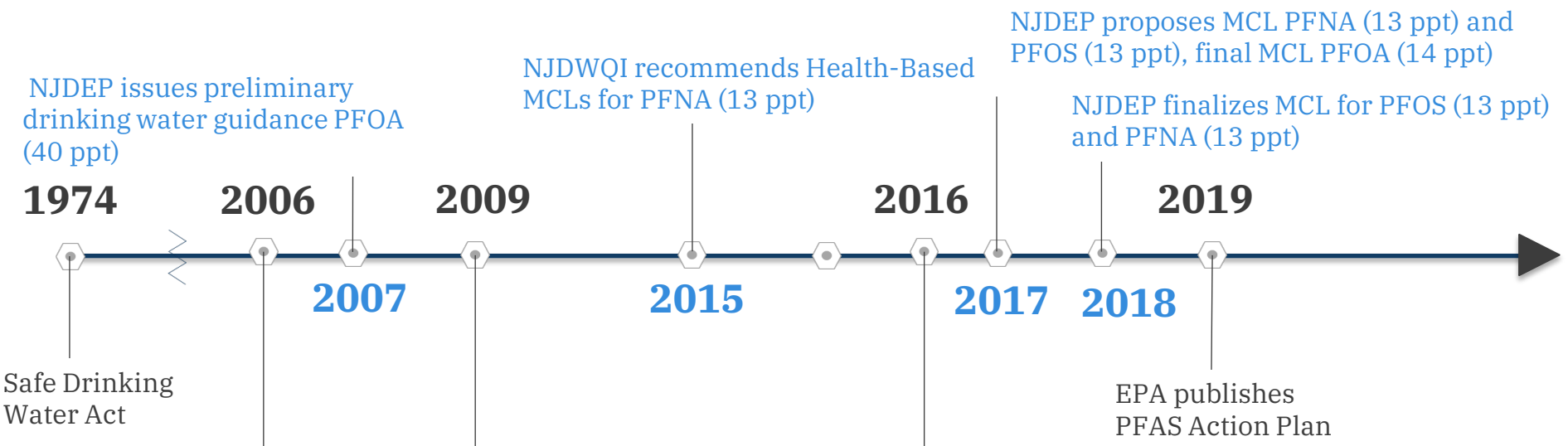

PFAS Type	Limit (ppt)
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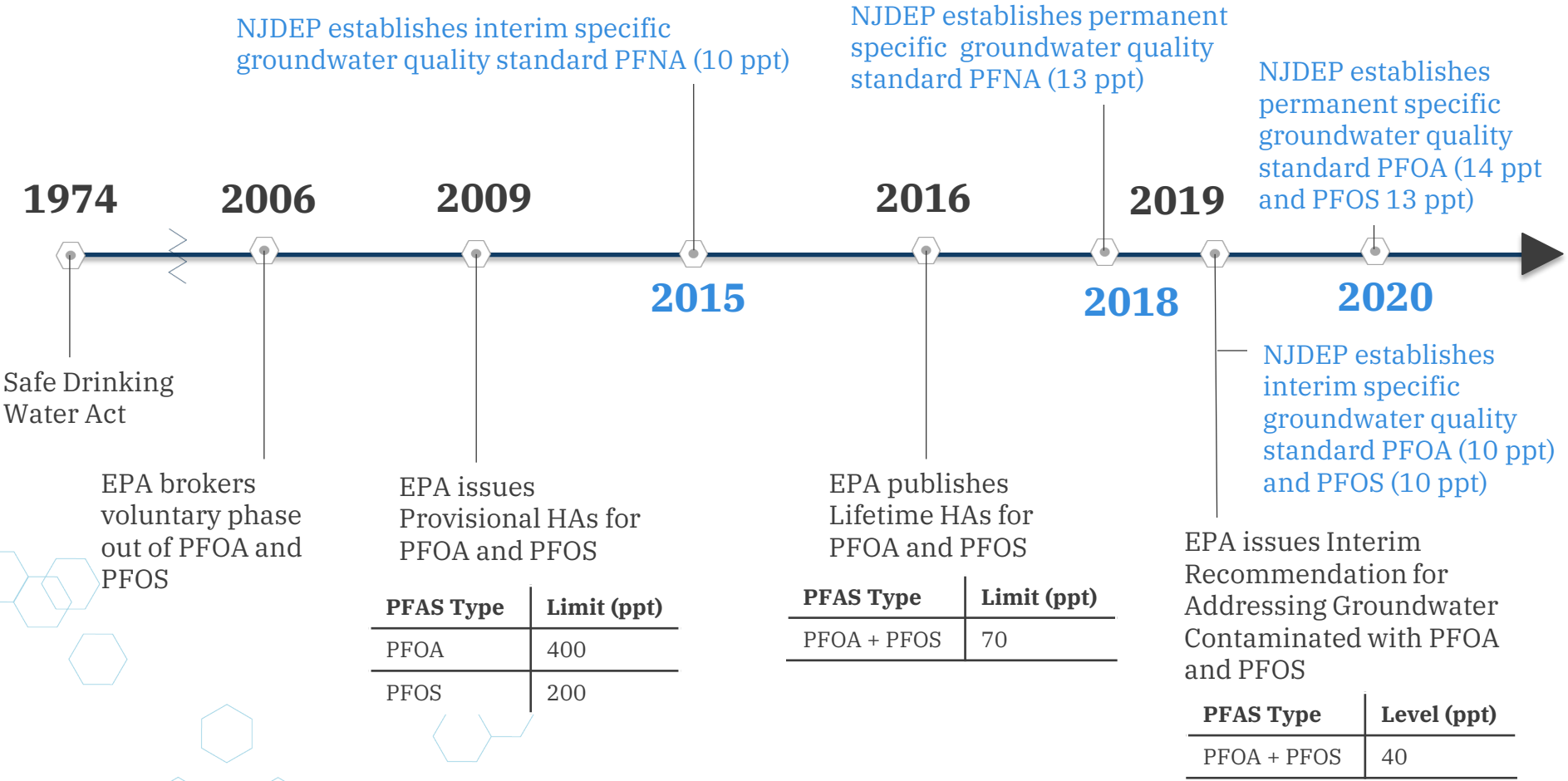
DEP = Department of Environmental Protection
DWQI = Drinking Water Quality Institute



DEP = Department of Environmental Protection
DWQI = Drinking Water Quality Institute


IF YOU DON'T KNOW, NOW YOU KNOW
THE DAILY SHOW WITH TREVOR NOAH
FOREVER CHEMICALS: PFAs


PFAS
19:58


FOREVER CHEMICALS
PBS NEWS HOUR


GMA COVER STORY
"FOREVER" CHEMICALS IN COSMETICS
NEW STUDY WARNS ABOUT HIDDEN TOXINS IN MAKEUP
GMA


DW
Are we contaminated?
10:17


U.S.'S GROUNDWATER CRISIS, EXPLAINED
WSJ EXPLAINS
7:36

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U.S. PFAS Regulations by State

Published by Source Intelligence on Jan 19, 2024 5:23:28 PM

safer states

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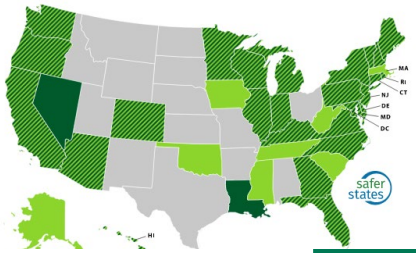
Policies for Addressing PFAS

34 states have introduced **302 policies** to protect people from toxic chemicals.
144 state policies have been adopted in **28 states.**

Introduced | Adopted | Introduced & Adopted



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PFAS DRINKING WATER STANDARDS: STATE-BY-STATE REGULATIONS

UPDATED: JANUARY 2024

Jan 16, 2024

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ECOS Paper: Processes and Considerations for Setting State PFAS Standards, 2024 Update

April 25, 2024

March 4, 2022

PFAS Update: State-by-State Regulation of PFAS Substances in Drinking Water

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PFAS State Activity Tracker

State	Rule Type	Action Type	Description	Status	Effective Date	Links	Notes	Entry Last Updated
Alabama	Binding	Environment	Water systems may be required to monitor for PFOA and PFOS.	In effect	8/9/2019	State Website		5/26/2020
Alabama	Non-binding guidance	Environment	Developing appropriate testing protocols, health-based standards, proper messageing to the public.	Pending		Regulation		5/26/2020

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Regulation?

- Enforceable
- Non-enforceable

Type?

- Maximum Contaminant Level
- Action Level
- Health Advisory
- Response Level
- Target Level
- Notification Level

Which PFAS?

- Sum PFOA and PFOS
- Individual Concentrations

Which Media?

- Drinking Water
- Surface Water
- Groundwater
- Soil

Other Stipulations?

- Only at known PFAS sites?
- Only for certain waters?
- Exposure criteria?

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Not an easy feat

- Different regulatory agencies
- Different uses of the same terms
- Inaccurate reporting by media
- State-specific nuances

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State-By-State PFAS Regulatory Map

By Avram Frankel, P.E., *Managing Principal, Business Director, Investigation and Remediation*

PUBLISHED
October 15, 2021

View Interactive Map

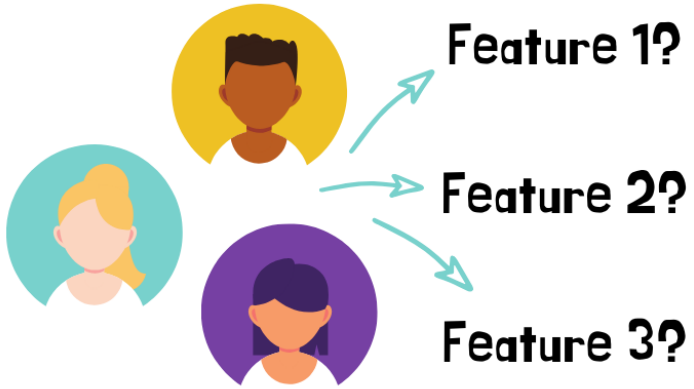
PFAS Regulatory Criteria – Drinking Water, Groundwater, and Surface Water

Welcome to Integral's State-by-State PFAS Regulatory Criteria Map. We developed these interactive map resources as an easy-to-use PFAS regulatory reference that is current, complete, and supported by the literature. Although other resources exist, we are not aware of any that consistently meet these criteria. The maps are a community resource. Feel free to cite them, as needed. Our goal is to keep them current, and we very much welcome your input. In fact, we are counting on it.

Dashboard Demonstration

- Stand by for live demo…

Dashboard Data & Features



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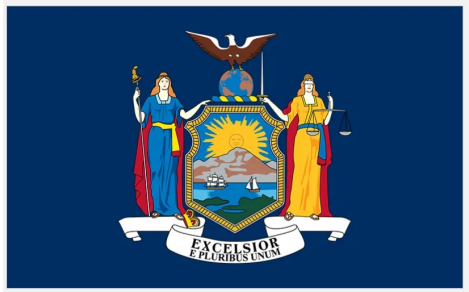
How do we use this information to evaluate contaminated sites?

- Dependent on regulatory framework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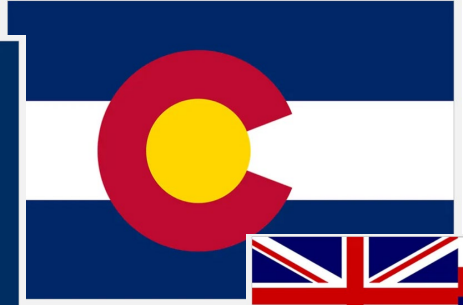
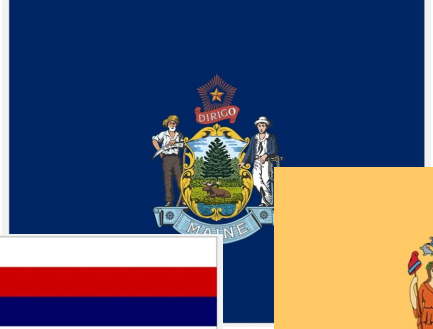
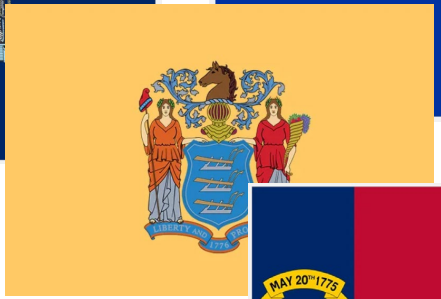
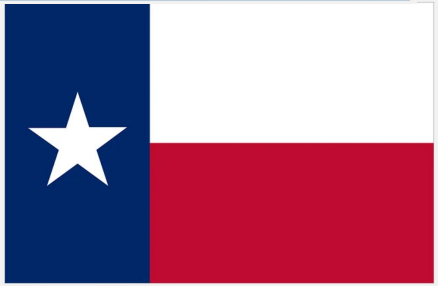
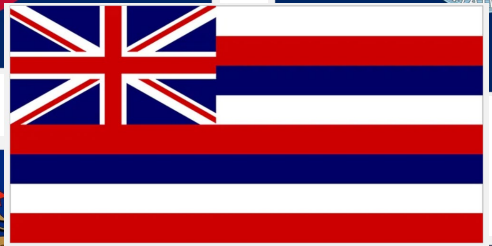


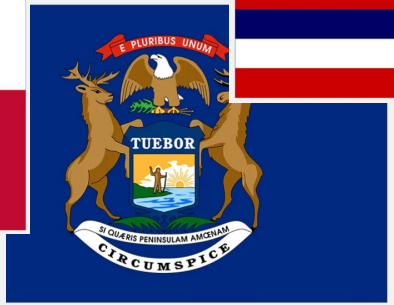

DIRIGO
MAINE


BATTLE BORN
NEVADA





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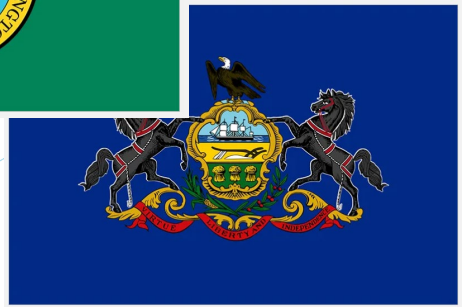
TUEBOR
SI QUÆRIS PENINSULAM AMŒNAM
CIRCUMSPICE

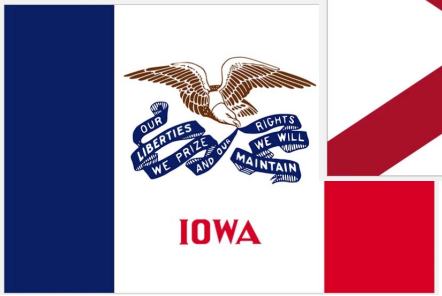

1858
L'ETOILE DU NORD
1819
1893
MINNESOTA


MAY 20TH 1775
N C
APRIL 12TH 1776


THE SEAL OF THE STATE OF WASHINGTON
1889




CALIFORNIA REPUBLIC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IOWA


GREAT SEAL OF THE STATE OF FLORIDA
IN GOD WE TRUST

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Why do groundwater screening values vary?

Exposure pathways

Not all pathways evaluated and varied exposure assumptions

Toxicity values

Availability and adaptation of scientific literature

Cancer and noncancer thresholds

Target risk selection: 1 in a 10,000 to 1 in 100,000,000

Target hazard quotient selection: 0.1 or 1

Background exposures

Potential exposure to other sources of PFAS in the environment (e.g., food, dust)

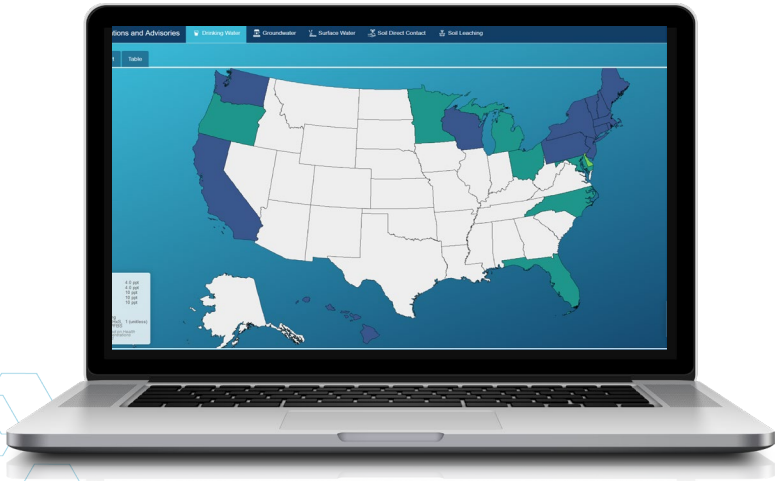
Groundwater Screening Level

Live Use-case Demo

Groundwater Risk-Based Screening Levels

PFOA in Groundwater	Agency	PFOA Groundwater Screening Level	PFOA Concentration > Groundwater Screening Level
10 ppt	Hawaii: Environmental Action Level	4 ppt	Exceeds
	New Jersey: Groundwater Quality Standard	14 ppt	Does not exceed
	Texas: Protective Concentration Level	290 ppt	Does not exceed
	EPA Tapwater Regional Screening Level	0.0027 ppt	Exceeds

Moving Forward: Together



- Regulation timeline: rapidly evolving and varied
- Dashboard: https://www.integral-corp.com/our-services/pfas/pfas-regulatory-criteria-map/
- Example application via groundwater exposure pathway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