

“Forever Chemicals” in Groundwater

John Lovie



Whidbey Island Water Systems Association

- Represents water systems, private well owners
- About 100 members
- Group A, Group B water systems, private wells, associate members
- Recipient of a Public Participation Grant from Washington State Department of Ecology
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- mail@whidbeywatersystems.org
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Disclaimer

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Overview

- PFAS Basics
- Limits
- Detections
- Potential Sources
- Cleanup Process
- Environmental Report Tracking System (ERTS)
- PFAS Cleanup Guidance
- Alternative solutions for drinking water
- Paying for cleanup
- Sourcewater Protection



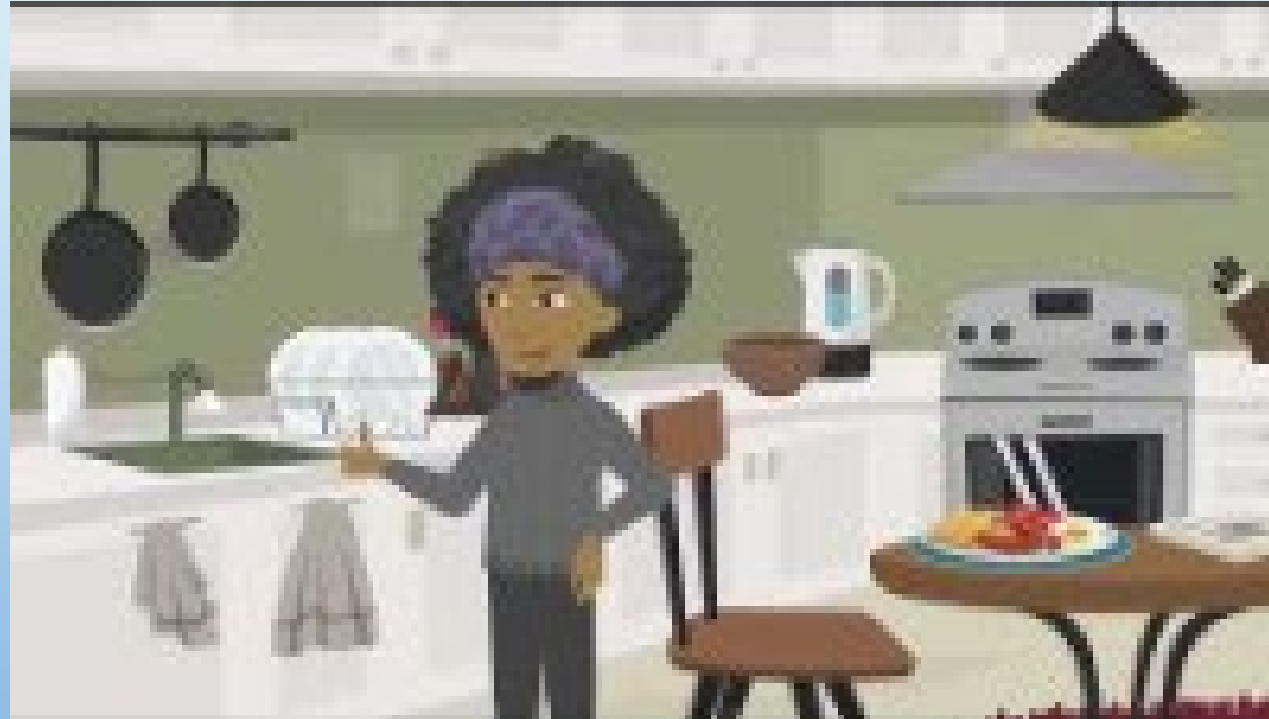
PFAS Basics 1: What are PFAS?



PFAS Basics 2: Why are PFAS a Health Concern?



PFAS Basics 3: Lowering your Exposure to PFAS in Drinking Water



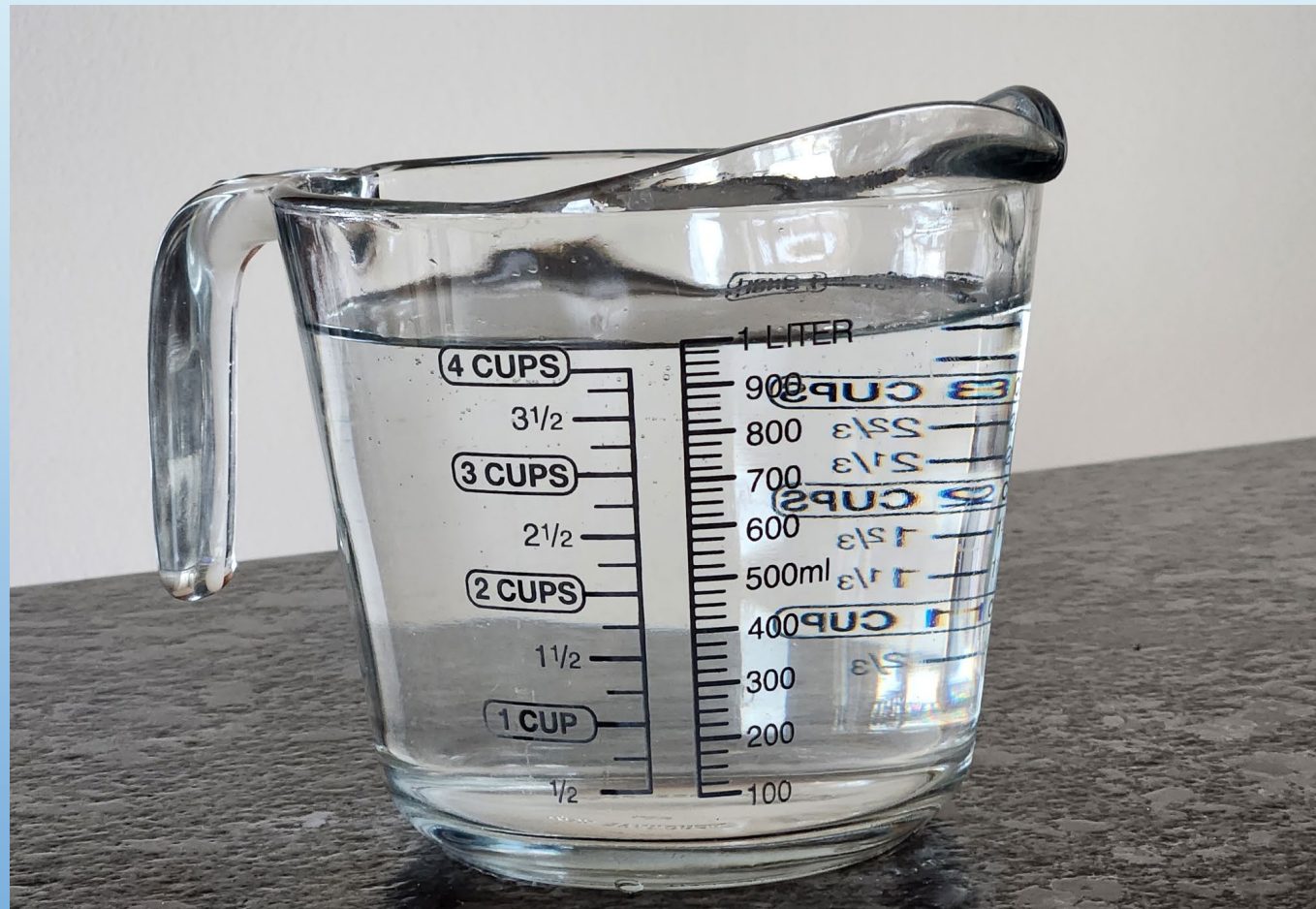
State vs. federal numbers for PFAS in Drinking Water (ng/L or parts per trillion)

Individual Maximum Contaminant Level (MCL) for 2 PFAS	WA State Action Levels (2021)	EPA Health Advisory Levels (2022)	EPA proposed MCL (2023)
PFOA (perfluorooctanoic acid)	10	0.004 *	4
PFOS (perfluorooctane sulfonic acid)	15	0.02 *	4
Hazard Index for group of 4 PFAS			HBWC used to calculate a ratio**
PFNA (perfluorononanoic acid)	9	-	10
PFHxS (perfluorohexanesulfonic acid)	65	-	9
PFBS (perfluorobutane sulfonic acid)	345	2,000	2,000
GenX (hexafluoropropylene oxide dimer acid and its ammonium salt)	-	10	10

*These are interim HALs.

**Health-based water concentration (HBWC) are the "acceptable" values used to create a ratio of observed/acceptable for each of 4 PFAS. If the ratios add up to more than 1.0, action must be taken to lower PFAS in the drinking water.

This is a jug of water with 4ppt of PFOS
How many molecules of PFOS are in there?



DOH Voluntary Testing Program

- Group A water systems
- Take-up varied widely across the state
- Some counties submitted no samples
- Overall, 1000 out of 7000 systems have been tested, but predominantly in the northwest
- Island County is the leader, with 137 out of 293 Group A systems tested
- The 10% detection rate in Island County (14 systems) is holding up across the state
- 700 Group A, 1800 Group B, and thousands of private wells can be expected have detections
- With MCLs, new methods, and compulsory testing, thousands of exceedances can be expected



PFAS Testing Results Dashboard | Washington State Department of Health

- Group A Public Water System Sources
- Does not include military facilities

PFAS in Drinking Water Data

This map shows PFAS results from drinking water testing at Group A public water system sources. Click a dot on the map to see information about the water system and source including test results (results will display in the table below the map). Flow patterns in water systems are complex, so a PFAS detection in a source near where you live does not mean that your home receives water from that source. Please contact your water system directly if you want information about your tap water. Source locations on this map are altered slightly from their actual location for security reasons, but still provide general locations of PFAS detections. When PFAS are detected above a State Action Level (SAL) for the first time, a second confirmation sample is required. The initial and confirmation sample results are averaged to determine if a SAL exceedance has occurred, this averaging of tests are not shown on this map or table.

View State Action Levels

[Click to learn more about PFAS water testing data in Washington](#)

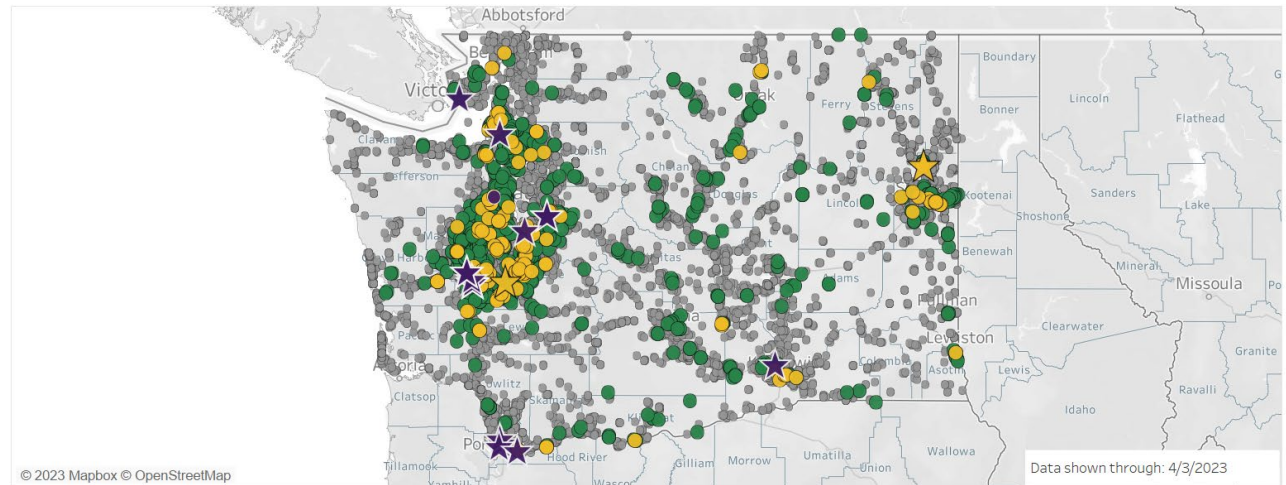
[Click to watch a video about how to use this dashboard](#)

MAP LEGEND

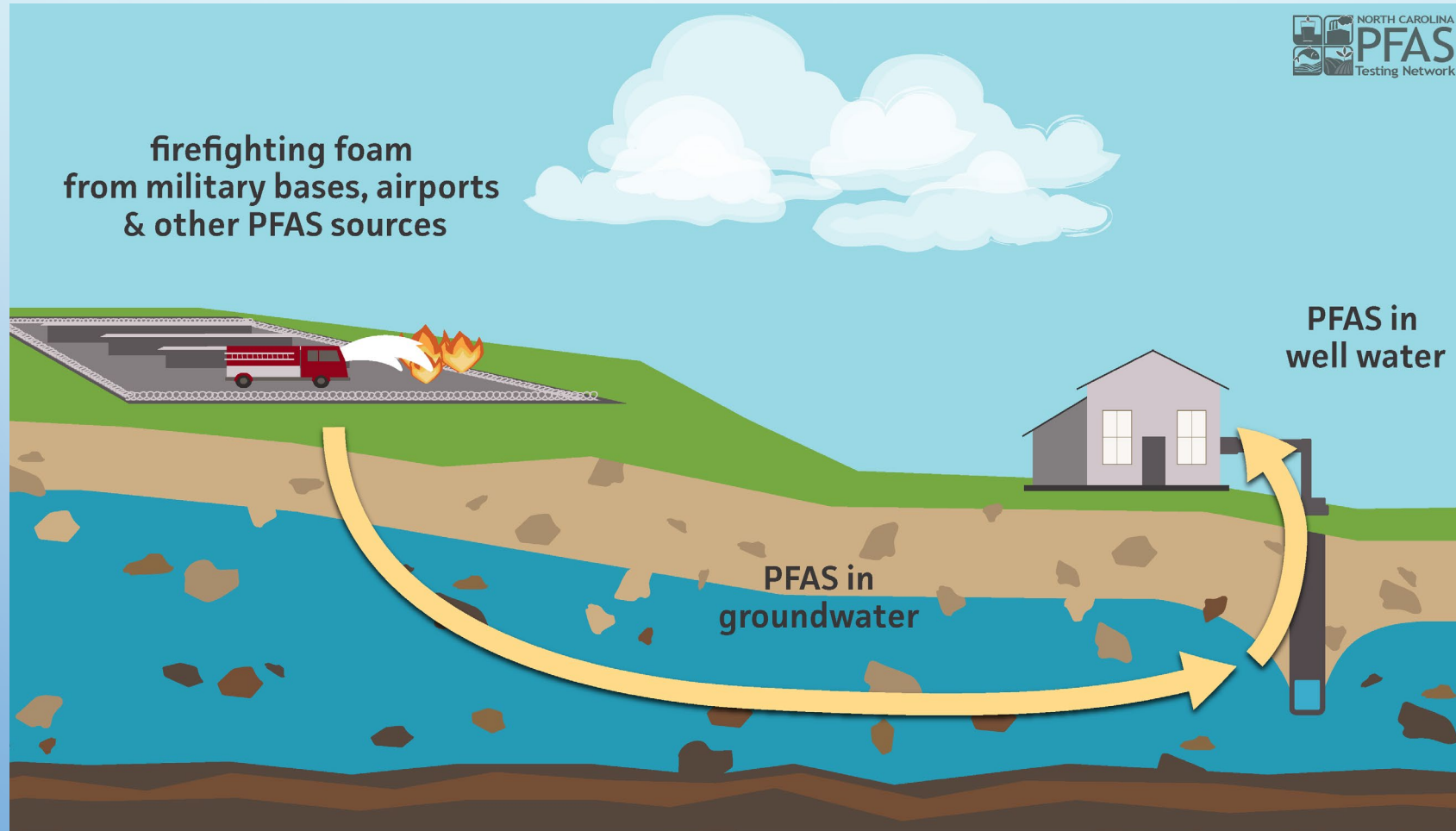
Selections made determine which water source data are included on the map.

- Map the most recent PFAS test result for each water source
- Map the highest PFAS test result for each water source

- | | | | | |
|----------------------------------|---|---|---|--|
| <input type="radio"/> Not Tested | <input checked="" type="radio"/> No PFAS detected | <input checked="" type="radio"/> PFAS detected at levels below State Action Level (SAL) | <input checked="" type="radio"/> PFAS detected at levels exceeding State Action Level (SAL) | <input checked="" type="radio"/> Indicates action is or has been taken to remove or reduce PFAS exposure |
| Include | Include | Include | Include | Include |



What are the sources of PFAS in drinking water?



AFFF - Washington State Department of Ecology



Firefighting foam
is the suspected source of
most PFAS contamination
in our state's
drinking water.



PFAS in Firefighting Foam (wa.gov)

Collection and disposal program

Environmental Impact Statement



PFAS in Firefighting Foam

Aqueous film-forming foam (AFFF) is a firefighting foam used to combat flammable liquid-based fires. AFFF extinguishes fires by creating a barrier between the material fueling the fire and the air, cutting off the oxygen it needs to burn.

Per- and polyfluoroalkyl substances (PFAS) are used in firefighting foam due to their ability to resist heat and dissolve in water. However, **PFAS are toxic chemicals that do not naturally break down in the environment.**



To request an ADA accommodation, contact Ecology at 360-407-6700 or hwtrpubs@ecy.wa.gov, or visit ecology.wa.gov/accessibility. For Relay Service or TTY, call 711 or 877-833-6341.

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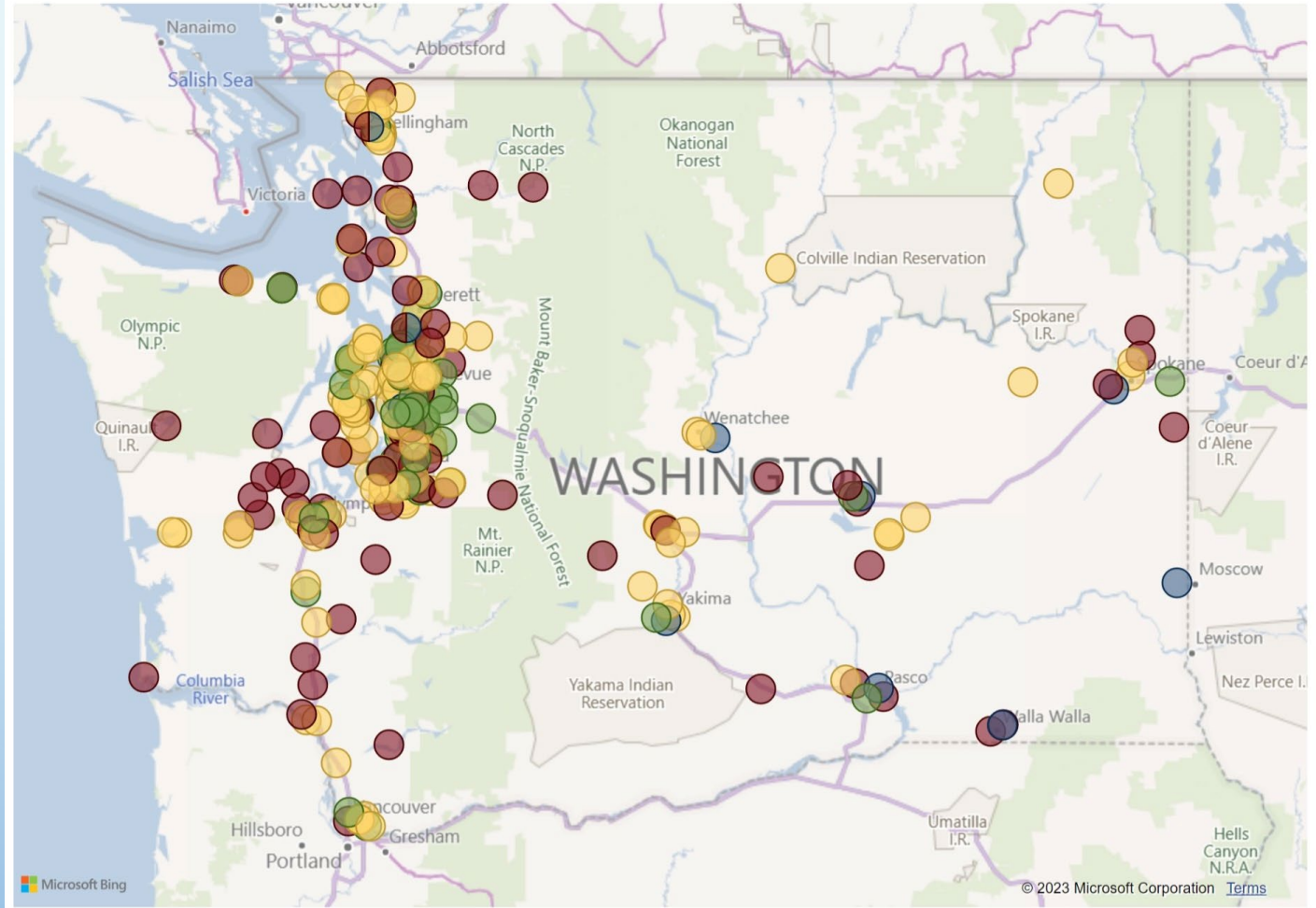
Publication: 22-04-037
August 2022

Product Replacement Program - Washington State Department of Ecology

● Fire departments who plan to participate in Ecology's AFFF firefighting foam disposal program

Businesses participating in Ecology's Product Replacement Programs

Business type ● Airport ● Auto Repair ● Dry cleaner ● Fire Department



Microsoft Power BI



Cleanup process - Washington State Department of Ecology

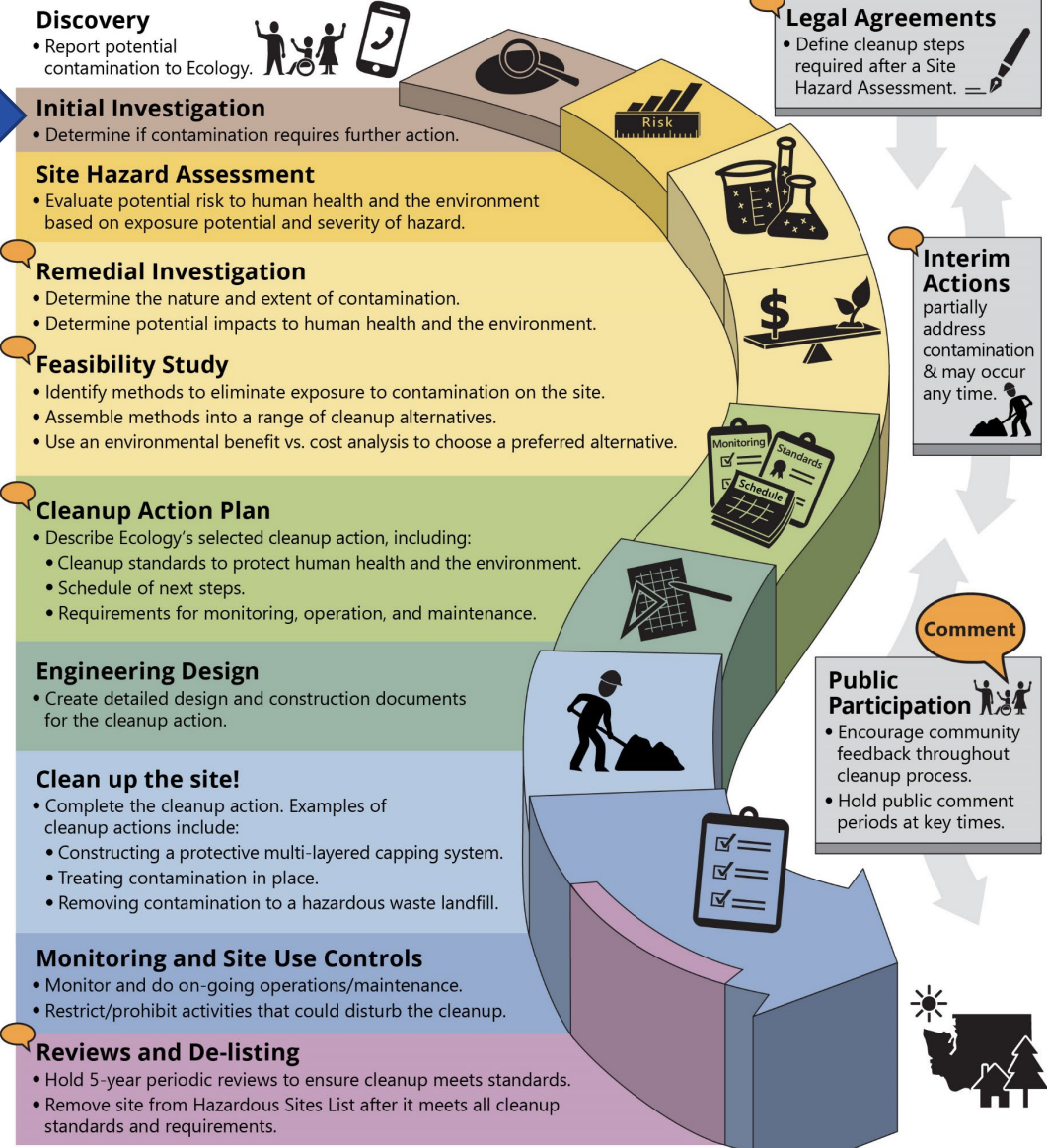


Discovery

- Report potential contamination to Ecology.



Washington's Formal Cleanup Process



Washington's Cleanup Law
Model Toxics Control Act (MTCA)

MTCA defines the cleanup process. This public-initiated environmental law directs upland cleanups (on land or in groundwater) and sediment cleanups (in freshwater or marine environments). Ecology enacts MTCA and regulates the cleanup process.



Statewide reporting form ERTS - Washington State Department of Ecology

Who is reporting?

Where did it happen?

What happened?

Who might be responsible?

DEPARTMENT OF **ECOLOGY**
State of Washington

Regulations & Permits Research & Data Blog Contact Us

Home Air & Climate Water & Shorelines Waste & Toxics Spills & Cleanup

Report an environmental issue > Statewide reporting form ERTS

Statewide Environmental Incident Report Form (ERTS)

If you see a spill or other environmental problem, we encourage you to report it. The sooner Ecology knows about an incident, the quicker we can act to reduce damages to our environment and protect sensitive natural resources.

Please use this Environmental Report Tracking System (ERTS) form to notify us of environmental issues in any Washington county.

Reports submitted using this form or via email are **only monitored during business hours**.

If this is an emergency, please contact the Washington State Emergency Management Division at **1-800-258-5990**.

NOTE: This form has display issues when viewed in Internet Explorer. Please use Edge, Chrome, Firefox or Safari.

Who is reporting?
(About the reporting party)

Your first name

Your last name

Confidential?
 ▾

If you indicate "Yes" your contact information will not be shared with external agencies.

Reporter type
 ▾

Your organization name (if any)

Your email

If you provide an email address, you will receive a confirmation email with the information you have provided in this form.

Reporting Environmental Contamination

Reporting not required for water systems but much appreciated
We won't list your water system; we'll list potential source or unknown source
You don't need to know source or have much data but any info on potential sources is appreciated

Reporting environmental contamination

What to Report

Detection of PFAS in water system
Any suspected environmental contamination

Reporting Options

Email nwroerts@ecy.wa.gov
Call 206-594-000
Online reporting form

Any Spill to Surface Water

Call immediately 24/7
800-OILS-911 / 800-645-7911

Finding the Reporting Form

Visit Ecology's web site at ecology.wa.gov
Click on "Report environmental issues"
Click on "Report other environmental issues"
Go to the section for the Northwest Region

What's In My Neighborhood (wa.gov)

- Sites where cleanup process has started
- List filtered by contaminant and county

DEPARTMENT OF ECOLOGY
State of Washington

What's in My Neighborhood: Toxics Cleanup

Home Filters 2 Help

Address, Site, or ID Radius Off

> Arsenic/Lead Contamination 1

▼ Cleanup sites on map 4

Filters 2 Export

Site Name?	CSID?	Go
Deer Lake Area PFAS	16781	📍
Fire Training Station NAS Whidbey	3434	📍
Harrington Lagoon Area PFAS	16780	📍
Mabana Area PFAS	16779	📍

Legend

Cleanup Site Status

- Awaiting cleanup
- Cleanup started
- Monitoring cleanup progress
- Cleanup complete

Everett Smelter Plume

Esri, NASA, NGA, USGS | Island County, WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, Bureau of Land Manag... Powered by Esri

Cleanup Levels

[Focus on: PFAS cleanup levels \(wa.gov\)](https://www.wa.gov)



Purpose and background

This focus sheet provides the Washington State Department of Ecology's (Ecology's) recommended soil and groundwater cleanup levels for part of a group of harmful compounds known as per- and polyfluoroalkyl substances, or PFAS. These compounds include:

1. PFOA, or perfluorooctanoic acid,
2. PFOS, or perfluorooctane sulfonic acid,
3. PFNSA, or perfluorononanoic acid,
4. PFHxS, or perfluorohexane sulfonic acid,
5. PFBS, or perfluorobutane sulfonic acid, and
6. HFPO-DA (GenX), or hexafluoropropylene oxide dimer acid.

The Washington State Department of Health (DOH) issued a final rule that included groundwater State Action Levels (SALs) for the first five PFAS compounds listed above, which became effective on January 1, 2022. The Department of Health calculated the SALs using peer-reviewed non-cancer reference doses (RfDs) that represent the best available science. They used RfDs to establish the SALs because there are limited data available to support a quantitative assessment of cancer risk for PFAS compounds.

We calculated the recommended groundwater cleanup level for HFPO-DA using Model Toxics Control Act (MTCA) [Equation 720-1](#)¹ and EPA reference doses (RfDs).

For comparison purposes, we've also included the Environmental Protection Agency's (EPA) Health Advisory Levels for PFOA, PFOS, PFBS, and HFPO-DA. EPA is still evaluating the RfDs they used to develop the interim Health Advisory Levels for PFOA and PFOS, and it's possible these levels could be revised in the future. EPA is also developing RfDs for several other PFAS compounds, which may lead to additional groundwater health advisories.

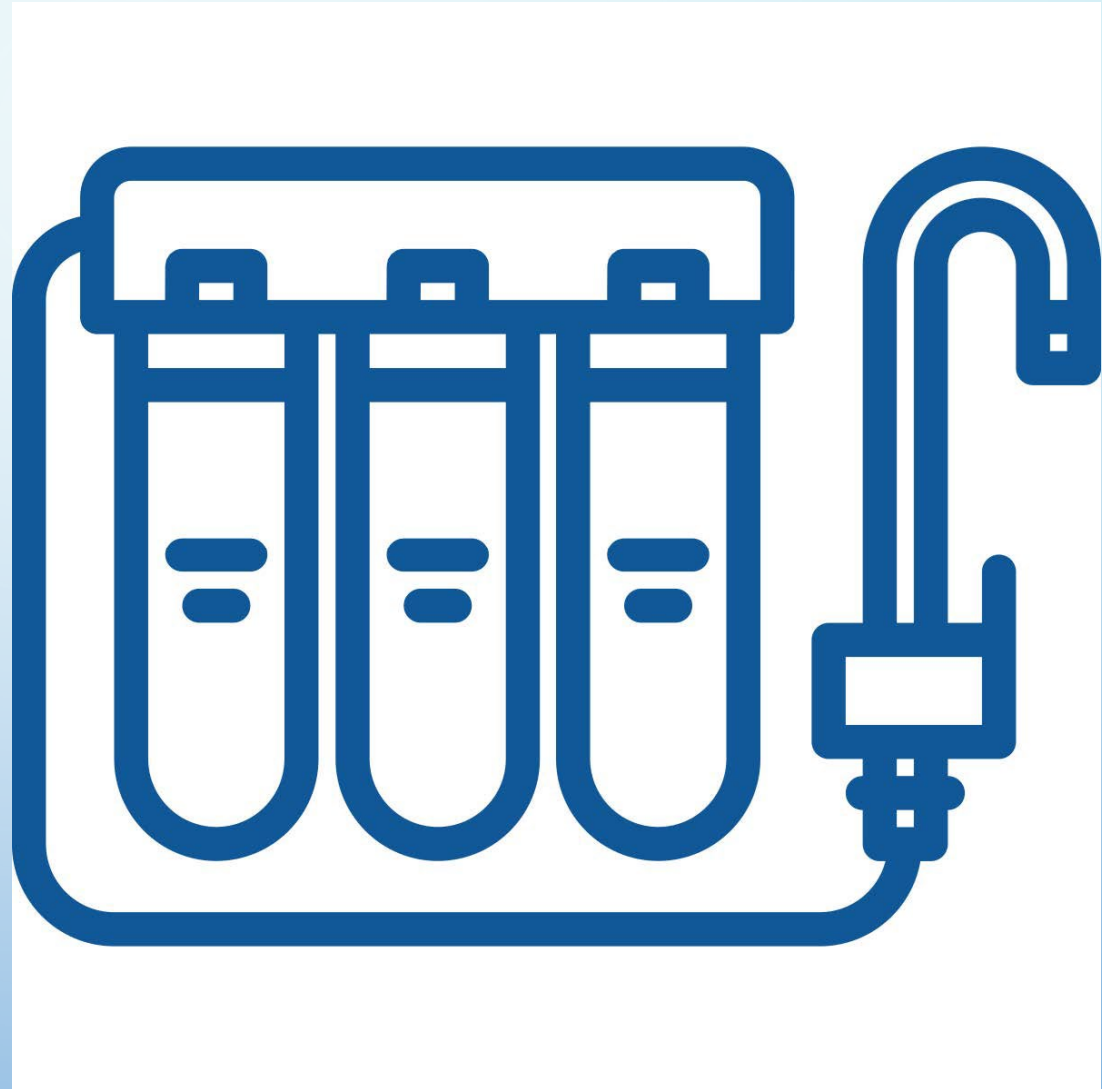
Table 1: Recommended groundwater cleanup levels

PFAS Compound	Recommended Groundwater Cleanup Level	EPA Health Advisory Level
PFOA	10 ng/L	0.004 ng/L
PFOS	15 ng/L	0.02 ng/L
PFNA	9 ng/L	None
PFHxS	65 ng/L	None
PFBS	345 ng/L	2,000 ng/L
HFPO-DA (GenX)	24 ng/L	10 ng/L



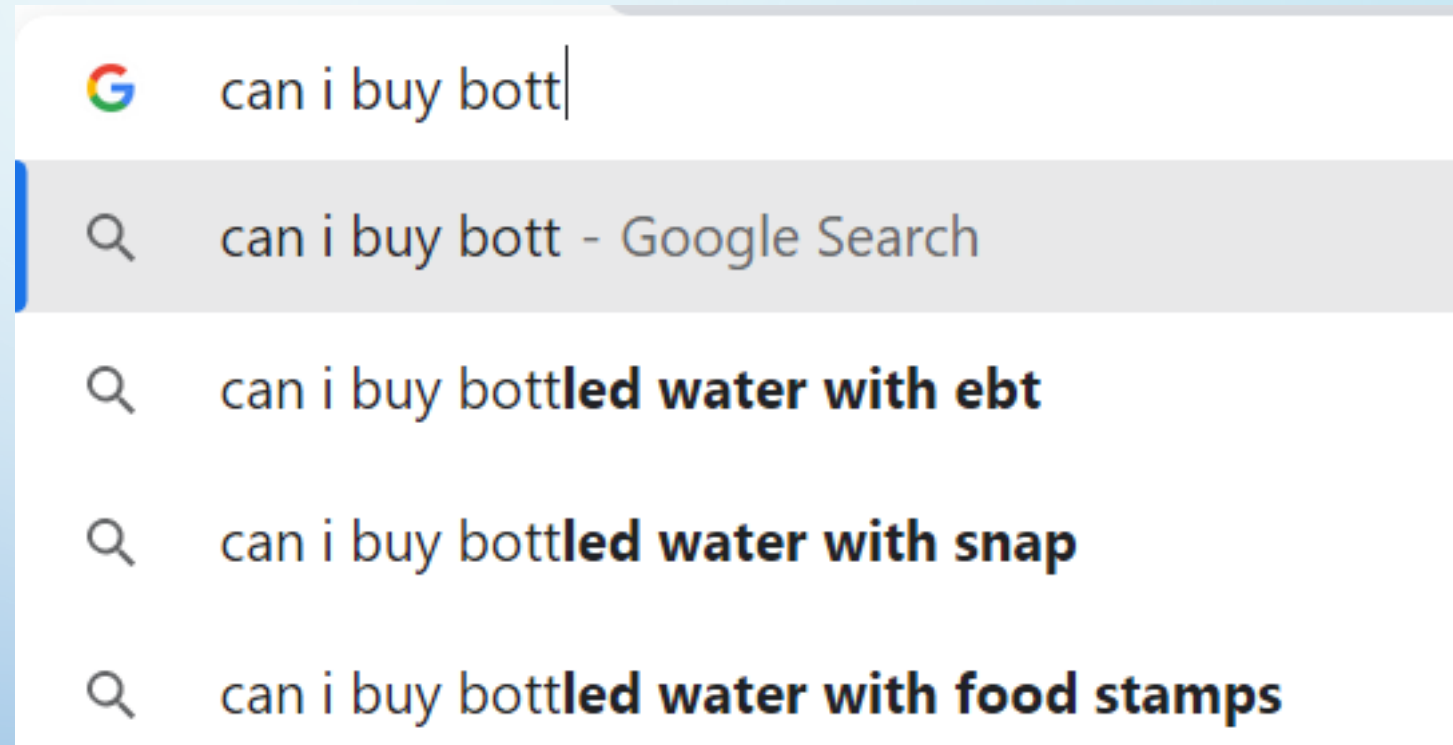
Alternative Solutions

- Bottled water
- Point of use filtration
- Treatment of drinking water
- Relocation of wells
- Consolidation of water systems
- Clean up of groundwater



Can I buy bottled water with food stamps?

- Safe drinking water act excludes private wells and Group B systems
- Water rights and zoning have encouraged both
- Approximately 1.7 million Washingtonians unprotected
- Clean water act excludes groundwater
- MTCA needs a polluter to pay



Paying for a solution

- A core principle of MTCA is “polluter pays”
- Everyone who touches the material is a Potentially Responsible Person (PRP)
- Some states have sued the manufacturers
- It will take a long time to recover the money
- Alternative Water Supply decision package
- [Area-wide groundwater investigation grants - Washington State Department of Ecology](#)
- [Safe drinking water action grants - Washington State Department of Ecology](#)



Lawsuit week for PFAS

- Settlement with Dupont \$1.12 billion
- City of Vancouver treatment plant \$233 million

PFAS manufacturer stock prices

Closing stock prices of major PFAS manufacturers for the week of May 30, 2023

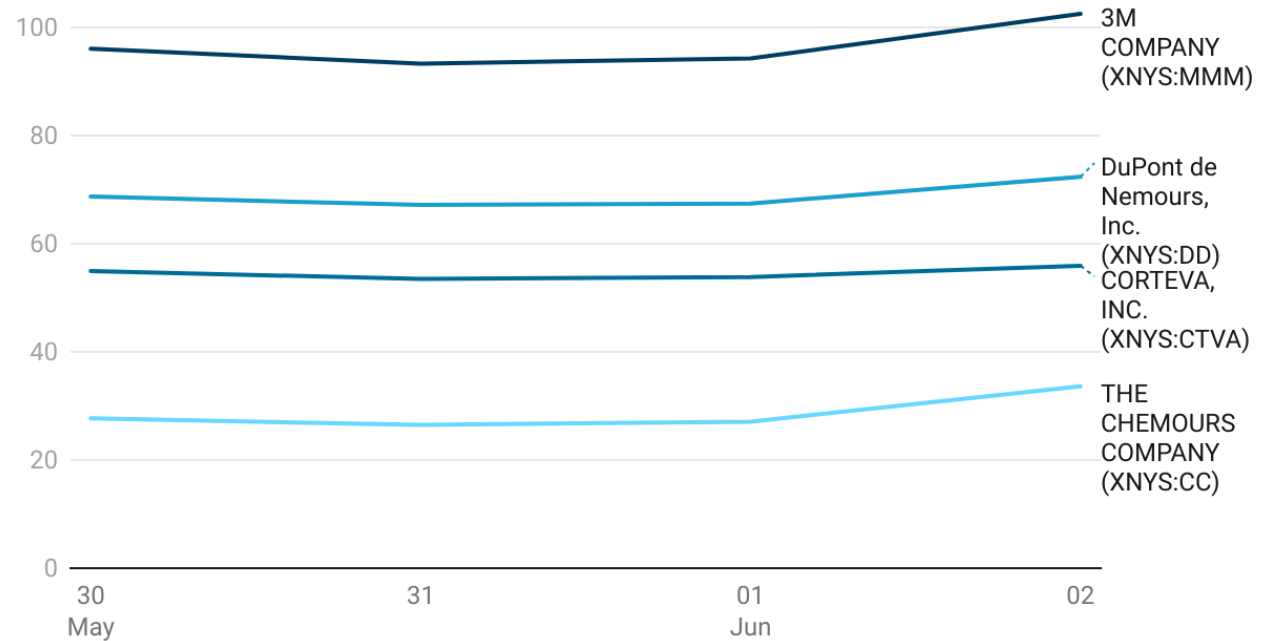


Chart: John Lovie • Source: NYSE • Created with Datawrapper

CAFOs and Dairies

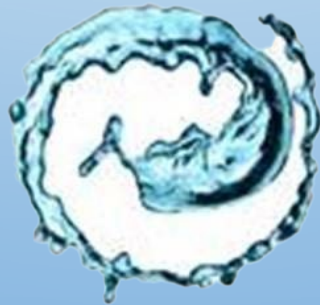
- Source of ammonia, nitrous oxide, nitrate, E. Coli, pesticides, antibiotics, organic material -> disinfection byproducts
- Inspection outsourced to Dept of Ag
- [Surf or Turf?](#)



Sourcewater Protection

- We are used to doing this for surface water
- What tools exist to protect groundwater?
- Need land use changes, zoning changes
- Need to protect critical aquifer recharge areas
- Low impact development





Association
Safe Adequate Water

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