



GREEN SCIENCE  
POLICY INSTITUTE

# A PFAS Primer

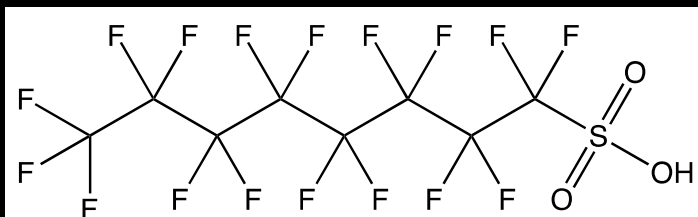
Tom Bruton, PhD

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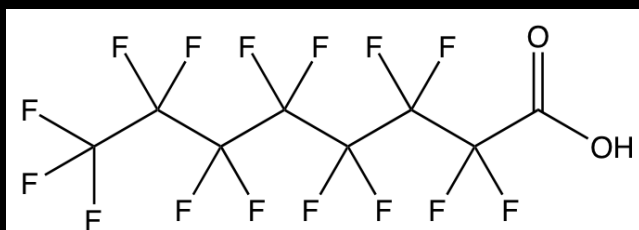
# PFAS

(Per and Polyfluoroalkyl Substances)

PFOS



PFOA



Carbon-Fluorine bond strength:

- Leads to oil and water repellency
- “Forever chemicals” -- last for geologic time!



# Common Uses



CARPETS



CARPET CLEANING  
PRODUCTS



FOOD PACKAGING



FURNISHINGS



COSMETICS



OUTDOOR GEAR



CLOTHING



ADHESIVES AND SEALANTS



PROTECTIVE COATINGS



NON-STICK COOKWARE

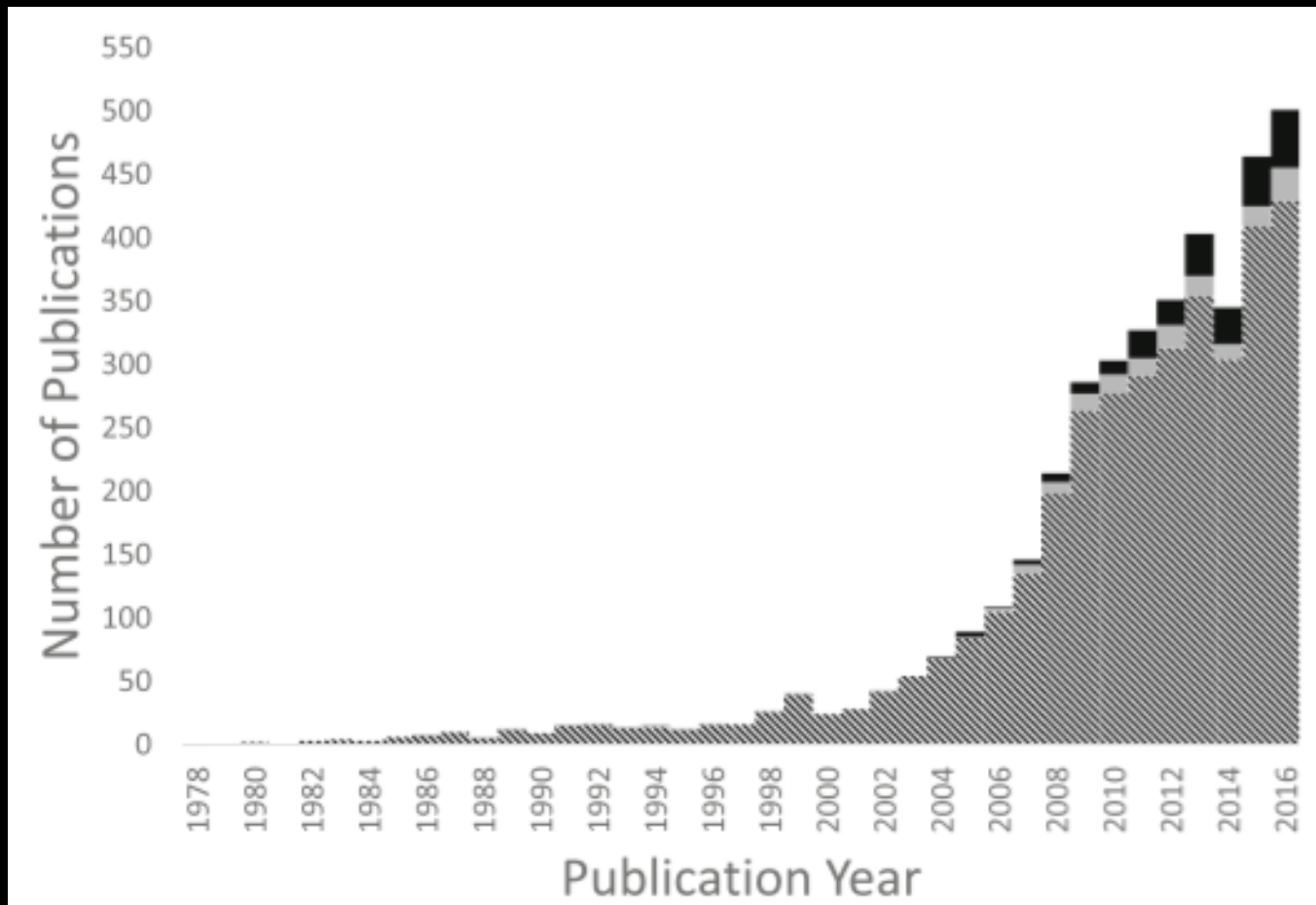


CARSEATS



FIREFIGHTING FOAM

# Scientific publications on PFAS



# Ubiquitous in the Environment

Science

**‘Forever chemicals,’ other pollutants found around the summit of Everest**

Newer PFAS compound detected for first time in Arctic seawater

‘Canary in a coal mine’: Scientists test alligators for PFAS chemical compounds

Washington Post, April 17, 2021

ACS News, July 29, 2020

Fayetteville Observer, May 7, 2021

# PFASs exposure is a health concern

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Exposure linked to health risks:

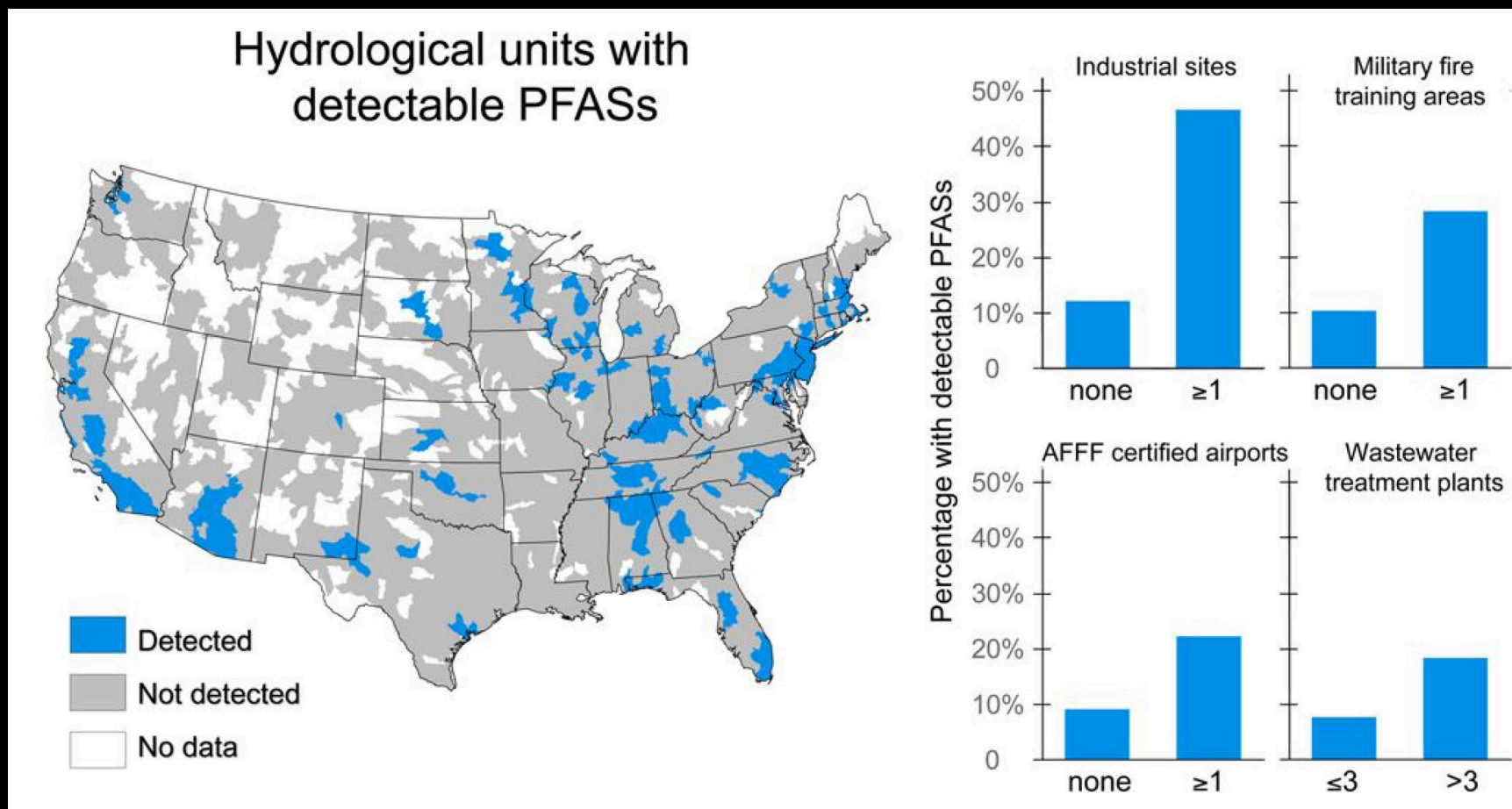
Cancer, elevated cholesterol, obesity, immune suppression, and endocrine disruption

Courtesy, Cindy Hu, Harvard University

(Ref: Lewis et al., 2015; Grandjean et al., 2012; Braun et al., 2016; Barry et al., 2013)

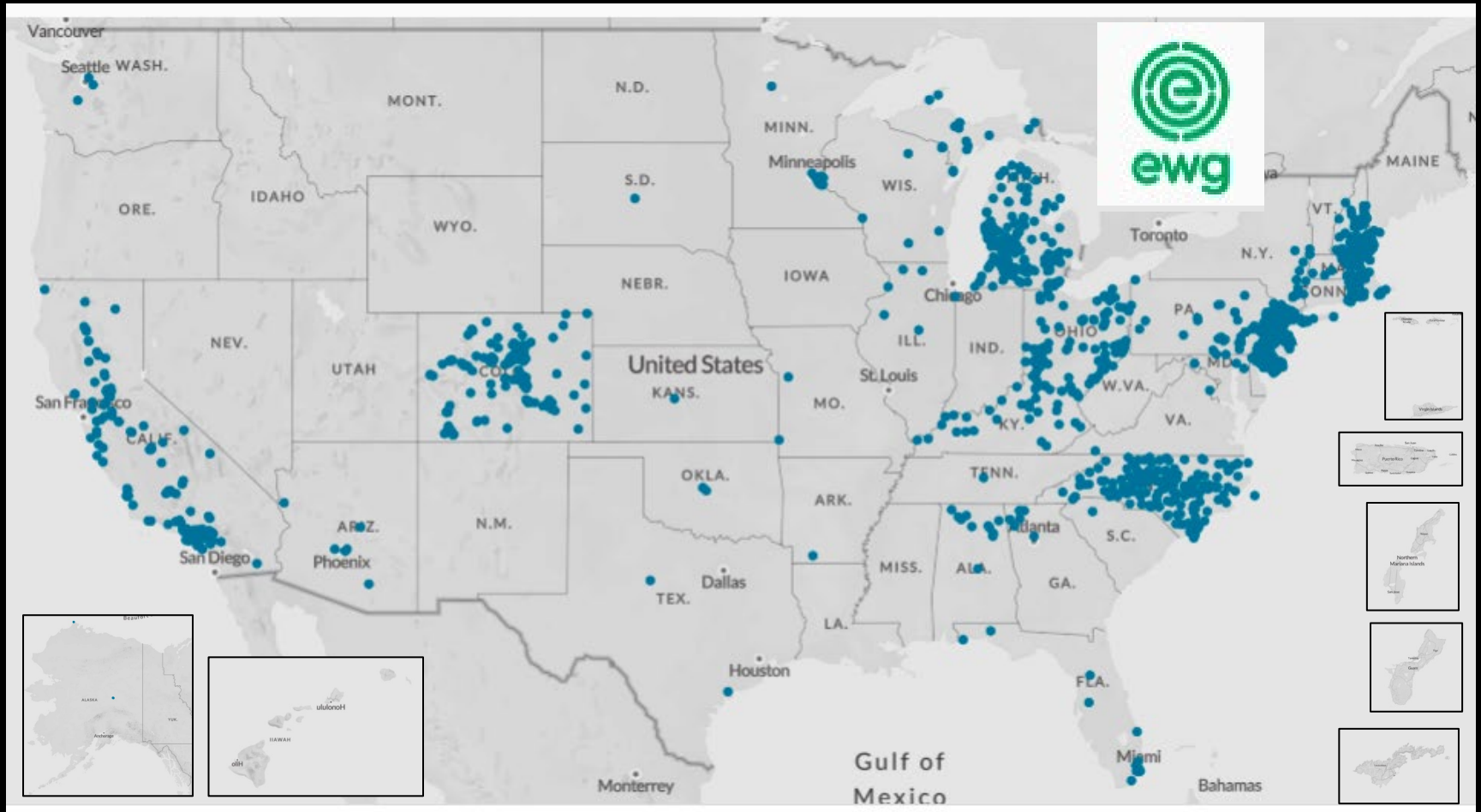


# PFAS in Drinking Water



EPA Lifetime Health Advisory Level of 70 ng/L PFOA + PFOS

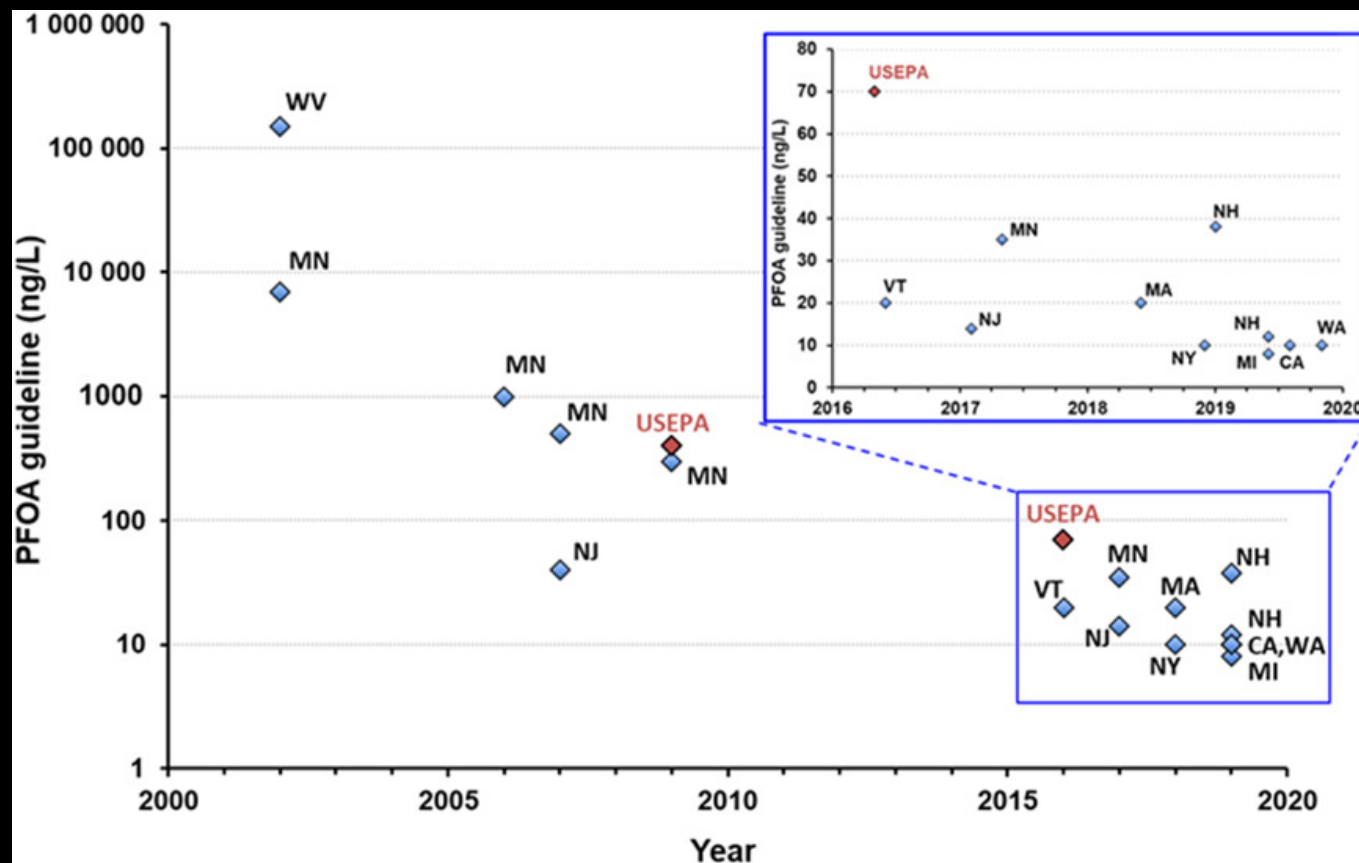
# PFAS in Drinking Water



[https://www.ewg.org/interactive-maps/pfas\\_contamination/map/](https://www.ewg.org/interactive-maps/pfas_contamination/map/)

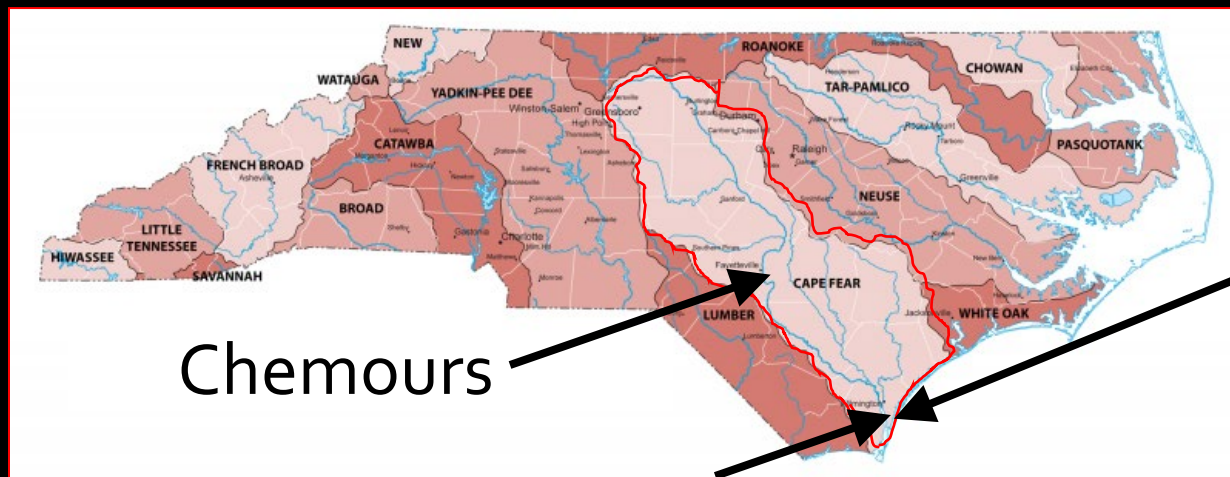


# Drinking Water Health Guidelines for PFOA (parts per trillion)



Post, G.. Environmental Toxicology and Chemistry, 2020. DOI: (10.1002/etc.4863)

# Water Treatment Costs: North Carolina



Chemours

Brunswick County:  
reverse osmosis  
filtration:

- \$99M to build
- \$2.9M to operate

Cape Fear Public Utility Authority  
activated carbon filtration:

- \$46M to build
- \$2.7M to operate each year

Wilmington Star News, May 9<sup>th</sup> & 10<sup>th</sup>, 2018

## Scientific Basis for Managing PFAS as a Chemical Class

Carol F. Kwiatkowski,\* David Q. Andrews, Linda S. Birnbaum, Thomas A. Bruton, Jamie C. DeWitt, Detlef R. U. Knappe, Maricel V. Maffini, Mark F. Miller, Katherine E. Pelch, Anna Reade, Anna Soehl, Xenia Trier, Marta Venier, Charlotte C. Wagner, Zhanyun Wang, and Arlene Blum

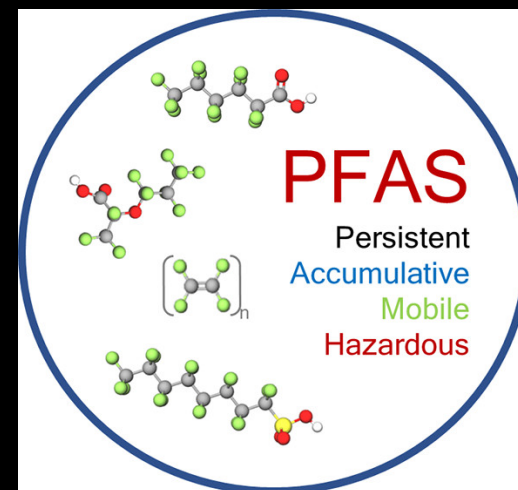


Cite This: <https://dx.doi.org/10.1021/acs.estlett.0c00255>



Read Online

- Extreme persistence and potential toxicity make all PFAS suspect
- Not enough time to study them all
- Avoid use when possible



PFAS are Problematic  
& Difficult to Clean Up

Prevention is preferable!  
Only use when necessary



# Questions?

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## Learn More

- [GreenSciencePolicy.org](http://GreenSciencePolicy.org)
- [PFASCentral.org](http://PFASCentral.org)