



# Introduction to the PFAST Network Research Initiative



THE UNIVERSITY  
of NORTH CAROLINA  
at CHAPEL HILL

Duke  
UNIVERSITY



UNC CHARLOTTE

NC STATE  
UNIVERSITY



**Detlef Knappe**  
**NC State University**  
([knappe@ncsu.edu](mailto:knappe@ncsu.edu))

**Jason Surratt**  
**UNC-Chapel Hill**  
([surratt@unc.edu](mailto:surratt@unc.edu))



NORTH CAROLINA  
AGRICULTURAL AND TECHNICAL  
STATE UNIVERSITY

Emerging PFAS Contaminants in the Cape Fear Region: University  
Collaborations on Environmental, Drinking Water and Health Effects  
UNC-Wilmington, May 31, 2019

# **Questions we would like to answer in this presentation**

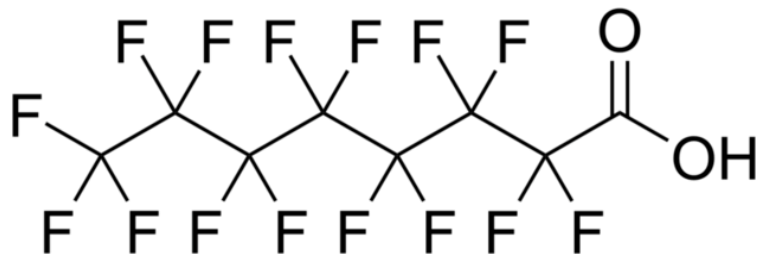
- What are PFAS?
- Why are North Carolina communities concerned about exposure?
- What are we doing to understand the extent and significance of this exposure?

# PFAS?

- An abbreviation that stands for **per- and polyfluoroalkyl substances**
- A class of **synthetic** chemicals
- Desirable properties
  - High thermal resistance
  - Water repellent
  - Grease repellent
  - Stain repellent

# Two types of PFAS have been heavily studied → “Legacy Compounds”

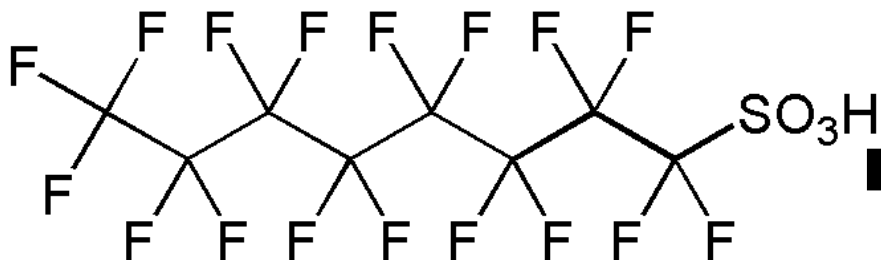
## Perfluorooctanoic acid (PFOA / C8)



Common uses:  
Goretex, Teflon



## Perfluorooctane sulfonate (PFOS)



Common uses:  
Firefighting, stain repellent



# PFAS are found in many consumer products



<http://www.sixclasses.org/>

...but

- PFAS are **persistent**
- PFAS are **toxic**
- PFAS are **bioaccumulative** (long-chain) or **mobile** in the environment (short-chain)

Compound	PFOA (C8)	PFOS	PFHxA (C6)
Half-Life (Human)	3.8 years	5.4 years	32 days

C6 is the most similar to GenX, and gives us our best guess at its half-life

Half-life = the time it takes for the concentration of a substance to decrease by half



# Why are North Carolina communities concerned about exposure?

## Toxin taints CFPUA drinking water

### MOST POPULAR

- 1 Toxin taints CFPUA drinking water  
Jun 8 at 10:38 AM
- 2 WATER FAQs: What we know and what we don't know  
Jun 8 at 3:35 PM
- 3 GenX fallout: Is my water safe to drink?  
Jun 8 at 5:59 PM
- 4 Local officials respond to GenX report  
Jun 8 at 5:30 PM

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▲ HIDE CAPTION

A 2000 aerial photo of Fayetteville Works on the Cumberland-Bladen county line. The site, home to several plants, one of which makes GenX, is about 100 miles upstream from Wilmington. [COURTESY OF THE FAYETTEVILLE OBSERVER]

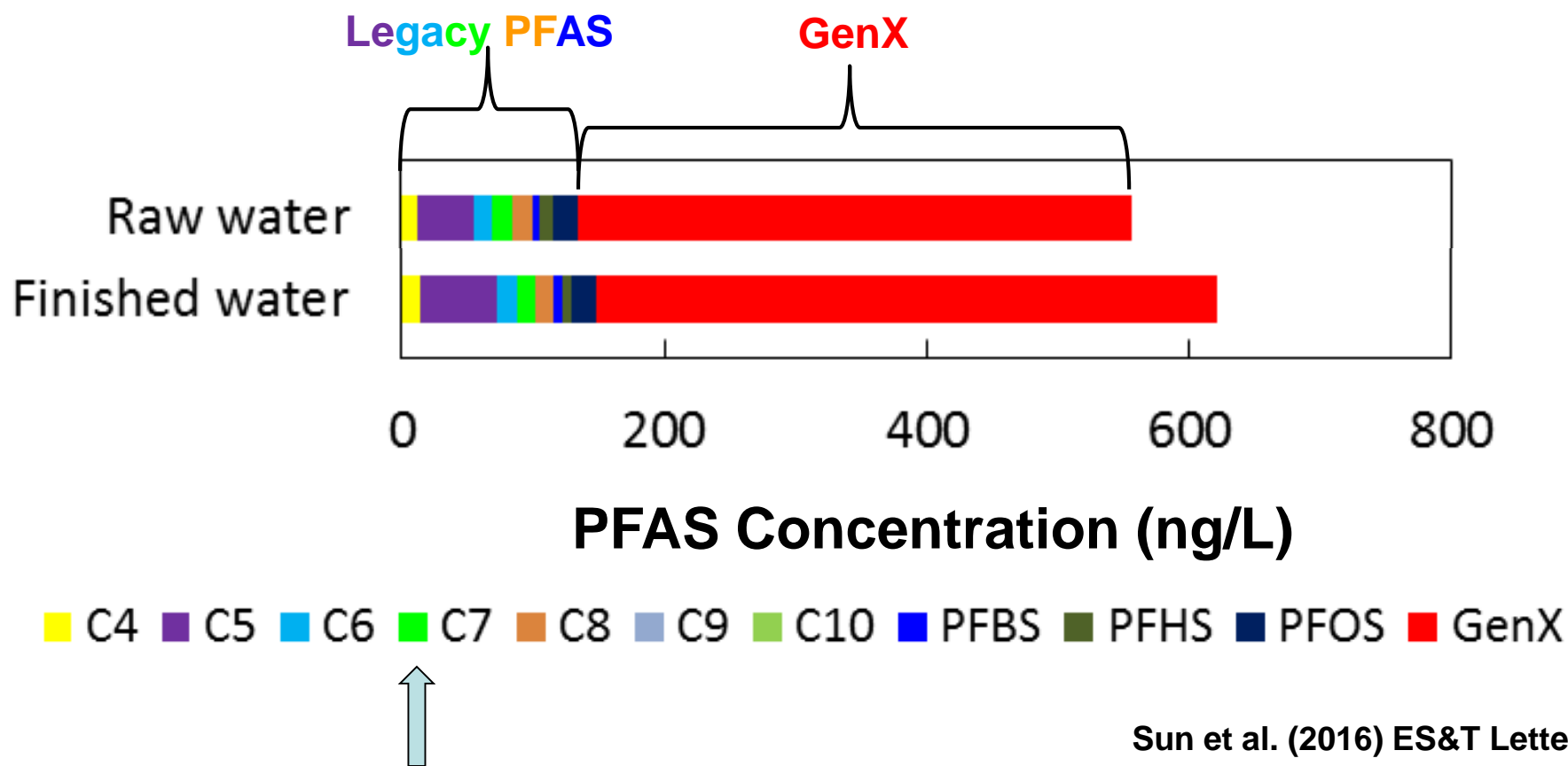
Utility can't filter out chemical produced upriver at Fayetteville plant

By Vaughn Hagerty StarNews Correspondent

Posted Jun 7, 2017 at 10:31 AM

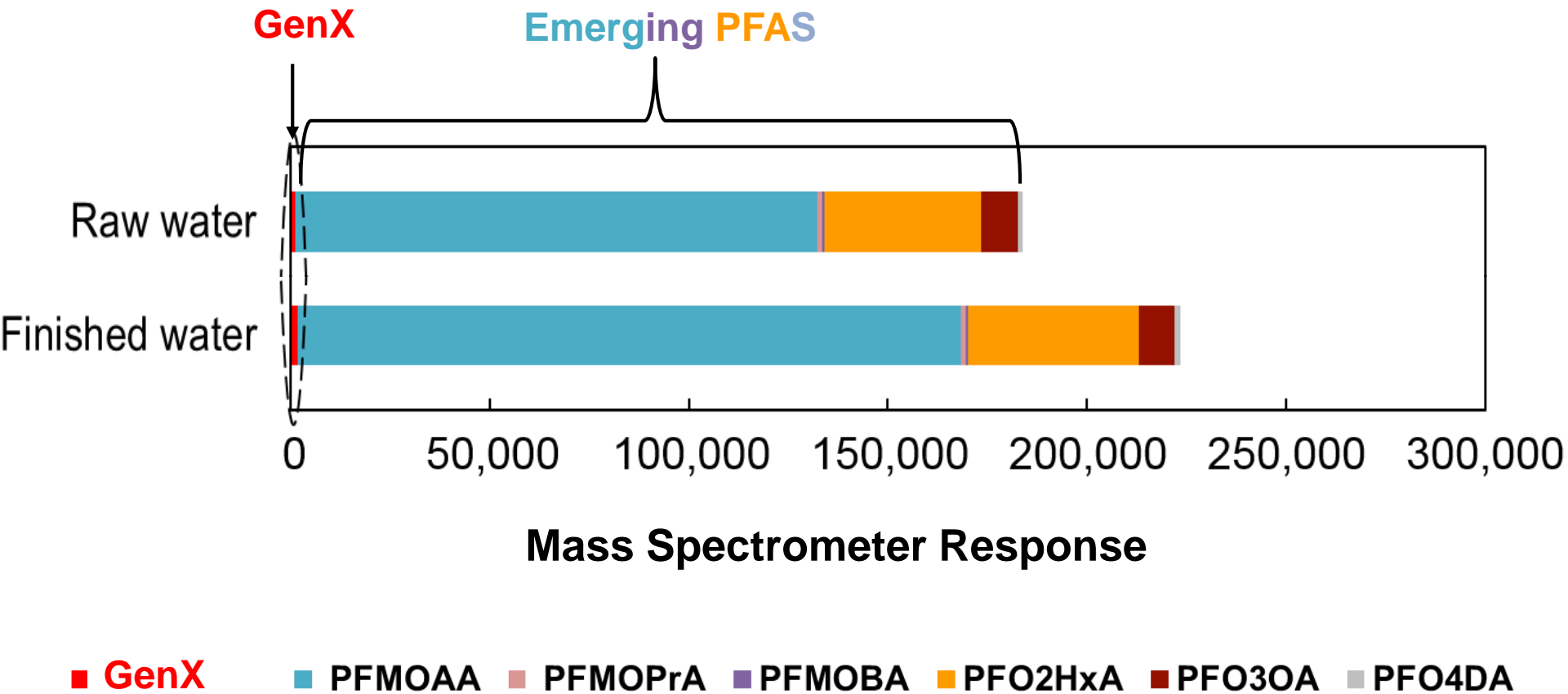
Updated Jun 8, 2017 at 10:38 AM

**In Wilmington, only C7 was detected in samples collected as part of EPA's Third Unregulated Contaminant Monitoring Rule (2013-2015). C7 was only a very small percentage of the total PFAS concentration we could quantify**





... and GenX was only a small fraction of the total mass spectrometer response associated with PFAS



# Why are North Carolina communities concerned about exposure?



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## Chemours: GenX polluting the Cape Fear since 1980

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**By Adam Wagner and Tim Buckland GateHouse Media**

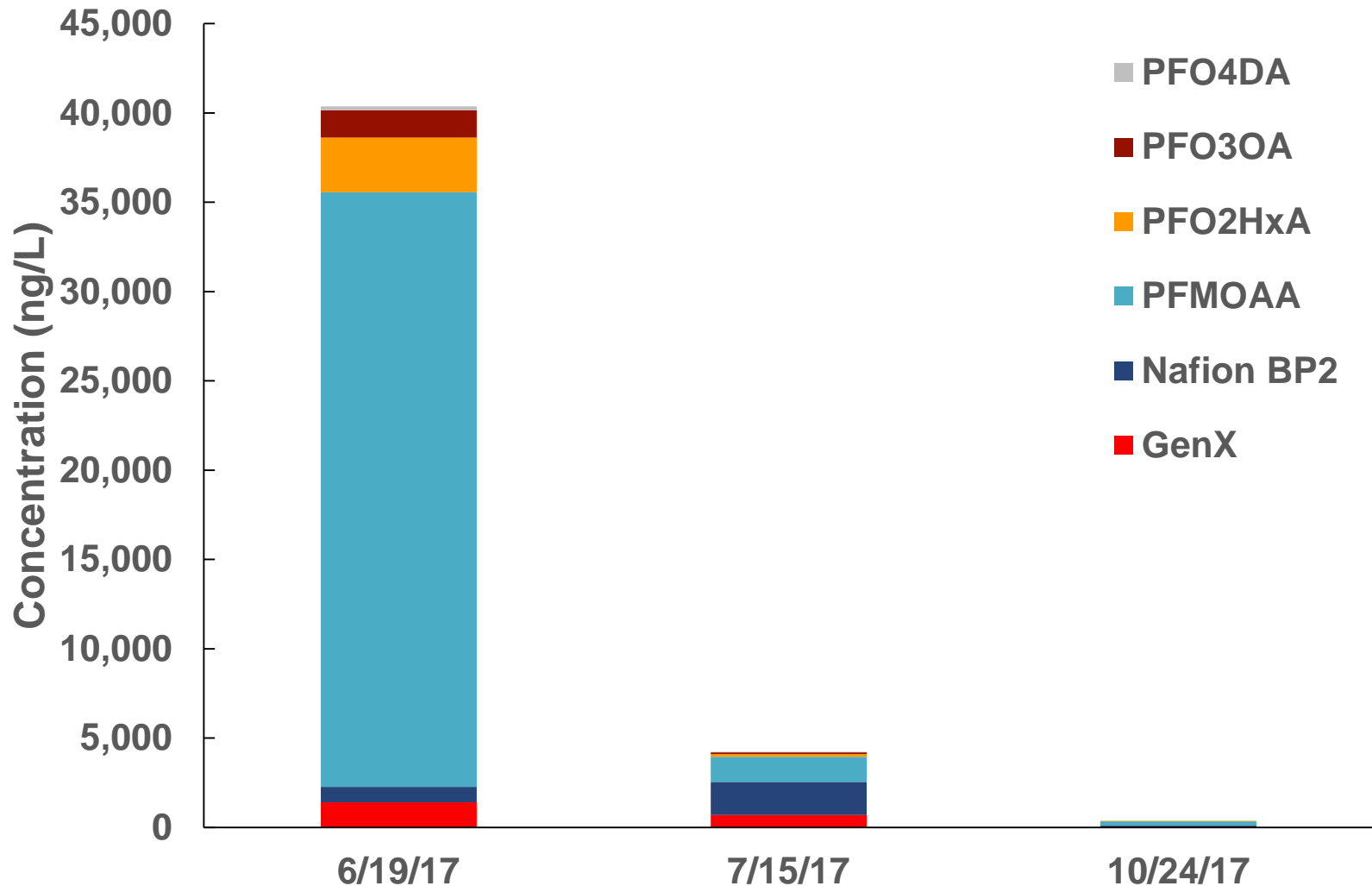
Posted Jun 15, 2017 at 2:00 PM

Updated Jun 16, 2017 at 12:06 AM

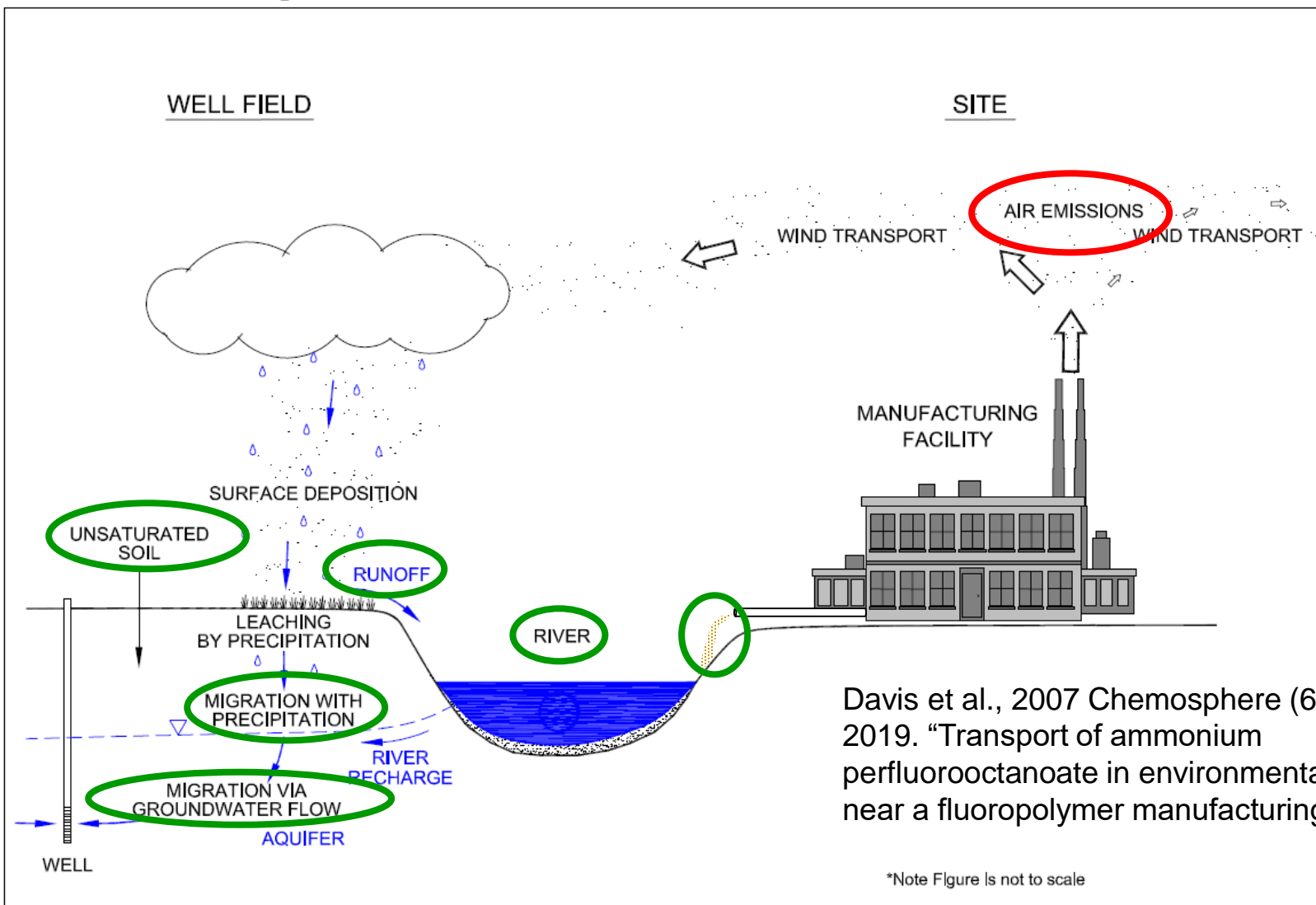
Wilmington-area officials demand answers, action during invitation-only meeting with company

WILMINGTON -- A former DuPont plant has been discharging an unregulated toxic chemical into the Cape Fear River since 1980, company officials revealed Thursday at a meeting with local and state officials.

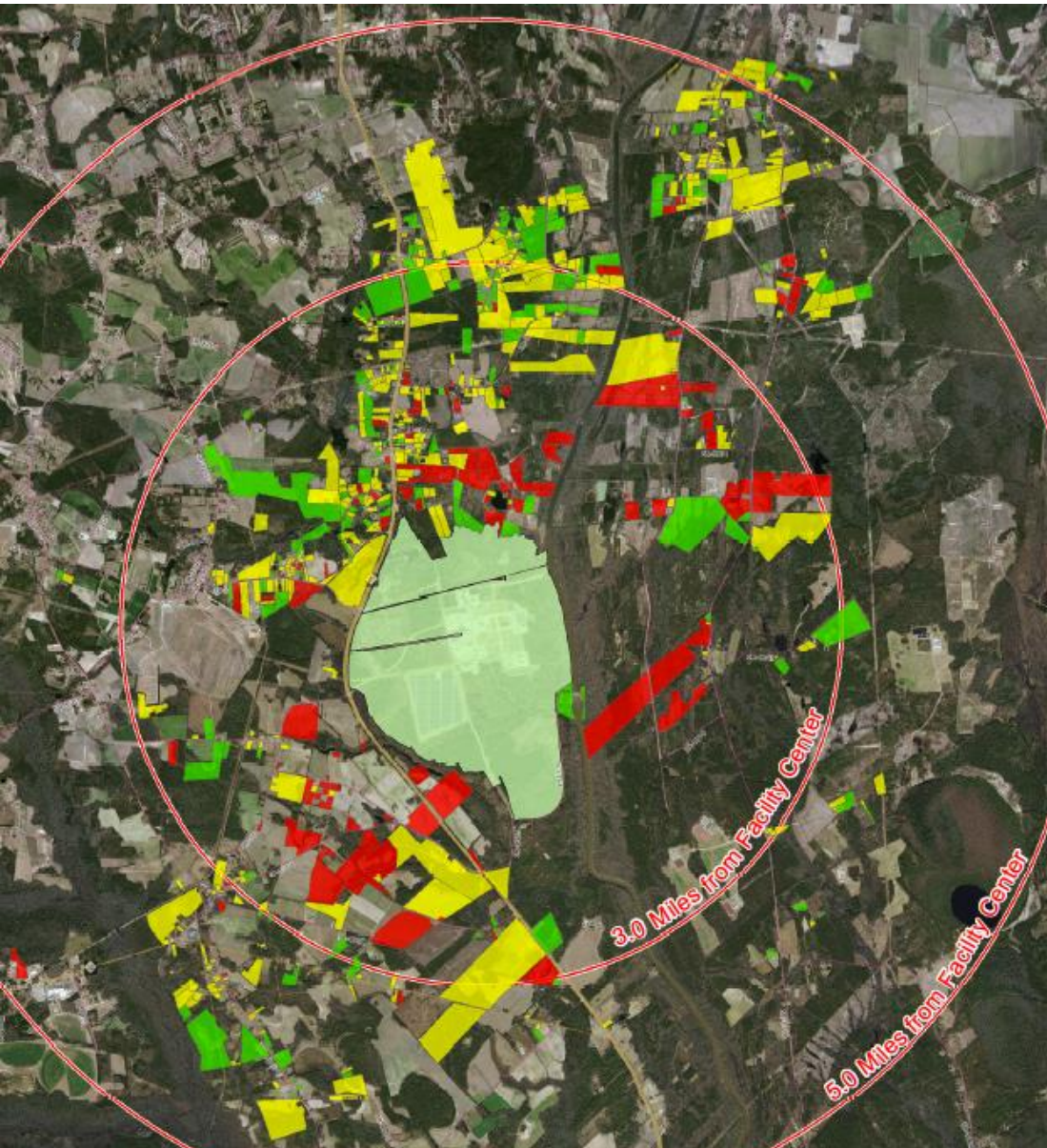
# PFAS concentrations in the lower Cape Fear River have dropped dramatically since mid-June 2017 (Kings Bluff Intake)



# PFAS originate from emissions to air and water and can contaminate rivers, groundwater, air, soil, and plants



# GenX detected in private drinking water wells >5 miles from plant



**Red: >140 ng/L**

**Yellow: detect-140 ng/L**

**Green: non-detect**

**~1,000 wells analyzed:**

**GenX >140 ng/L: 225**

**Detect – 140 ng/L: 538**

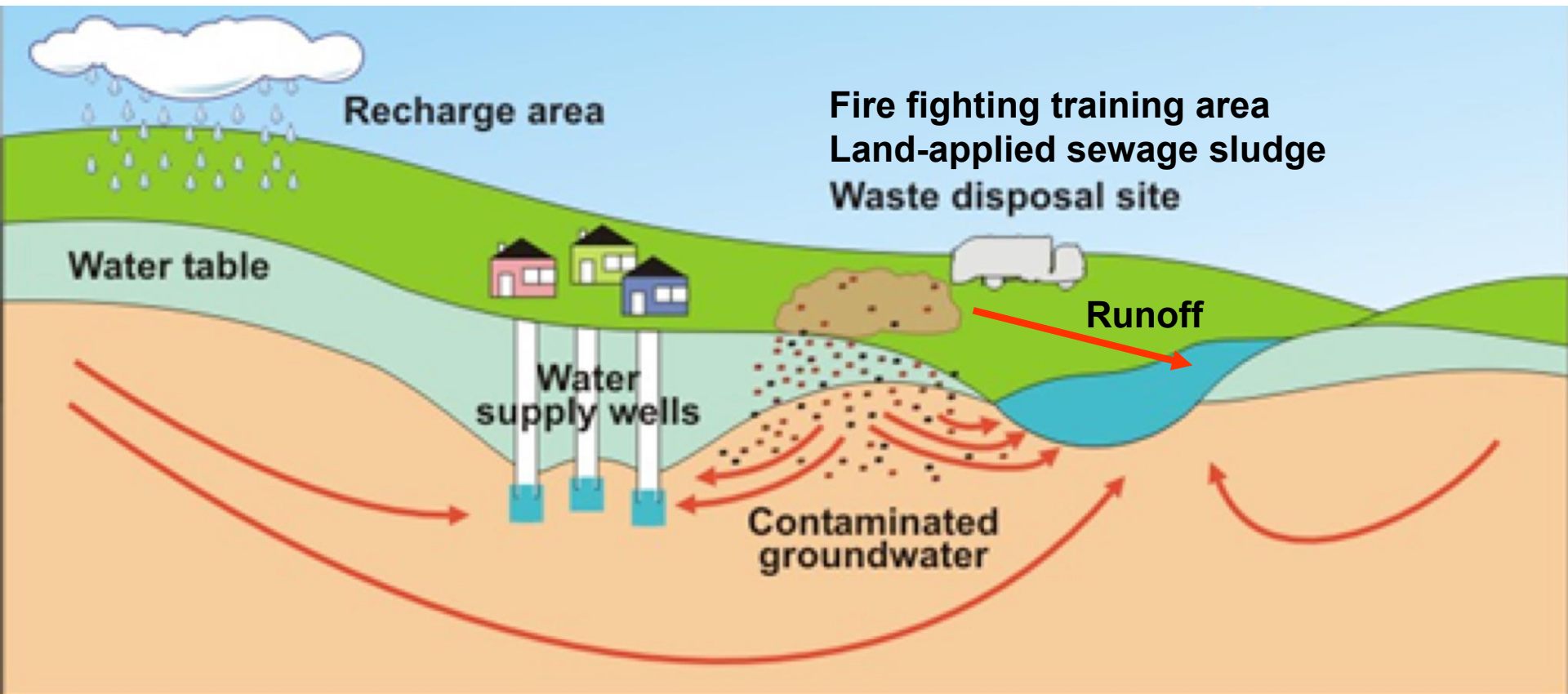
**Non-detect: 231**

**Max. GenX: 4,000 ng/L**

**GenX detections in 3 counties**

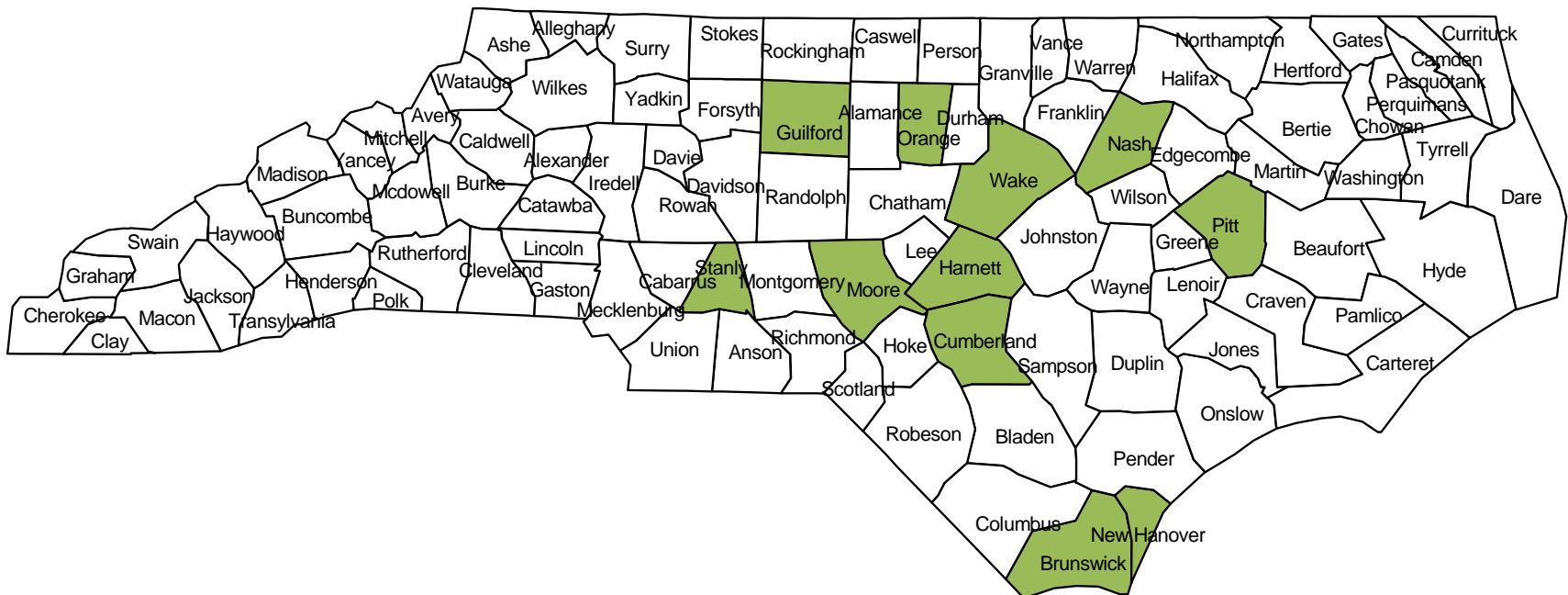


Disposal of **waste** and **sewage sludge** as well as **fire fighting training** can contaminate **groundwater** and **surface water** with **PFAS**





**Based on EPA data (2013-2015), PFAS  
were detected in 20 public water systems  
located in 11 NC counties**



# High levels of PFAS are present in the Haw River at Bynum (drinking water source for Pittsboro)

