

# Perfluorinated Compounds in the Widefield Aquifer



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# Perfluorinated compounds (PFCs)

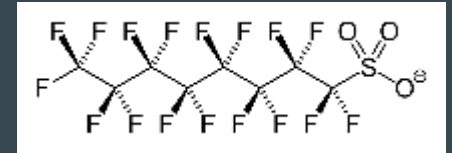
Family of human-made substances that do not occur naturally in the environment.

Carbon fluorine bond one of the strongest in nature, so no natural degradation.

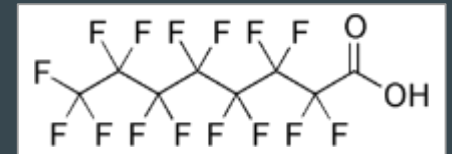
Hydrophobic and oleophobic properties, water soluble.

Used in products that resist heat, oil, stains, grease and water.

Nearly all Americans have measureable levels of PFCs in their blood.



PFOS



PFOA

# Why are we talking about PFCs?

In 2013 and 2014, the EPA required large public water systems across the country to evaluate PFC levels as part of the Unregulated Contaminant Monitoring Rule (UMCR).

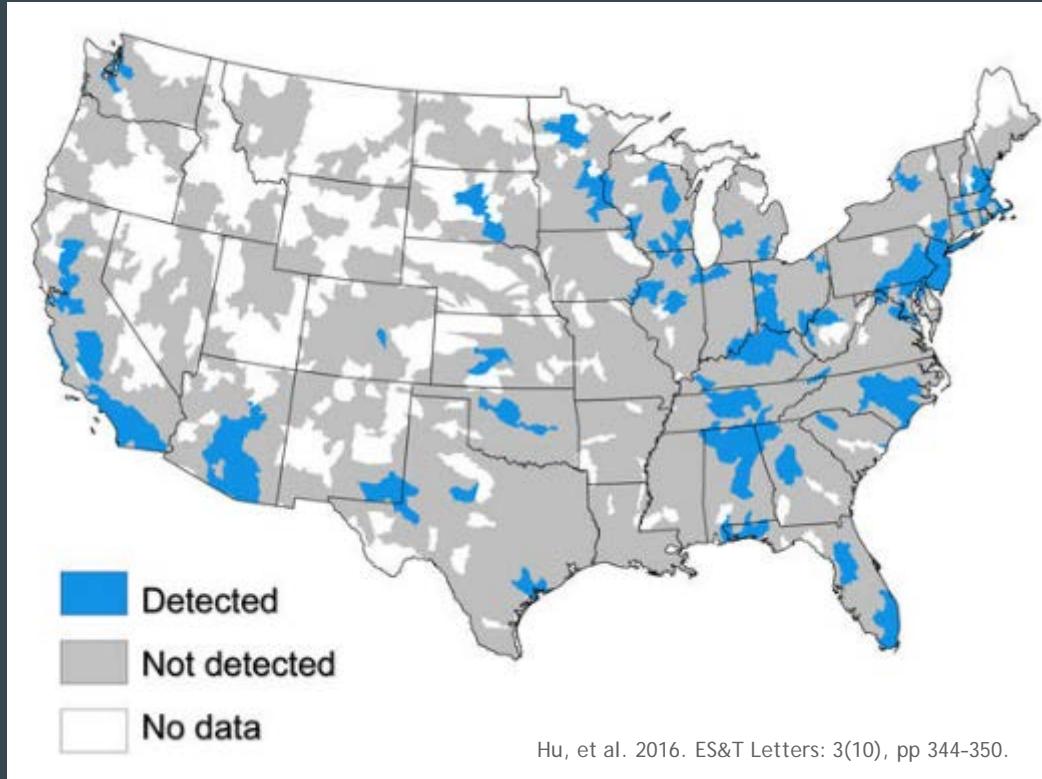
UMCR is program that gathers data to determine locations and amounts of unregulated substances in drinking water sources to determine if they should be regulated under the Safe Drinking Water Act.



# UCMR required testing for six PFCs

- PFBS (Perfluorobutanesulfonic acid)
- PFHpA (Perfluoroheptanoic acid)
- PFHxS (Perfluorohexane sulfonic acid)
- PFNA (Perfluorononanoic acid)
- PFOA (Perfluorooctanoic acid)
- PFOS (Perfluorooctansulfonic acid)

# PFCs were found in 108 U.S. public water systems





# PFCs detected in public water supplies for Security, Widefield, and Fountain

Bright yellow = Approximate Widefield Aquifer boundary

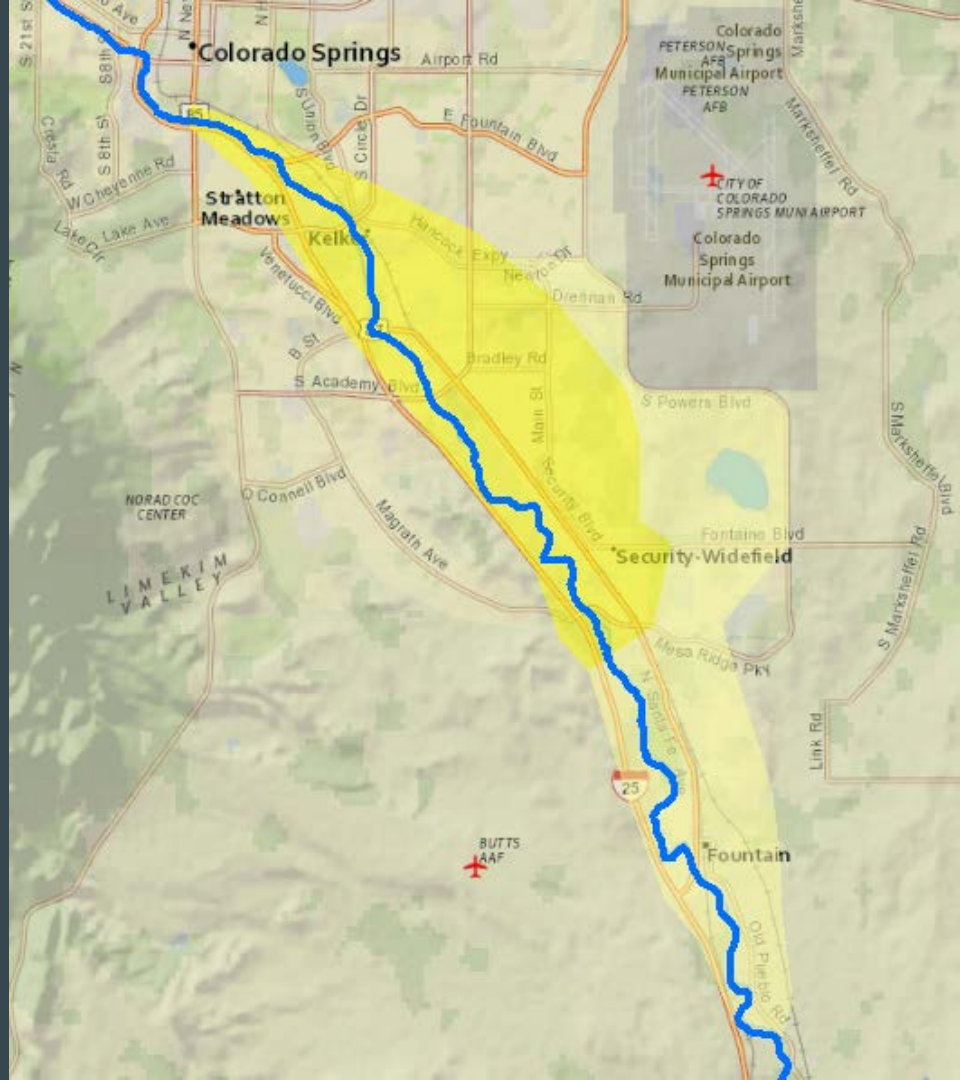
Pale yellow = Additional area of investigation

# Widfield Aquifer

Paleochannel of Fountain  
Creek

Studied by USGS in the  
1970's

Renewable supply of  
almost 4 billion gallons  
per year



# Who is drinking water from Widefield Aquifer?

City of Fountain (20,000 residents)

Widefield Water and Sanitation District (19,000 residents)

Security Water District (18,000 residents)

Stratmoor Hills (6,500 residents)

Garden Valley Mobile Home Park (600 residents)

Security Mobile Home Park (150 residents)

Private wells (220+ residents)

Approximately 65,000 residents.





# PFCs and health



We don't know much - most information on PFOA and PFOS.

Low birth weight and accelerated puberty.

Changes in blood cholesterol, liver enzymes, and uric acid levels - potential for elevated risk of heart disease, liver disease or high blood pressure.

Possible link to thyroid disease, some immune system effects, kidney cancer and testicular cancer.

# Health Advisory

Provides a margin of protection from exposure to specific PFCs (PFOA and PFOS) in drinking water

2009 “Provisional” EPA Health Advisory

PFOA: 400 ppt

PFOS: 200 ppt

May 2016 EPA Health Advisory

Based on developmental effects

PFOA + PFOS < 70 ppt

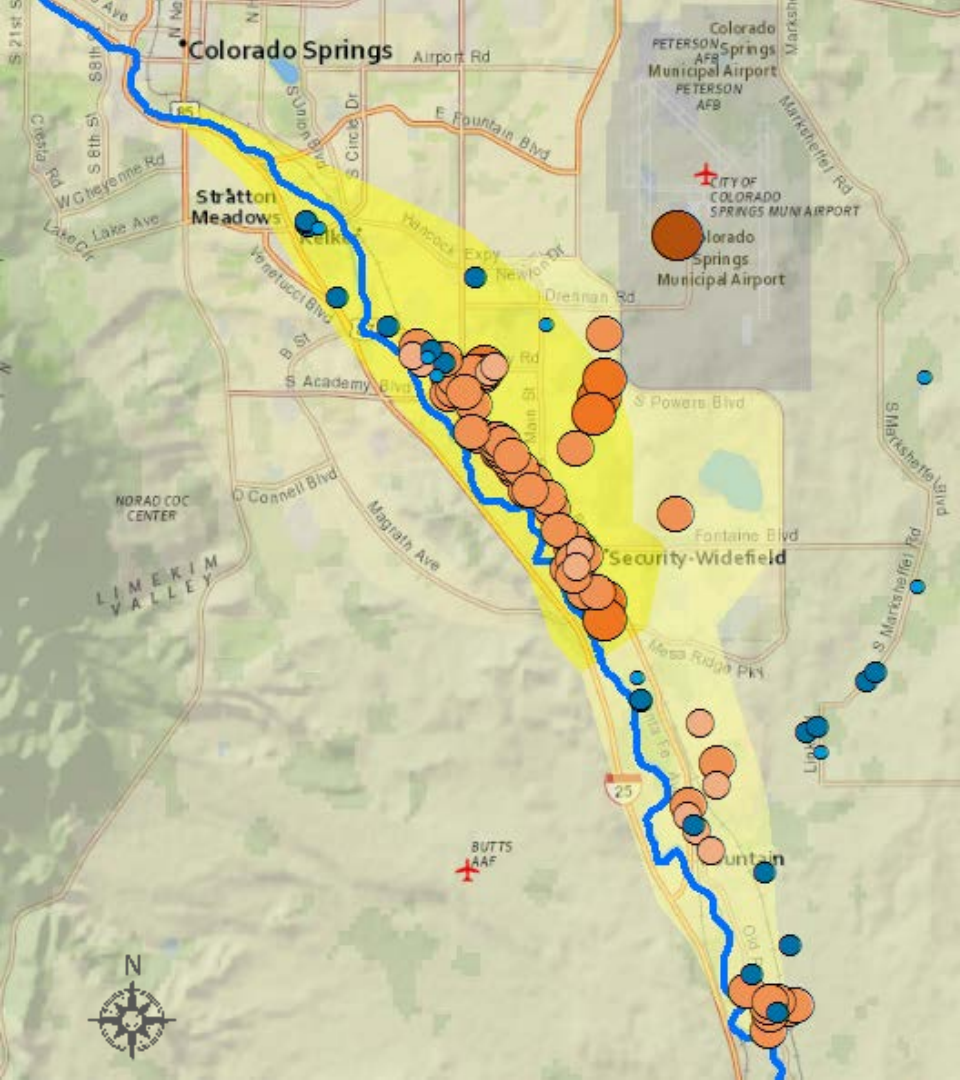
May 2016 Colorado Recommendation

PFOA + PFOS + PFHpA < 70 ppt

# PFC levels in groundwater

Orange = exceed health advisory, size proportional to level

Blue = not detected (small) or below health advisory (large)



# Three large systems

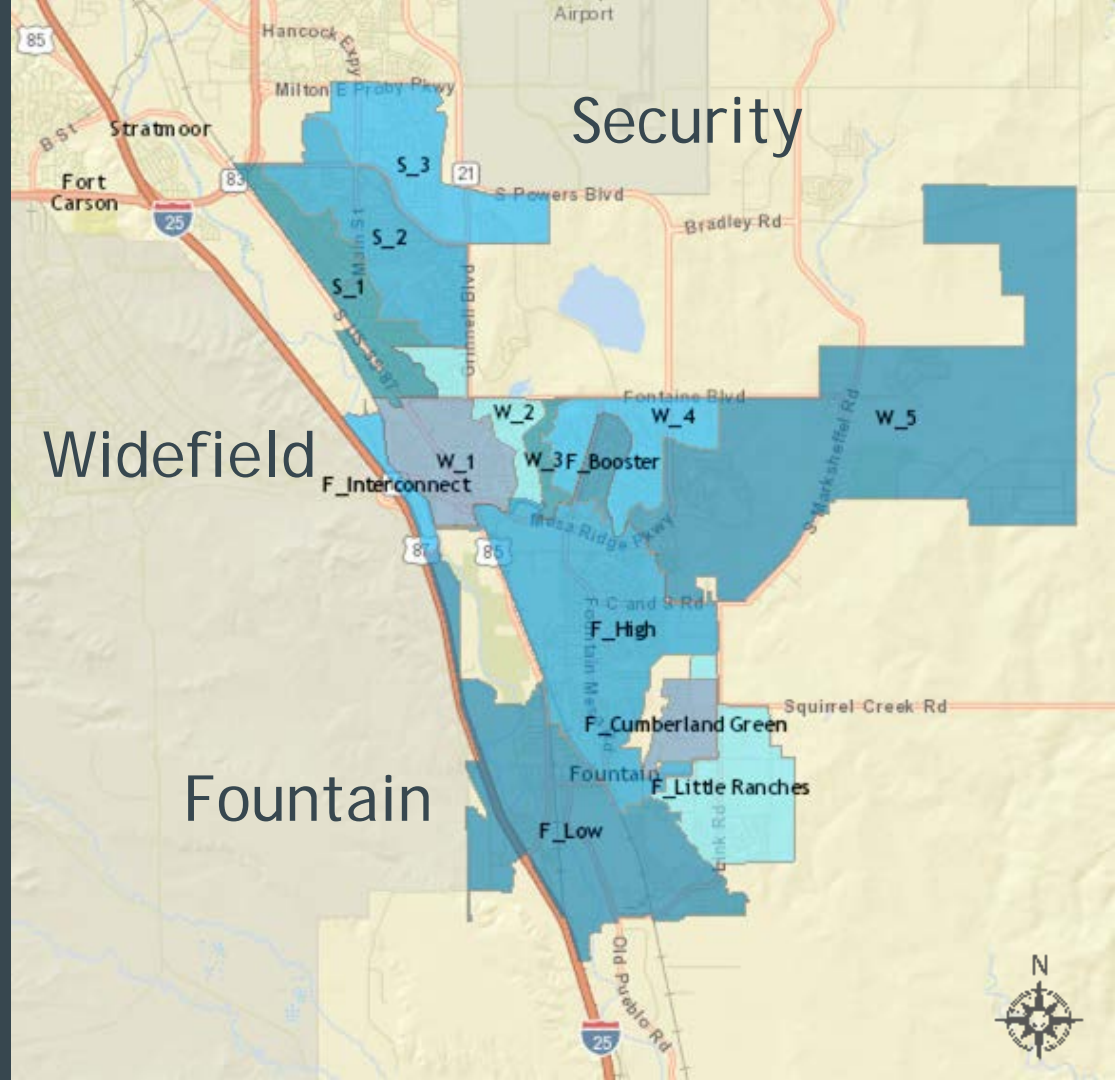
Serve 57,000 residents.

Shut down as many wells as possible.

Rely heavily on SDS and FVA water.

Currently all zones below health advisory.

Increased summer water usage -  
> exceedance of health advisory



# Status of drinking water



Reliance on SDS/FVA is not sustainable.

Air Force is providing alternate drinking water.

Air Force working with systems to install or fund installation of treatment - \$4.3 million allocated may not be enough.

Source identification/plume delineation process ongoing.

# Can I eat produce from my farm or garden?

Some evidence that certain PFCs in water and soil can accumulate in produce.

No data was available on PFC levels in produce in area of investigation.

Few labs and complicated methodology to analyze levels.



# Colorado School of Mines Collaboration

CSM measured PFC levels in soil.

Water data collected by multi-agency  
collaborative employed.

Predicted levels in produce using CSM  
uptake models.

Developed PFC screening levels for produce.



# Growing conditions: Contaminated soil + irrigation with water containing PFCs > health advisory



**Adults:** Consumption of up to four servings of vegetables and three servings of fruit per day over a three month period in a given year is likely to result in exposures below EPA recommended levels for PFCs.

**Children:** Consumption of two servings of fruits/vegetables per day over a three month period in a given year is likely to result in exposures below EPA recommended levels for PFCs.



# Growing conditions: Contaminated soil + irrigation with water containing PFCs < health advisory

Adults and Children: Consumption of all recommended servings of fruits and vegetables per day over a three to six month period in a given year is likely to result in exposures below EPA recommended levels for PFCs.



# Status of produce

Gardeners and farmers can continue to grow and eat food with a level of protection from PFCs following CDPHE recommendations.

Measured levels of PFCs in a few produce samples confirm CDPHE recommendations.

Level of PFCs in produce may vary, but will persist due to soil and water contamination





# Questions?

More information available at [colorado.gov/cdphe/pfcs](https://colorado.gov/cdphe/pfcs)

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