Army Strategy

Three-Pronged Approach to Addressing PFAS

Test Drinking Water | **Cleanup Past Releases** | **Mitigate use of AFFF**

Test Drinking Water

Ensure PFOS/PFOA is below the lifetime health advisory in drinking water, through mitigation as appropriate

- In 2019, the Army tested 12 Yakima Training Area drinking water wells for PFAS. Only one well showed an exceedance (103 ppt) of the EPA lifetime health advisory (70 ppt). The Army immediately closed the well.
- This well is in a remote location and was only used during training exercises. An alternate water source is now used for training exercises.
- Sample Army drinking water systems to ensure no one is drinking water above EPA's lifetime health advisory of 70 ppt for PFOS/PFOA due to Army operations
- Off installation sampling conducted in September 2021 and January 2022; bottled water provided to 56 residences; sampling continues.

Cleanup Past Releases

Fulfill our environmental cleanup responsibilities following the federal cleanup law (aka CERCLA)

- Investigate and perform appropriate response actions to address PFOS/PFOA impacts attributed to past or current Army activities. Installations with the potential to impact drinking water supplies are first priority.
- CERCLA preliminary assessment completed at Yakima in October 2019 identified 3 sites where PFAS releases may have occurred.
- CERCLA site inspection completed at Yakima in 2020; Fire training pit has highest level PFOS+PFOA – 50,200 ppt; West boundary wells were 5,450 ppt, 2,710 ppt, 1,249 ppt, 311 ppt, and 198 ppt.

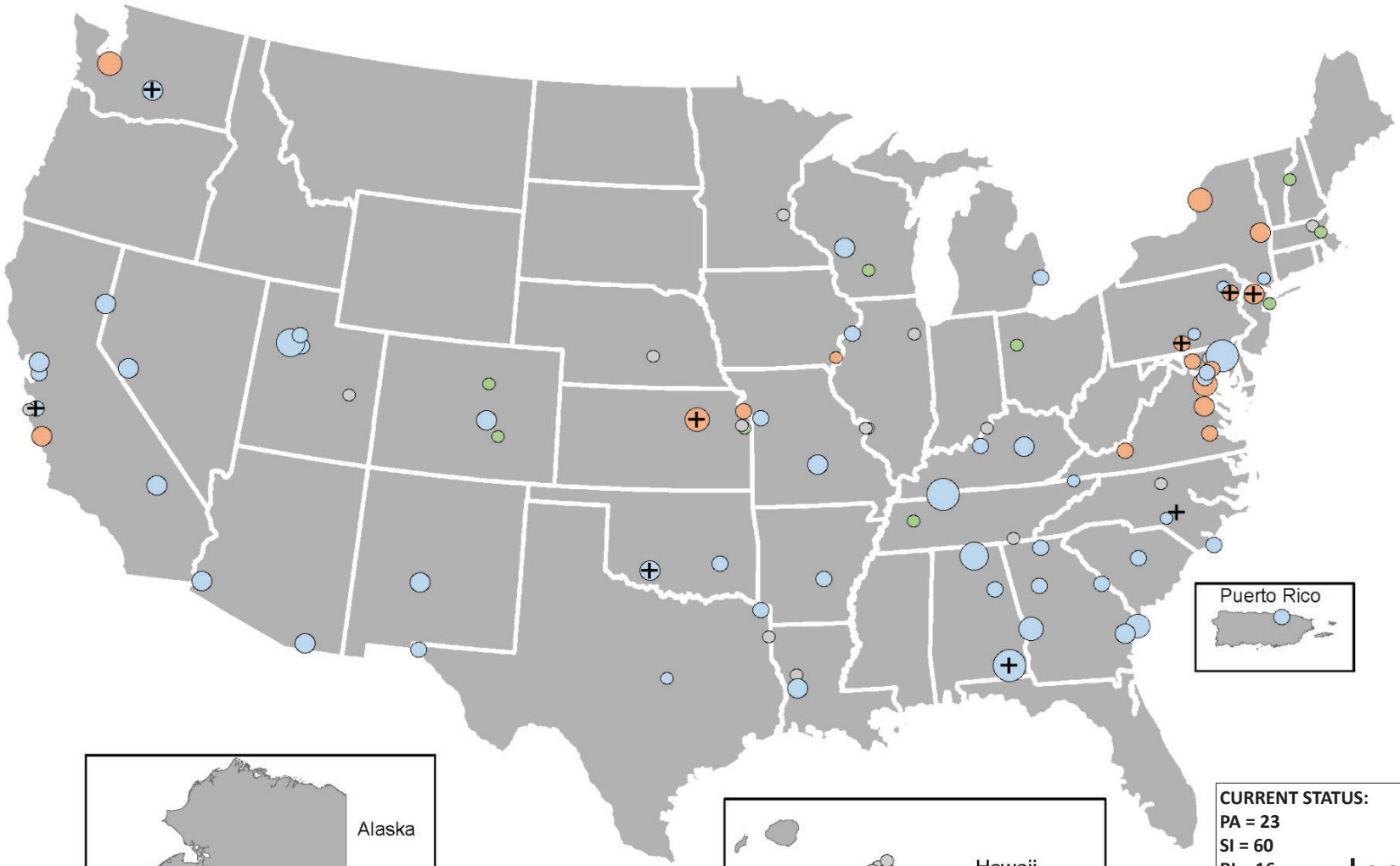
Mitigate Use of AFFF

Identify, remove, replace and properly dispose of older supplies of AFFF formulations

- Since 2014, YTC has not used AFFF for fire emergencies or training.
- In 2017, the DoD updated the military specification for AFFF in 2017, which set limits for PFOS and PFOA at the lowest levels of quantitation.
- YTC replaced the old AFFF with a new formulation that has trace amounts of PFOS and PFOA. YTC Fire and Emergency Services will only use the new formulation in emergencies and conduct immediate cleanup if used.
- YTC will transition to a fluorine-free AFFF formulation when it is approved for military use

PFAS: per and polyfluoroalkyl substances
EPA: Environmental Protection Agency
YTC: Yakima Training Center
PFOS: perfluorooctane sulfonic acid
ppt: parts per trillion
MILSPEC: military specification
PFOA: perfluorooctanoic acid
YTC: Yakima Training Center
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

U.S. ARMY PFAS INVESTIGATION STATUS



CURRENT STATUS:
PA = 23
SI = 60
RI = 16
NFA = 9

108 Installations

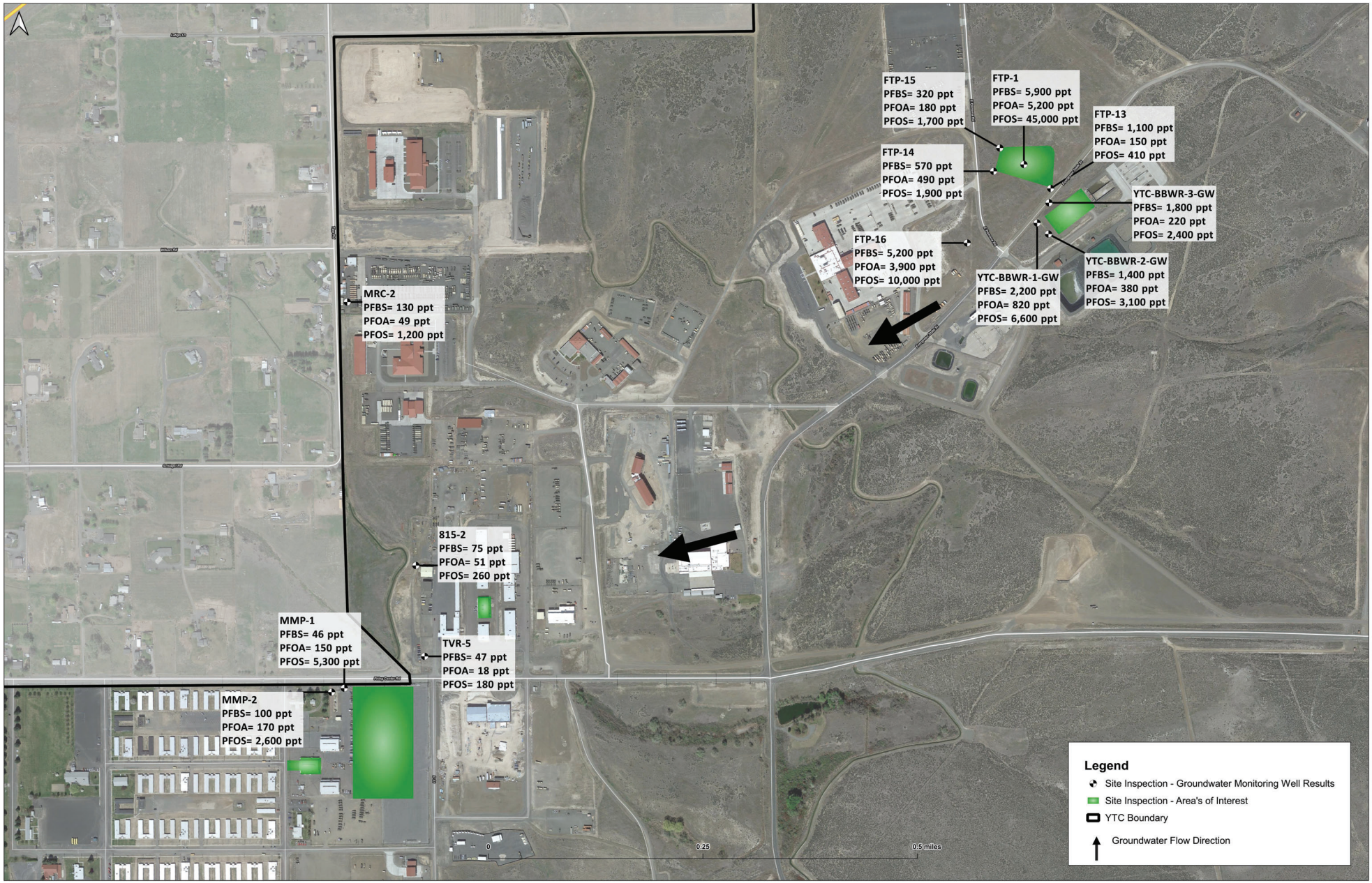
Definitions:
- **PA** = Preliminary Assessment
- **SI** = Site Inspection
- **RI** = Remedial Investigation
- **NFA** = No Further Assessment
- ⊕ = Off-post investigations

N

PFAS: per and polyfluoroalkyl substances

Current as of 18 May 2022

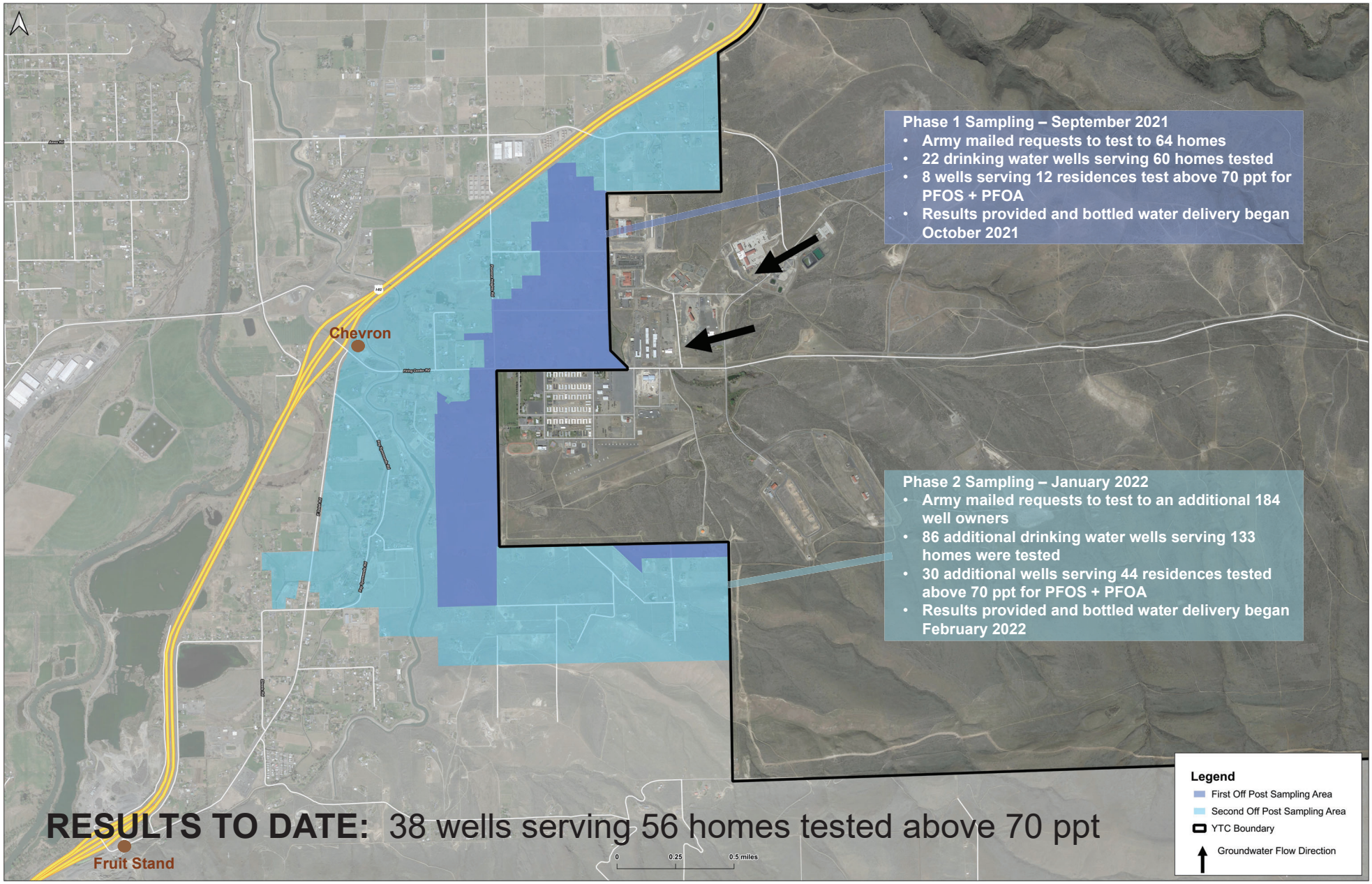
On-Post Groundwater Monitoring Well PFAS Testing



PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid PFBS: perfluorobutane sulfonic acid: ppt: parts per trillion YTC: Yakima Training Center

FTP: Former Fire Training Pit BBWR: Bird Bath Wash Rack MRC: Marine Reserve Center 815: Former Building 815 TVR: Tracked Vehicle Repair MMP: Main Motor Pool

Off-Post Drinking Water Test Results – Phase 1 & 2



RESULTS TO DATE: 38 wells serving 56 homes tested above 70 ppt

PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid ppt: parts per trillion YTC: Yakima Training Center

Per- and Polyfluoroalkyl Substances (PFAS)

What Are PFAS?

- Family of manufactured compounds
- Do not occur naturally.
- Used since 1950s in commercial and industrial products.
- Increase a product's resistance to heat, stains, water, and grease.
- Last a long time in the environment.

Where Do PFAS Come From?

firefighting foam

U.S. Navy / Photographer's Mate 3rd Class Tommy Gilligan

stain-resistant carpets and fabrics

Image: freepik.com

water-resistant fabrics

Image: Kyler Boone / unsplash

personal care products

Image: freepik.com

nonstick cookware

Image: Valeria_Aksakova / freepik

food packaging

Image: freepik.com

PFAS: per and polyfluoroalkyl substances

Potential Health Effects and Recommendations

How Might PFAS Exposure Affect People's Health?

Scientists are still learning about how people's exposure to PFAS might affect their health.

Exposure to certain PFAS **may** lead to the following:

- Increased cholesterol levels.
- Changes in liver enzymes.
- Decreased vaccine response in children.
- Small decreases in infant birth weight.
- Increased risk of high blood pressure or preeclampsia in pregnant women.
- Increased risk of kidney or testicular cancer.

What Can I Do to Protect My Health?

Get your water tested if you are in the areas the Army is testing.

If the level of PFAS in your tap water exceeds health advisory levels,

- Reduce exposure to PFAS in drinking water and through other sources.
- Switch to alternate water for drinking and cooking.
- Continue to breastfeed, the benefits greatly outweigh potential risks.
- Share your PFAS water results and discuss health concerns at your next doctor's visit.
- Go to regular preventive health care screening and services.
- Boost your health with healthy activities and foods.

PFAS: per and polyfluoroalkyl substances

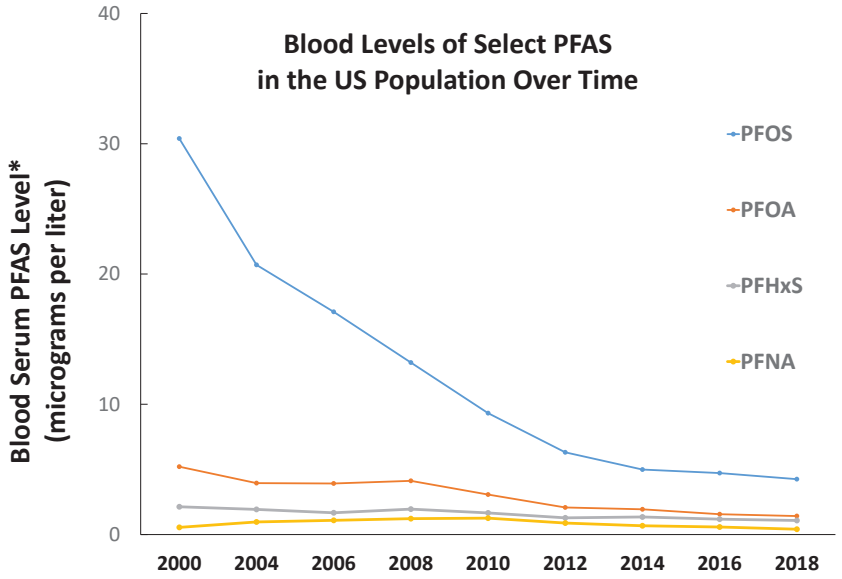
Exposure to PFAS

How Are People Exposed to PFAS?

- **Drinking water containing PFAS**.
  May be a significant source of exposure.
  - Infants may have higher exposure than adults.
  - Skin contact while bathing, showering, washing dishes, or washing clothes is **not** a significant source of exposure.
- **Eating food contaminated with PFAS**. May occur when water for crops or livestock contains PFAS or food packaging contains PFAS.
- **Using some consumer products**. Likely a lower exposure compared to drinking water containing PFAS.
- Accidentally swallowing contaminated soil or indoor dust.

PFAS in People

- Nearly all people tested have some PFAS in their blood.
- Levels of PFOS and PFOA have declined in people as use in products phases out.
- Some PFAS stay in the body a long time.
- PFAS blood levels cannot be used to diagnose or predict a health problem in a person.



Source: CDC's National Health and Nutrition Examination Survey (*Geomean)

PFAS: per and polyfluoroalkyl substances
PFOS: perfluorooctane sulfonic acid
PFOA: perfluorooctanoic acid
PFHxS: perfluorohexane sulfonic acid
PFNA: perfluorononanoic acid
CDC Centers for Disease Control and Prevention

EPA Lifetime Health Advisory for Drinking Water

The Army is providing bottled water for cooking and drinking to households whose water exceeds the EPA Lifetime Health Advisory for PFOS and PFOA.

- Established in 2016 by the US EPA.
- Advises use of alternate drinking water if PFOS and PFOA combined occur above 70 ppt.
- Set to protect health over a lifetime of exposure.
  - Includes sensitive populations such as a fetus or infant.
  - Accounts for exposure from sources other than drinking water. Assumes 80% of PFAS exposure comes from other sources.
- Based on developmental effects in animal studies and review of studies in people.
- Updated periodically to review newer science.

PFAS: per and polyfluoroalkyl substances PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid EPA: Environmental Protection Agency

Protecting Your Health: PFAS in Drinking Water

State drinking water standards

- The Washington State Board of Health set State Action Levels (SALs) for five PFAS in October 2021.
- SALs are health protection levels for long-term drinking water. They also apply to shorter periods for sensitive groups.
- Washington SALs were set by state scientists and account for newer science and exposure of breastfed infants.

State Action Levels (SALs)

- Require most public water systems to test for PFAS and take certain actions, like monitoring and public notice, if they find PFAS.
- Recommend when to take action to reduce PFAS in drinking water.

PFOA	10
PFOS	15
PFNA	9
PFHxS	65
PFBS	345

SAL units are in parts per trillion (ppt)

Acronyms

PFAS	per and polyfluoroalkyl substances	PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid	PFHxS	perfluorohexane sulfonic acid
PFOS	perfluoroctane sulfonic acid	PFBS	perfluorobutane sulfonic acid

How to minimize exposure when PFAS exceed a SAL in your tap water

Short-term

- Use an alternate water source like bottled water for drinking and cooking if you are pregnant, breastfeeding or mixing infant formula.
- Others should consider alternate water when PFOS+ PFOA+ PFNA levels are greater than 70 ppt.

Long-term

- Install a home filter to remove PFAS from your water.
- Connect to a nearby public water system or well that doesn't have PFAS.
- Contact Yakima Health District to explore other options.

Washington State Department of Health

Protegiendo Su Salud: PFAS en Agua Potable

Estándares estatales de agua potable

- El Consejo de Salud del Estado de Washington estableció los niveles de Acción Estatal (SALs por sus siglas en inglés) para cinco PFAS en octubre del 2021.
- Los SALs son niveles de protección de la salud para el consumo de agua potable a largo plazo. También se aplican a períodos más cortos en grupos vulnerables.
- Los SALs de Washington fueron establecidos por investigadores en el estado y representan los datos más recientes, así como la exposición de bebés lactantes.

Niveles de Acción del Estado (SALs)

- Requieren que la mayoría de los sistemas de agua pública realicen pruebas de PFAS y tomen ciertas medidas, como el monitoreo y aviso público, si encuentran PFAS.
- Recomiendan cuándo se deben tomar medidas para reducir los PFAS en el agua potable.

PFOA	10
PFOS	15
PFNA	9
PFHxS	65
PFBS	345

Las unidades SAL están en partes por trillón (ppt)

Acrónimos

PFAS per y sustancias polyfluoroalkyladas
PFOA ácido perfluorooctanoico
PFOS sulfonato de perfluoroctano
PFNA ácido perfluorononanoico
PFHxS ácido perfluorohexano sulfonico
PFBS ácido perfluorobutano sulfonico

Cómo reducir la exposición cuando los PFAS superan un SAL en el agua de la llave

A corto-plazo

- Use fuentes de agua alternativa, como agua embotellada para beber o cocinar si está embarazada, amamantando o cuando usa agua potable para mezclar formula infantil.
- Otras personas deben considerar fuentes de agua alternativa cuando los niveles de PFOS+ PFOA+ PFNA son más altos que 70 ppt.

A largo-plazo

- Instale un filtro en su casa para remover PFAS del agua.
- Conéctese a un sistema de agua público cercano o a un pozo de agua privado que no tenga PFAS.
- Hable con el Distrito de Salud de Yakima para explorar otras opciones.

Washington State Department of Health

PFAS in Animals and Gardens

There are no established limits or regulations about PFAS in animals, animal feeds, animal products, or fruits and vegetables. Scientists are still actively researching these topics in order to make informed recommendations.

Animal Health

How PFAS may affect the health of pets or livestock is currently unknown.

Animals drinking water or eating feed containing PFAS will have PFAS in their bodies.

Once the source of PFAS is removed, PFAS levels go down

- Animals pass PFAS from their bodies at different rates, based on their size, species, and the type of PFAS
- Most animals seem to pass PFAS from their bodies much faster than people

Studies in research animals (mice, rats, primates) show PFAS can:

- Damage the liver and immune system
- Alter hormone levels and offspring growth and development
- Produce certain tumors
- Accumulate in the organs

Consult your veterinarian if you are concerned about your animal's health.

Animal Products

Eating animal products from animals drinking water or eating feed containing PFAS may increase the PFAS levels in your body.

Washington State Department of Agriculture recommends testing products from animals drinking water containing PFAS before selling them.

Once the source of PFAS is removed, PFAS levels go down in animals

- There are no established limits for PFAS in animal products
- PFAS tend to accumulate in animal organs
- Wildlife and game in this area have not been tested for PFAS

Gardening

Plants can take up PFAS from irrigation water and the soil.

Plants accumulate PFAS differently depending on the type of PFAS, species of plant, and area of the plant (such as leaves or roots)

- Root vegetables and leafy greens (like carrots, lettuce, spinach, etc) may accumulate higher levels of PFAS than other produce
- Fruits (tomatoes, cucumbers, melons) may accumulate less PFAS

Eating produce irrigated with water containing PFAS may increase the PFAS levels in your body.

If you have been irrigating with water containing PFAS, some PFAS will also be detected in the soil.

WA State Department of Agriculture recommends testing products irrigated with water containing PFAS before selling them.

PFAS: per and polyfluoroalkyl substances

Avoid Swallowing PFAS


Drinking Water


Baby Formula


Coffee and Tea


Rice


Pasta

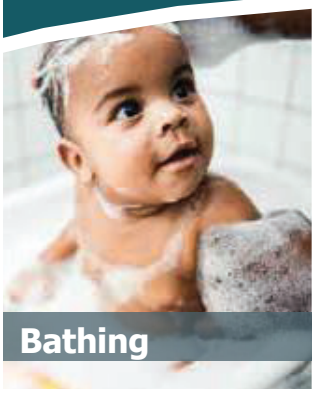

Soup

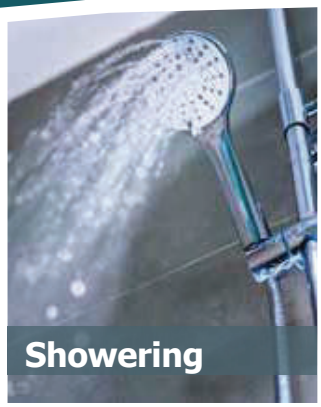
The main ways that PFAS get from tap water into your body:

- drinking the water
- drinking beverages made with the water like infant formula, coffee, or tea
- eating food prepared with the water

The best way to prevent PFAS from getting in your body is to avoid swallowing them

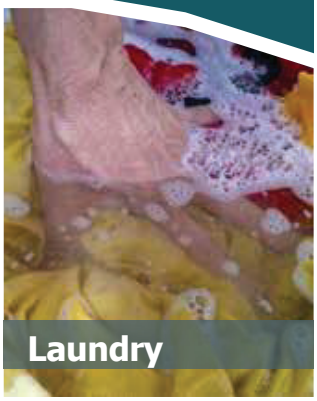
Skin Contact is a Minimal Concern


Bathing


Showering


Hand Washing


Washing Dishes


Laundry

Touching the water is OK. PFAS in water don't get through your skin very well. Touching the water while showering, bathing, doing dishes or laundry is not an exposure of concern.

Washington State Department of Health

DOH 825-037 May 2022

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X Evite ingerir PFAS


Agua potable


Fórmula para bebés


Café y Te


Arroz


Pasta


Sopa

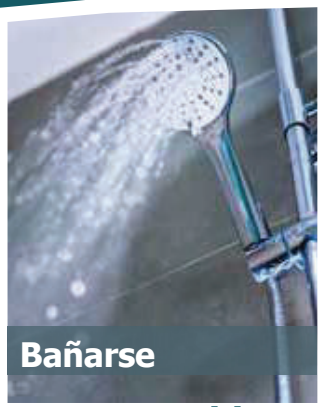
Las principales formas en que las PFAS pasan del agua potable (de la llave) a su cuerpo son:

- Al beber agua potable
- Al tomar bebidas hechas con agua potable como leche de fórmula para bebés, café o te
- Al comer alimentos preparados con agua potable

La mejor forma de evitar que las PFAS entren en su cuerpo es no ingerirlas

El contacto con la piel es una preocupación mínima


Ducharse


Bañarse


Lavarse las manos


Lavar platos


Lavar ropa

Tocar el agua no es un problema. Las PFAS en el agua no se absorben muy bien en su cuerpo. Tocar el agua al ducharse, bañarse, lavarse las manos, o lavar platos o ropa no se considera una exposición para preocuparse.

Washington State Department of Health

DOH 825-037 mayo 2022

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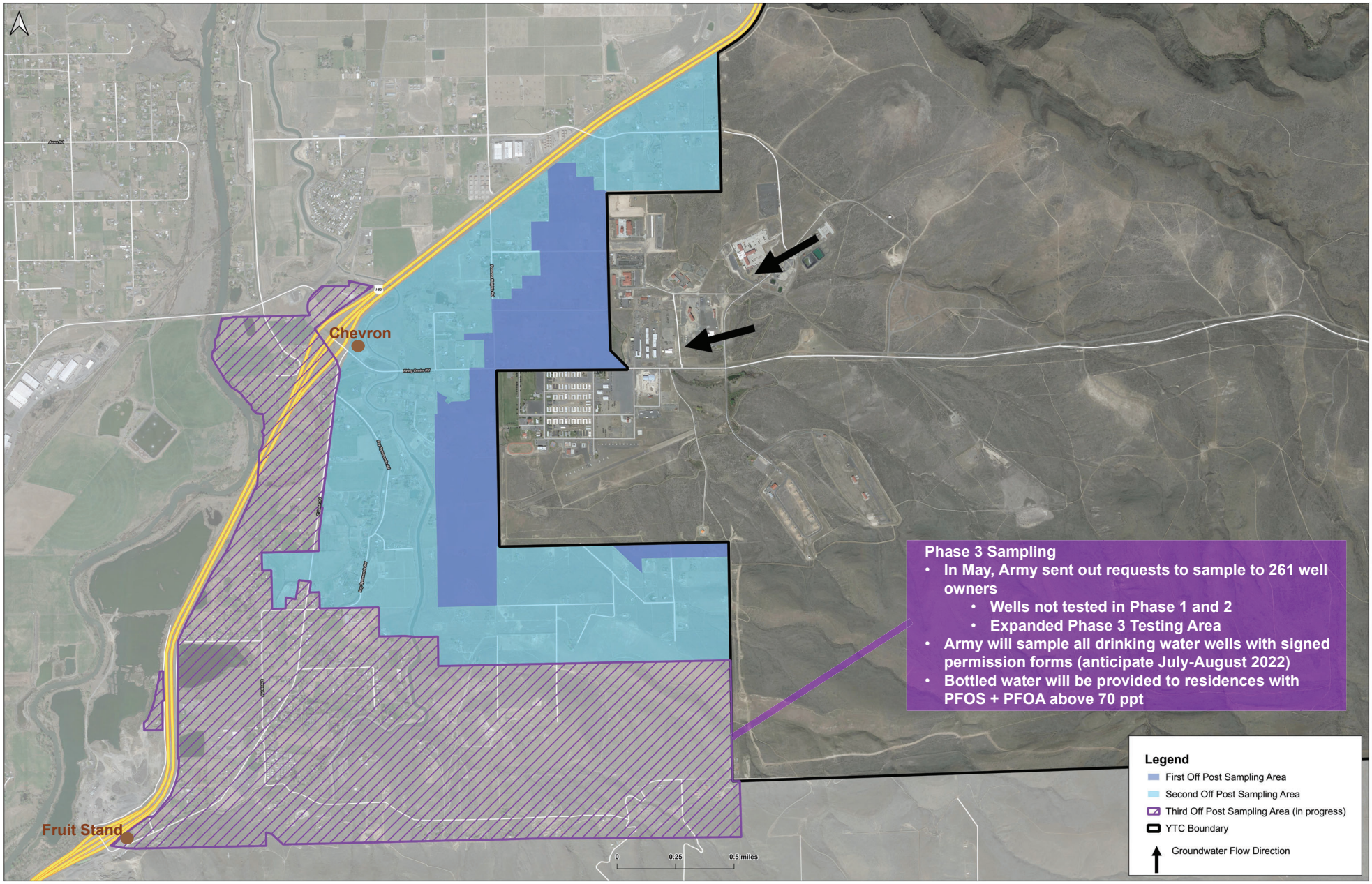
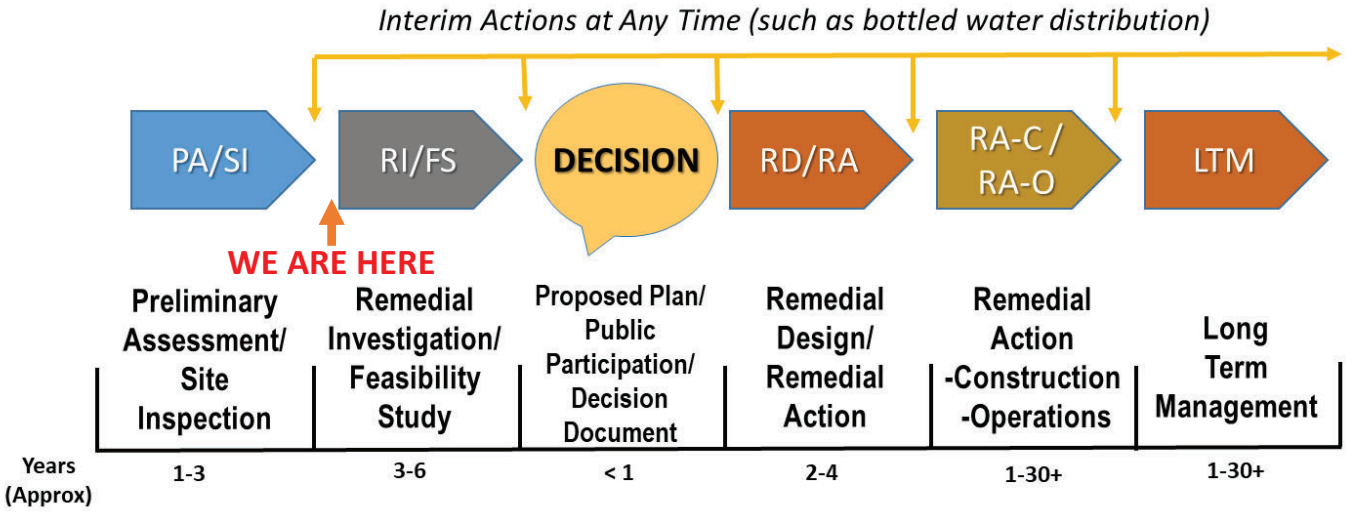
Phase 3 Drinking Water Sampling



PFOS: perfluorooctane sulfonic acid PFOA: perfluorooctanoic acid ppt: parts per trillion YTC: Yakima Training Center

Army Next Steps

- **Interim Actions**
  - Continue delivering bottled water to people in households with PFOS + PFOA above 70 ppt
  - Partnering with U.S. Army Corps of Engineers
    - Beginning Summer 2022, identify/evaluate all interim drinking water solutions (other than bottled water)



- **Remedial Investigation**
  - Army follows the federal cleanup law (aka CERCLA)
  - Planning Currently Underway:
    - Army will contract with expert consultant in Summer 2022
    - Army will work with regulators and other stakeholder to develop plans
    - Additional monitoring wells will be installed on YTC
  - Field investigations will identify:
    - Where are the sources?
    - How big is the release?
    - How does PFAS move in the groundwater?
  - Collected data will be used for risk assessment and developing options for cleanup

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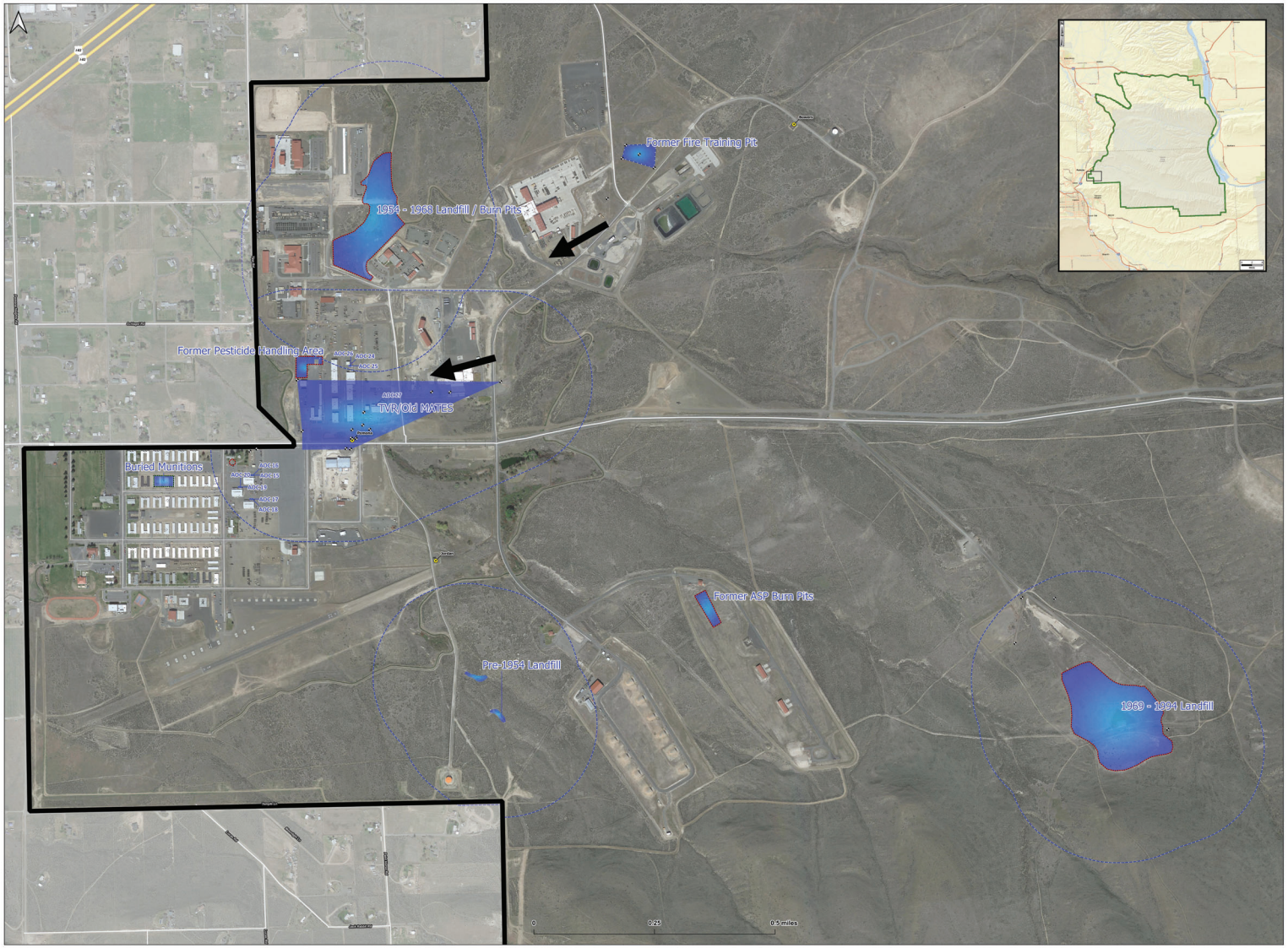
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Cleanup of Past Contamination



Cleanup Program established in 1985 to address contamination from past activities

1995 EPA facility assessment report required site investigation and cleanup

77 Solid Waste Management Units (SWMU)

38 Areas of Concern (AOC)

Today: Cleanup Complete at 94 Sites

Received concurrence from Washington regulators

Army still working on 21 sites in addition to PFAS

Groundwater Monitoring (3 sites)

- Tracked vehicle repair (TVR)
- Old mobilization and training equipment site (MATES)
- Former Fire Training Pit (FTP)

Land Use Controls (7 sites)

Site Investigations Remaining (11 sites)

AOC 14, AOC 15, AOC 16, AOC 17, AOC 18, AOC 19, AOC 20, AOC 24, AOC 25, AOC 26, and AOC 27

Legend

- Groundwater Monitoring Wells
- YTC Drinking Water Wells
- YTC Boundary
- Installation Restoration Program Active Sites

Installation Restoration Program Land Use Controls

- Prevent residential land use and unplanned excavation of contaminated soil
- Address potential discarded military munitions under building if demolished
- Prevent installation of new drinking water well within 1000 ft of the site boundary

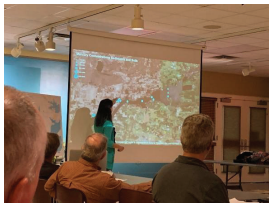
Groundwater Flow Direction

All documents are available at the Yakima Central Library at 102 N 3rd St, Yakima, WA

Washington State Department of Ecology Link: https://apps.ecology.wa.gov/cleanupsearch/site/2301

Let Your Voice Be Heard

Consider Volunteering to Serve on YTC Restoration Advisory Board (RAB)


WHAT IS A RAB?

A RAB provides the community with the opportunity to become involved in the environmental restoration process either as a RAB member or participation at RAB/public meetings