

PFAS Sampling Preparation

Engineering Services for PFAS Sampling at
California Public Water Systems

WR3372 Phase 02



John Merrill, Morgan Greenwald, and Elisabeth Hawley
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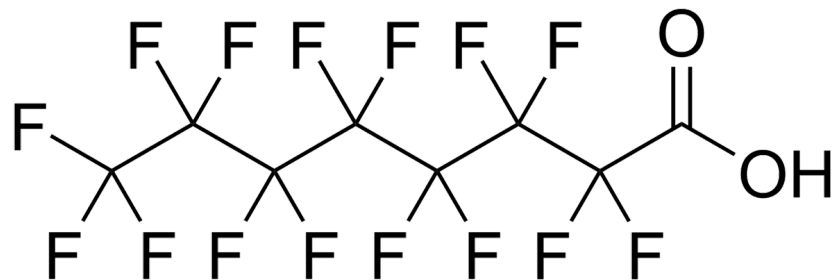
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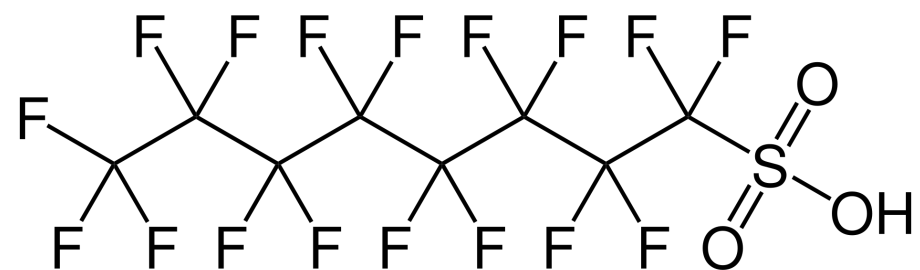
Background

What are PFAS?

- Per- and polyfluoroalkyl substances
 - Family of anthropogenic compounds that are widely used in a variety of products and processes and are often present in mixtures
 - Detectable in wastewater, septic systems, landfill leachate, urban stormwater, agricultural areas where biosolids have been land-applied
 - “Forever chemicals” that do not readily degrade



Perfluorooctanoic acid (PFOA)



Perfluorooctanesulfonic acid (PFOS)

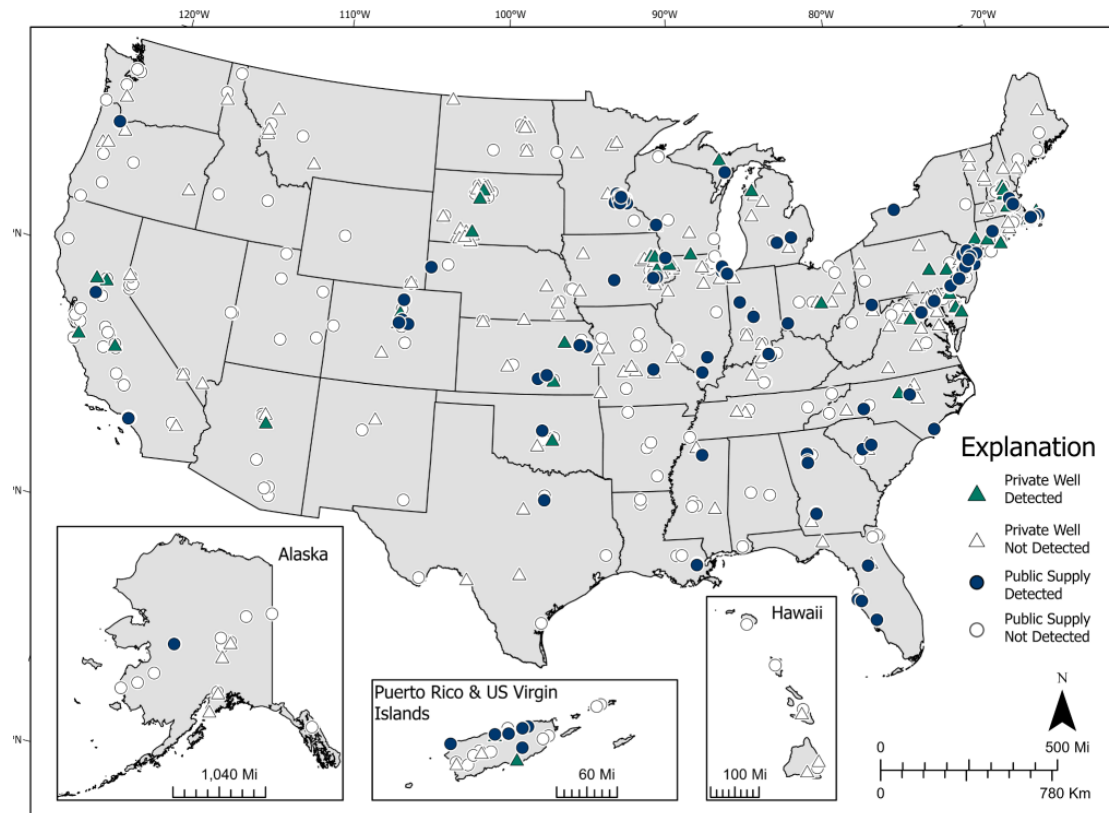
- EPA Method 533
 - Liquid chromatography and tandem mass spectrometry to analyze for 25 target PFAS
- Absorbable organic fluorine (AOF)
 - Combustion ion chromatography analysis
- Other PFAS analyses – Identified on chain of custody as “DoD QSM Extract”
 - LC-HRMS (formerly non-targeted analysis (NTA))
 - IC-MSMS - Ultra-short PFAS

- Strong public pressure to regulate PFAS
- Low toxicity thresholds (nanogram per liter [ng/L] or part per trillion)
- Proposed Federal drinking water Maximum Contaminant Levels (MCLs) for six PFAS in 2023, final MCLs expected very soon
 - PFOA and PFOS: 4 ng/L
 - Proposed hazard index of 1 for sum of PFNA, PFHxS, PFBS, and HFPO-DA*
- California drinking water notification levels and response levels, based on a running four-quarter average

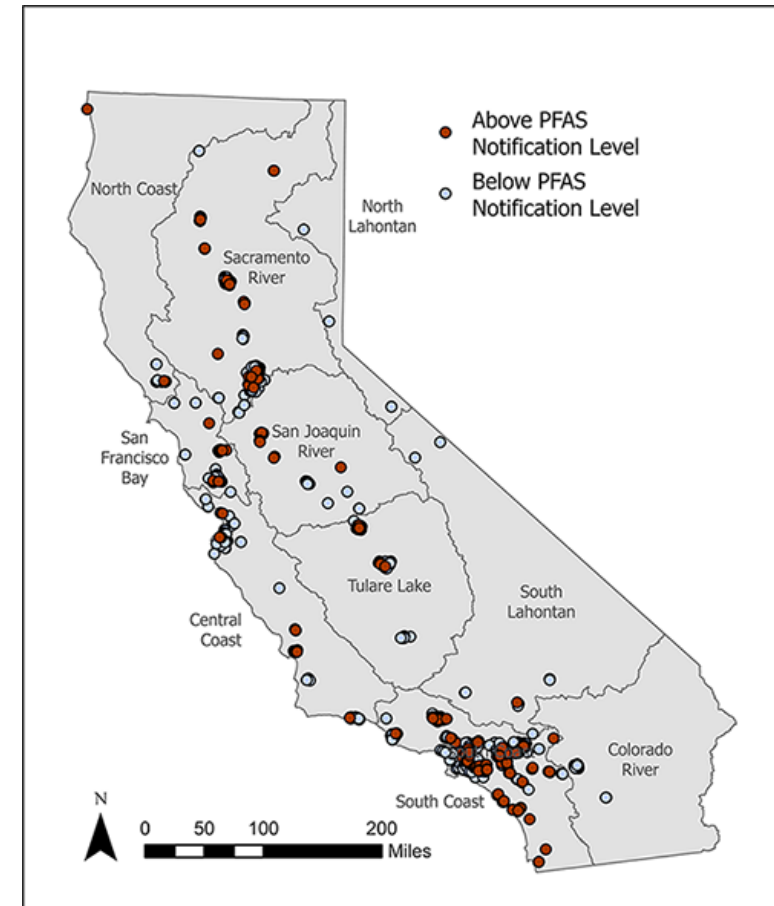
	Units	PFOS	PFOA	PFBS	PFHxS
Notification level	ng/L	6.5	5.1	500	3
Response level	ng/L	40	10	5,000	20

* Measured concentrations of each PFAS are divided by health-based water concentrations (10 ppt PFNA, 9 ppt PFHxS, 2,000 ppt PFBS and 10 ppt HFPO-DA), summed, and compared with 1.

PFAS Occurrence



>45% of the nation's tap water, 2023



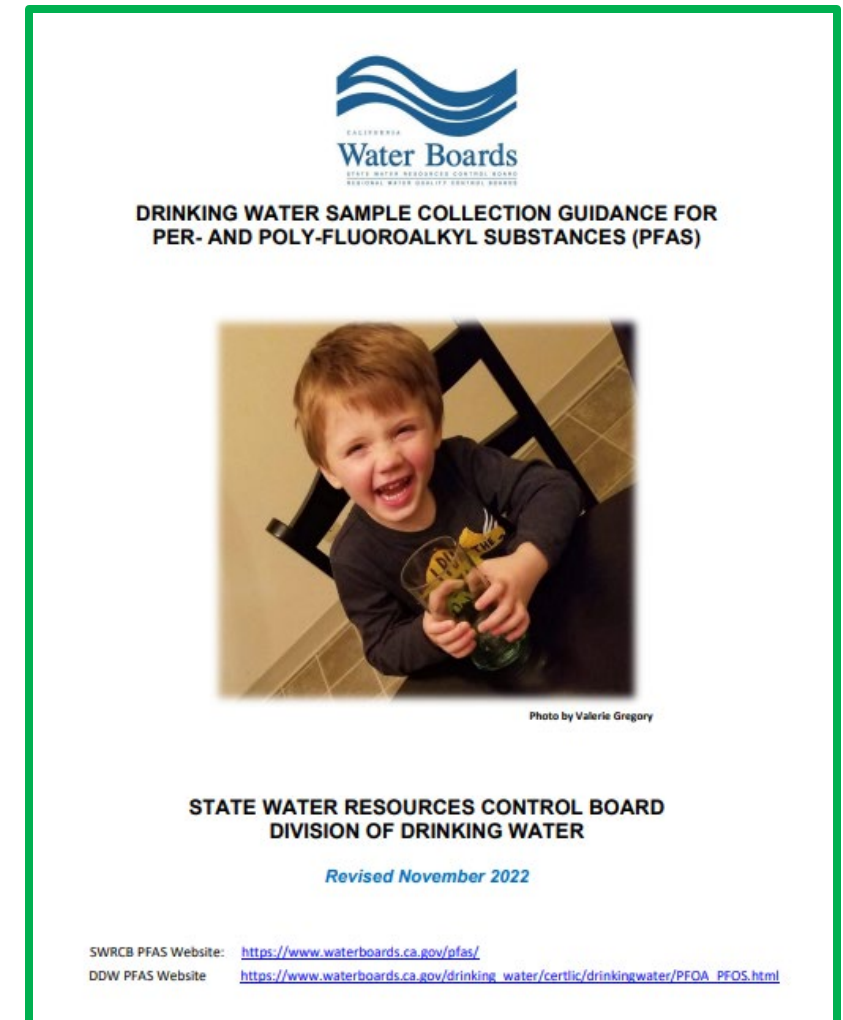
Groundwater (untreated) samples in CA, 2019

Previous California DDW PFAS Sampling

- 2013-2015 Sampling at large water systems (>10,000 people) under Federal UCMR 3
- 2019 Sampled over 600 PWSs adjacent to airports and landfills that received 2019 investigative orders or PWS wells with PFAS detections under UCMR 3
- 2020 General order to expand PFAS testing based on 2019 results
- 2021 General order for PFAS sampling on-Base or near Department of Defense sites
- 2021 Pilot study focused on PFAS analytical methods
- 2023-2025 Sampling at large water systems and representative samples of small systems for 29 PFAS under UCMR 5

PFAS Sampling Challenges and Uniquities

- Potential for cross-contamination, false positive results
 - PFAS are potentially present in variety of commonly-used materials
 - Low method detection limits (low to sub ng/L)
- Current sampling guidance reflects project-specific requirements
 - Project Quality Assurance Project Plan (QAPP)
 - [State Water Resources Control Board Drinking Water Sample Collection Guidance for Per and Poly-Fluoroalkyl Substances \(PFAS\)](#)



Eliminate Cross-Contamination

- Minimize the use of the following at least 24 hours prior to sampling
 - Cosmetics, moisturizers, sunblock and insect repellants (except PFAS-free products*), fragrances, creams, and other personal care products, including products
- Other items to avoid
 - New or unwashed clothing
 - Clothing recently laundered with fabric softener or anti-static dryer sheets
 - Waterproof or stain-resistant boots and clothing (e.g., GORE-TEX®)
 - Coated HDPE (e.g., Tyvek®) products



*Alba Organics Natural, Aubrey Organics, Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30, Banana Boat for Men Triple Defense Continuous Spray Sunscreen SPF 30, Banana Boat Sport Performance Coolzone Broad Spectrum SPF 30, Banana Boat Sport Performance Sunscreen Stick SPF 50, Coppertone Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50, Coppertone Sport High-Performance AccuSpray Sunscreen SPF 30, Coppertone Sunscreen Stick Kids SPF 55, Jason Natural Sun Block, Kiss my Face, L'Oréal Silky Sheer Face Lotion 50+, Meijer Clear Zinc Sunscreen Lotion Broad Spectrum SPF 15, 30 and 50, Meijer Wet Skin Kids Sunscreen Continuous Spray Broad Spectrum SPF 70, Neutrogena Beach Defense Water + Sun Barrier Lotion SPF 70, Neutrogena Beach Defense Water+Sun Barrier Spray Broad Spectrum SPF 30, Neutrogena Pure & Free Baby Sunscreen Broad Spectrum SPF 60+, Neutrogena Ultra-Sheer Dry-Touch Sunscreen Broad Spectrum SPF 30, and Yes to Cucumbers. Examples of PFAS-free insect repellent include Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellent, Herbal Armor, California Baby Natural Bug Spray, BabyGanics, OFF! Deep Woods® spray for clothing and skin, Sawyer® do-it-yourself permethrin treatment for clothing, Insect Shield Insect® pretreated clothing, DEET products, and sunscreen/insect repellent combination product Avon Skin so Soft Bug Guard-SPF 30. Products with fluorinated ingredients (e.g., polyfluoroalkyl phosphate esters) should not be worn during sampling

- Other items to avoid
 - Pre-packaged food and fast-food wrappers
 - Consuming food and beverages or smoking in the sampling area
 - Waterproof/treated papers in field notebooks and waterproof markers (such as Sharpie[®])
 - Chemical or blue ice
 - Polytetrafluoroethylene (PTFE) including Teflon[®], Hostaflon[®] and other fluoropolymer-containing materials (e.g., PVDF, Kynar[®], Neoflon[®], Tefzel[®])

