

February 2020: The PFAs Story in El Paso County

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ORGANAGARDENS



Accessing Clean Water:

The PFAS Story in El Paso County, CO

Dr. Eli Fahrenkrug
Dr. Tyler Cornelius



Torres del Paine, Southern Chile



King George Island, Antarctica



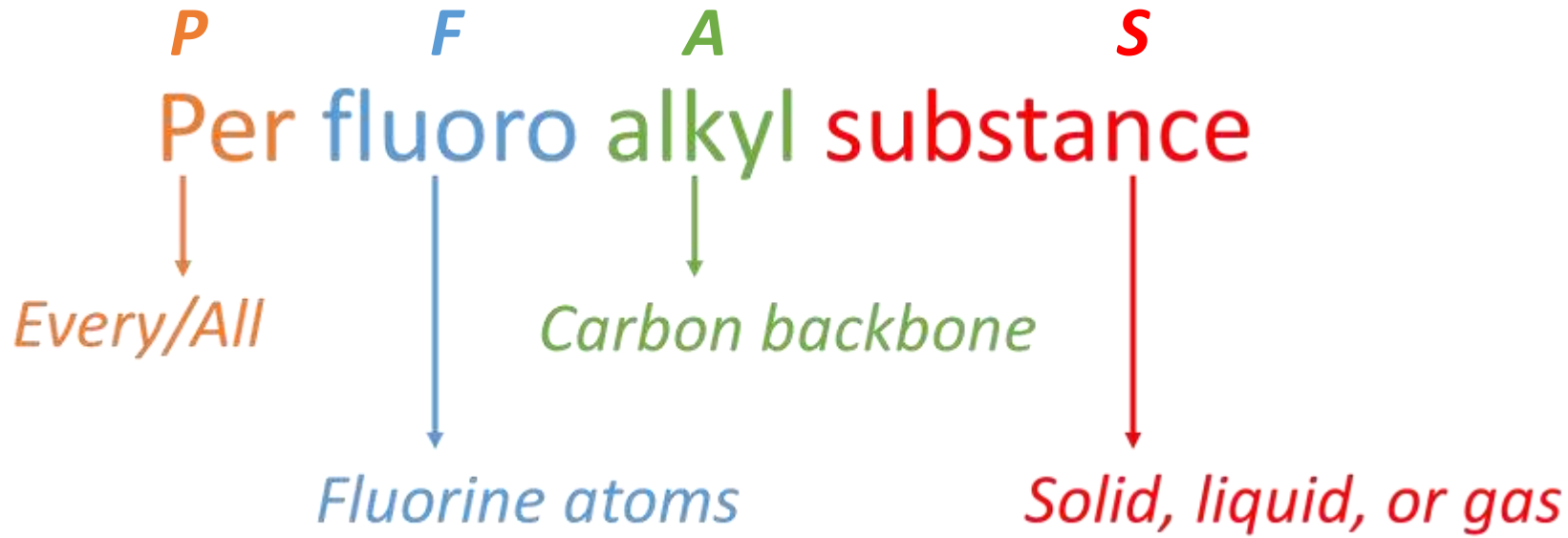
Treriksröset, northern tips of Sweden, Finland, Norway



Haba Xueshan, Yunnan, China



How to Speak Chemistry *What is PFAS?*



Properties

- Surfactant
- Persistent
- Bioaccumulative
- Toxic

Perfluorooctane carboxylate (PFOA)



Where *else* do they come from?



Where *else* do they come from? *Manufacturing*

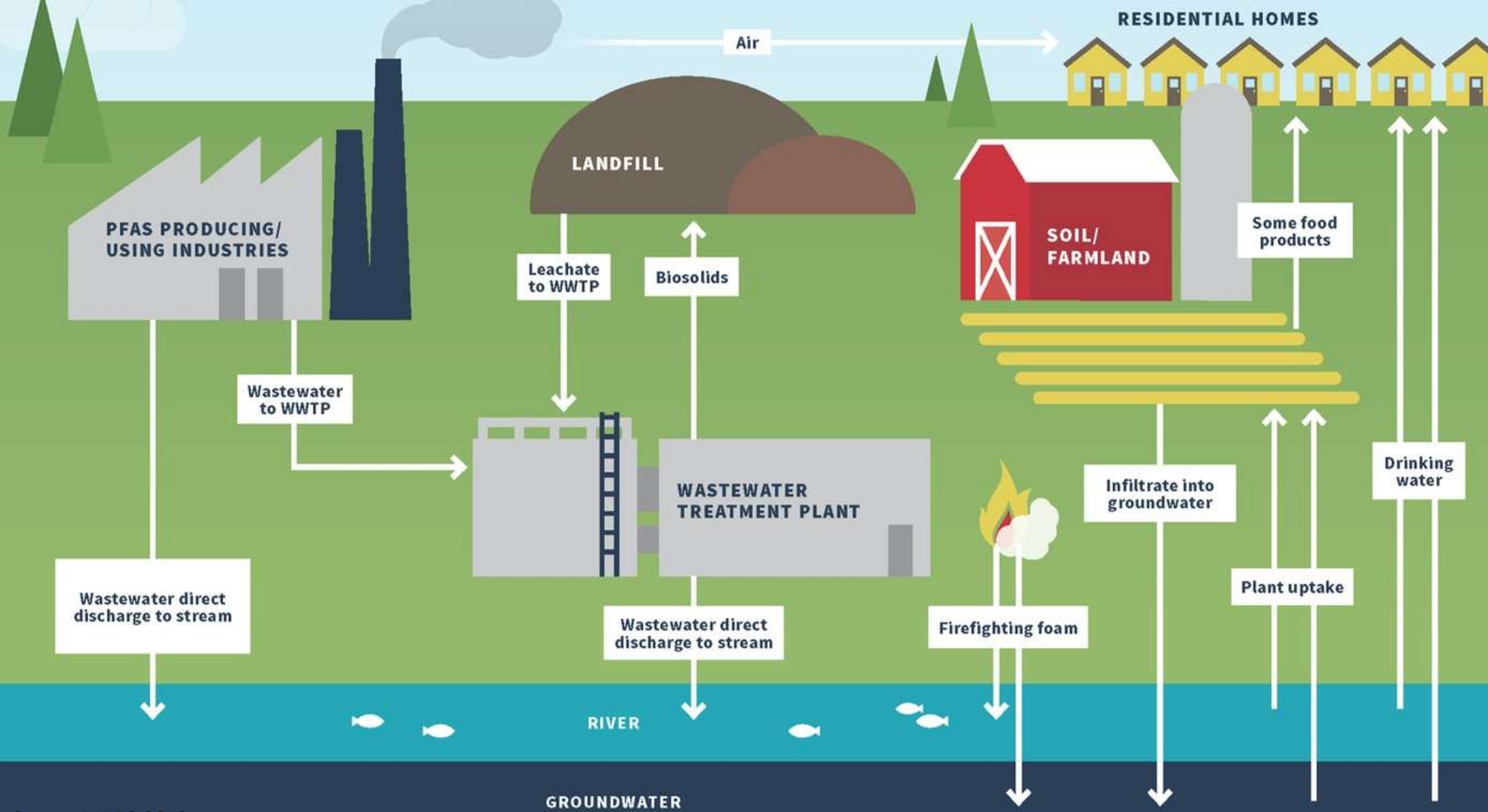


Where do they come from?

Aqueous Film Forming Foams (AFFFs)



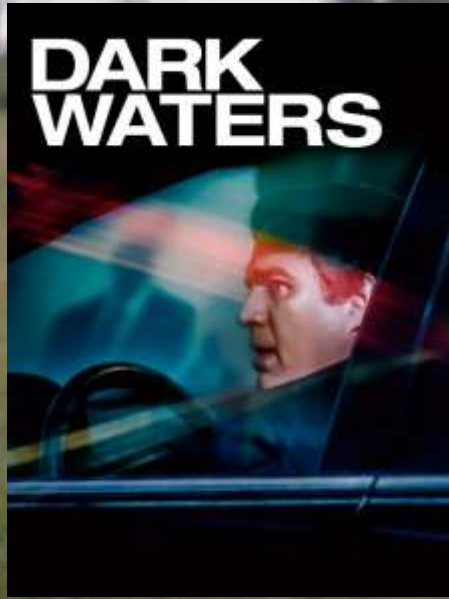
Peterson AFB started use in 1970



Source: MDEQ 2018

A scenic landscape photograph featuring a large mountain range in the background under a blue sky with light clouds. The mountains have some snow patches. In the middle ground, there is a dense forest of evergreen trees. In the foreground, a small town or village is visible with several houses and buildings. The text "How did PFAS get here?" is overlaid in the center of the image.

How did PFAS get here?



FEATURE

The Lawyer Who Became DuPont's Worst Nightmare

Rob Bilott was a corporate defense attorney for eight years. Then he took on an environmental suit that would upend his entire career — and expose a brazen, decades-long history of chemical pollution.



Environmental Justice

Relating to the disproportional environmental health and risk burdens associated with social inequality - including but not limited to racial and ethnic identification, socioeconomic status, gender, age, and more recently, nationality/ citizenship /immigration status.



Environmental Justice

Anthropogenic pollution, a category into which PFAS contamination would be placed, is one of the most common ways that marginalized groups get exposed to substances with negative environmental health outcomes.



The New York Times

Toxic 'Forever Chemicals' in Drinking Water Leave Military Families Reeling



Feb. 2019

Well water users warned after Air Force Academy finds toxic level of firefighting chemical

By Tom Roeder and Jakob Rodgers The Gazette Aug 24, 2019 Updated Aug 31, 2019

The Gazette

PULITZER PRIZE-WINNING JOURNALISM, EST. 1872

High levels of toxic chemicals found in water at Air Force Academy, officials say

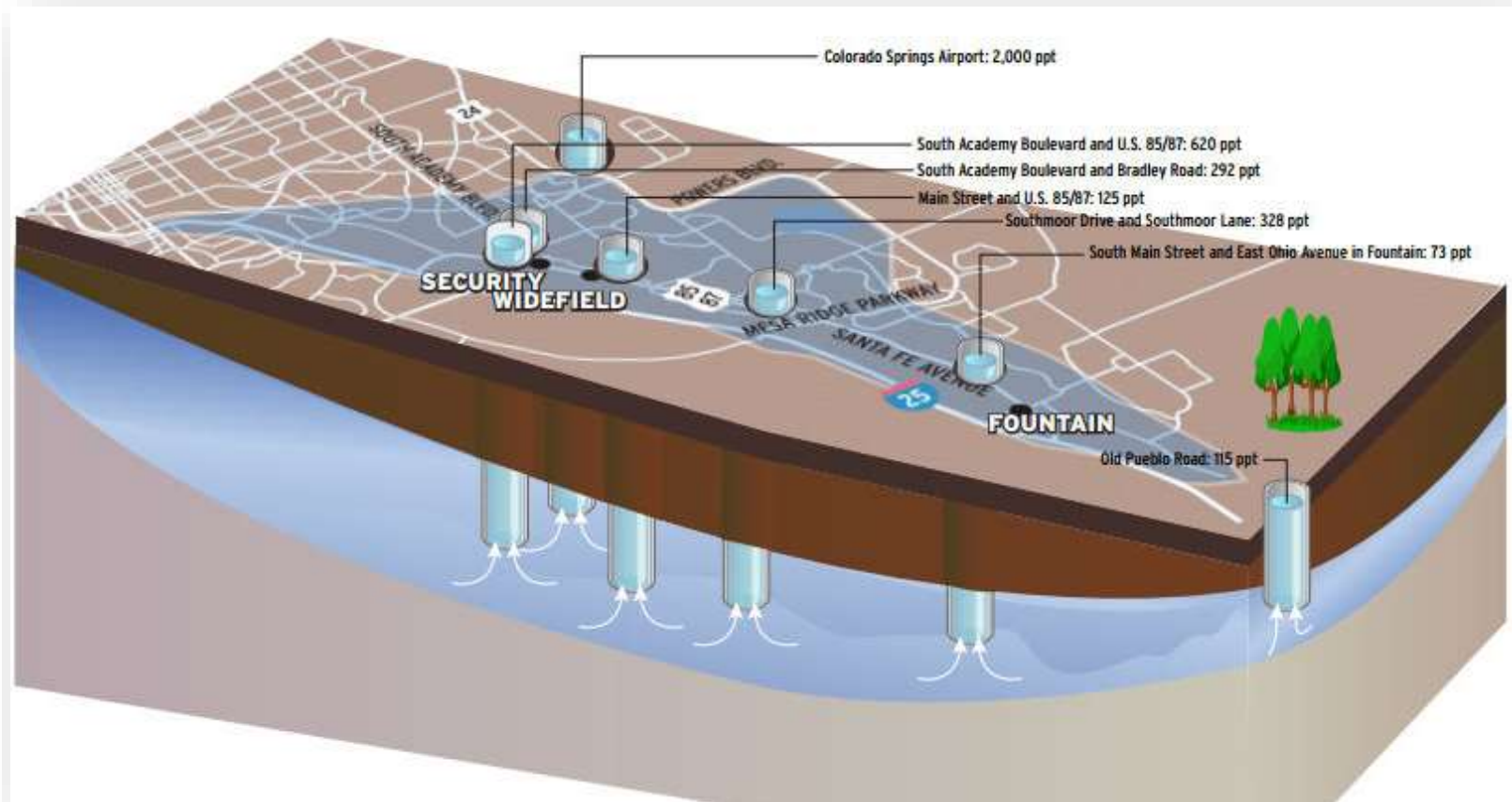
From the Contaminated water in the Pikes Peak region | Full Coverage series

By Jakob Rodgers and Ellie Mulder jakob.rodgers@gazette.com Aug 23, 2019



PFAS in Our Backyard

1. One of the **largest affected** groups (70k people)
2. **Source** = Peterson AFB
3. Water districts first to take action
4. Other water users? Long term impacts?

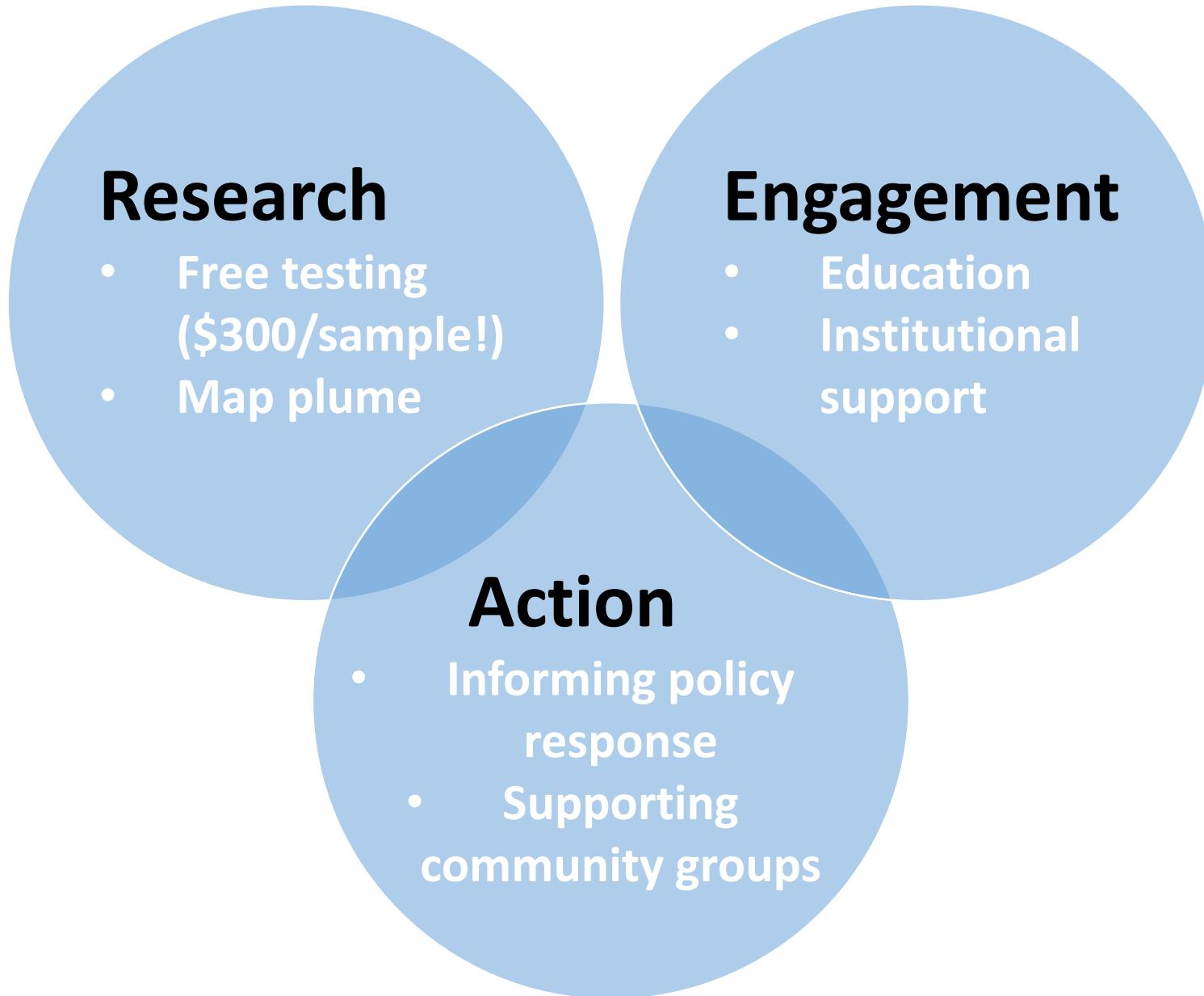


Initial Responses

- **Water Managers:** First priority was to to stop the exposure. A major crisis, financially and politically.
- **Air Force response:** Financial support. Public relations.
- **Colorado Department of Public Health and Environment (CDPHE):** Try to get information into the hands of those who needed to make decisions. Scale of pollution meant that the agency lacked funding to do what other states did.
- **Community Organizing:** Fountain Valley Clean Water Coalition



Specific Aims of the *Fountain Valley Water Project*



Goal of increasing **scientific accessibility** and **scientific literacy** in communities with less direct representation

Science Aims of the *Fountain Valley Water Project*



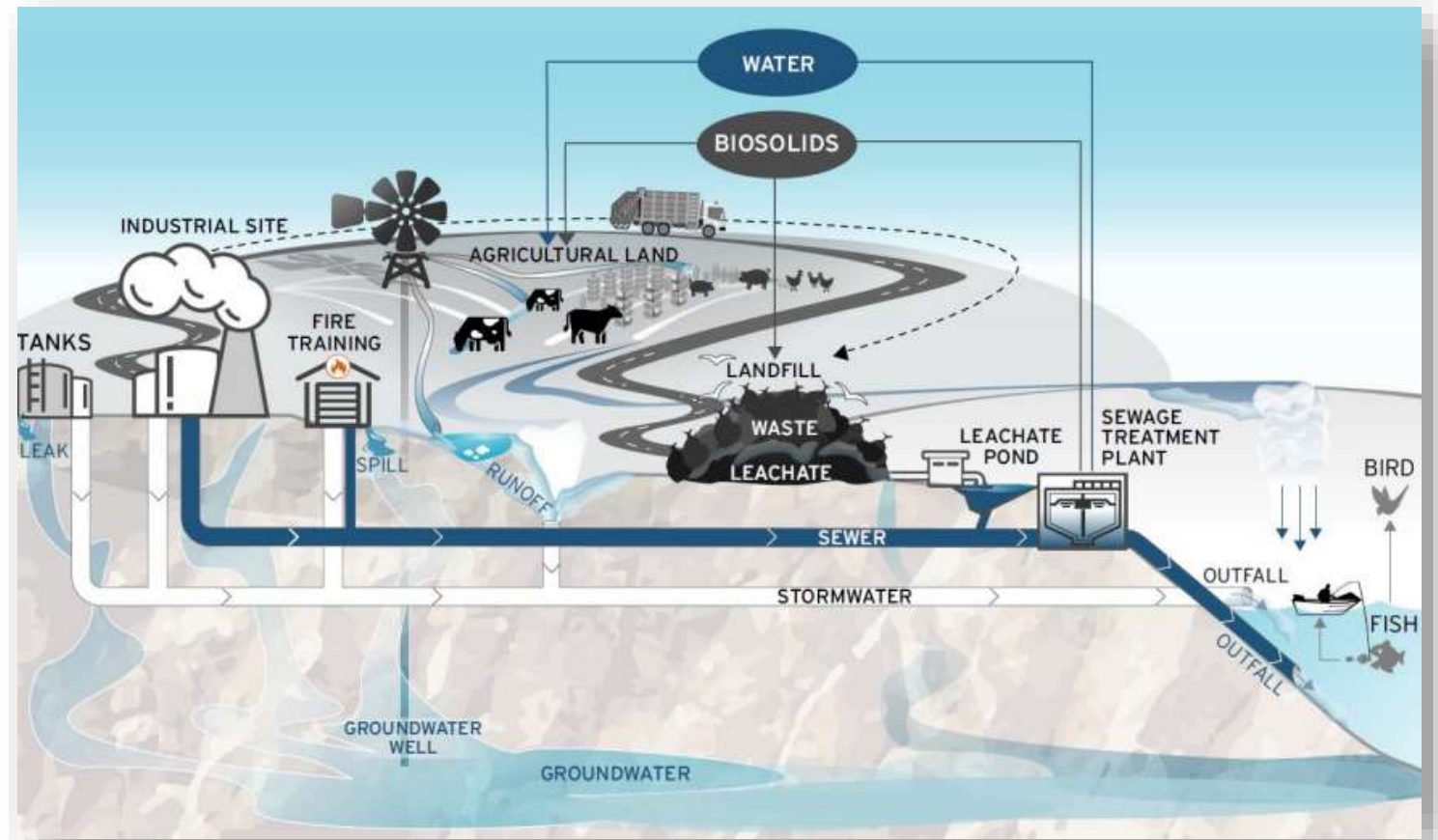
1. **Surface Waters** (streams & tributaries)

- Where/how is PFAS moving?

2. **Groundwater** (wells, ag, drinking water)

- Underground 'plume'

3. **Soils** (ag, gardens)



How to measure PFASs?

*High Pressure Liquid Chromatography
Triple Quadrupole Mass Spectrometry
= LC-MS/MS or triple quad*



***\$300 per sample + \$100/hr for
sample collection***

Capable of measuring sub Parts per Trillion (ppt)

Less than half of a drop of PFOA in a super tanker containing six million gallons of oil would comprise about one part per trillion.

Constructing the *Surface Water* study



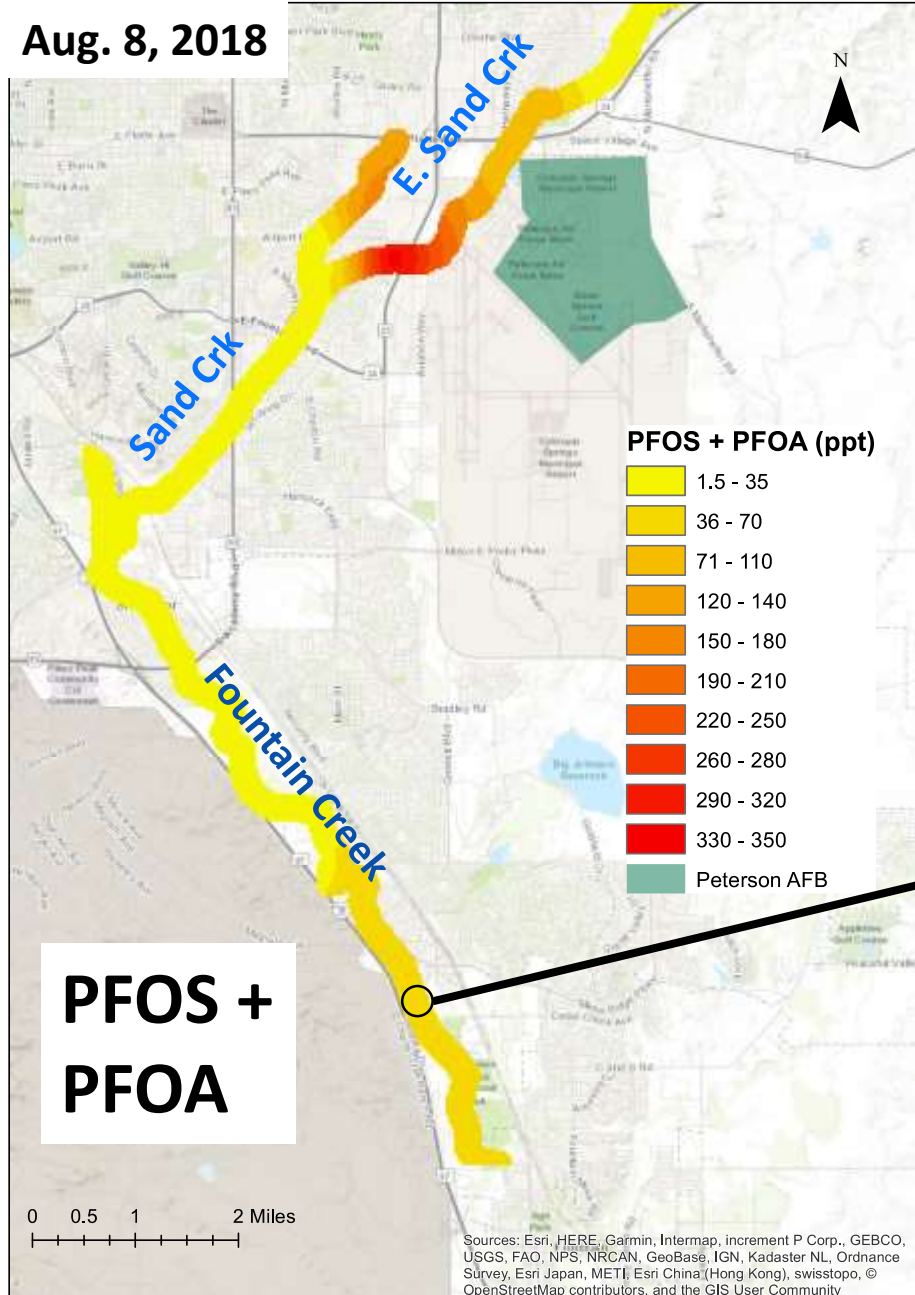
Identify all surface waters

Determine how PFAS is **moving**

Collect every 6 mo.

Surface Water study: *initial results*

Aug. 8, 2018



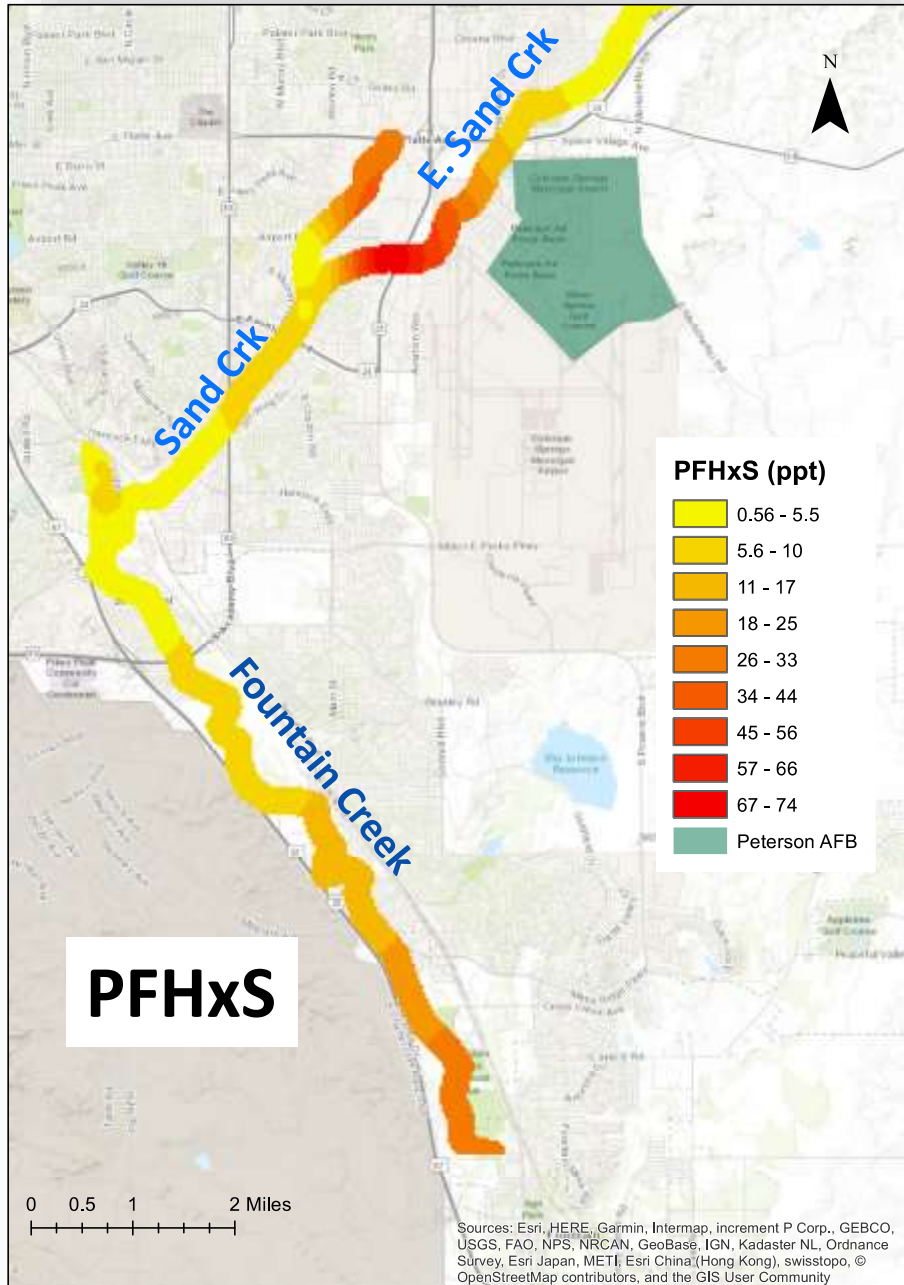
EPA Advisory: **70 ppt (PFOS + PFOA)**



Hot spot by PAFB (5x EPA advisory)

Sample into Pueblo County?

Surface Water study: *initial results*

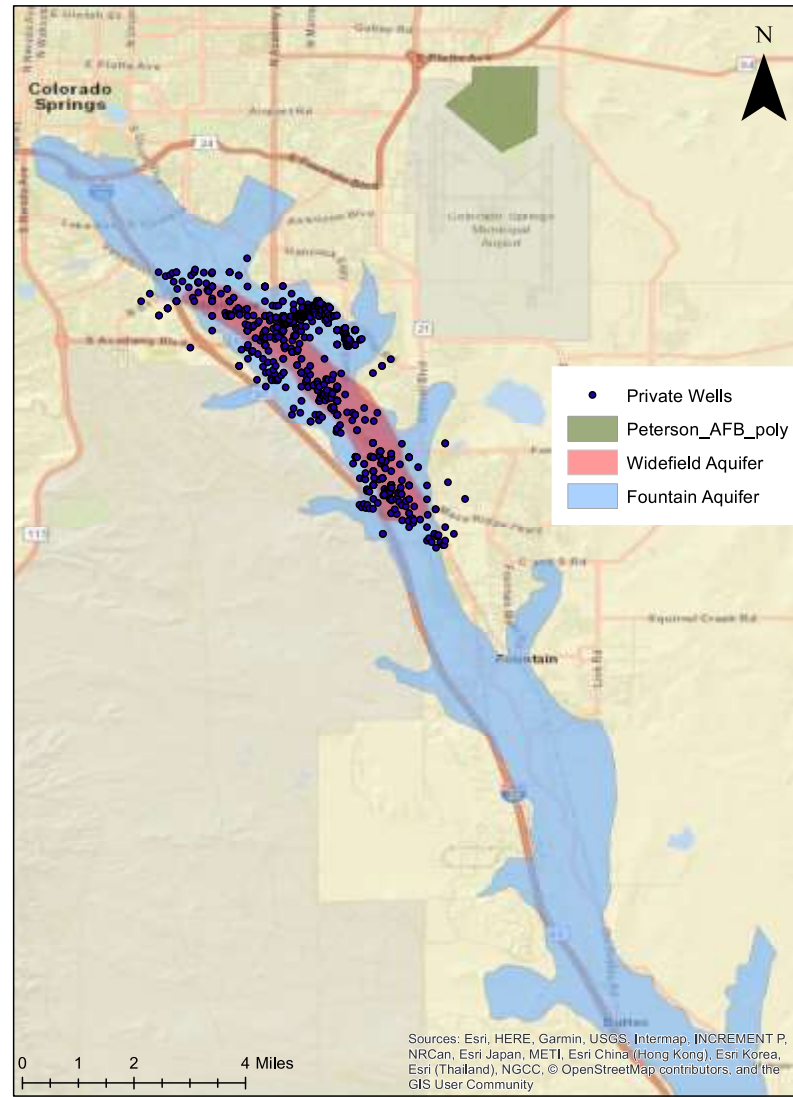
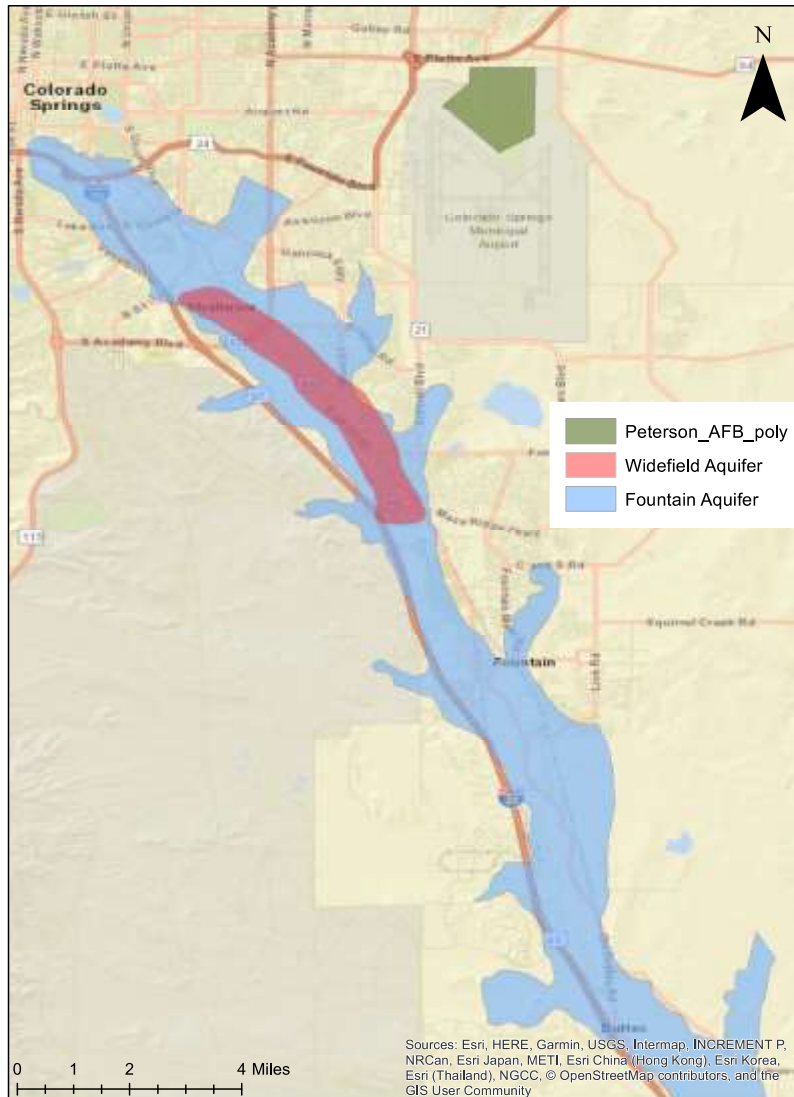


Blood tests show southern El Paso County residents have high levels of toxic chemicals from contaminated water

By: [Jakob Rodgers](#) Dec 14, 2018



Constructing the *Groundwater* study



Thousands of groundwater wells: *How to sample them?*

Challenges in constructing the *Groundwater* study

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Fountain Valley Water Study: We are contacting you because public records indicate you may be using a private well for your water. The Fountain Valley Water Project is a newly-formed, local non-profit organization that acts as a non-partisan research group. Our primary goal is to gather and share critical water quality information with our community. To do so, we need your help!

What is the research for? Our initial study aims to evaluate the extent of our water contamination, where it is heading, and which private wells are exposed.

What do you need from me? We want to test your private well for contaminants and use the results of the testing for this research. All personal information will be kept completely confidential. Participants can opt out at any time.

What do I get in return? Your participation in this study will benefit everyone who drinks and uses our groundwater. In addition, every six months we will send you a personalized letter that describes the analyses conducted, what they mean, and how the research can be useful for the broader community.

How do I get involved? To indicate your interest in learning more about the study, fill out the attached survey, drop it in the mail, and wait for us to contact you!

For more information: email us at FountainValleyWaterProject@Gmail.com

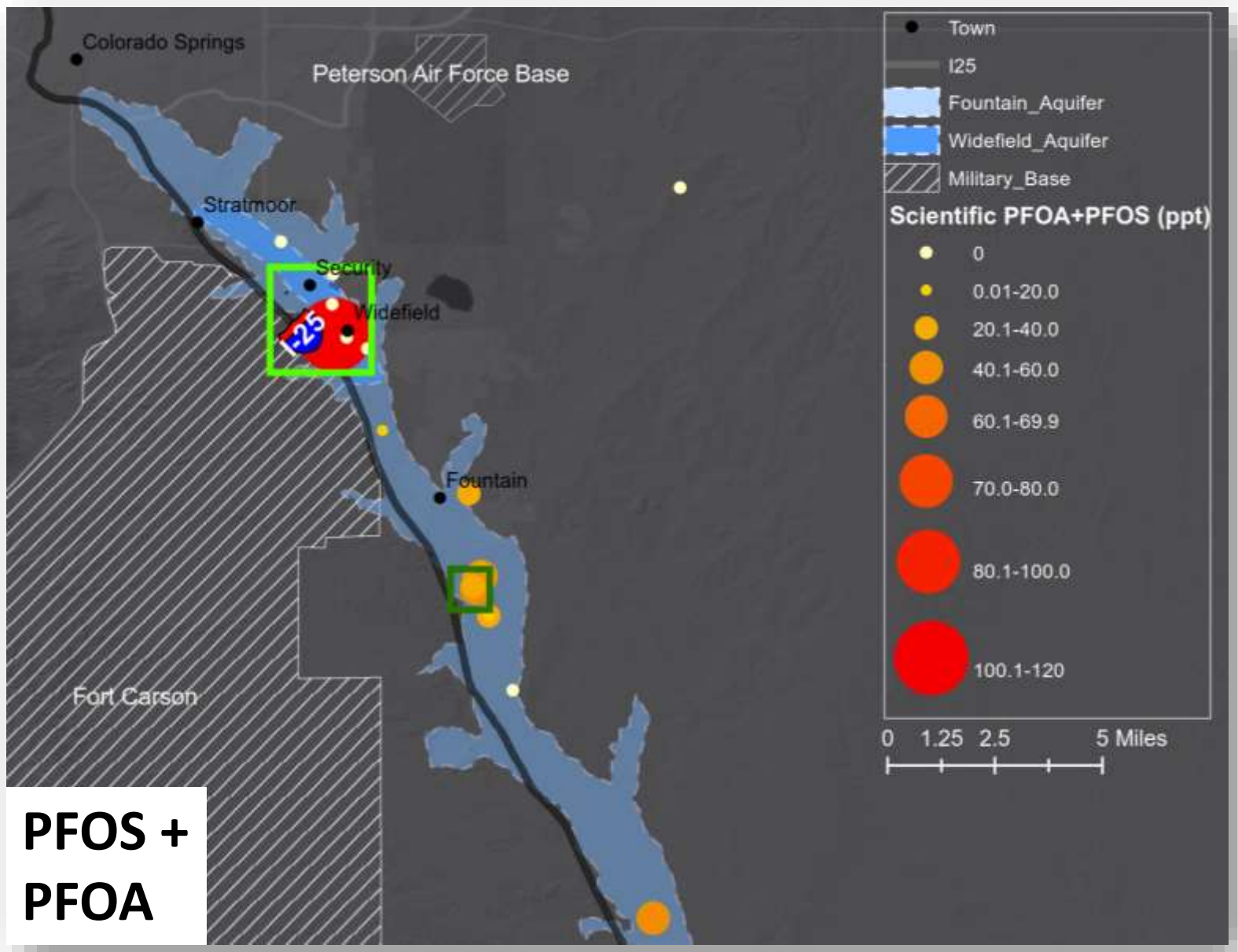


Fountain Valley
Water Project



Mailers, door-to-door,
e-mail, website,
newspaper...

Hot spots in the groundwater results.



Transport is complex
– need more data

Hot spots in the
Fountain Creek
Alluvium aquifer

>50 ppt in Wigwam
well water – over 25
miles south of AFB

Project outcomes so far.

Communication and Translation



PRIVATE WELL PFAS TESTING REPORT

September 3, 2019

Resident Address
Colorado Springs, CO, 80903

Dear Resident,

Thank you for your participation in the Fountain Valley Water Project's study of PFAS chemicals in private wells near the Wildfield aquifer. We want to thank you for your patience in waiting for this information. We are writing to return the results of your initial water test, and to offer some additional information on what comes next. Your personalized test results are listed in the chart below.

How does your water compare to the EPA Advisory?

You can see in the graphic to the right that your well tested at 59 ppt (parts per trillion), and the current EPA advisory limit is 70 ppt. An EPA health advisory suggests what is safe to consume, based on the latest scientific research. To date the EPA has an advisory for two chemicals in the PFAS family, PFOS and PFOA, which commonly get lumped together. These two substances are two of the most common compounds in Aqueous Film Forming Foam (AFFF), which was used on the Peterson Air Force Base for training, seeping into our aquifer. PFOS and PFOA are the most studied, likely because of their presence in drinking water supplies around the country. Health advisory studies have linked PFOS and PFOA exposure in humans to a number of negative health outcomes including increased cholesterol, hypertension, ulcerative colitis, some cancers, and thyroid problems. This advisory means that if a water source had a combined number of PFOA and PFOS that tested above 70 ppt, it would exceed what the EPA considers safe. Some states think that the advisory level should be lower (see graphic on the right).



How do your PFAS levels compare? This chart shows your combined PFOS + PFOA levels with current National and State advisories



Why did we test for other PFAS chemicals?

Each chemical has different attributes. We tested additional chemicals because we want to understand what is there, where they are, and how they might be moving. In your test results we found 29.4 ppt of a third chemical that is important to our local contamination: PFHxS (perfluorohexane sulfonic acid, another type of PFAS). This chemical is also linked to the AFFF firefighting foam that was used at Peterson. Initial studies show higher concentrations of this particular PFAS chemical in our groundwater. Preliminary data from Dr. John Adgate's health study also indicate that this chemical appears in study participants' blood at high levels.¹

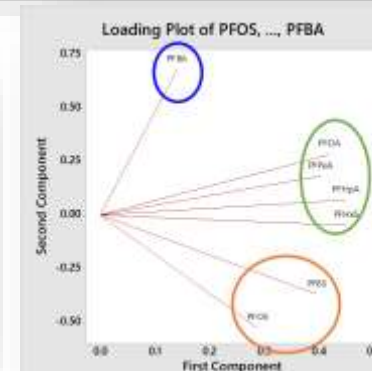
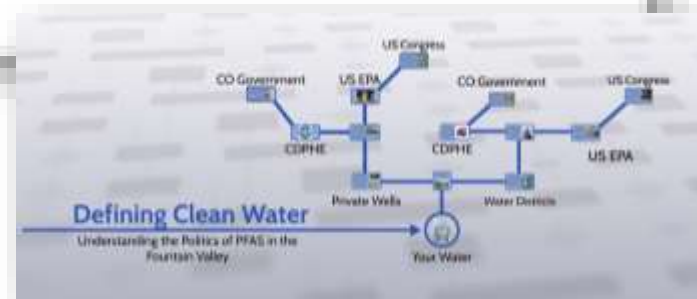


Scientific



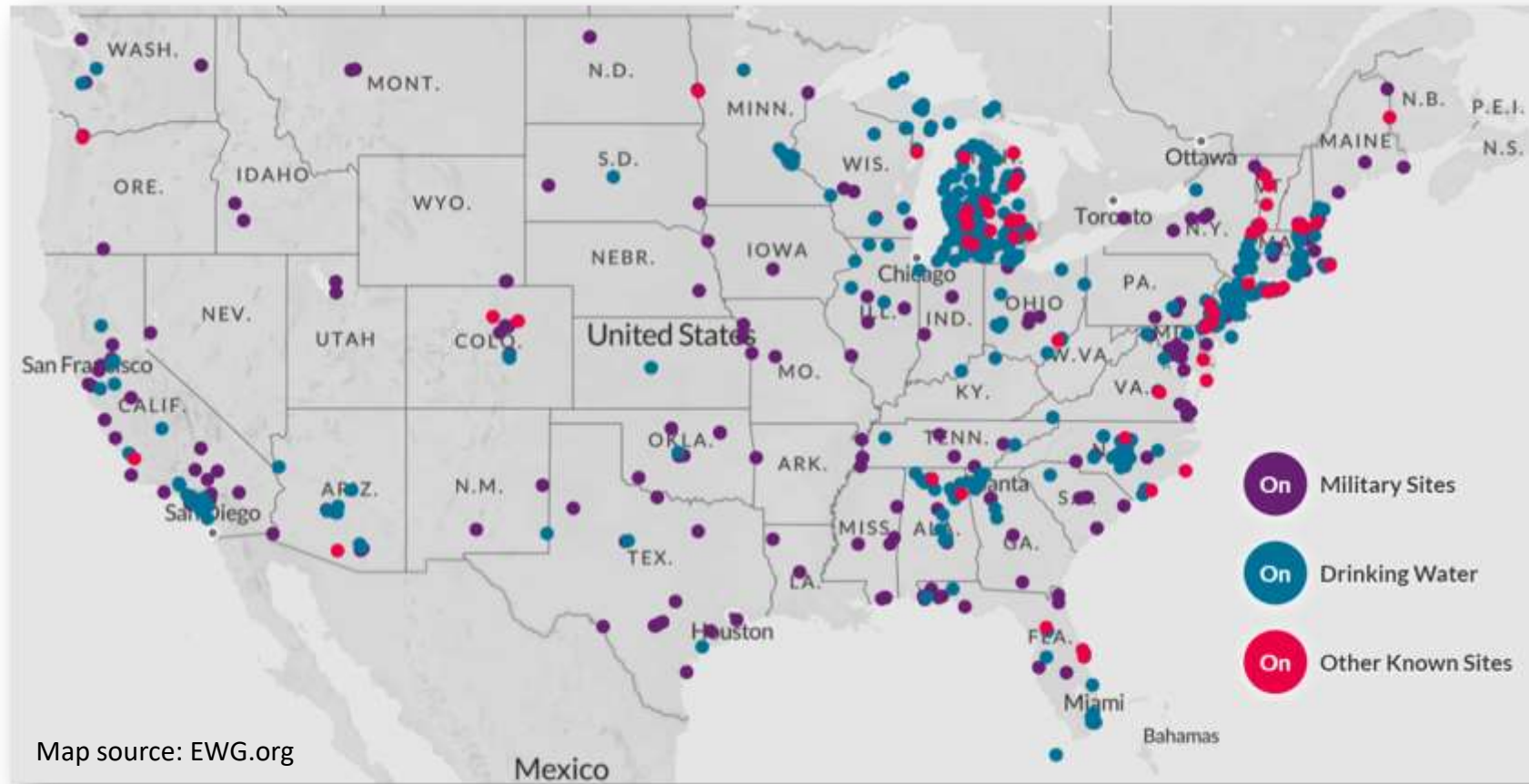
per-sistence

A podcast about toxic PFAS chemicals and the people they're hurting



\$35k in tests for community

722 PFAS Contamination Sites as of August 2019



99.5% Americans have PFAS in their blood
>\$1 trillion for remediation

Fourth National Report on Human Exposure to Environmental Chemicals; Centers for Disease Control and Prevention: Atlanta, **2015**.

Hu, X. C.; et al. *Environ. Sci. Tech. Let.* **2016**, 3, 344.

Thanks for listening!

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Fountain Valley
Water Project





Prof. Tyler Cornelius



Prof. Eli Fahrenkrug



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