

***PFCs/PFAS:
Emerging Environmental Contaminants
& NJDEP Update***

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New Jersey Department of Environmental Protection**

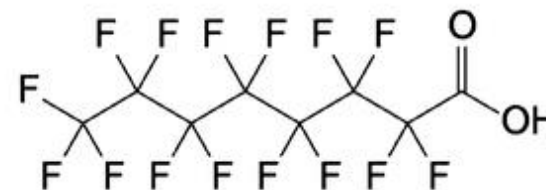


**NCNJ Air & Waste Management Association Webinar
March 23, 2018**

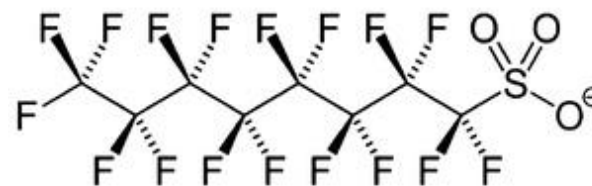
*The conclusions expressed in this presentation
do not necessarily reflect the policies of NJDEP.*

What are Perfluorinated Compounds (PFCs) ?

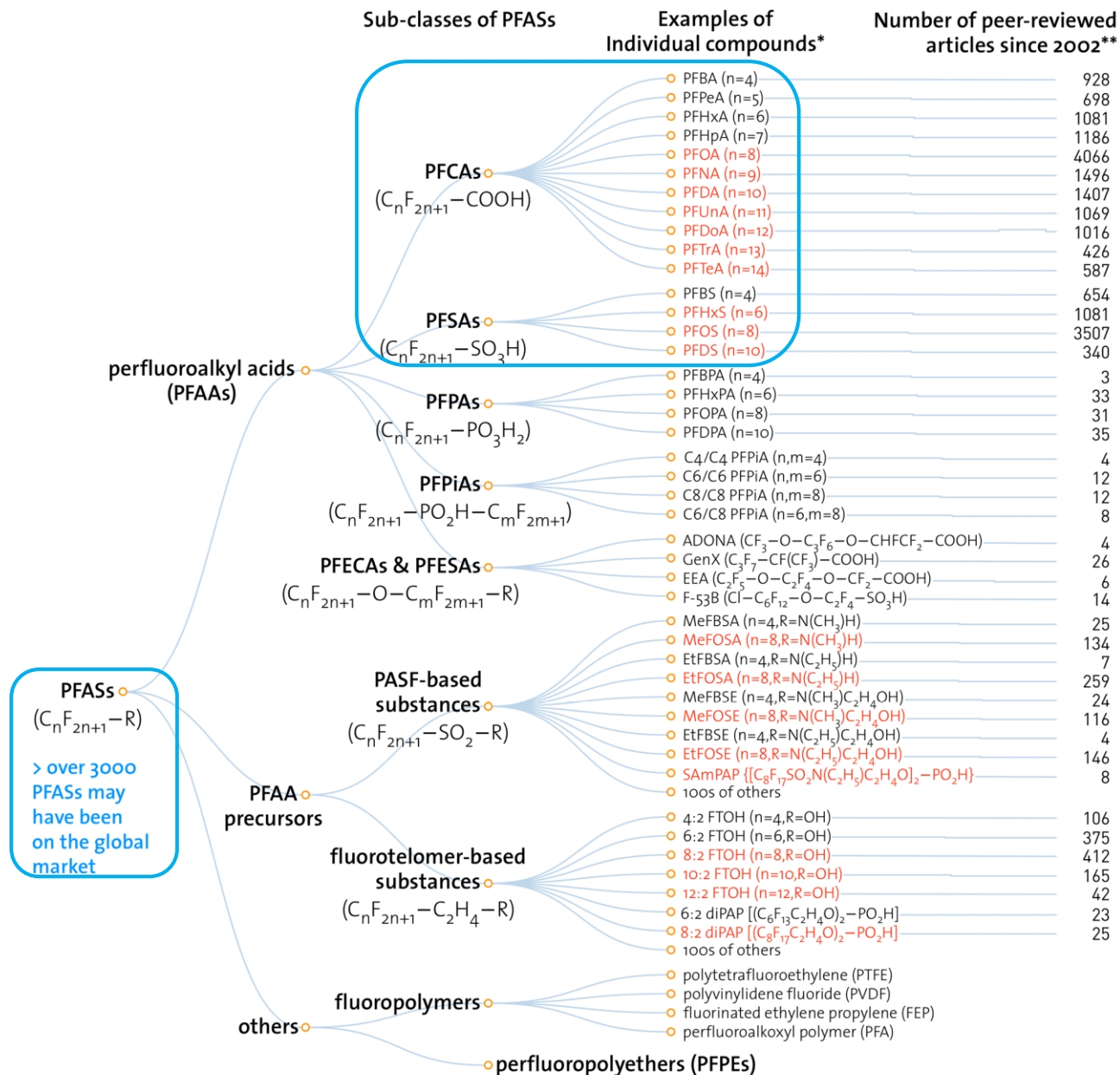
- Manmade chemicals used commercially & industrially for over 60 years.
- More properly called perfluoroalkyl acids (PFAAs)
- Totally fluorinated carbon chain of **varying length**.
 - ***Repel oil and water.***
- Hydrophilic charged functional group:
 - Carboxylates (COO^-); Sulfonates (SO_3^-)
 - ***Water soluble.***
- Extremely strong C-F bond.
 - ***Chemically & thermally non-reactive.***
 - Useful properties.
 - ***But do not break down in the environment.***
- Part of much larger group: **per- and polyfluoralkyl substances (PFAS)**:
 - Current term; includes aliphatic compounds with other structures with at least one totally fluorinated carbon.
 - ***Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)*** (8 carbons) - main focus of early studies.
 - ***Many PFCs and other PFAS*** now known to be present in water, other environmental media, and humans.



Perfluorooctanoic acid (PFOA)



Perfluorooctanesulfonate (PFOS)



* PFASs in **RED** are those that have been restricted under national/regional/global regulatory or voluntary frameworks, with or without specific exemptions (for details, see OECD (2015), Risk reduction approaches for PFASs. <http://oe.cd/1AN>).

** The numbers of articles (related to all aspects of research) were retrieved from SciFinder® on Nov. 1, 2016.

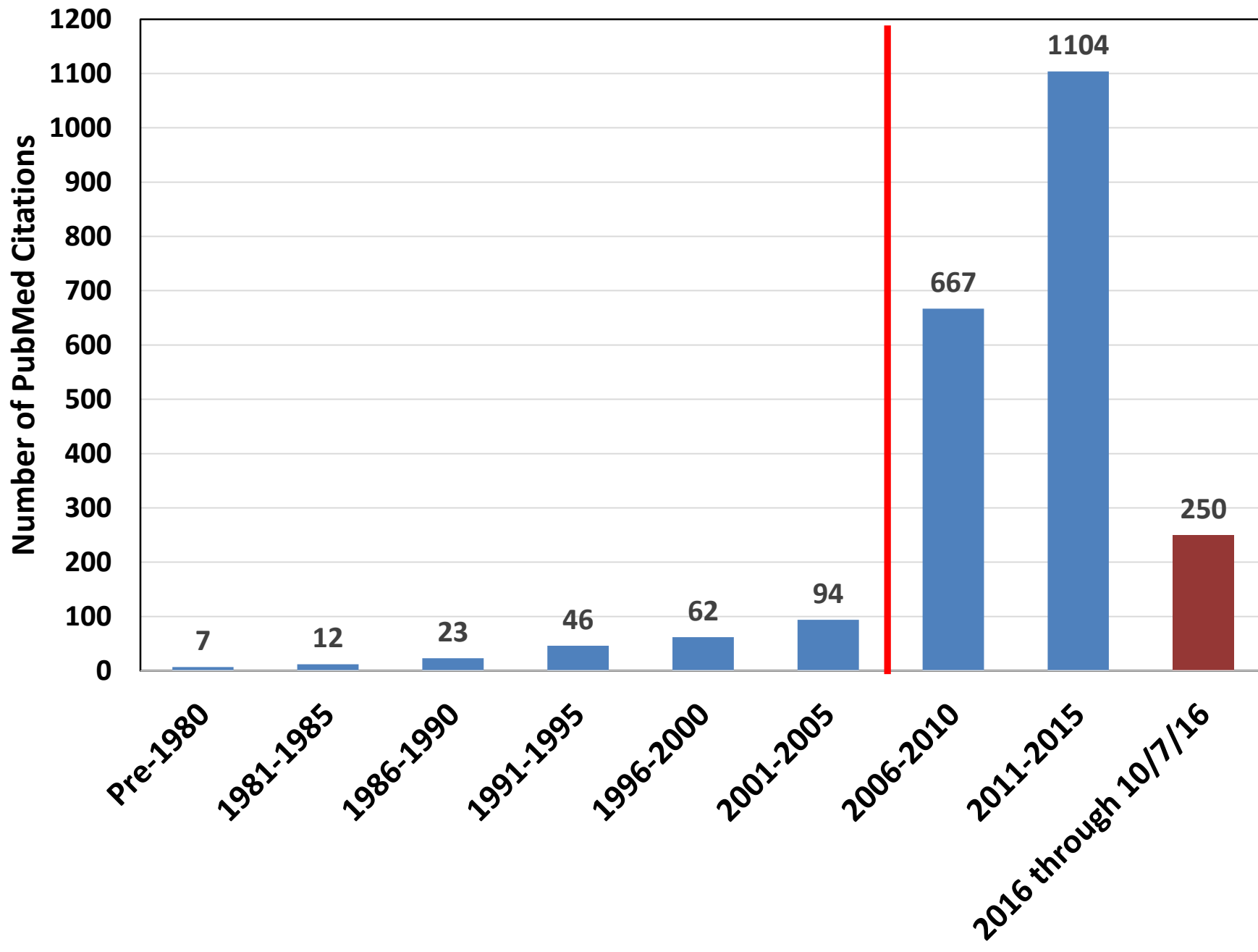
Uses of PFCs and Other PFAS

- **Processing aid** in production of fluoropolymer plastics used in:
 - Non-stick cookware
 - Waterproof/breathable clothing
 - Chemical/heat resistant industrial products.
- **Water & stain resistant coatings**
 - For carpets & upholstery
- Grease-proof **food packaging**
- **Metal plating**
- **Aqueous fire fighting foams**

....and many other uses not listed here



Great Increase in PFOA Publications in Past 10+ Years



And...Extensive Media Attention

HARVARDgazette

SCIENCE & HEALTH > HEALTH & MEDICINE

Unsafe levels of toxic chemicals found in drinking water of 33 states

High levels of fluorinated compounds have been linked to cancer, hormone disruption

August 9, 2016 |



POPULAR

-  Not your average | February 6, 2017 |
-  A revised portrait | February 2, 2017 |
-  Study opens door | February 7, 2017 |
-  Advance in high-pr

BUCKS COUNTY
Courier Times

UNWELL WATER

A PUBLIC SERVICE PROJECT OF THE INTELLIGENDER

FAQ on what's going on with the well water in Horsham, Warminster and Warrington?

- Q- WHAT'S GOING ON?
- Q- WHAT AREAS ARE AFFECTED?
- Q- IS MY WATER SAFE TO DRINK?
- Q- WHAT HEALTH RISKS DO PFOS AND PFOA POSE?
- Q- WHY AM I ONLY LEARNING ABOUT THIS NOW?
- Q- HOW COULD THIS HAPPEN?
- Q- WHAT SHOULD I DO?
- Q- WHAT IS THE GOVERNMENT DOING ABOUT THIS?
- Q- WHAT'S GOING TO HAPPEN NEXT?


Map Legend

PRIVATE WELLS:

- Sum of PFOS & PFOA concentrations above Health Advisory Level
- Sum of PFOS & PFOA concentrations below Health Advisory Level

PUBLIC WELLS:

- ★ Closed, above EPA health level
- ★ PFOS & PFOA detected above EPA health level
- ★ Not tested



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PFASs seen as biggest emerging chemical issue for US states

11 January 2018 / Children's products, Cleaning products, Electrical & electronics, Halocarbons, Personal care, United States

State policy experts predict that 2018 will see continued action by US state legislatures on regulating chemicals. They say this year will see a continued focus on flame retardants and disclosure mandates. And there will be a close look at a controversial family of chemicals the federal government has effectively said it will not regulate.



This comes despite one of the main intentions behind 2016's TSCA

WATER ONLINE

Water Wastewater Industrial Utility Management Innovations

News | March 20, 2018

EPA To Convene National Leadership Summit To Take Action On PFAS

Washington — Today, in a letter sent to governors of 56 states and territories, the U.S. Environmental Protection Agency (EPA) announced plans to host a National Leadership Summit in Washington, D.C. to take action on Per- and Polyfluoroalkyl Substances (PFAS). PFAS is a category of man-made chemicals that have been widely used to make products because of their stain-resistant, waterproof and/or nonstick properties.

"EPA's leadership summit will bring together stakeholders from across the country to build on the steps we are already taking and to identify immediate actions to protect public health," said EPA Administrator Scott Pruitt. "Through this event, we are providing critical national leadership, while ensuring that our state, tribal, and local partners have the opportunity to help shape our path forward."

NJ Focus on PFCs in Drinking Water Since 2006

Environ. Sci. Technol. 2009, 43, 4547–4554

Occurrence and Potential Significance of Perfluorooctanoic Acid (PFOA) Detected in New Jersey Public Drinking Water Systems

GLORIA B. POST,^{a,*} JUDITH B. LOUIS,[†] KEITH R. COOPER,[‡] BETTY JANE BOROS-RUSSO,[§] AND R. LEE LIPPINCOTT[†]

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the U.S. population geometric mean is and 3.4 µg/L in 200 is of concern due to has a half-life of s adverse effects on t the immune system (5). In some stud population were as other measures of f not find these effec found associations mellitus and incre were negative (5). 70 000 people exp association with s blood, including i Sources of expo (13), house dust (Exposure also occu transformation of alcohol which is v



Contents lists available at SciVerse ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres



Review

Perfluorooctanoic acid (PFOA), an emerging drinking water contaminant: A critical review of recent literature ☆ ☆ ☆

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Article

pubs.acs.org/est

Occurrence of Perfluorinated Compounds in Raw Water from New Jersey Public Drinking Water Systems

Gloria B. Post,^{*} Judith B. Louis, R. Lee Lippincott, and Nicholas A. Procopio

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Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres



Associations of perfluorinated chemical serum concentrations and biomarkers of liver function and uric acid in the US population (NHANES), 2007–2010

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Environ Sci Pollut Res
DOI 10.1007/s11356-017-0309-3

RESEARCH ARTICLE

Occurrence and source identification of perfluoroalkyl acids (PFAAs) in the Metedeconk River Watershed, New Jersey

Nicholas A. Procopio¹ · Robert Karl² · Sandra M. Goodrow¹ · Joseph Maggio² · Judith B. Louis¹ · Thomas B. Atherholt¹



PERSPECTIVE

Key scientific issues in developing drinking water guidelines for perfluoroalkyl acids: Contaminants of emerging concern

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Why the current focus on long-chain PFCs as emerging contaminants ?

Long-Chain PFCs Are Widely Detected in Drinking Water and Other Environmental Media

- **Highly water soluble** (unlike other PBT chemicals).
- EPA Unregulated Contaminant Monitoring Rule 3, 2013-15 (UCMR3)
 - Nationwide public water system monitoring found widespread contamination that was previously unknown
 - *PFOA & PFNA* – detected much more frequently in New Jersey than nationally.

Sources include:

- Releases from **industrial facilities** where made or used.
 - Many types - **large and small**.



- **Wastewater treatment plants.**



- Discharge of treated **wastewater**.
- Application of **sludge/biosolids** on agricultural land.



- Release of **fire fighting foams**.
 - Firefighter training sites.
 - Airports & military bases.

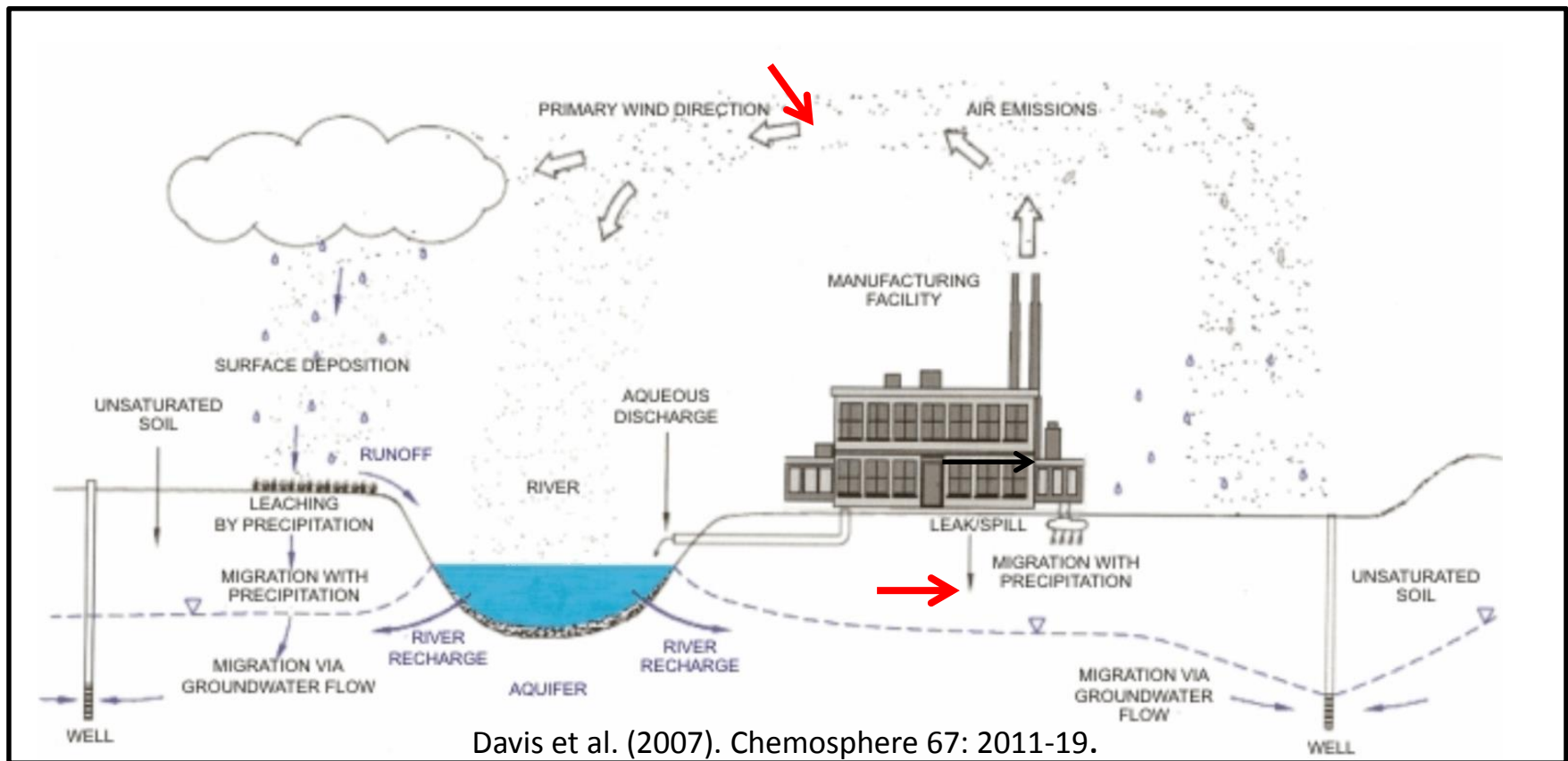
...and other sources.



Transport of PFOA after Industrial Discharge from Fluoropolymer Production Facility*

Two pathways for: Industrial releases —→ Groundwater:

1. Migration of groundwater plume
2. Air emissions —→ Soil deposition up to miles away —→ Migration to groundwater



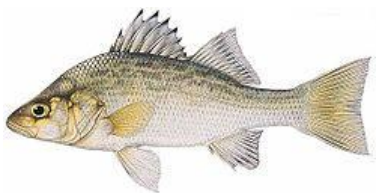
**Other PFAS, including PFNA and GenX, have also been emitted to air at industrial facilities.*

Environmental Fate & Transport of PFCs

- Persistent, Bioaccumulative, and Toxic...

- BUT very different from “classic” PBT chemicals

| | PFCs | Dioxins & PCBs |
|--|---------|----------------|
| Highly water soluble | YES | NO |
| Bind well to soil & sediments | NO | YES |
| Degrades in environment to some extent | NO | YES |
| Bioaccumulates significantly in fish | NO/YES* | YES |
| Bioaccumulates in lipids | NO | YES |
| Drinking water is major exposure route | YES | NO |



* **NO** - Less than 8 fluorinated carbons (e.g. **PFOA**, **PFHxS**).

YES – 8 or more fluorinated carbons (**PFOS**, **PFNA**, and higher).
– **PFOS** is the PFC most commonly detected in fish; other longer-chain PFAS also frequently found.

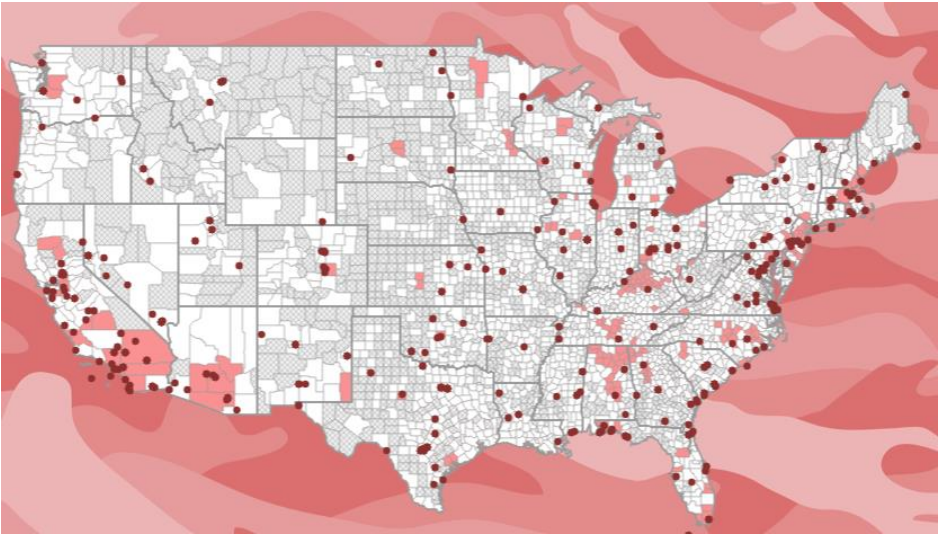
Widespread Former Use in Aqueous Fire Fighting Foam

Military to check 664 sites for water poisoning

Contamination may have come from foam used to fight fires

Albuquerque Journal 11 Mar 2016 +18 more

PROVIDENCE, R.I. — The military plans to examine hundreds of sites nationwide to determine whether chemicals, and is testing wells in a nearby rural area after the discovery of perfluorinated chemicals in drinking water,



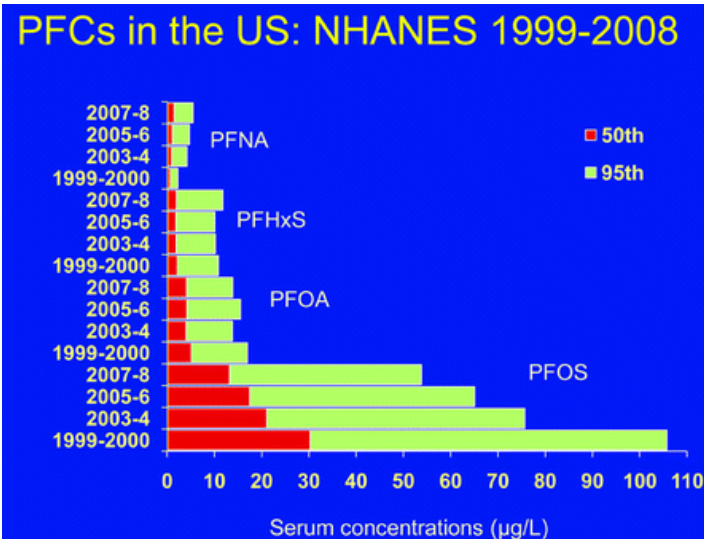
| <u>Groundwater:</u> | Field Site 1 | Field Site 2 |
|-------------------------|--------------|--------------|
| | ng/L | ng/L |
| 4:2 FtTAoS ^b | 990 | 210 |
| 6:2 FtTAoS | 53,000 | 6,900 |
| 4:2 FtS | 230 | 7,500 |
| 6:2 FtS | 5,700 | 220,000 |
| 8:2 FtS | 11,000 | 370 |
| PFBS | 64,000 | 43,000 |
| PFHxS | 380,000 | 240,000 |
| PFHpS | 60,000 | 11,000 |
| PFOS | 1,100,000 | 78,000 |
| PFDS | ND | ND |
| PFBA | 6,100 | 24,000 |
| PFPeA | 39,000 | 69,000 |
| PFHxA | 27,000 | 130,000 |
| PFHpA | 55,000 | 15,000 |
| PFOA | 63,000 | 51,000 |
| PFNA | 1,000 | 220 |

Field & Porter, 2013



Long-Chain PFCs are Persistent in Humans

- Slowly excreted - Half-lives are **several years**.
- Accumulate blood serum (and other organs) bound to proteins – Do not distribute to fat.
 - Unlike most persistent organic pollutants (e.g. dioxin, PCBs)
- Found in blood serum (ppb) of **virtually all U.S. residents & worldwide**.
 - Levels of PFOA and PFOS are decreasing over time (latest data is from 2013-14).
- General population exposed from food and consumer products.
 - Exposure greatly increased by **low levels in drinking water**.



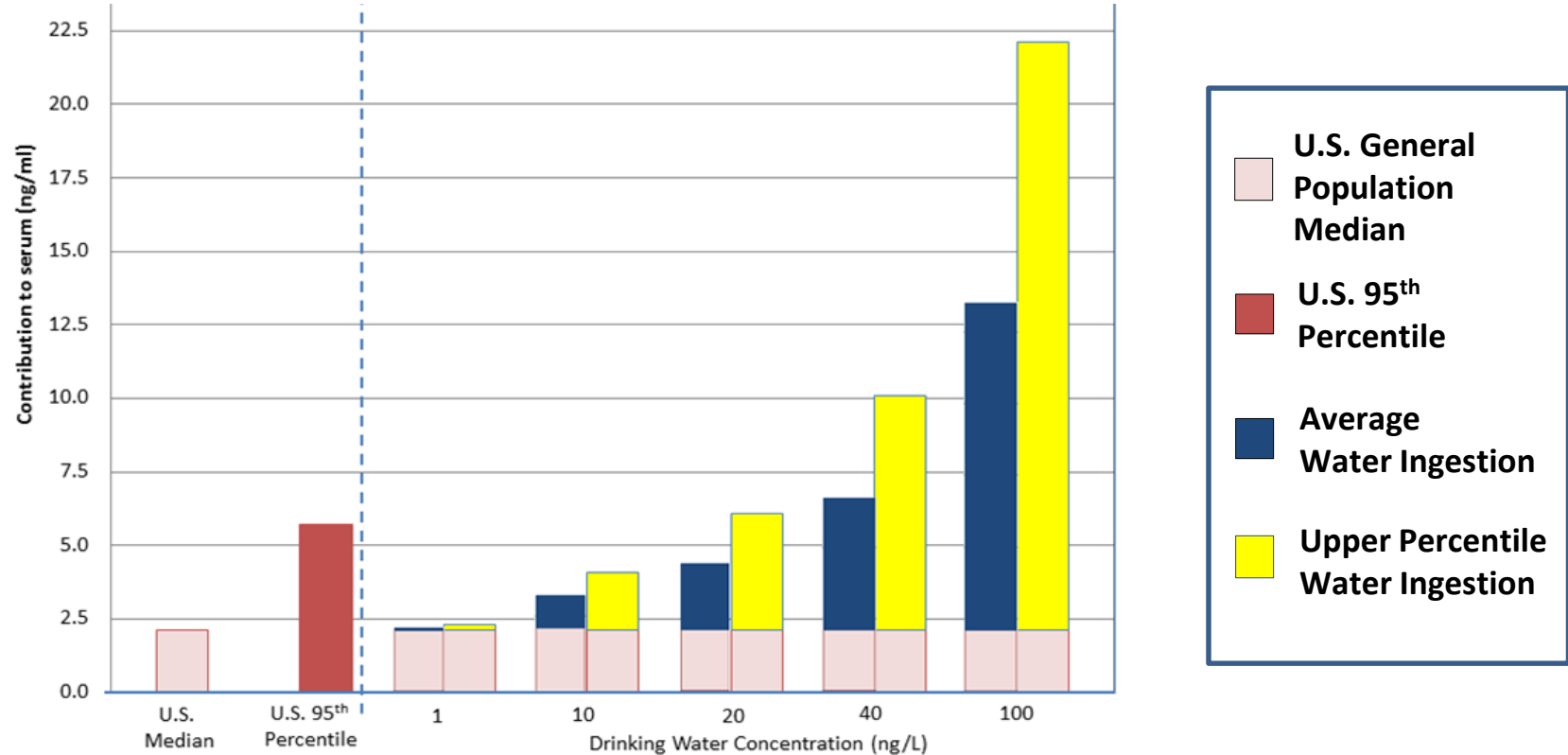
PFOA – Perfluorooctanoic acid, C8

PFNA - Perfluorononanoic acid; C9

PFOS - Perfluorooctane sulfonate, C8-S

PFHxS - Perfluorohexane sulfonate, C6-S

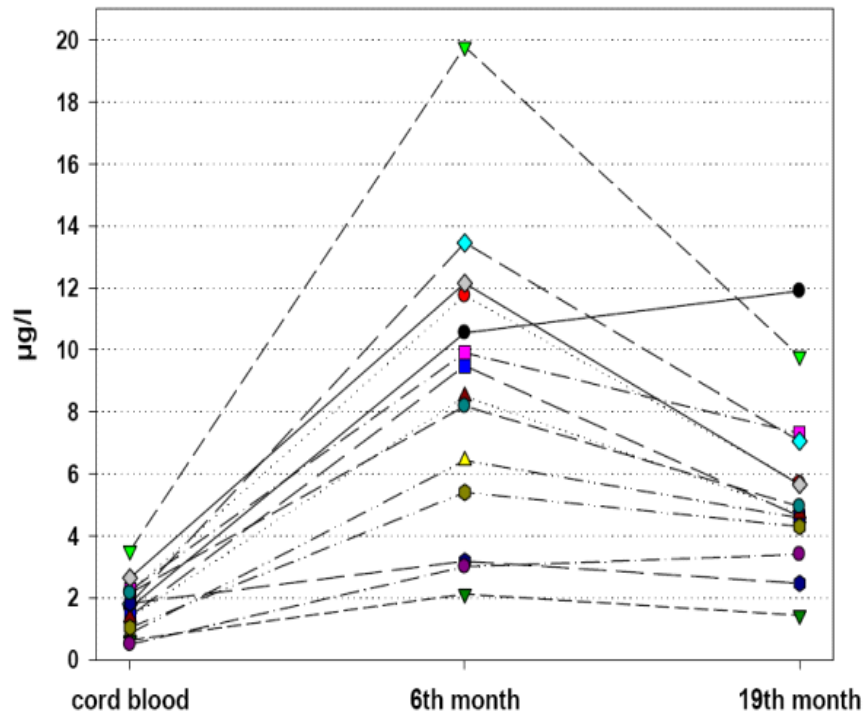
Low Drinking Water Concentrations of Long-chain PFCs Substantially Increase Human Body Burden – Example: PFOA



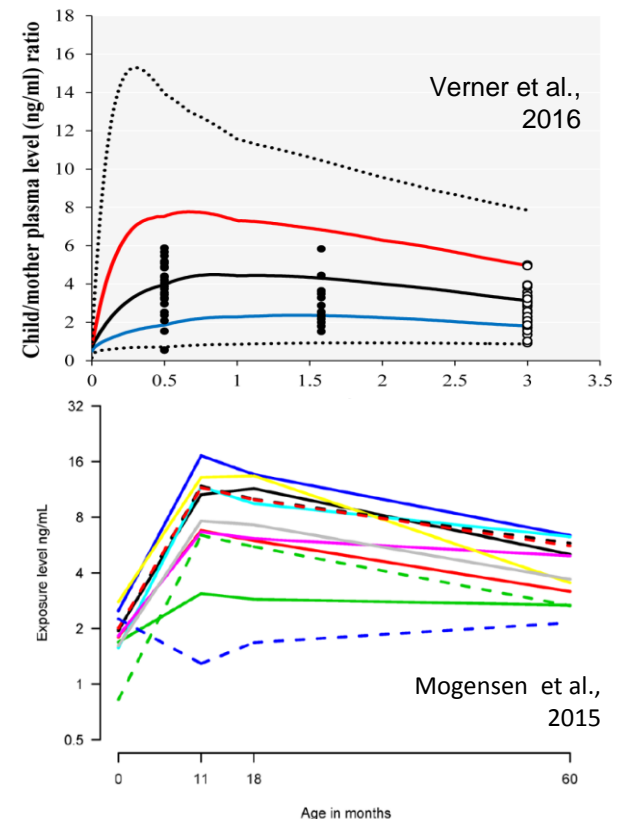
- Bioaccumulation of long chain PFCs from drinking water:
 - Blood serum:drinking water ratio > 100:1.
 - **Ongoing exposure to relatively low drinking water concentrations can overwhelm other exposure sources.**
- Differ from other PBT chemicals (e.g. dioxins, PCBs):
 - *Drinking water is not important exposure route.*

Increases in Serum PFCs Are Greater in Infants

- Higher exposures - from breast milk or formula:
 - PFCs in breast milk *similar or higher* than in maternal drinking water.
 - Ingest much *more fluid per body weight* than older individuals.
- Sensitive subpopulation for developmental & other short-term effects.



Fromme et al., 2010



Long–Chain PFC Toxicology and Epidemiology - Summary

- **Multiple types of toxicity in animals** - *Hepatic, immune system, developmental, reproductive, thyroid, metabolic, and neurobehavioral (varies among PFCs).*
 - Some at very low doses. Most sensitive effect include:
 - **PFOA** – certain developmental effects; some effects persist into adulthood.
 - **PFOS** – decreased immune response.
 - **Tumors in rat studies - PFOA, PFOS, (and GenX, perfluoroethers replacement for PFOA) - tumors in rats.**
 - *Perfluorohexanoic acid* (PFHxA, C6; shorter chain – did not cause rat tumors.
 - *Other PFCs/PFAS* – no chronic studies.
- Long-chain PFCs generally **more toxic & longer half-lives** than *shorter chain PFCs*.
- **Similarities and differences** in toxicity and mode of action among compounds.
 - *Example: Peroxisome proliferator activated receptor-α (PPARα) mode of action of many PFAS does not appear to apply to PFOS.*
- Epidemiological associations with one or more PFCs in the **general population and/or communities with contaminated drinking water** include:

| | | |
|----------------------|------------------------|-------------------------------------|
| ↑ <i>cholesterol</i> | ↑ <i>liver enzymes</i> | ↓ <i>vaccine response</i> |
| ↑ <i>uric acid</i> | ↓ <i>birth weight</i> | <i>Testicular and kidney cancer</i> |

 - NJ review concluded that some associations fulfill multiple criteria for causality.

Long-Chain PFCs in Drinking Water - Summary

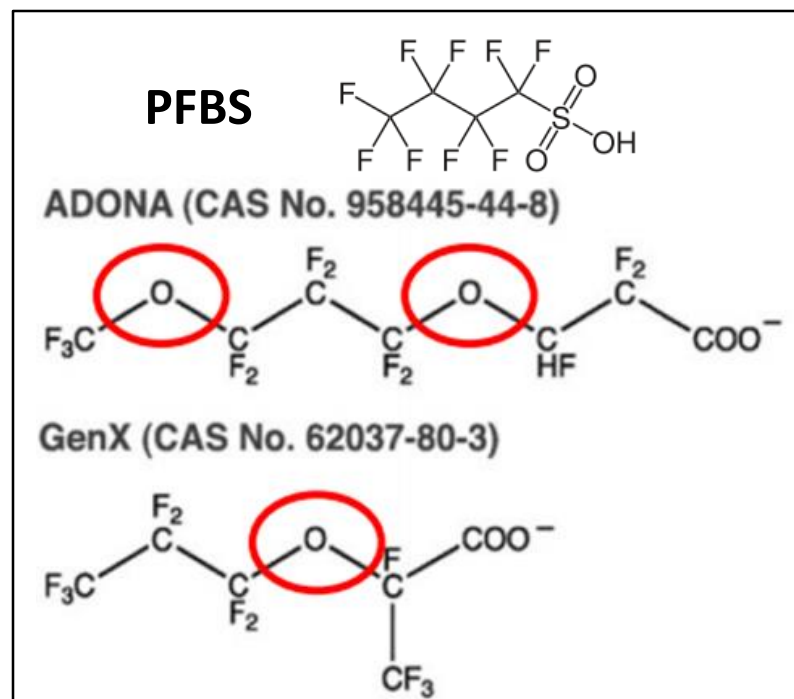
- Persist indefinitely in the environment.
- Remain in the body for many years after exposure ends.
- Low drinking water levels (e.g. 10-20 ng/L) substantially increase human exposure.
 - *In contrast, drinking water is not an important exposure route for other PBT chemicals (e.g. dioxins, PCBs).*
- Multiple types of toxicity in animals, including some at low doses.
- Associated with human health effects at general population and drinking water exposure levels.
 - *NJ review concluded that some effects have evidence for causality.*
- Higher infant exposures are of particular concern.
- **Overall - suggests need for caution about exposure from drinking water.**

Replacements for Phased Out Long-chain PFCs

- **Long-chain PFCs** phased out through voluntary agreement of major U.S. manufacturers with EPA.
 - However...will remain in the environment indefinitely.

- **Replacement PFAS:**

- Short chain PFCs, and PFAS with other structures (e.g. perfluoroethers).
- Approved by EPA.
- **Shorter human half-lives.**
- But...some have **similar toxicity**
 - e.g. *GenX* (replacement for PFOA) - same tumor types as PFOA in rats.
 - Some others **not thoroughly tested.**
- May need to be used in **greater amounts.**
- And... like long-chain PFCs, **do not break down** in the environment.
- Analysis by only a few commercial labs; research methods needed until recently.
- **GenX recently detected** in surface water, ground water, drinking water, and/or plants near industrial facilities in several locations.
 - **Current topic** of scientific interest and public concern.



Occurrence of PFCs in Raw versus Finished Drinking Water

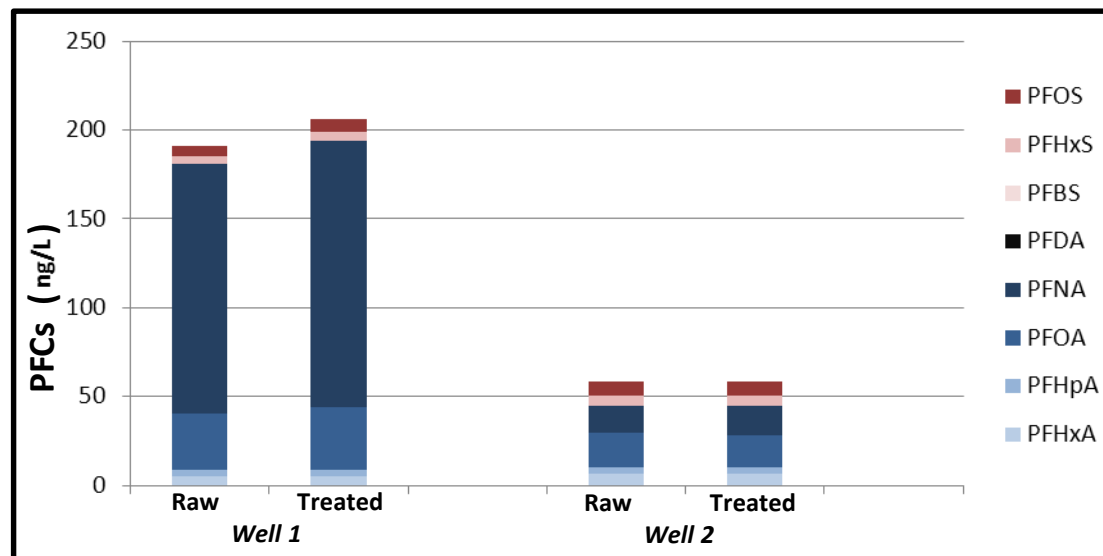
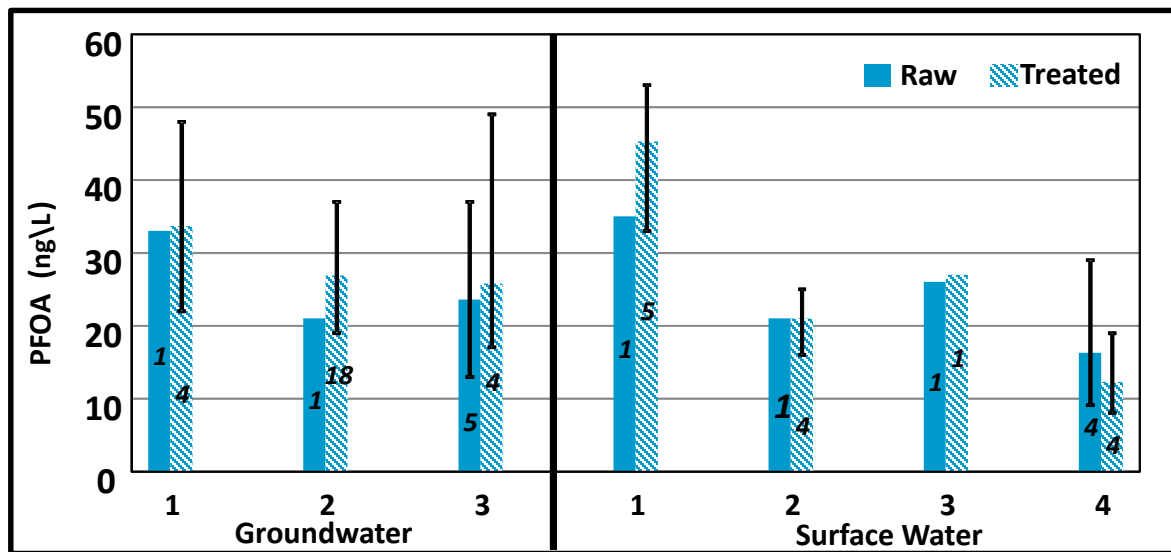
- **Source water is generally a good indicator of finished water.**
 - Not removed by conventional drinking water treatment processes.



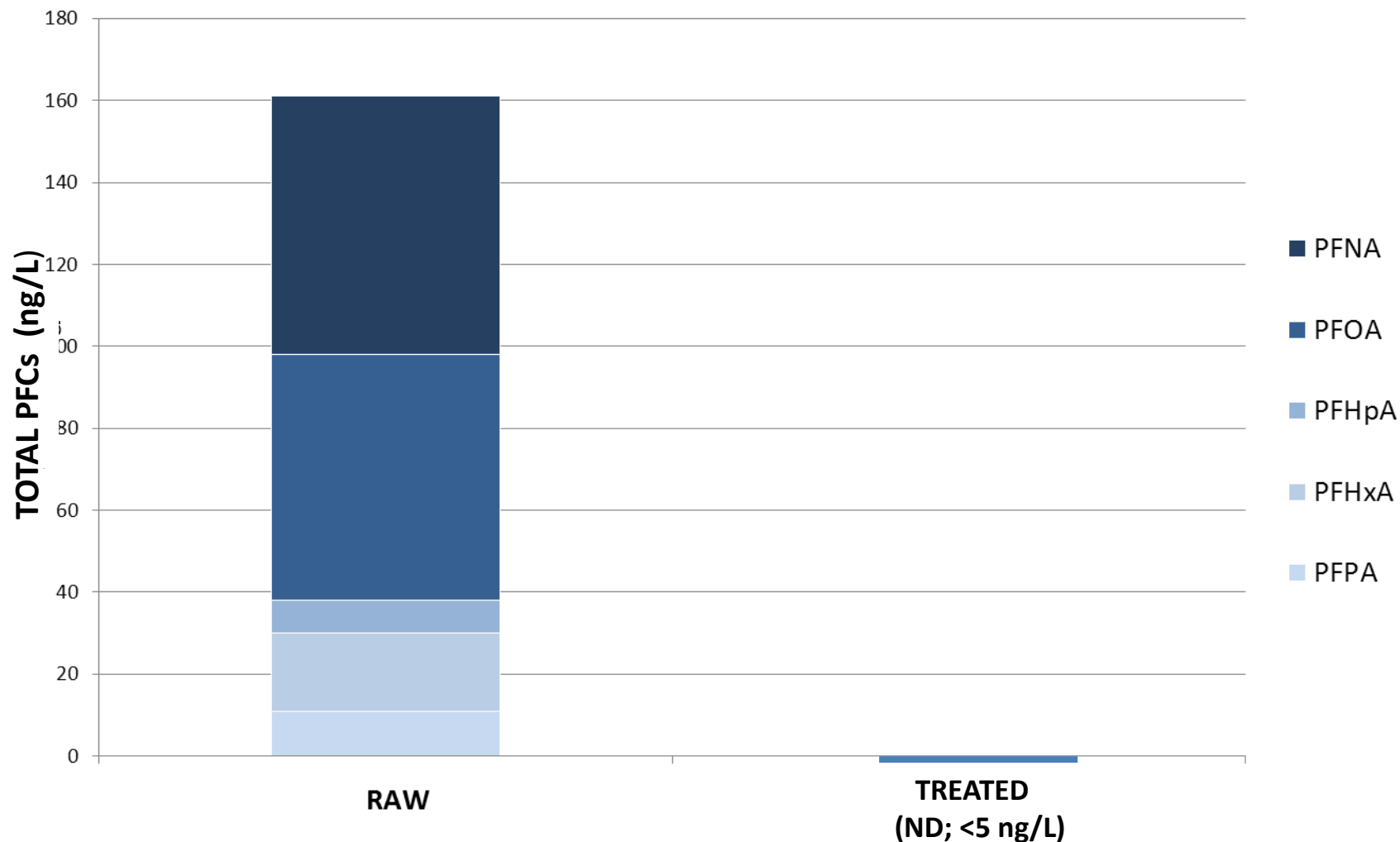
- Can be removed from drinking water by treatment systems specifically designed for PFC removal.
 - Granular activated carbon
 - Reverse osmosis.
 - Possibly ion exchange.



Raw versus Treated Water in NJ Public Water Systems Without Treatment Designed for PFC Removal



Raw versus Treated Groundwater at NJ Public Water System with Granular Activated Carbon Designed for PFC Removal



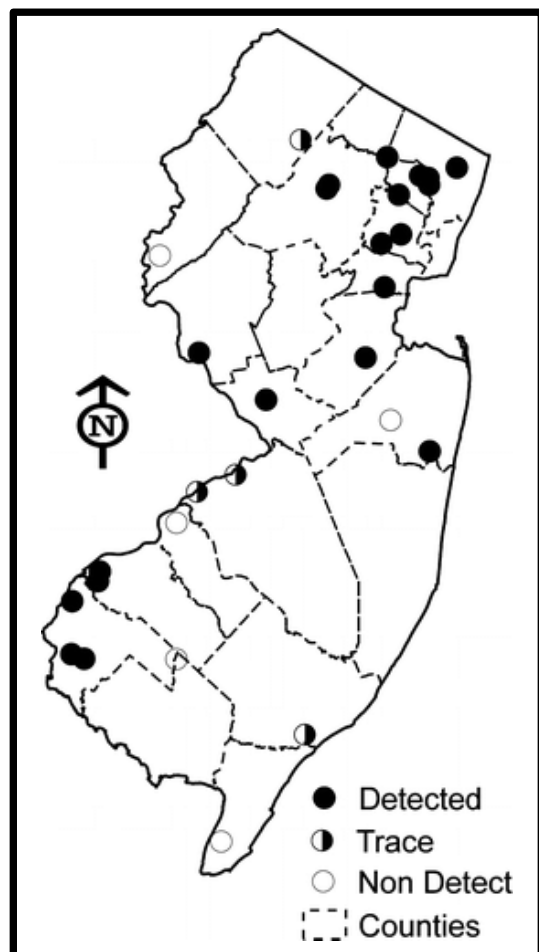
NJ Public Water System (PWS) PFC Occurrence Data

- New Jersey has **more extensive data on occurrence of PFCs in public water systems (PWS)** than most or all other states.
- PFOA detection in raw and finished water from a NJ PWS **first reported to NJDEP in 2006**.
 - Near potential industrial source in Salem County.
- **NJDEP statewide occurrence studies (2006 and 2009)**.
 - First state to conduct such studies.
- **NJDEP PFC database**:
 - Includes NJDEP studies, as well as other data reported to NJDEP by PWS and other parties.
- **USEPA Unregulated Contaminant Monitoring Rule (UCMR3) (2013-15)**:
 - Allows for comparison of NJ PWS data to rest of U.S. on equal basis.



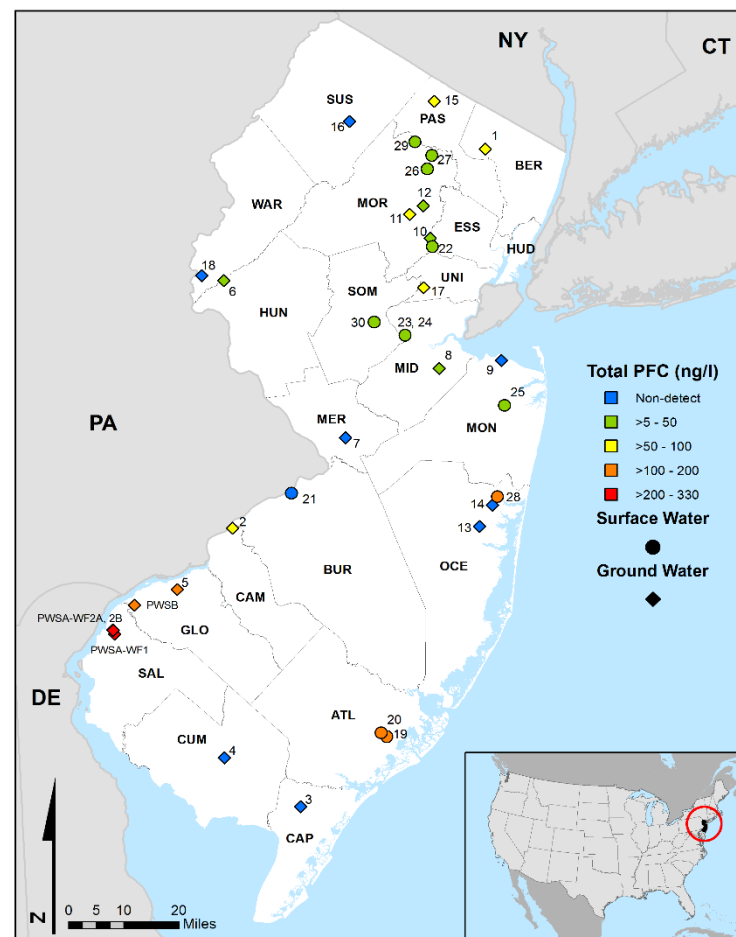
NJDEP Studies of PFCs in NJ PWS

PFOA Detections in 2006 Study (PFOA & PFOS - 23 PWS)



- Low levels of multiple PFCs commonly found in NJ PWS.
- Potential sources identified at some sites and unknown at others.
- *2006 study:*
PFOA – 65%;
PFOS - 30%
(≥ 4.0 ng/L).
- *2010 study (10 PFCs):*
PFOA & PFOS results similar to 2006.

PFC Detections in 2009-10 Study (10 PFCs - 31 PWS)

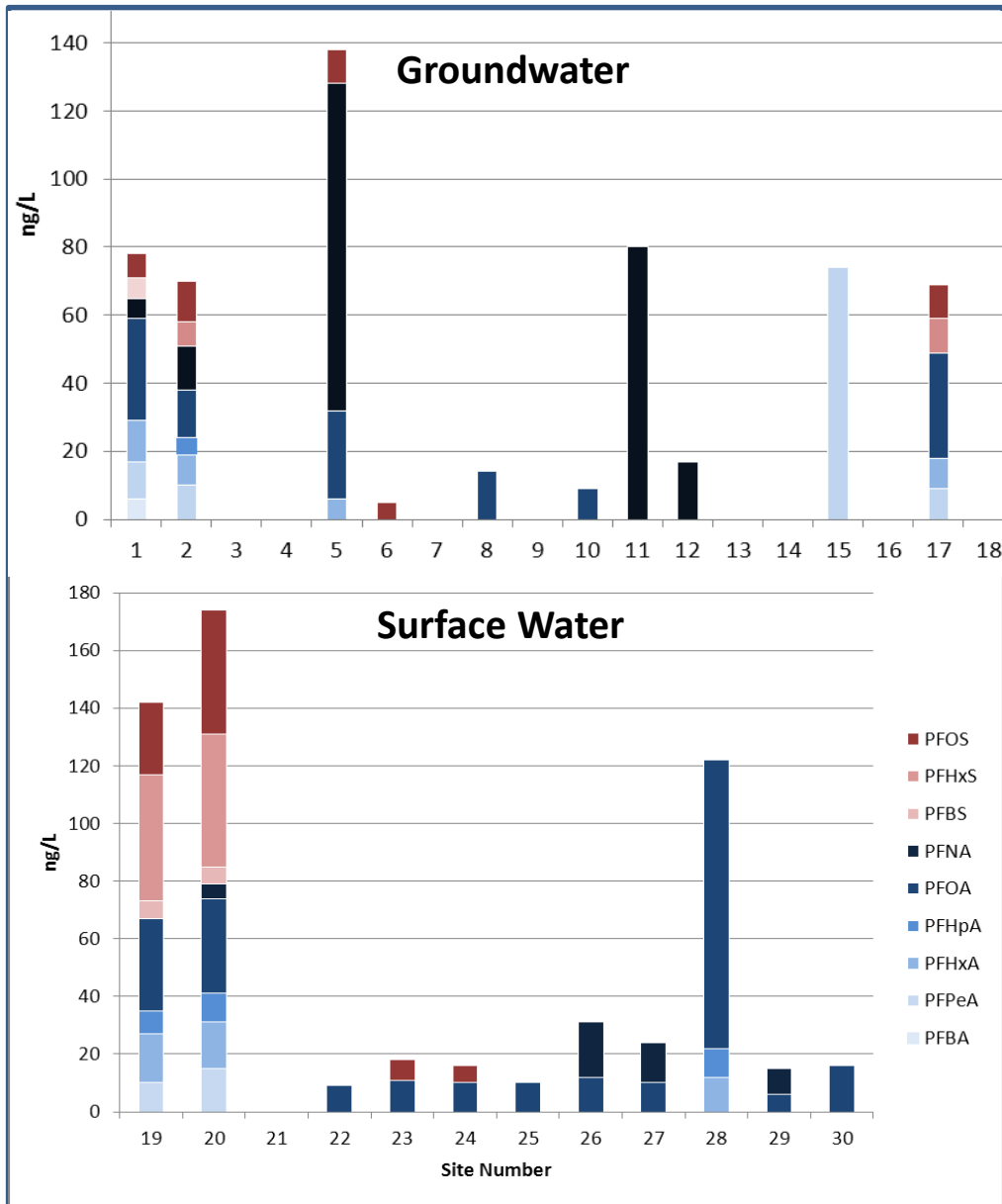


2009-10 NJDEP Study of 10 PFCs in Public Water Systems

- Raw water from 31 public water systems in 20 of 21 NJ counties.
- PFCs analyzed:
 - **Seven carboxylates (C4-C10):**
 - *Perfluorobutanoic acid (PFBA, C4)*
 - *Perfluoropentanoic acid (PFPeA, C5)*
 - *Perfluorohexanoic acid (PFHxA, C6)*
 - *Perfluoroheptanoic acid (PFHpA, C7)*
 - *Perfluorooctanoic acid (PFOA, C8)*
 - *Perfluorononanoic acid (PFNA, C9)*
 - *Perfluorodecanoic acid (PFDA, C10)*
 - **Three sulfonates (C4-S, C6-S, C8-S)**
 - *Perfluorobutane sulfonate (PFBS, C4-S)*
 - *Perfluorohexane sulfonate (PFHxS, C6-S)*
 - *Perfluorooctane sulfonate (PFOS, C8-S)*



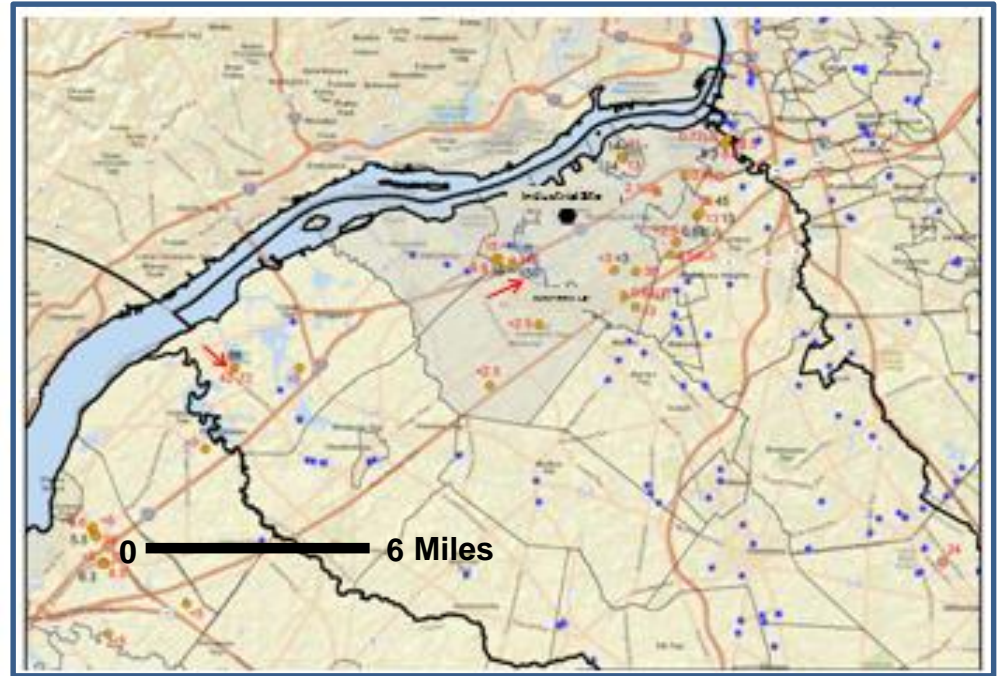
Results of 2009-10 NJDEP Study of 10 PFCs in NJ PWS



- Between **1 and 8 PFCs** in 70% of PWS.
- **Total PFCs:** 9 – 174 ng/L.
- **PFOA:** Most frequently detected (57%); up to 100 ng/L.
 - But other PFCs found at some sites where PFOA not detected.
- **PFOS:** 30%; up to 43 ng/L.
- **PFDA (C10):** Not detected.
- **Other PFCs:** 3% to 23% of PWS.
- **PFNA (C9):** Up to 96 ng/L
 - Higher than reported in drinking water elsewhere in the world.
 - Infrequently found elsewhere in U.S.
 - Industrial source in southern NJ.
- Potential sources identified at some, but not all, sites.

Perfluorononanoic Acid (PFNA,C9) in Gloucester County, NJ

- Found in wells of two PWS (→ on map) in Delaware River (DRBC study) at higher levels than reported elsewhere in the world.
- Later found in wells of several additional PWS.
- Believed to be more toxic and more persistent in human body than PFOA.



- Potential industrial source (◆ on map) - PFNA was used as processing aid in production of fluoropolymer plastic (PVDF).
 - Large amounts of PFNA (tons per year) released to air and water for 25 years.
 - Use ceased in 2010.
- Situations of PFNA drinking water contamination have not been previously investigated elsewhere.

USEPA Unregulated Contaminated Monitoring Rule (UCMR3)



- Federal Safe Drinking Water Act requires UCMR monitoring of **finished water** from U.S. PWS for 30 unregulated contaminants every 5 years.
 - **All large** (>10,000 customers) and a **few small PWS**.
 - **UCMR3 (2013-15) included 6 PFCs**.
- New Jersey public water systems participating:
 - All 165 large community systems.
 - 13 of ~435 small community and 8 of ~700 non-transient non-community systems.
- **Higher Reporting Levels** than for most other NJ PFC drinking water data from certified laboratories.
 - Allows for **comparison of NJ data to rest of U.S.** on same basis.
 - **Lower % occurrence than in other NJ data** with lower RLs.
 - Recent evaluation of **national UCMR3 data using lower RLs also shows much higher occurrence** at lower levels nationally.

NJ versus National PFC Detections in UCMR3

- PFOA and PFNA - much more frequent in NJ than nationally.**
 - PFNA – Gloucester and Camden Counties*
 - PFOA – Various locations*
- Other PFCs - occurrence similar in NJ and nationally.**

| <i>Compound</i> | <i>Reporting Level (ng/L)</i> | <i>New Jersey PWS</i> | | <i>National PWS</i> | |
|------------------------|--------------------------------------|------------------------------|-------------------------|---|---|
| | | <i># Detects*</i> | <i>% Detects</i> | <i># Detects (other than NJ)**</i> | <i>% Detects (other than NJ)</i> |
| PFOA (C8) | 20 | 18/175 | 10.2% | 90/4734 | 1.9% |
| PFNA (C9) | 20 | 4/175 | 2.3% | 10/4734 | 0.2% |
| PFOS (C8-S) | 40 | 6/175 | 3.4% | 89/4734 | 1.9% |
| PFHxS (C6-S) | 30 | 2/175 | 1.1% | 53/4734 | 1.1% |
| PFBS (C4-S) | 90 | 0/175 | 0% | 8/4734 | 0.2% |
| PFHpA (C7) | 10 | 6/175 | 3.4% | 79/4734 | 1.7% |
| | | | | | |
| Any PFC | ----- | 25/175 | 14.3% | << 329/4734*** | << 6.9%*** |

* New Jersey data as of 10/14/16. **USEPA data posted online as of 7/16.

*** Actual National # and % detections for “Any PFC” are substantially lower than shown due to detections of multiple PFCs in many PWS.



PFAS Monitoring in a Post Health Advisory World-What Should We Be Doing?



<https://nysawwa.org/docs/presentations/2017/FINAL-PFAS%20Monitoring%20in%20Post%20health%20Advisory%20World-What%20Should%20We%20Be%20Doing-2017.pdf>

Frequency of Detection Comparison by # of Samples



| | Compound | Official NCOD Database samples with detection (UCMR 3 MRLs) | EEA Subset of Samples with detection using UCMR 3 MRLs | EEA Subset of Samples with detection using 5 ng/L MRL | EEA Subset of Samples with detection using 2.5 ng/L MRL |
|---------------|--------------|---|--|---|---|
| RL | N | ~36,000 | ~10,500 | ~10,500 | ~10,500 |
| (ng/L) | | | | | |
| 40 | PFOS | 0.8% | 1.3% | 11.5% | 20.5% |
| 20 | PFOA | 1.0% | 1.8% | 12.5% | 23.5% |
| 20 | PFNA | 0.1% | 0.1% | 0.6% | 1.9% |
| 30 | PFHxS | 0.6% | 1.0% | 6.0% | 12.3% |
| 10 | PFHpA | 0.6% | 1.5% | 3.3% | 8.8% |
| 90 | PFBS | <0.1% | 0.2% | 5.3% | 11.9% |



NJDEP Database of PFCs in Public Water Systems

- Developed and maintained by NJDEP Division of Science, Research & Environmental Health.
 - Includes data from 2006 – present.
- Data from:
 - Two NJDEP occurrence studies.
 - Additional data from followup sampling of PWS in NJDEP studies & other PWS.
 - UCMR3 detections (but not UCMR3 non-detect data).
- Data as of January 2016:
 - 80 public water systems (including 8 with UCMR3 detections only).
 - 282 sampling locations.
 - 1,035 samples
 - 423 raw water, including individual wells and surface water intakes
 - 612 finished water.
- Analytes:
 - PFOA & PFOS only - 374 samples.
 - Broader suite of PFCs - 661 samples.
- Results in this larger database generally consistent with 2006 & 2009-10 NJDEP studies and NJ UCMR3 data.



EPA & States PFAS Drinking Water Regulatory Summary



- **EPA Lifetime Health Advisories** - finalized in 2016:
 - *PFOA, PFOS, or total of both - 70 ng/L (ppt).*
 - *Replaced higher 2009 Provisional Short Term Advisories.*
 - *Guidance - not enforceable.*
 - *No current plans to develop regulatory standards.*
- Several **states** (VT, MN, and NJ) have developed **more stringent** PFOA and PFOS standards or guidelines in consideration of:
 - *More sensitive endpoints of toxicity (NJ, MN).*
 - *Higher exposures of infants (MN, VT).*
 - *Resulting increases in blood serum PFC levels (NJ).*
- Some states have standards or guidance for **additional PFAS** of local concern:
 - Minnesota: **Perfluorobutanoic acid (PFBA)** and **perfluorobutane sulfonate (PFBS)** - 4 carbons.
 - New Jersey: **Perfluorononanoic acid (PFNA)** - 9 carbons.
 - Several states: **Perfluorohexane sulfonate (PFHxS; found in fire fighting foams), perfluoroheptanoic acid (PFHpA), and PFNA** included in total of 70 ng/L when applying EPA PFOS + PFOA Health Advisory.
 - North Carolina: **GenX** (perfluoroether replacement for PFOA).

Status of NJDEP PFC Standards & Regulations



NJ Drinking Water Quality Institute (DWQI) was asked by NJDEP Commissioner to recommend Maximum Contaminant Levels (MCLs) for PFNA, PFOA, and PFOS (2014).

- Legislatively-established advisory body charged with recommending MCLs to NJDEP.
http://www.nj.gov/dep/watersupply/g_boards_dwqi.html
- Members: Public health community, academia, and water purveyors, appointed by Governor (3), Assembly (3), and Senate (3); *Ex officio* members: NJDEP (3) and NJ Dept. of Health (2).
- MCL recommendations based on [health effects](#), [analytical limitations](#) (Practical Quantitation Level; PQL), and available [treatment removal](#) technology.

PFNA

- Ground Water Quality Standard - 10 ng/L (adopted Jan. 16, 2018). PFNA also added to NJ Hazardous Substances List.
- MCL – 13 ng/L (proposed August, 2017). Public comments are being reviewed.

PFOA

- DWQI MCL recommendation – 14 ng/L (March 2017).
- NJDEP Commissioner accepted recommended MCL, and stated that MCL will be proposed. This value is currently used guidance by NJDEP (Nov. 2017).

PFOS

- DWQI draft recommended MCL - 13 ng/L (Dec. 2017). MCL recommendation to be finalized after consideration of public comments.

NJDEP Division of Water Supply & Geoscience

PFAS Update



- A number of public water systems (PWS) have detected PFOA, PFNA, and/or PFOS above the values on the preceding slide.
- About half of these PWS have taken steps to reduce PFAS levels in finished water.
- DWSG is recommending continued monitoring and steps to eliminate or reduce exposure.

NJDEP Site Remediation Program (SRP)

PFAS Update



- SRP Emerging Contaminants webpage provides direction to remediating parties and LSRPs regarding emerging contaminants, including PFAS:
<http://www.nj.gov/dep/srp/emerging-contaminants/>
- SRP is applying the PFOA guidance value of 14 ng/L for affected private potable wells. The responsible party will be required to provide treatment or an alternative water supply and, if they fail to do so, NJDEP will implement the response action.
- SRP issued information requests to manufacturing facilities that may have used PFAS.



Ongoing NJDEP PFAS Studies



- ***Statewide fish tissue, sediments, surface water (Div. of Science, Research & Environmental Health; DSREH)***
 - 11 sites around the state.
 - Site locations selected due to proximity of potential source.
 - ~100 fish collected.
 - Data currently being analyzed.
- ***Southwestern NJ Atmospheric Deposition and Source Identification Study with EPA Office of Research & Development (Site Remediation Program & DSREH)***
 - Total of ~130 samples over ~150 square miles.
 - Samples include soil, vegetation, surface water (fresh and brackish), sediments, and groundwater from private drinking water wells.
 - Will identify PFAS for which research analytical methods are needed, as well as PFCs detected by commercial laboratory methods.

Current National PFAS Activities

- **EPA/National Toxicology Program (NTP):**



- Development of toxicity screening methods for rapid assessment & prioritization for further testing of large numbers of PFAS.

<https://www.epa.gov/sciencematters/epa-toxicologists-focus-innovative-research-pfas-compounds>

- **EPA:**



- National Leadership Summit on PFAS, May 2018: Details to follow.

<https://www.epa.gov/pfas/pfas-national-leadership-summit-and-engagement>

- **ITRC (Interstate Technology & Regulatory Council) PFAS Team:**



- Six PFAS Fact Sheets <https://pfas-1.itrcweb.org/>; AFFF fact sheet to follow.
- Longer Technical/Regulatory Guidance document – in preparation.

- **Centers for Disease Control (CDC):**



- National health study of communities with PFAS exposure near military sites - funded in recently finalized 2018 federal budget.

<http://www.circleofblue.org/2018/world/perfluorinated-chemicals-health-study-included-in-congress-budget-deal/>

Thank you!

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