Cape Fear Public Utility Authority
Board Workshop Agenda
Halyburton Park Meeting Room
4099 South 17th Street
Wilmington, NC 28412
August 15, 2018 9:00 AM

I.	**Call to Order and Opening Comments**	**9:00 AM**
II.	**Determination of a Quorum**	
III.	**Adoption of Agenda**	
IV.	**Presentations**	
	a. *Reducing Exposure to Emerging Contaminants in Drinking Water*	**9:05 AM**
	b. Analysis of Per- and Polyfluorinated Organic Compounds in Raw and Finished Drinking Water	**9:15 AM**
	c. *PFAS Exposure: What Are the Health Implications?*	**9:30 AM**
	d. *Efforts to Control the Source: The Future of PFAS Regulation*	**9:50 AM**
V.	**Break**	**10:00 AM**
VI.	**Presentations**	
	a. *We Can Improve the Treatment Process at the Sweeney Plant*	**10:10 AM**
	b. *Financial Impacts*	**10:20 AM**
	c. *Customer Input: Findings from the CFPUA Customer Survey*	**10:25 AM**
	d. *Where Do We Go From Here?*	**10:35 AM**
VII.	**Public Comments**	**10:45 AM**
VIII.	**Legal Update (Closed Session)**	**11:10 AM**
IX.	**Discussion by Board**	**11:35 AM**
X.	**Adjourn**	**12:00 PM**

PFAS and the Sweeney Water Treatment Plant

August 15, 2018 Board Workshop

Cape Fear Public Utility Authority
Stewardship. Sustainability. Service.

Reducing Exposure to Emerging Contaminants in Drinking Water

Jim Flechtner

Executive Director

Cape Fear Public Utility Authority

Stewardship. Sustainability. Service.

Emerging Contaminants: What Are They, and How Many Are There?

Cape Fear Public Utility Authority
Stewardship. Sustainability. Service.

- Companies can make new chemicals faster than drinking water regulations, surface water standards and health science can keep up.
- 85,000 chemicals are registered under the Toxic Substances Control Act (TSCA). Fewer than 10,000 of those have toxicological studies associated with them.
- These new chemicals are being released to the environment before health data has been established and, in some cases, before commercial laboratories can even test for them.
- Per- and polyfluorinated (PFAS) compounds are just one type of emerging contaminant.

PFAS: A National Problem

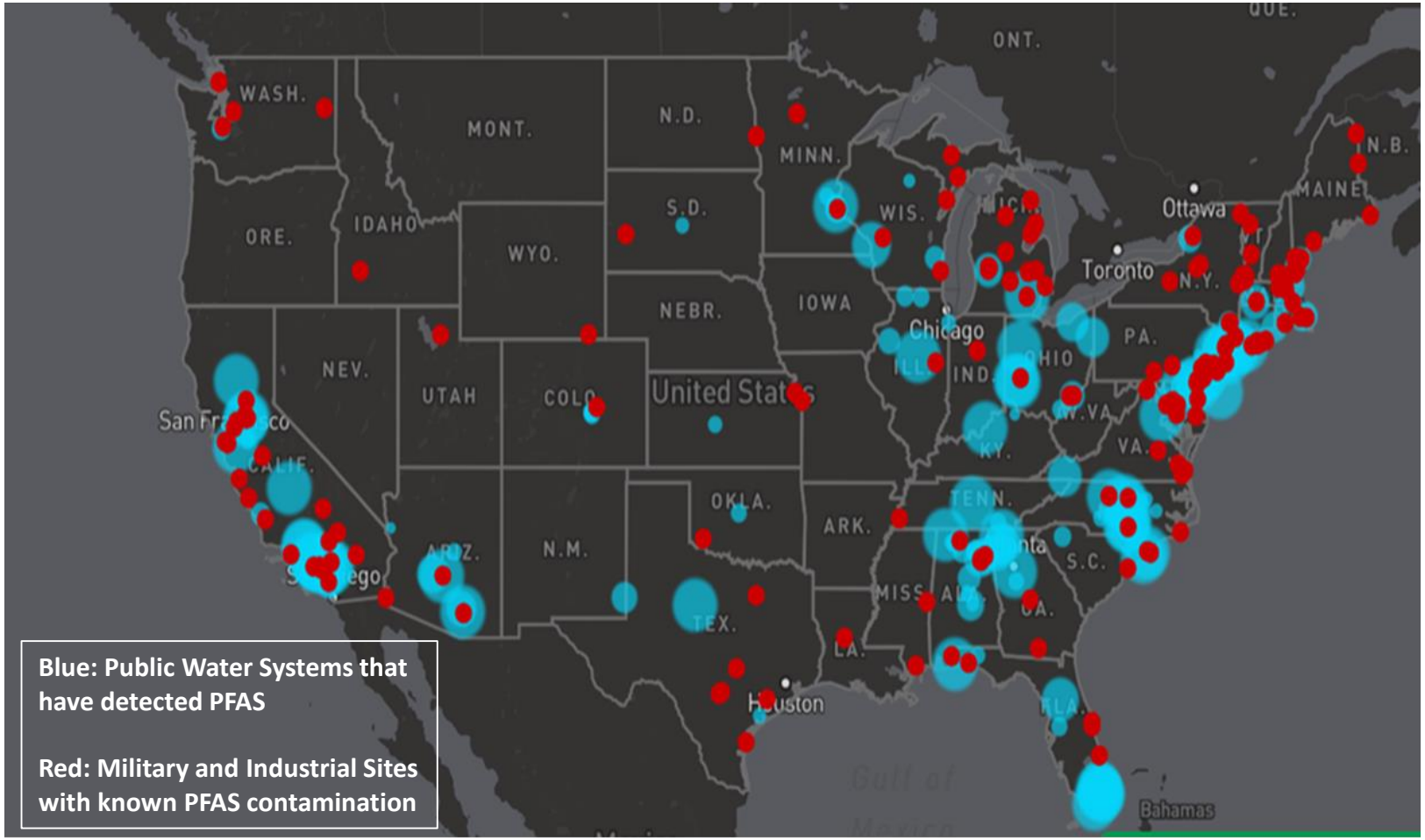


Figure 1: PFAS Detection in the United States (Source: Environmental Working Group, 2018)

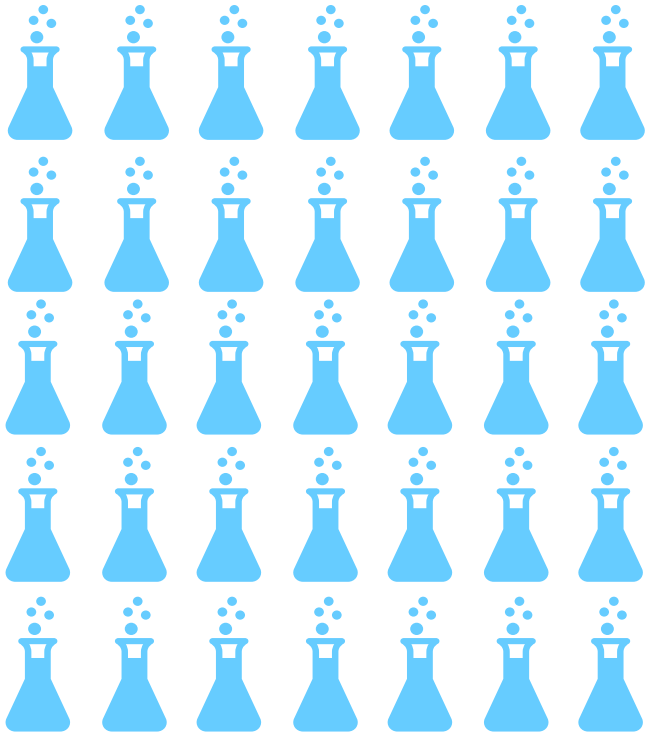
AWWA "State of the Water Industry 2018" report findings *(967 utilities responded):*

- Pollution was named as the macro-scale phenomena that will have the most negative impact on the water industry.
- Source Water Protection has been on the list of the "Top Ten Water Industry Challenges" since 2015.

CFPUA Action on PFAS — 14 Months

- For over one year, we have worked on the issue of GenX and other PFAS compounds.
- We have:
  - Worked with UNCW to identify new compounds.
  - Worked with NCDEQ to remain informed on regulatory actions.
  - Worked with NCDHHS to understand the health impacts.
  - Continuously monitored levels of PFAS in drinking water.
  - Taken legal action against Chemours.
  - Set up free water stations in our groundwater areas.
  - Conducted a full pilot study to investigate treatment options.
  - Removed 50 million gallons from the Aquifer Storage and Recovery site.
  - Participated in interviews, forums and industry conferences to share our experience with regulators, utilities and the public.

Testing for PFAS in CFPUA Service Areas



CFPUA regularly monitors for **45** different PFAS

8

PFAS do not have testing standards and results must be estimated

37

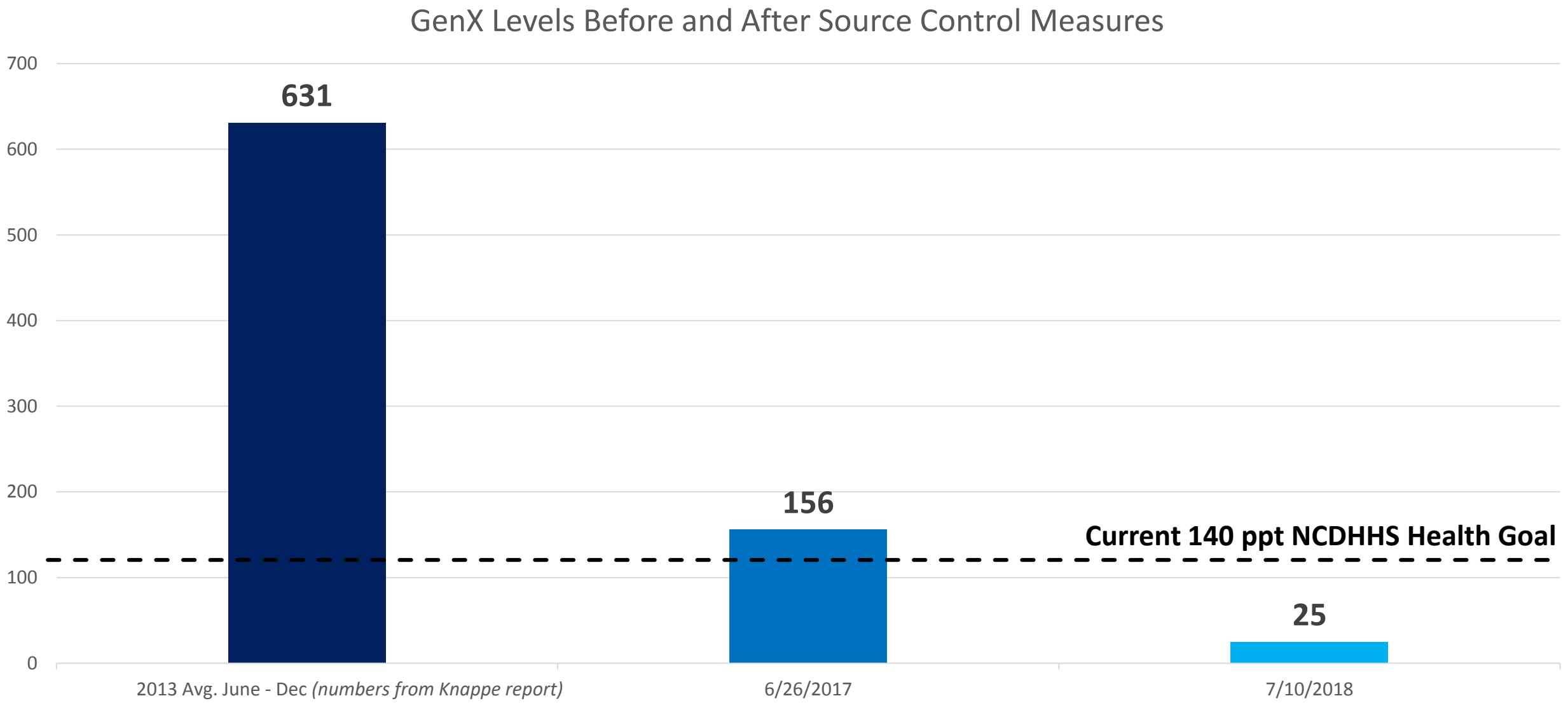
PFAS have testing standards

Of the **37** PFAS that have testing standards,

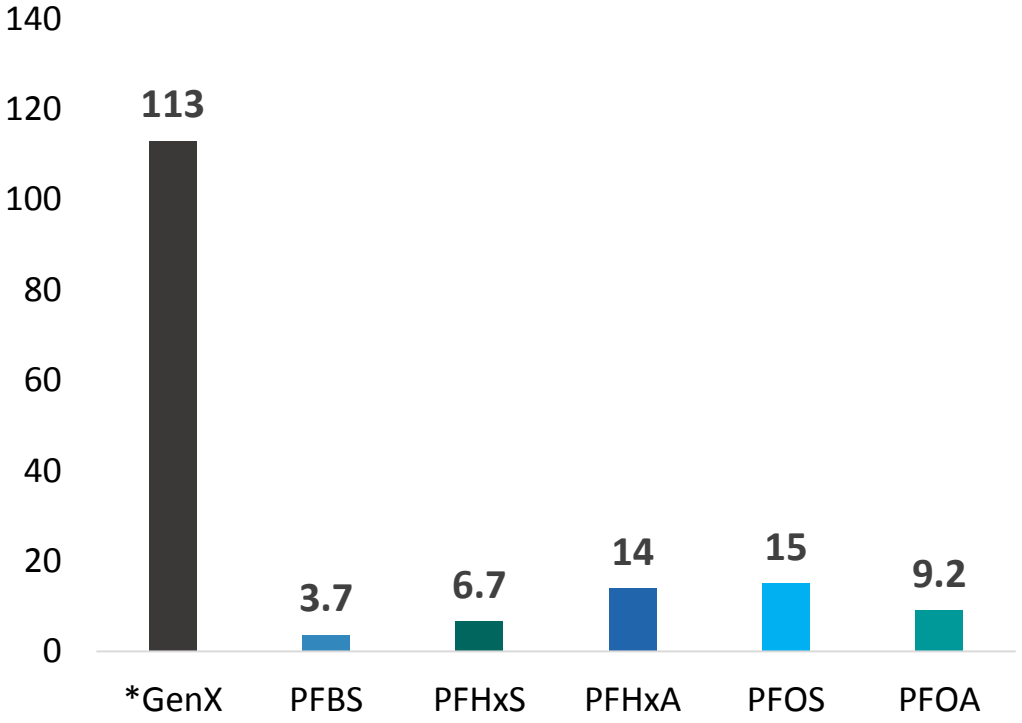
27 are typically at non-detectable limits and

10 are consistently detected

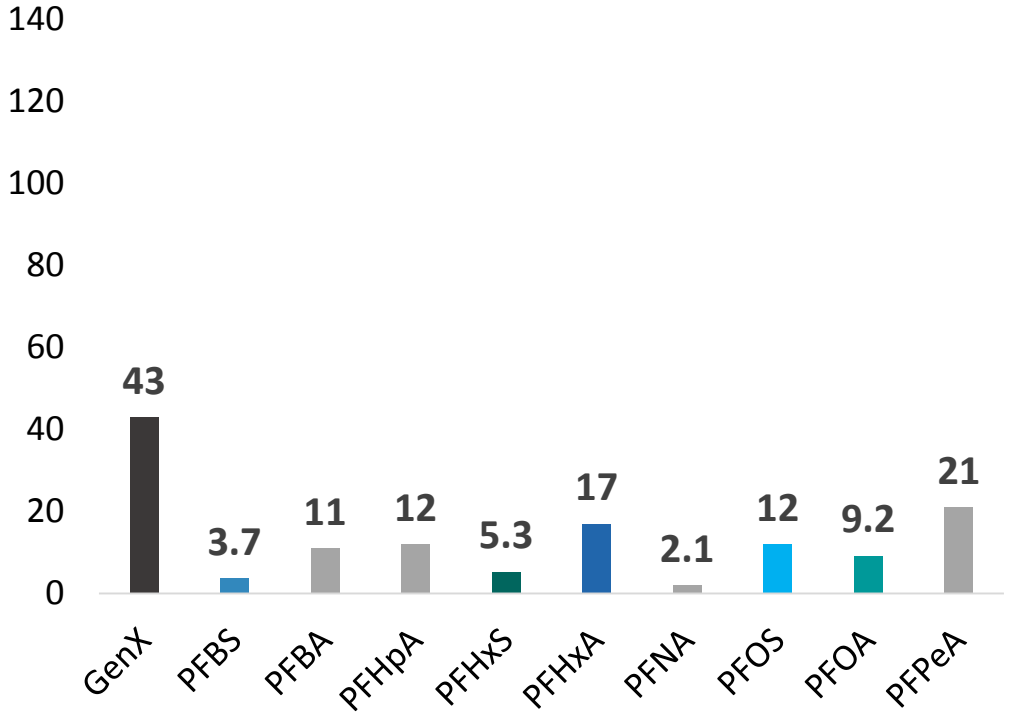
Source Control Shows Success with GenX



GenX Levels are Down, Other PFAS Remain: Is Remediation Needed?



July 2017

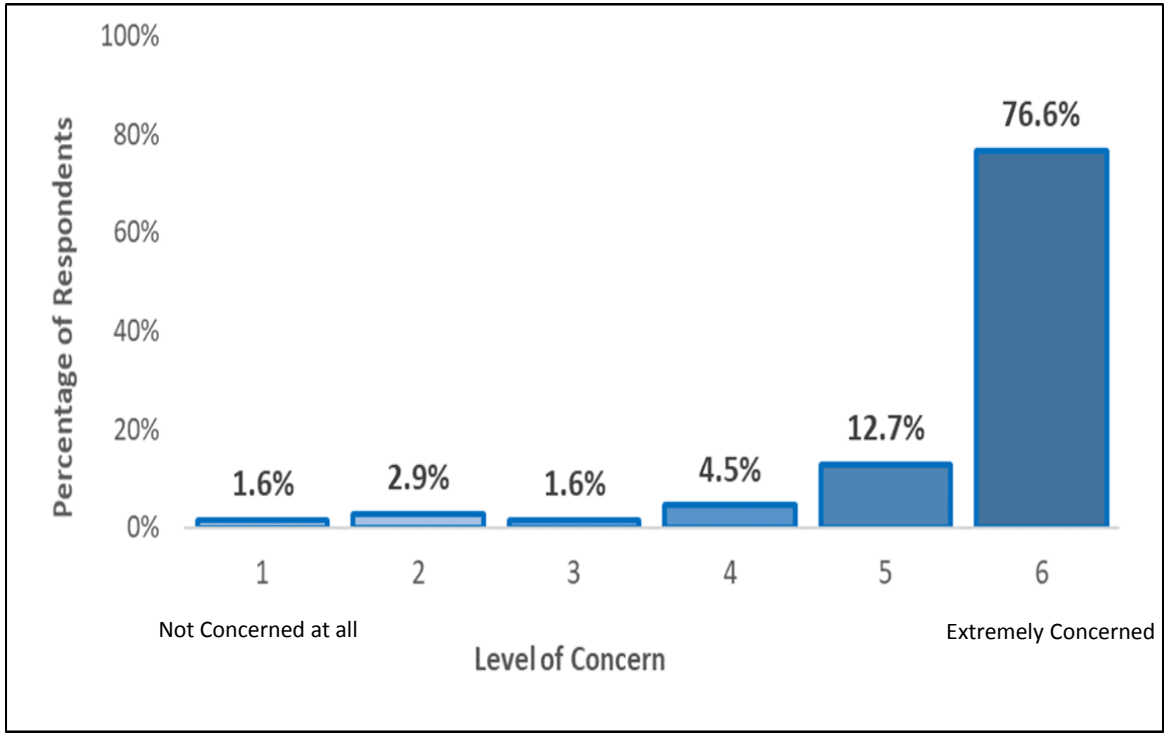


June 2018

*Levels of compounds are measured in parts per trillion (ppt)

Customers Share Our Concern

- A vast majority of respondents in our recent survey said they were “concerned” or “extremely concerned” about GenX.
- Customers continue to call, email and write to CFPUA about the issue of per-fluorinated compounds.
- Many customers mentioned their participation in Dr. Hoppin’s exposure study.



An Effective Strategy Against PFAS and Other Emerging Contaminants

- No single solution to this problem. We need:
  - Improved source control, regulation and enforcement
  - Environmental remediation
  - Additional Advanced Water Treatment
- We meet all state and federal drinking water regulations.
- The right question: Should we do more to protect the health of our current and future customers?

Analysis of Per- and Polyfluorinated Organic Compounds in Raw and Finished Drinking Water

Drs. Ralph N. Mead, Brooks Avery, Bob Kieber, Megumi Shimizu, Steve Skrabal

Marine and Atmospheric Chemistry Research Laboratory

Department of Chemistry and Biochemistry

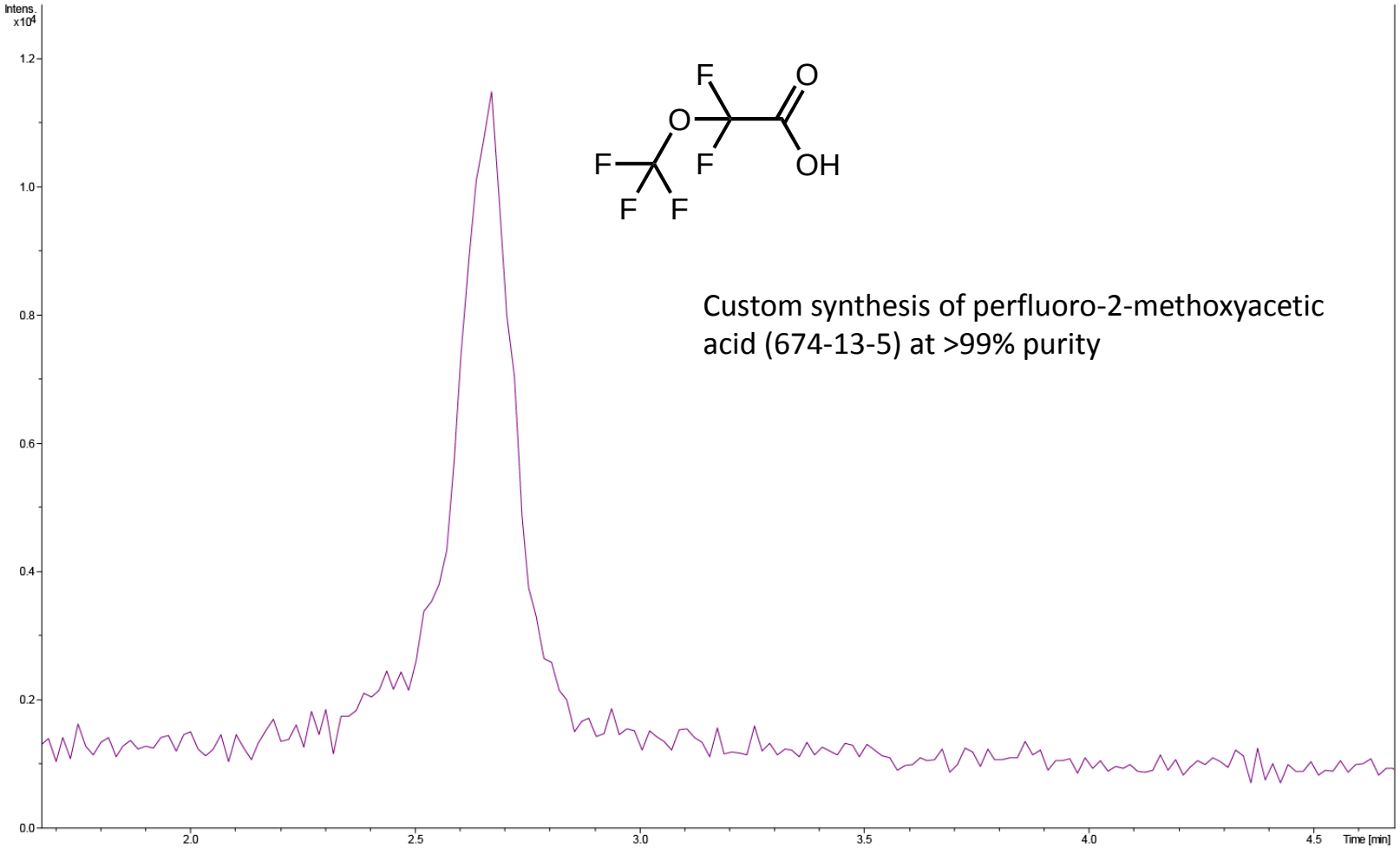
University of North Carolina Wilmington

Objective of presentation:

- Describe the non-targeted screening of per- and polyfluorinated alkyl substances (PFAS) in raw and finished water collected on a weekly basis from the Sweeney Water Treatment Facility.

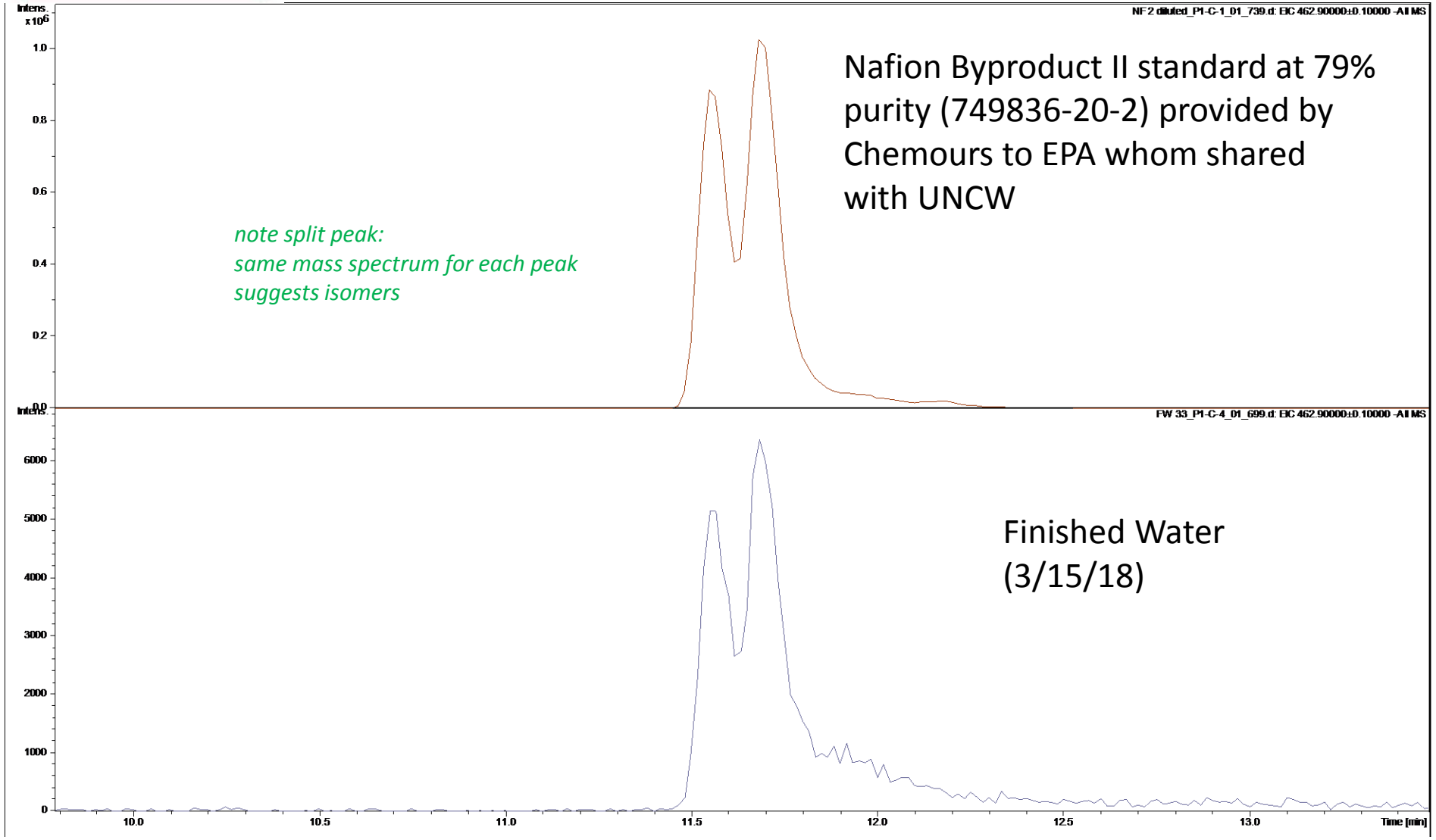
- Sample collection began November 28, 2017 and will continue until August 31, 2018.

Confirmed Structure



Custom synthesis of perfluoro-2-methoxyacetic acid (674-13-5) at >99% purity

Confirmed Structure

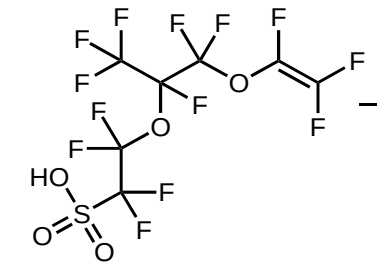


note split peak:
same mass spectrum for each peak
suggests isomers

Nafion Byproduct II standard at 79% purity (749836-20-2) provided by Chemours to EPA whom shared with UNCW

Finished Water (3/15/18)

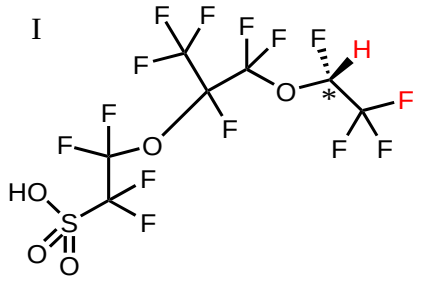
Possible Source of Split Peak in Nafion Byproduct II (PFESA)



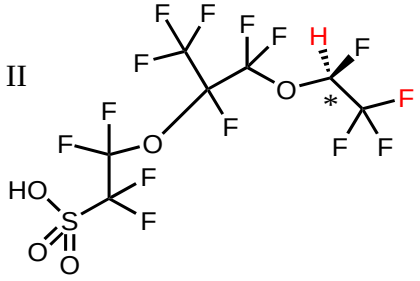
PFESA byproduct I

HF

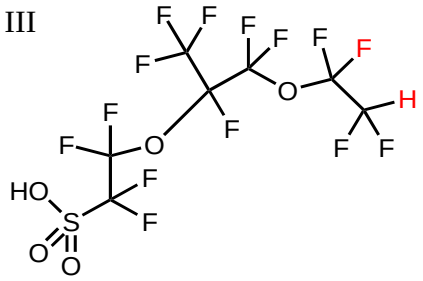
I



II



III



PFESA by product II

Enantiomers:

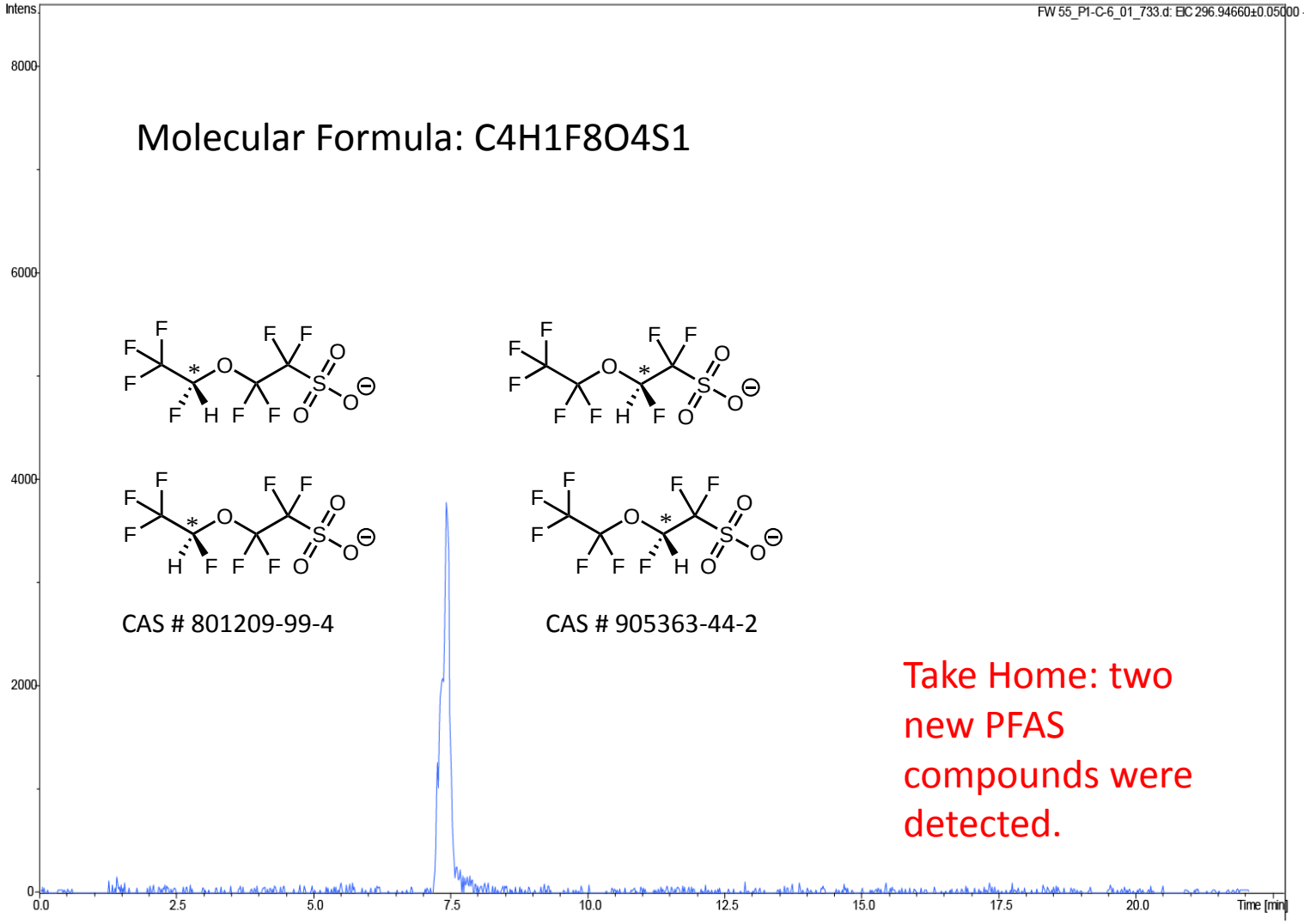
non-superimposable on mirror image

Constitutional isomer

Take Home: There is a mixture of Nafion Byproduct II compounds.

Stryner et al., 2015

Additional PFAS Detected



Molecular Formula: $C_4H_1F_8O_4S_1$

CAS # 801209-99-4

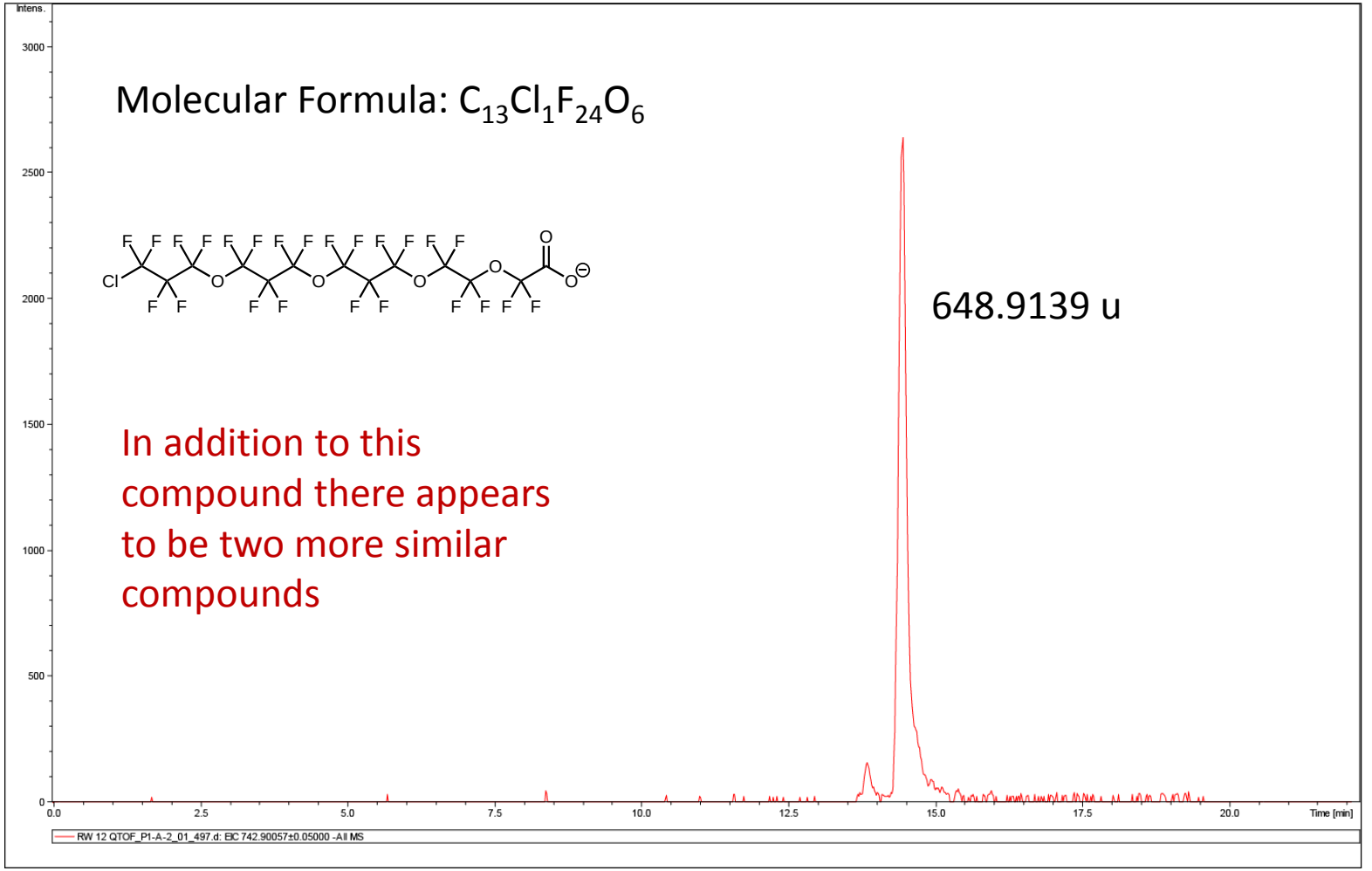
CAS # 905363-44-2

Take Home: two new PFAS compounds were detected.

Additional PFAS Detected

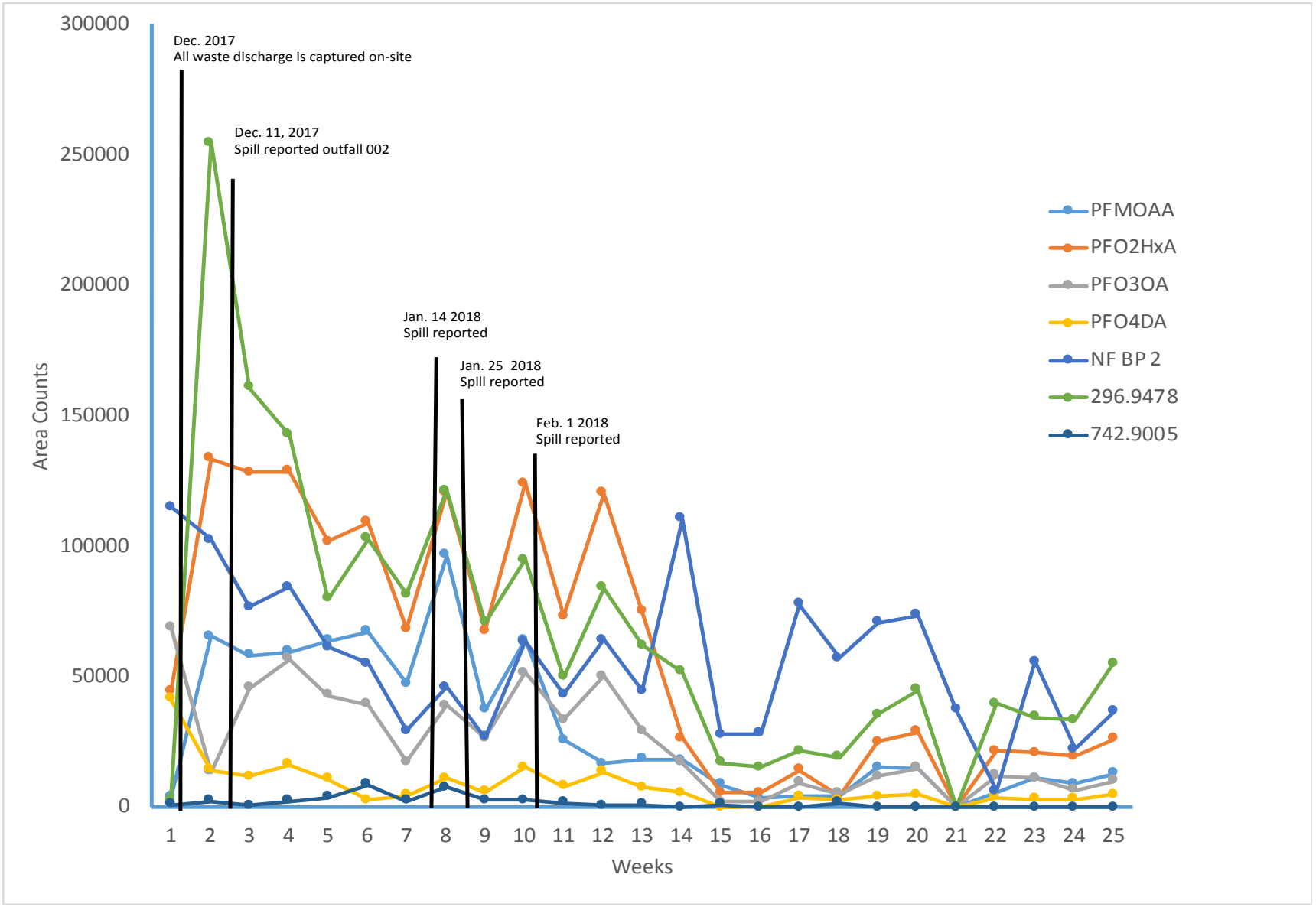
Molecular Formula: $C_{13}Cl_1F_{24}O_6$

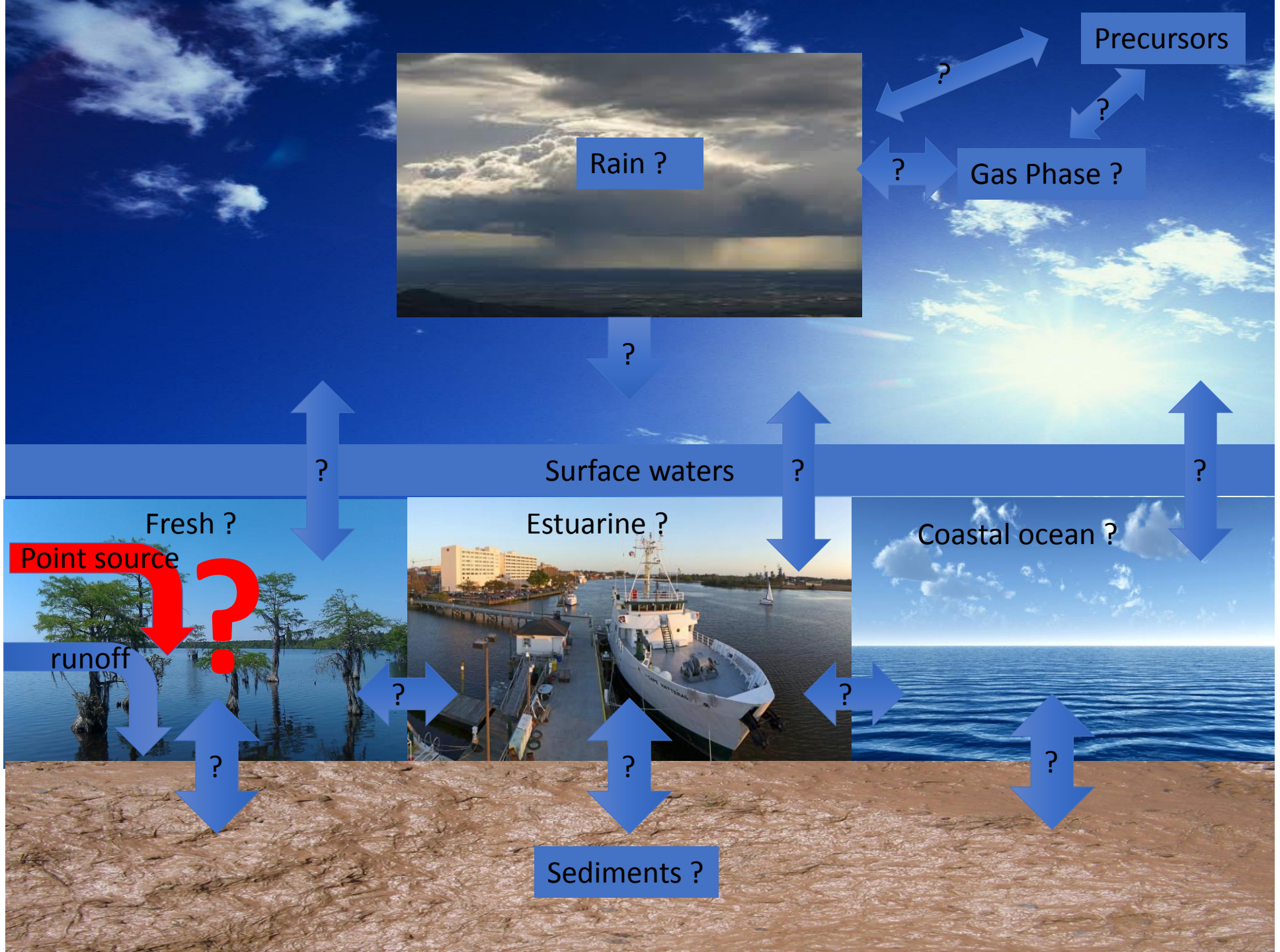
In addition to this compound there appears to be two more similar compounds



648.9139 u

Weekly area counts of nontargeted PFAS detected in finished water. The first sampling occurred 11/28/17 and goes through 5/19/18.




Precursors
?
?
Rain ?
?
Gas Phase ?
?
?
Surface waters
?
?
Fresh ?
Estuarine ?
Coastal ocean ?
Point source
!?
runoff
?
?
?
?
?
Sediments ?

What is the Future?

- Identify and characterize potential new compounds in raw and finished water
- Obtain standards to confirm structure and quantify concentrations
- Determine what other environmental compartments PFAS are in and how does it impact drinking water utilities (e.g. CFPUA)
- As compounds are confirmed collaborate with colleagues for human health studies. Currently collaborating with Dr. Jamie Dewitt on PFMOAA
- Continue to provide expertise to CFPUA as needed

Acknowledgements

Marine and Atmospheric Chemistry Research Laboratory (MACRL)

Funding provided by:

Cape Fear Public Utility Authority
Stewardship. Sustainability. Service.

NSF

CHE-1039784

Questions?

PFAS Exposure: What are the Health Implications?

Jamie DeWitt

Associate Professor

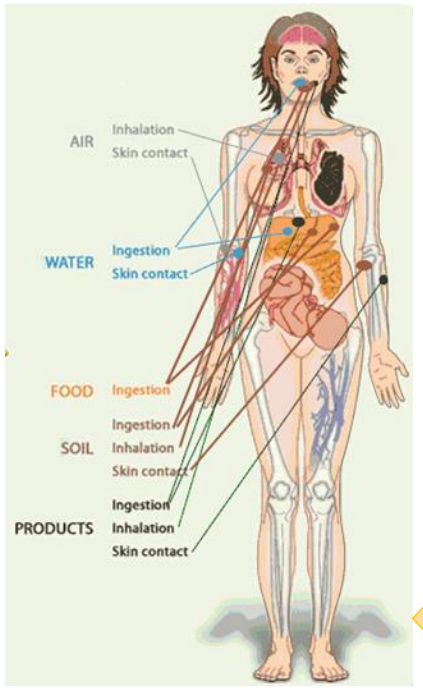
Department of Pharmacology & Toxicology

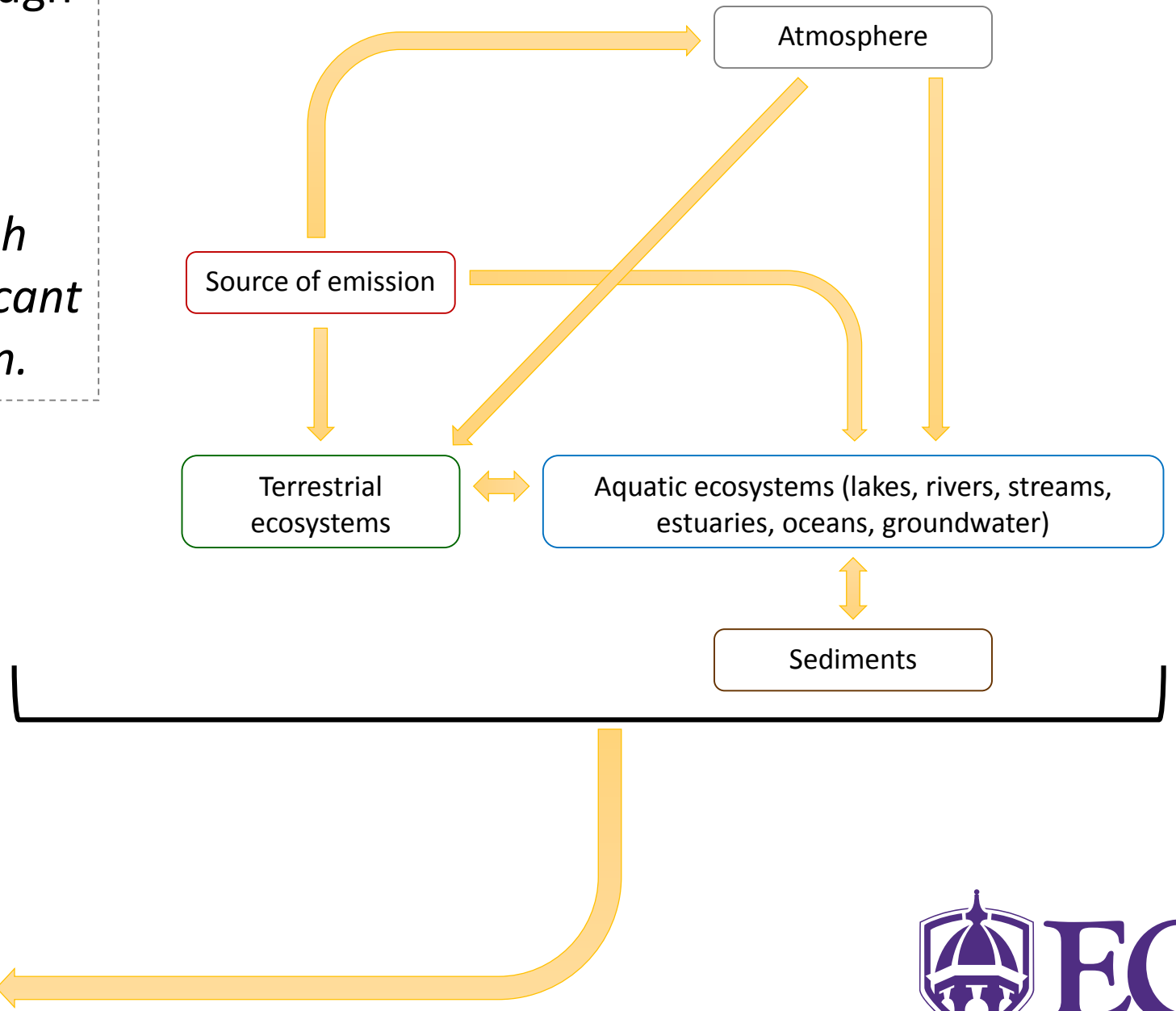
Brody School of Medicine

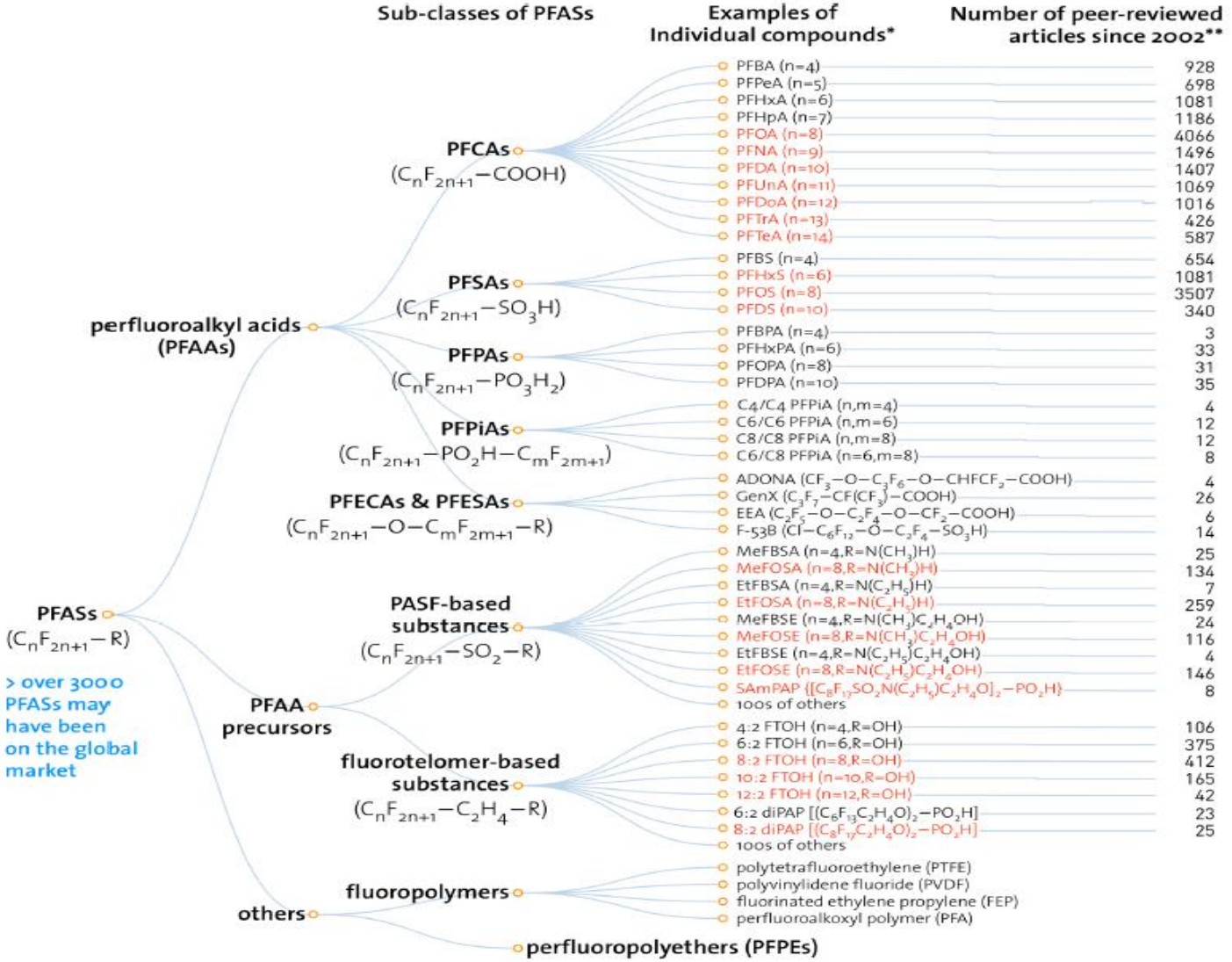
East Carolina University

We are exposed to PFASs through multiple pathways.

Minimizing exposure through drinking water can be a significant source of exposure reduction.







* 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.

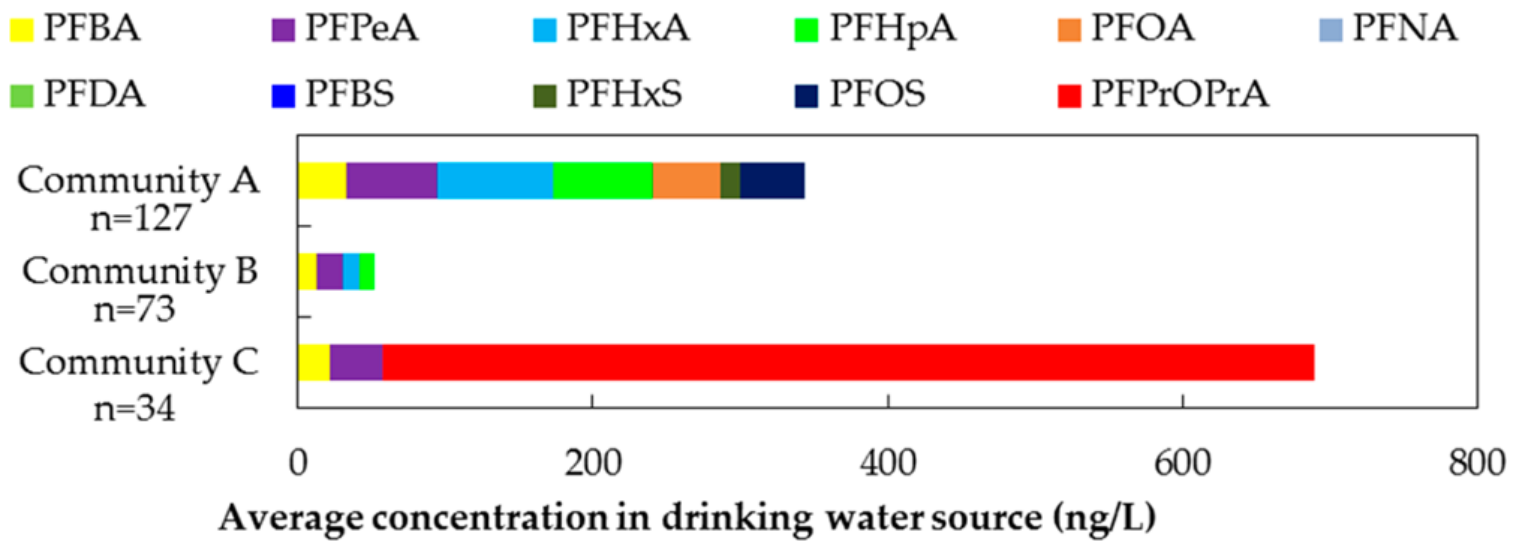
Figure 1. "Family tree" of PFASs, including examples of individual PFASs and the number of peer-reviewed articles on them since 2002 (most of the studies focused on long-chain PFCAs, PFSAs and their major precursors.).

As our detection capabilities improve, our "exposome" could grow to encompass a greater number and diversity of PFASs.

Should we be concerned about our exposure to PFASs in general?
To specific PFASs?
To some more than others?

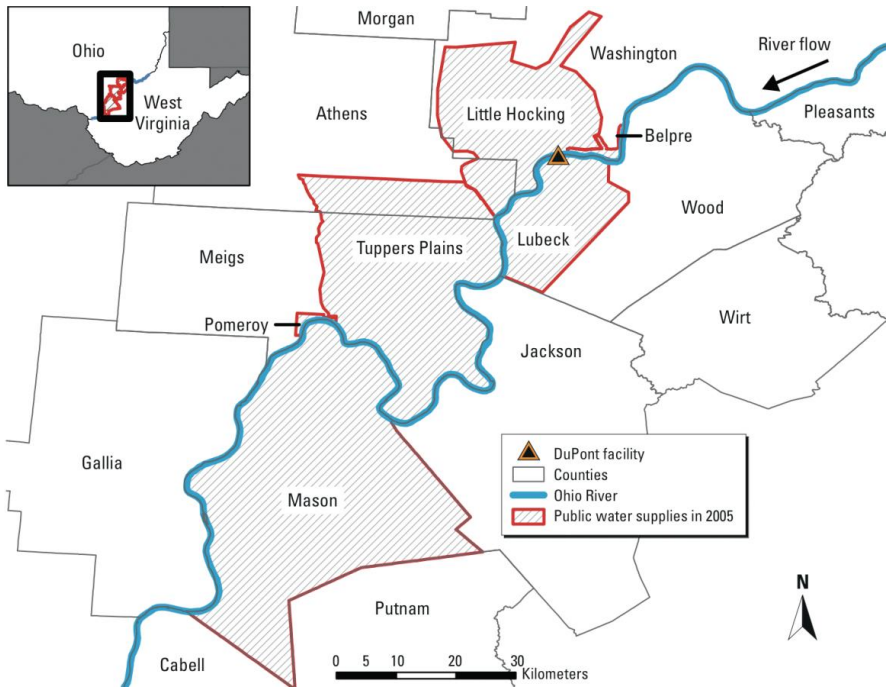
Figure from: Wang et al. 2017. Environmental Science & Technology. 51:2508-2518.

In the Cape Fear River, at least 11 PFESA and PFECA compounds have been identified.



Should we be concerned about health risks in humans who are exposed to these PFASs in their drinking water?

Figure from: Sun et al. 2016. Environmental Science & Technology Letters.



Probable links for PFOA in this community included:

- Cancer - kidney and testicular
- Diagnosed elevated cholesterol
- Pregnancy-induced hypertension and preeclampsia
- Thyroid Disease
- Ulcerative colitis

Studies of other PFASs also have identified:

- Developmental and reproductive toxicity.
- Immunotoxicity.
- Liver damage.

C8 Science Panel

http://www.c8sciencepanel.org

ECU

International Agency for Research on Cancer (IARC)

PFOA is a "probable human carcinogen" (Class 2B) based on evidence of kidney and testicular cancer in humans.

U.S. National Toxicology Program (NTP)

PFOA and PFOS are "presumed to be immune hazards to humans" based, in part, on evidence of suppression of antibody responses in experimental animals and humans.

U.S. Environmental Protection Agency (EPA)

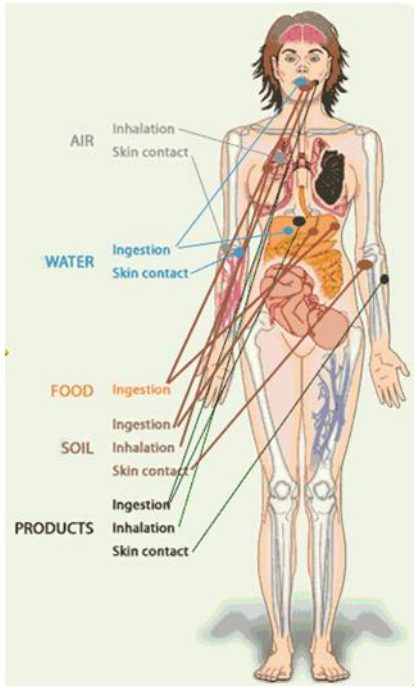
Drinking water health advisory for PFOA and PFOS calculated to offer "a margin of protection against adverse health effects to the most sensitive populations: fetuses during pregnancy and breastfed infants.

What do these conclusions mean for other PFASs?

ECU

Risk of an effect

Exposure



How much exposure (**dose**) does it take to produce an effect?

Other factors also contribute to the **risk** of an effect:

How long exposure occurs.

Age/life stage of exposure.

Route(s) of exposure.

How quickly excretion occurs.

Sensitivity of people being exposed.

Other factors may also increase or decrease risk.

Exposure → Risk of an effect

What if we have no information or very little information on effects but we know that people are getting exposed?

Rae et al. (2015) demonstrated that chronic exposure to GenX:

- Induces liver toxicity
- Induces liver, testicular, and pancreatic tumors

Wang et al. (2016) demonstrated that sub-chronic exposure to GenX:

- Induces liver toxicity (increased liver weight to a greater degree than similar doses of PFOA for the same duration)
- Alters genes associated with fat metabolism in liver, similar to PFOA

Rushing et al. (2017) demonstrated that sub-chronic exposure to GenX:

- Suppresses the ability of the immune system to generate antigen-specific antibodies

Based on a small number of studies, GenX, for example appears to produce a suite of toxicological effects similar to PFOA.

But what about the dose question?

ECU®

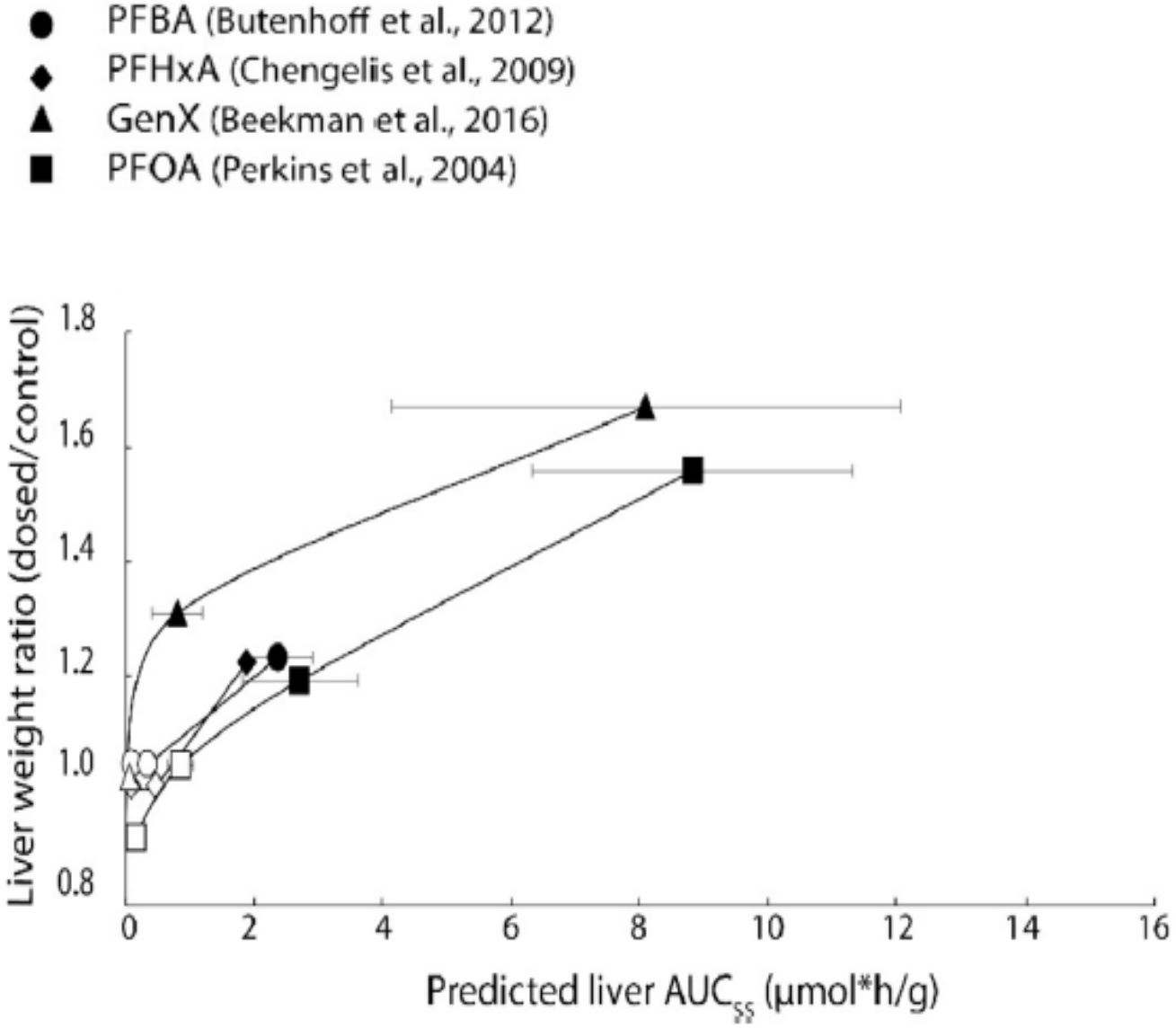


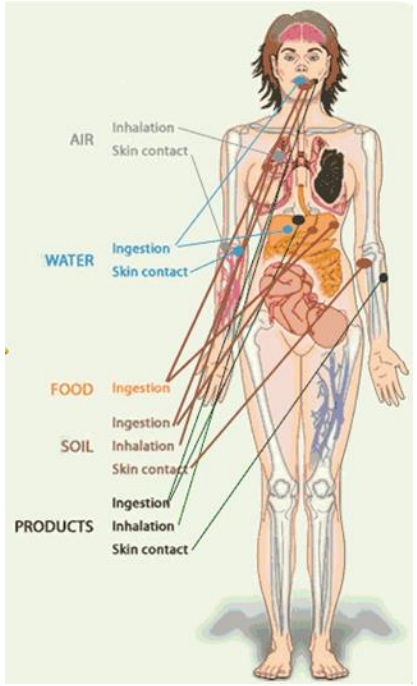
Figure from: Gomis et al. 2018. Environment International.

Major conclusions (Gomis et al., 2018):

- GenX appears less toxic than the legacy compounds because it (appears to) produces effects at higher doses and is eliminated from the body more rapidly.
- *However*, GenX concentration at the target site (i.e., liver), which we can calculate from the internal dose, is what really determines the toxicity.
- *Therefore*, GenX is more potent than PFOA at inducing increases in liver weight, on an internal dose basis.

Risk of an effect

Exposure



Therefore, reducing EXPOSURE to all PFASs, even those for which we have little to no toxicological data, is prudent given the growing body of evidence about PFAS toxicity and risk of effects.

This is even more important given uncertainties surrounding *PFAS mixtures* and interactions with other agents.

Cape Fear Public Utility Authority
Stewardship. Sustainability. Service.

Questions?

Efforts to Control the Source: The Future of PFAS Regulation

Beth Eckert

Director of Environmental Management

Carel Vandermeyden

Director of Engineering

Cape Fear Public Utility Authority

Stewardship. Sustainability. Service.

Regulatory Framework: Where are the Gaps?

- The Clean Water Act (CWA) created a basic structure for regulating discharge of pollutants into the waters of the United States.
  - Under the CWA, pollutants are prohibited from being discharged unless permitted.
  - Purpose is to protect US waters for uses such as: drinking water, recreation etc.

- The CWA works in tandem with the Safe Drinking Water Act (SDWA) to ensure that public water suppliers can provide safe and reliable drinking water.

- Clean Water Act is the front line protection to ensure:
  1. Public water suppliers can reliably meet the Safe Drinking Water Act standards.
  2. Polluters are responsible for ensuring discharge meets regulations.

Action At Many Levels—
Will Regulatory Standards Be Established?

- Science Advisory Board (SAB)
- North Carolina Department of Environmental Quality (NCDEQ)
- North Carolina Department of Health and Human Services (NCDHHS)
- Agency for Toxic Substances and Disease Registry (ATSDR)
- United States Environmental Protection Agency (EPA)

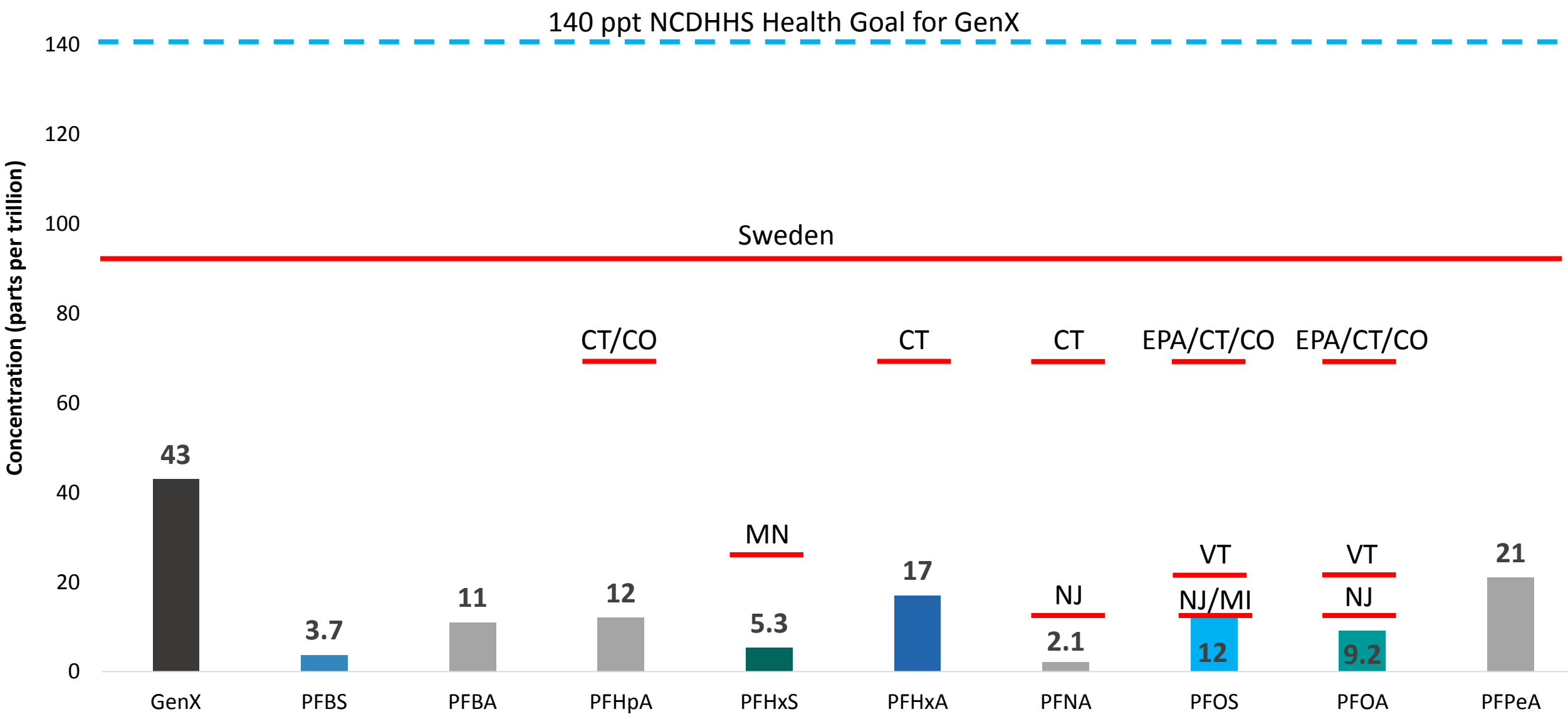
NCDEQ: Actions to Control the Source

- Continues to sample the CFR, drinking water facilities and Chemours
- Samples groundwater, wastewater, stormwater and air emissions from Chemours
  - Identified contamination of sediment, soil, and groundwater
  - Confirmed UNCW finding of PFCs in rain
  - Identified GenX in fishes
- Began investigation of Chemours facility and its immediate surroundings along with wastewater, storm water, and air emission discharge practices
- Established NPDES working group
- Issued Notices of Violation and are taking legal action against Chemours
- Required corrective actions at Chemours

EPA: Actions to Control the Source

- Established method to measure 14 PFAS in drinking water
- Held PFAS Summit in May 2018
  - Water industry professionals, regulators and researchers presented on PFAS.
  - Announced official visits to states impacted by PFAS. Announced creation of a PFAS Management Plan by Fall 2018
- Developing human health toxicity values for GenX and PFBS by end of Summer 2018.
- Initiating steps to evaluate the need for a maximum contaminant level (MCL) for PFOA and PFOS.
- Beginning the necessary steps to propose designating PFOA and PFOS as “hazardous substances” through one of the available statutory mechanisms, including potentially CERCLA Section 102.
- Held Community Listening Meeting in Fayetteville on August 14, 2018.

What Are the Existing Health Goals for PFAS?



Regulatory Gaps Show Treatment is Necessary

- GenX and other compounds remain unregulated in the air, water and sediment.
- Chemours has asked for a groundwater regulatory level of 75,000 parts per trillion and NCDEQ has not yet made a decision.
- There is little indication of seeing maximum contaminant levels for short chain PFAS such as GenX in the near future.

Cape Fear Public Utility Authority
Stewardship. Sustainability. Service.

Questions?

We Can Improve the Treatment Process at the Sweeney Plant

Carel Vandermeyden

Director of Engineering

Frank Styers

Chief Operating Officer

Cape Fear Public Utility Authority

Stewardship. Sustainability. Service.

Reducing Levels of PFAS Requires Additional Treatment

- Conventional water treatment is designed around federal and state regulations—plants are designed to be compliant with the Safe Drinking Water Act and to meet taste and odor goals.

- Additional advanced treatment processes can reduce levels of PFAS in drinking water

Completed Pilot Testing to Select PFAS Treatment Options

- Technologies Considered
  - Granular Activated Carbon
  - Ion Exchange
  - Reverse Osmosis
- Operational Strategies
- Criteria for Full Scale Design
- Considerations
  - Removal Rates
  - Environmental Impacts
  - Rate Impacts and Cost
- Secondary benefits if implemented for PFAS treatment

Considerations for Selecting Treatment Process

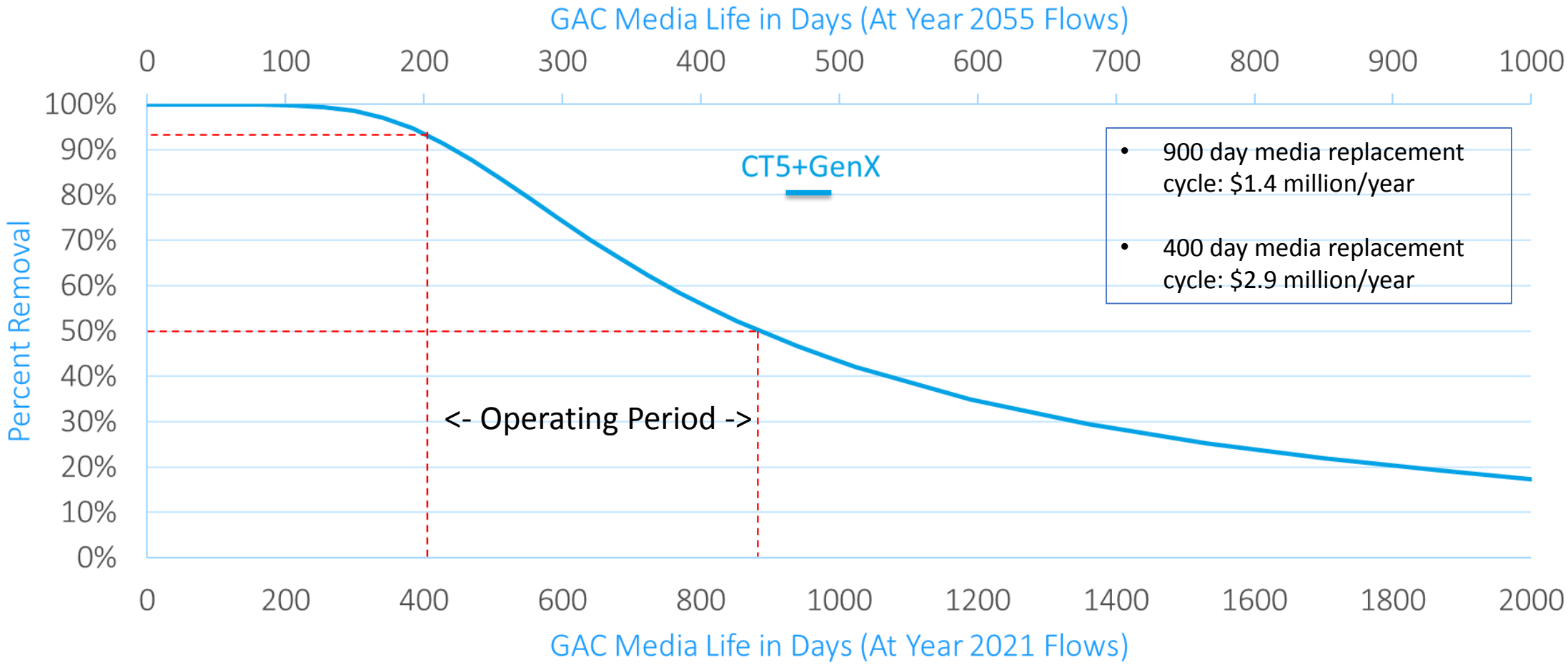
Cape Fear Public Utility Authority
Stewardship. Sustainability. Service.

Consideration	Granular Activated Carbon	Ion Exchange	Reverse Osmosis
Treatment			
• PFAS removal	Effective towards PFAS reduction	Effective towards PFAS reduction	Provides broad removal of all varieties of PFAS
• Flexibility	Can be modified to adapt to changes in regulations	Limited flexibility.	Limited flexibility because RO provides broad removal
• Corrosion control	Consistent with existing corrosion control program	Consistent with existing corrosion control program	Requires additional treatment to prevent lead and copper corrosion
Environmental	Removes PFAS from the environment	Filter media must be disposed of, cannot be destructed like carbon	Creates waste stream with concentrated PFAS levels to Cape Fear River (NPDES Permit required)

Financial Comparison to Reduce PFAS at the Sweeney Water Treatment Plant

	GAC	RO
Capital Costs	$46,000,000	$150,000,000
Annual Operating Costs	$2,900,000	$4,700,000
Lifecycle Net Present Value	$215,000,000	$504,000,000

Life of GAC Media: When Do GenX and the "Connecticut Five" PFAS Begin to Breakthrough?



- 900 day media replacement cycle: $1.4 million/year
- 400 day media replacement cycle: $2.9 million/year

Questions?

Financial Impacts

John McLean

Chief Financial Officer

Cape Fear Public Utility Authority

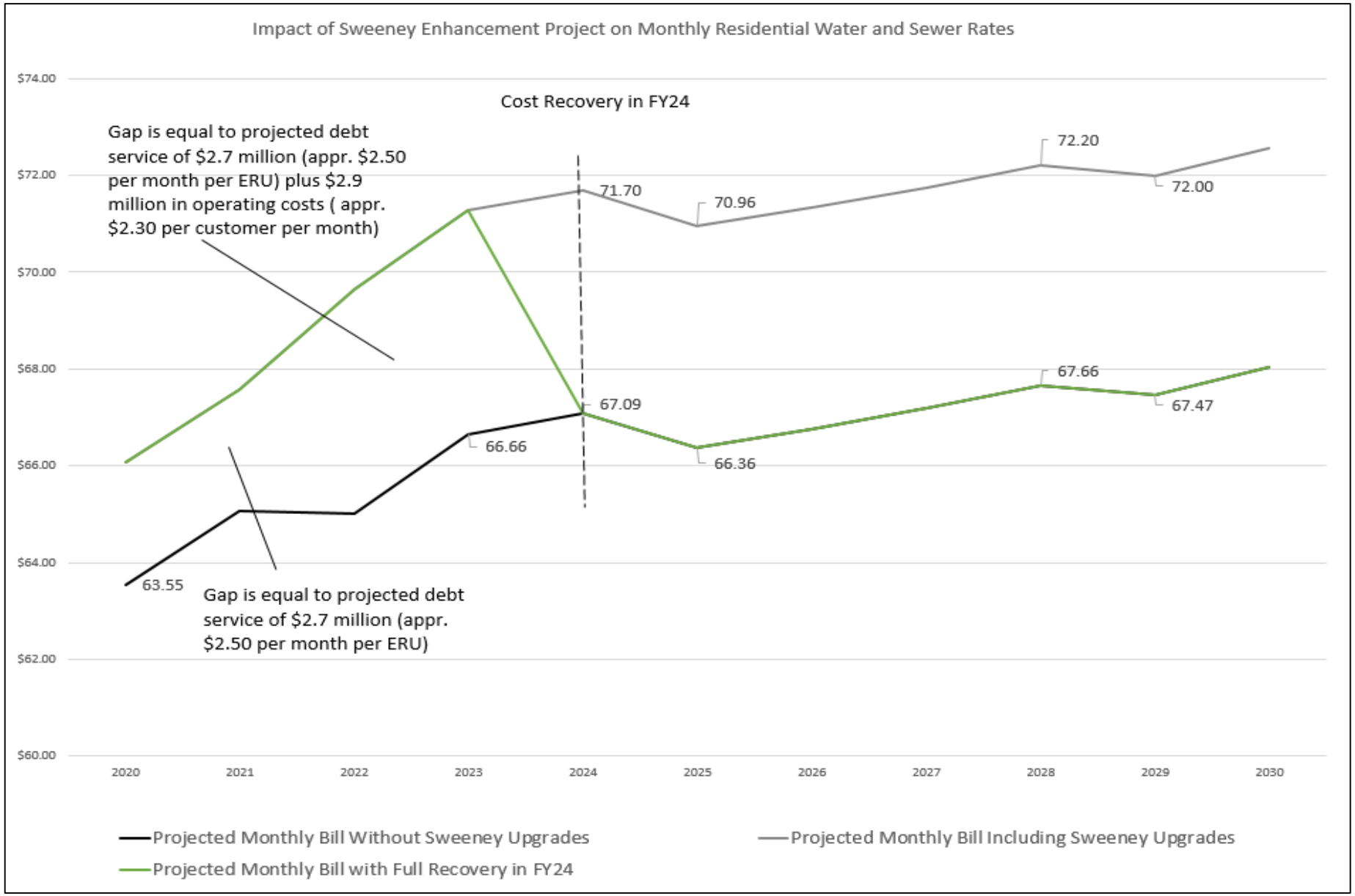
Stewardship. Sustainability. Service.

How Will an Upgrade Affect our Customers?

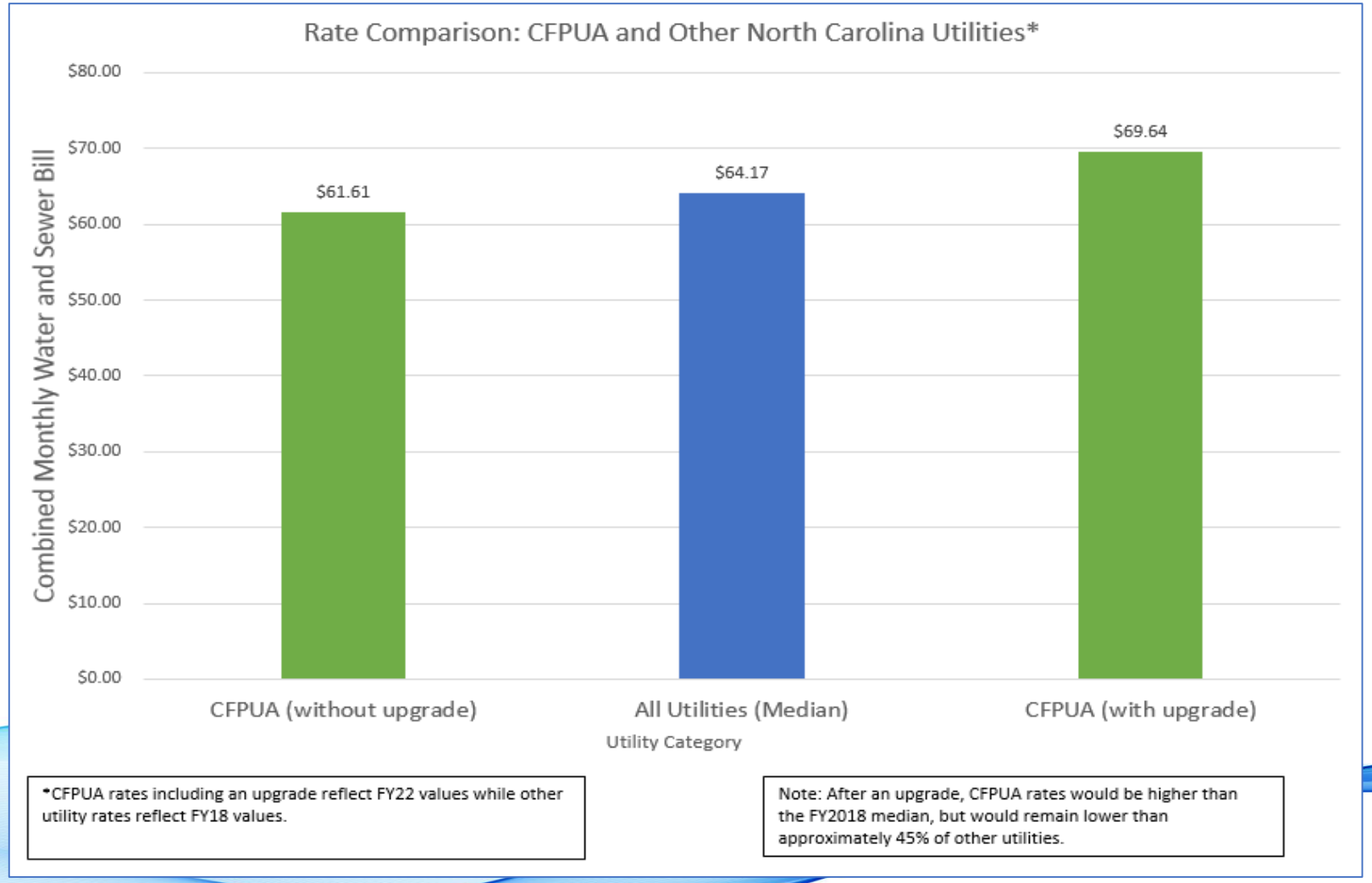
- Cost of Sweeney Enhancement Project
  - Capital: $46 million which translates to approximately $2.7 million in debt service over the 25 years
  - Operating: $2.9 million starting in FY22, increases thereafter proportional to increased flows

Three Possible Rate Scenarios

Rate Scenario	Impact
Scenario 1: No upgrade to the Sweeney Plant	No incremental impact to rates.
Scenario 2: Upgrade the Plant with full cost recovery in FY24	• Rate impact for the fiscal years 2020-2023: **$2.50-$4.64 per month** • Fiscal year 2024 and thereafter: No incremental impact to rates
Scenario 3: Upgrade the Sweeney Plant with no cost recovery	• Rate impact for the fiscal years 2020-2023: **$2.50-$4.64 per month** • Rate impact for the fiscal year 2024 and thereafter: **$4.36-$4.61 per month**


Impact of Sweeney Enhancement Project on Monthly Residential Water and Sewer Rates
Cost Recovery in FY24
Gap is equal to projected debt service of $2.7 million (appr. $2.50 per month per ERU) plus $2.9 million in operating costs (appr. $2.30 per customer per month)
Gap is equal to projected debt service of $2.7 million (appr. $2.50 per month per ERU)
$74.00
$72.00
$70.00
$68.00
$66.00
$64.00
$62.00
$60.00
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
63.55
66.66
67.09
66.36
67.66
67.47
71.70
70.96
72.20
72.00
Projected Monthly Bill Without Sweeney Upgrades
Projected Monthly Bill with Full Recovery in FY24
Projected Monthly Bill Including Sweeney Upgrades

How Will Rates Compare After an Upgrade?



Questions?

Customer Input: Findings From the CFPUA Community Survey

Lindsey Hallock

Director of Public and Environmental Policy

Cape Fear Public Utility Authority

Stewardship. Sustainability. Service.

CFPUA Customer Survey

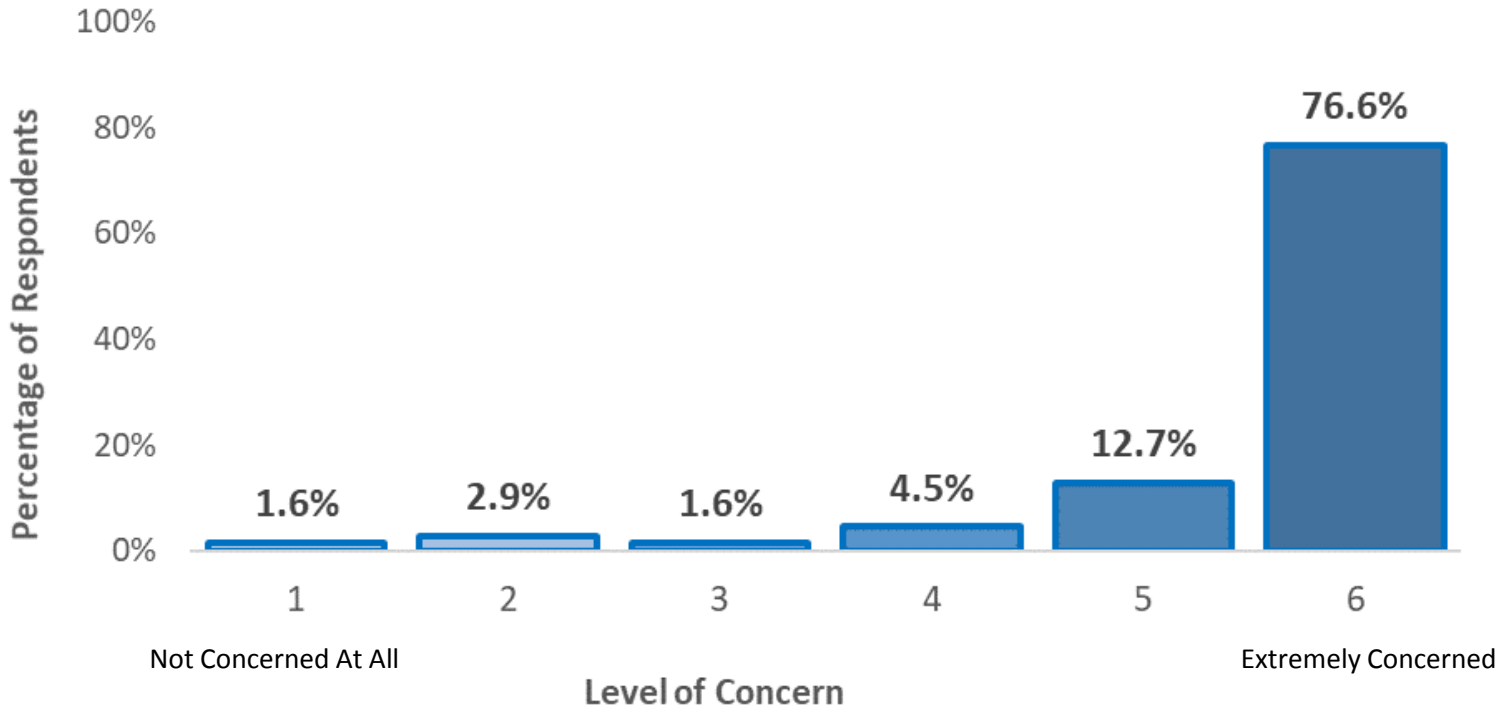
- Designed to solicit feedback from customers and members of the community on:
  - Level of concern regarding PFAS compounds
  - Willingness to pay for a Sweeney upgrade
  - Placement of regulatory responsibility
  - Popular sources of information
  - Customer service experience
- Available for the month of June on our website and in our offices at 235 Government Center Drive and 305 Chestnut Street.
- Nearly 250 responses—a majority were CFPUA customers living in Sweeney water system
- Not a representative sample of our service area

Customer Survey: Significant Trends

Question 4:

On a scale of one to six, rate your level of concern about GenX.

- 89.3% of respondents are concerned or extremely concerned about GenX.

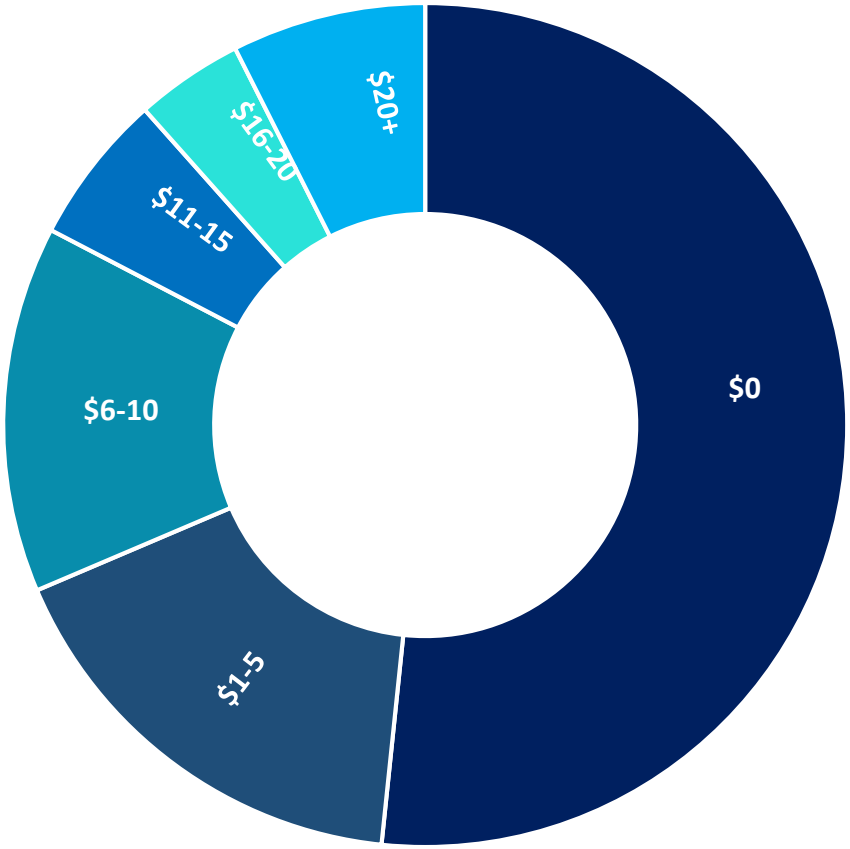


Customer Survey: Significant Trends

Question 6:

Select the most (per bimonthly bill) that you are willing to pay in addition to your current charges for the CFPUA plant upgrade.

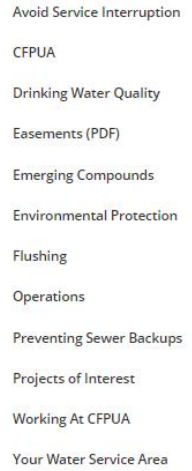
- Of customers that responded “$0”:
  - 83% responded that they were extremely concerned about GenX.
  - Many believe Chemours should be the organization that pays for an upgrade.
- 48.45% of respondents were willing to pay between $1-$20+ per bi-monthly bill for a Sweeney upgrade.

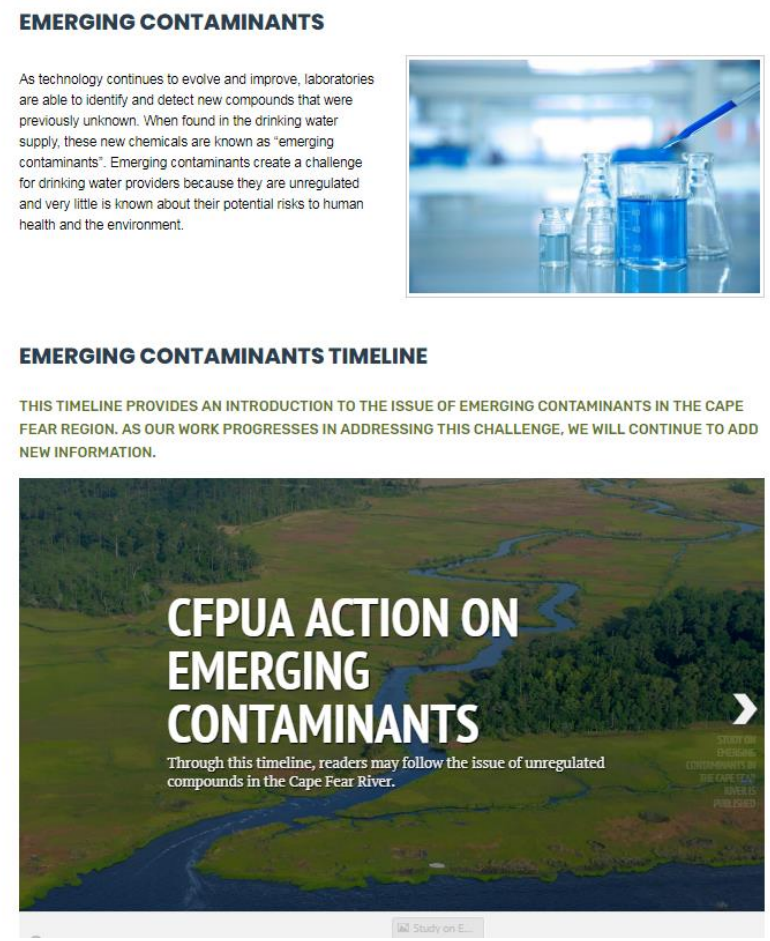


Customer Survey: What Are We Doing Well?

- **CFPUA website was listed as a popular source of information on this issue.**
  - Staff should continue to use the website, social media and our Notify Me! Program to release regular and accessible information to customers and the media regarding PFAS compounds and other water quality issues.

- **Customers overwhelmingly agree with our decision to take legal action.**
  - CFPUA should continue to update the public, when possible, on our litigation against Chemours and Dupont.





Customer Survey: Where Can We Improve?

Issue # 1: Customer assistance related to GenX was not standardized across all fronts.

- Solution #1: Continue to issue One Voice documents to all employees to ensure staff has up-to-date information on drinking water systems, PFAS results and latest CFPUA action on water quality.
- Solution #2: Continue to enroll new employees in the Notify Me! Program and encourage existing employees to read weekly releases.
- Solution # 3: Establish and maintain triage process to handle rapid increase in calls and ensure employees involved are trained in that process.

Issue # 2: Rate Increases and Water Quality

- Solution #1: Clearly communicate potential funding sources for the upgrade and their impacts on rates and water quality.
- Solution # 2: Continue to find new ways to address rate affordability in the future with customer assistance programs, billing changes and partnerships with the City and County.

Customer Survey: Where Can We Improve?

Issue # 3: Customers want organizations to work together to protect source waters rather than remain siloed by role.

- Solution #1: Continue to work on our Source Water Protection Plan and solicit feedback from local municipalities, community groups and local governmental organizations.
- Solution #2: Continue to comment publicly on NPDES permits and regulatory decisions that may affect source water quality at our intake.
- Solution # 3: Actively participate in NPDES working group.

Questions?

Where Do We Go From Here?

Jim Flechtner

Executive Director

Cape Fear Public Utility Authority

Stewardship. Sustainability. Service.

The Question:

Should We Do More to Protect the Health of Our Current and Future Customers?

- There are additional compounds in our source water
- Reducing levels of contaminants is protective of public health
- There are gaps in federal and state regulations and enforcement
- Source control can only do so much
- GAC and Ion Exchange can be added to the existing treatment process
- Our rates would increase approximately $5 per month
- Our customers expect cleaner drinking water
- We can’t rely on Chemours and DuPont to control discharges

Next Steps

- September 12: Board vote on Sweeney design contract
- Late September:
  - Customer Letter
  - Public outreach through a series of public meetings
  - Presentations to local civic and environmental groups
- Implementation Process
  - 12 months to complete design
  - 30 months for bidding and construction

Questions?

CFPUA REPORT

CUSTOMER SURVEY: GENX & THE SWEENEY WATER TREATMENT PLANT UPGRADE

AUGUST 2018

Background

In the wake of the reports of per- and polyfluorinated (PFAS) compounds in the Cape Fear River in June 2017, CFPUA took action on several fronts: legal, communications, research and water treatment technology. CFPUA's Sweeney Water Treatment Plant, as it is currently designed, is unable to remove per-fluorinated compounds from the drinking water. After completing a pilot study at the Plant, we have determined that Ion Exchange (IX) and Granular Activated Carbon (GAC) technologies are effective in reducing levels of these compounds in treated drinking water.

In May 2018, the CFPUA Board voted to authorize staff to negotiate a design contract to upgrade the Plant to reduce PFAS compounds in the finished water — a project that would cost approximately $50 million. Because an upgrade would consequently increase rates, CFPUA created a customer survey to gather customer input on the issue of water quality.

The survey, comprising 10 questions, aimed to quantify community concerns, questions and thoughts about PFAS. Electronic surveys were made available on the CFPUA website and Facebook page. Paper copies of the survey were made available in our offices at 235 Government Center Drive and the downtown location at 305 Chestnut Street. Individual responses remained anonymous.

The following report summarizes the survey's findings and highlights interesting trends in respondent opinion.

SURVEY OVERVIEW

AT THE END OF THE SURVEY PERIOD, JUNE 5 – JUNE 30, 246 COMPLETED SURVEYS HAD BEEN RECEIVED.

QUESTION 1: 97% of completed surveys were from CFPUA customers.

QUESTION 2: 85% of CFPUA customer respondents resided within the Sweeney water system.

QUESTION 3: 99% of CFPUA customer respondents were residential customers.

QUESTION 4: 77% of respondents indicated extreme concern about GenX.

QUESTION 5: Health, cost, and regulation were the main concerns about GenX and other PFAS in the River.

QUESTION 6: Respondents believe that upstream dischargers, state regulators and local utilities should work together to keep PFAS out of the Cape Fear River.

QUESTION 7: 51.7% of respondents do not wish to pay additional costs to fund the Sweeney upgrade, while 48.9% would pay between $1 - $20 bimonthly.

QUESTION 8: 40% of respondents contacted CFPUA to ask questions after learning about GenX.

QUESTION 9: 54.7% of respondents visit the CFPUA website for news about GenX.

QUESTION 10: 48% of customers commented about rate increases and water treatment costs.

Response Findings: A Deeper Analysis

Review of the 246 survey responses revealed several trends. The most noteworthy of these trends have been graphed, as shown below.

Question 1: Are you a CFPUA water customer?

The initial survey questions focused on gathering respondent information on the survey participants. Determining whether or not the respondent is a CFPUA customer helped confirm that the survey reached the intended audience. Of the 245 respondents who answered this question, 238 were CFPUA customers.

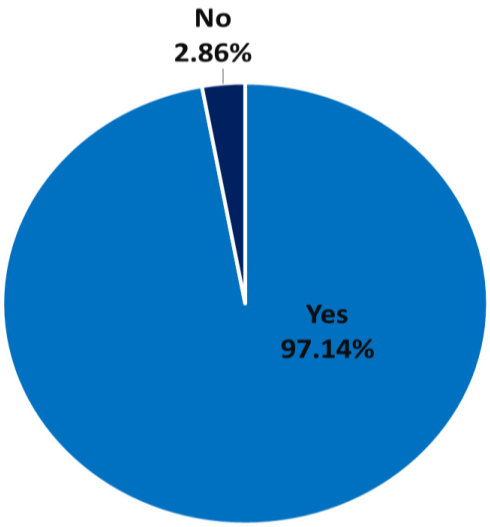


Figure 1. Percentage of respondents who indicate they are CFPUA customers

Question 2: If you are a CFPUA customer, which drinking water system serves your home or business?

To further determine whether respondents were the targeted audience, Question 2 identified which water system the respondent resides in. Of the 238 CFPUA customers, 204 reside within the Sweeney Water Treatment Plant area.

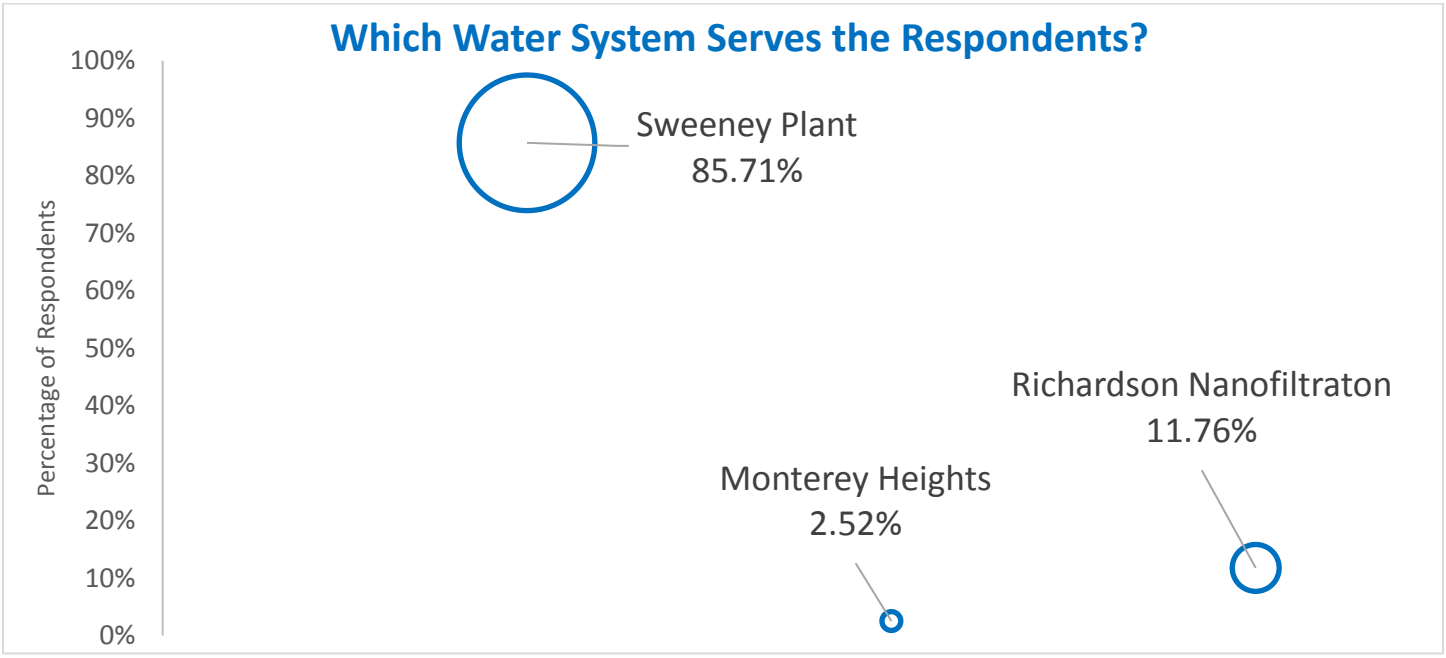


Figure 2. CFPUA customers' drinking water systems

Question 3: If you are a CFPUA customer, are you residential or non-residential?

Question 3 helped further characterize respondents by distinguishing between residential and non-residential customers. Of the 239 respondents who answered this question, 236 were residential customers, two were non-residential and one was both residential and non-residential.

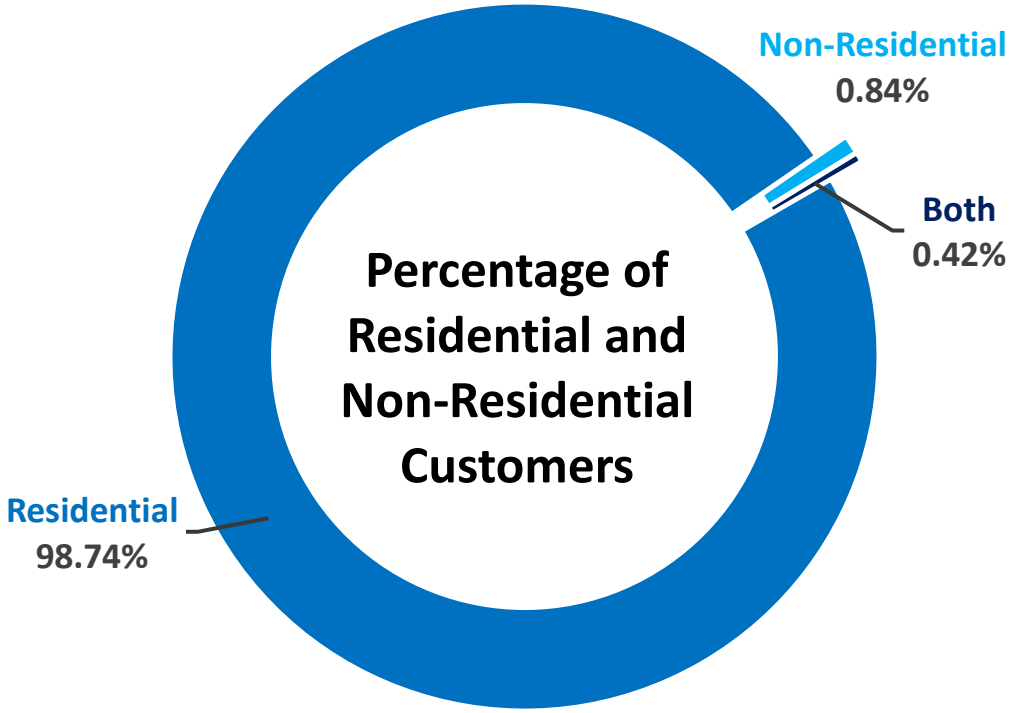


Figure 3. Percentage of respondents who are residential customers or non-residential customers, or both

Question 4: On a scale of one to six, rate your level of concern about GenX.

Question 4 helped gauge the level of concern about GenX within CFPUA's customer base, in addition to providing a platform for respondents to voice their thoughts in the comment section of Question 4. As shown below, on a scale of one to six, 244 responses indicated that 187 respondents were extremely concerned, while only 4 repsondents indicated no concern at all.

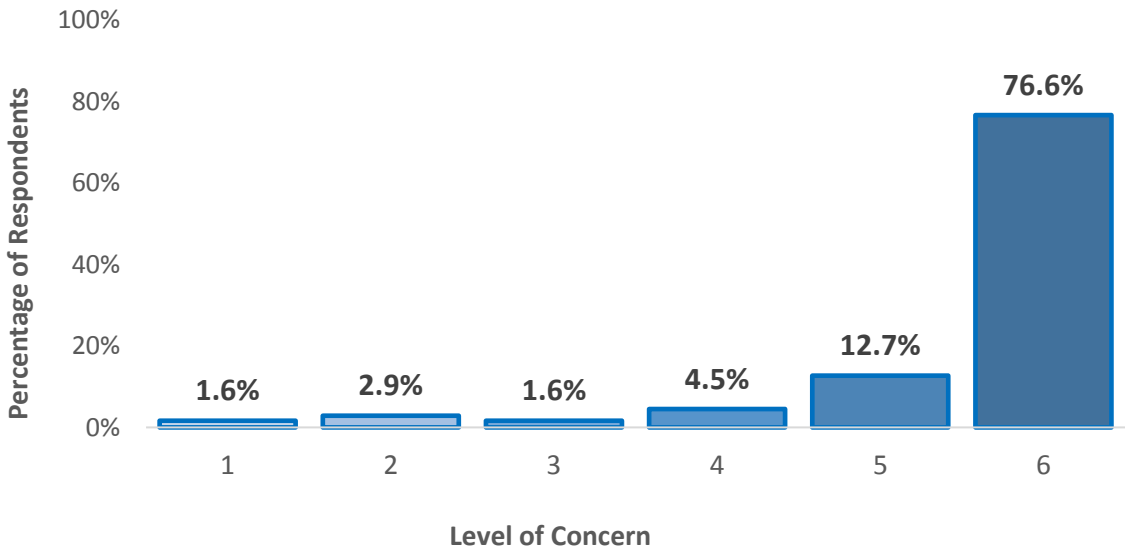
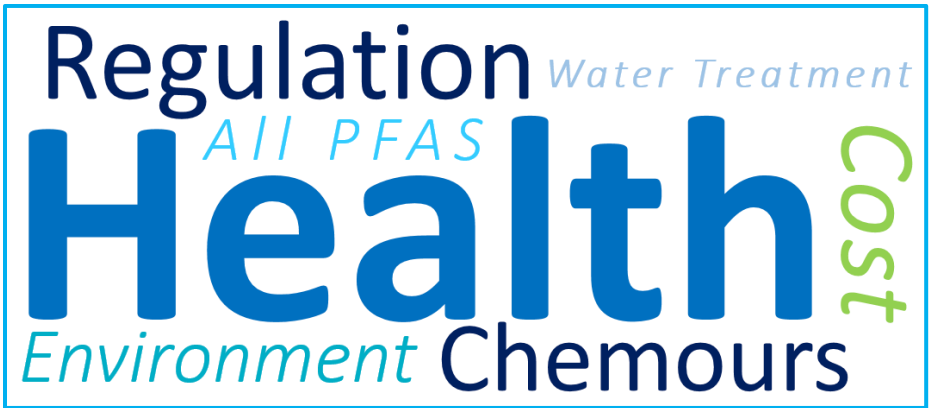


Figure 4. Respondents' overall level of concern about GenX

Question 4 - *Comment Section:* Share what concerns you about GenX.

The comment section of Question 4 received 170 written responses, most of which provided additional information on the high level of concern about GenX. The overwhelming majority of concern was about human health. Respondents also expressed concerns about pet health, the effects of GenX on the environment, the cost of the upgrade, additional PFAS and Chemour's pollution of the river.



Word Frequency:

Health:	149
Regulation:	29
Cost:	27
Chemours:	20
Environment:	17
All PFAS:	16
Water Treatment:	7

Question 5: In your opinion, who is responsible for keeping GenX and other PFAS out of the River?

As indicated in Figure 5, the majority of respondents believe that the responsibility for keeping PFAS out of the river is shared among local utilities, upstream dischargers and state regulators. This question also included a comment space for respondents, in which several response trends were noted:

- CFPUA's portion of the responsibility is to ensure water is clean before providing it to customers.
- Upstream dischargers are responsible for the contamination and should ultimately be held responsible for costs of contamination damages, especially the upgrade to the Sweeney Water Treatment Plant.
- Customers should not bear the cost of the Sweeney Plant upgrade.

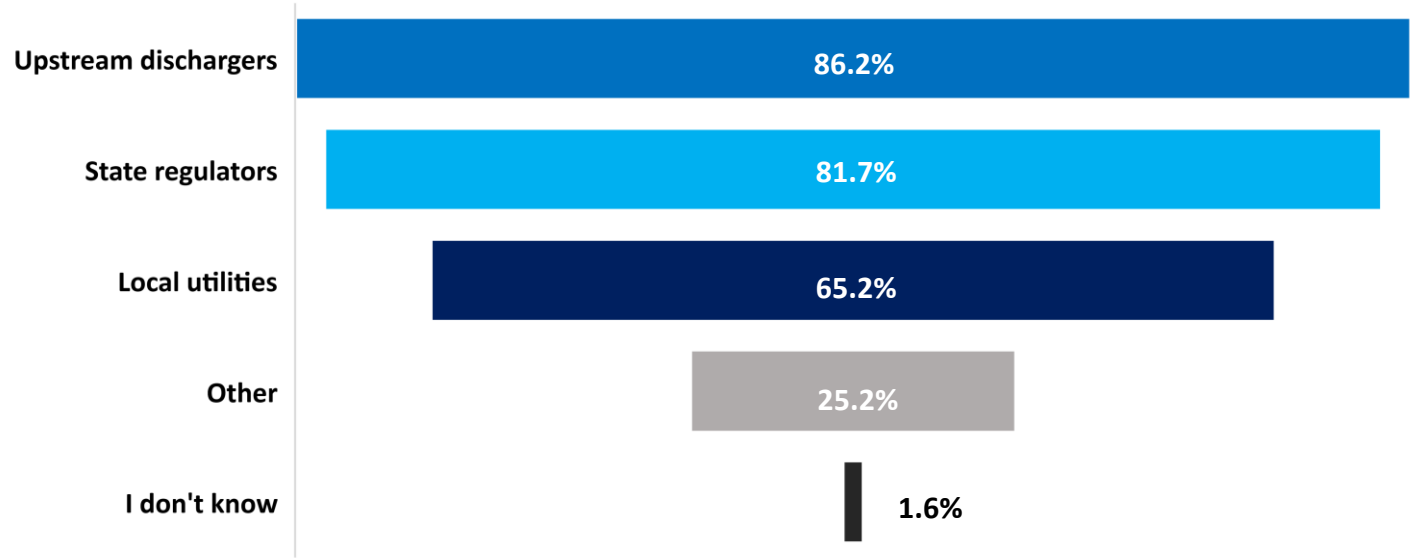


Figure 5. Who respondents feel is responsible for keeping GenX/PFAS out of the Cape Fear River

Question 6: Select the most (per bimonthly bill) that you are willing to pay in addition to your current charges for the CFPUA plant upgrade.

This question was designed to collect feedback on a potential rate increase to pay for an upgrade to the Sweeney Plant. 51.7% of respondents do not wish to pay for an upgrade, and 48.4% indicate they would be willing to pay an additional amount on their bimonthly bill for an upgrade. Of the 123 respondents who indicated they did not want to pay for an upgrade, 104 responded that they were extremely concerned about GenX.

58% of respondents to Question 6 mentioned cost-related concerns in their Question 10 comments. The comments centered around the idea that CFPUA customers should not bear the financial responsibility of the upgrade for various reasons including, but not limited to, the following:

- Chemours should fund the upgrade
- Do not want to pay more money for contaminated water
- If CFPUA customers fund the upgrade, they want reimbursement and do not know when or if they would be reimbursed
- CFPUA should tap into other sources of capital before asking ratepayers to pay additional amounts

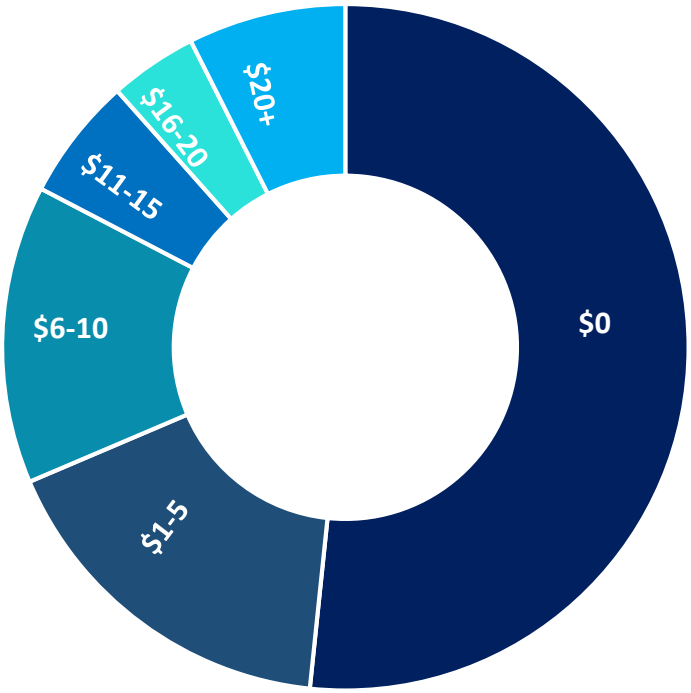


Figure 6. Amount respondents are willing to pay for Sweeney Plant upgrade

Survey Question 7: After news of GenX, did you contact CFPUA to ask questions about GenX?

Of the **245** respondents who answered this question, 98 respondents or **40%** contacted CFPUA upon learning about GenX, while 147 respondents or **60%** did not. This question was created with the intention of gaining insight on the number of customers who contacted CFPUA in light of the many concerns about GenX. Those who contacted CFPUA were prompted to rate their level of satisfaction with the interaction in Question 8.

Survey Question 8: If you called CFPUA after hearing about GenX, rate your level of satisfaction on a scale of one to six.

Question 8 served as the comment section for Question 7. As represented in Figure 7., **8.7%** were extremely satisfied, while **54.8%** were not satisfied at all for various reasons. Below are several write-in responses:

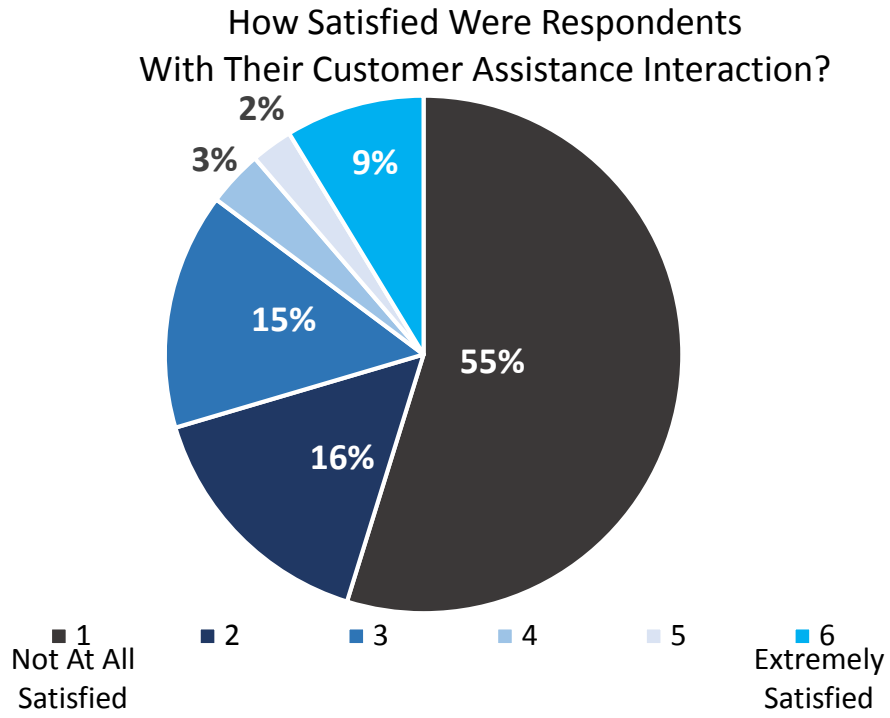


Figure 7. Respondents' level of satisfaction with CFPUA response on GenX

Survey Question 9: Where do you go to find news on GenX?

Local news websites are the most frequented information source for GenX, with **73.3%** responding they retrieved news from them. **55.1%** of respondents report using local newspaper, social media and environmental organizations. While not the most commonly utilized, CFPUA is among the most frequented source of information for participatnts, with **54.7%** respondents accessing it for news. (Please note that this question allowed multiple response selections.)

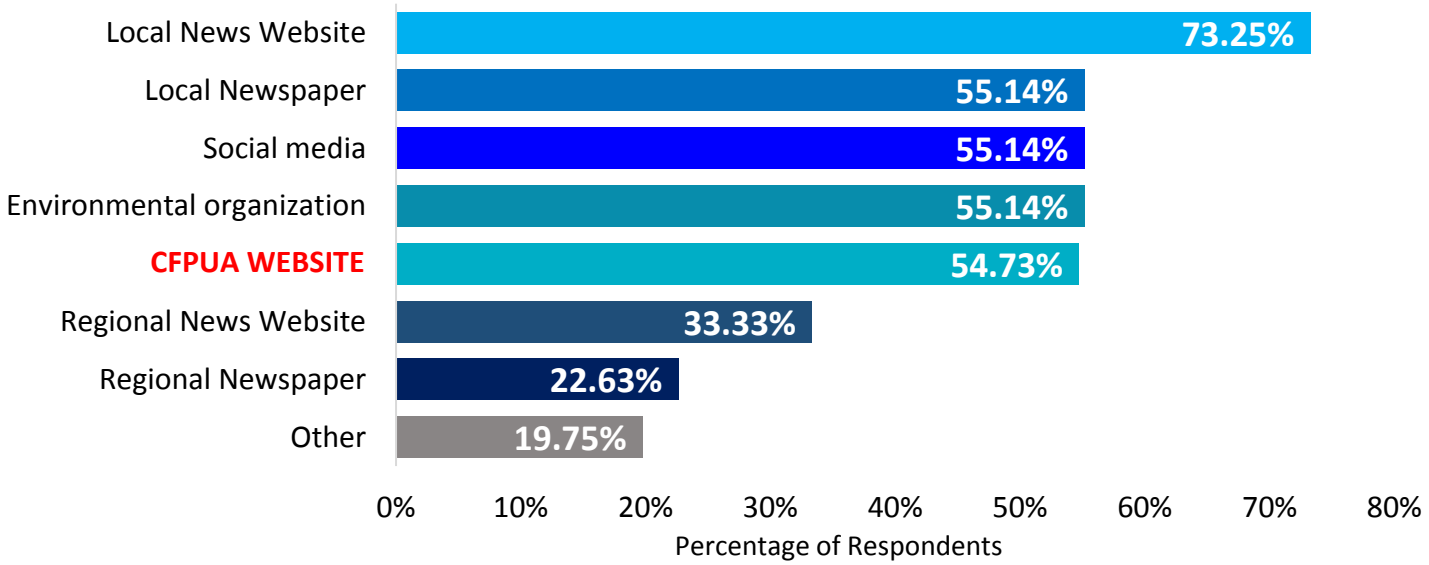
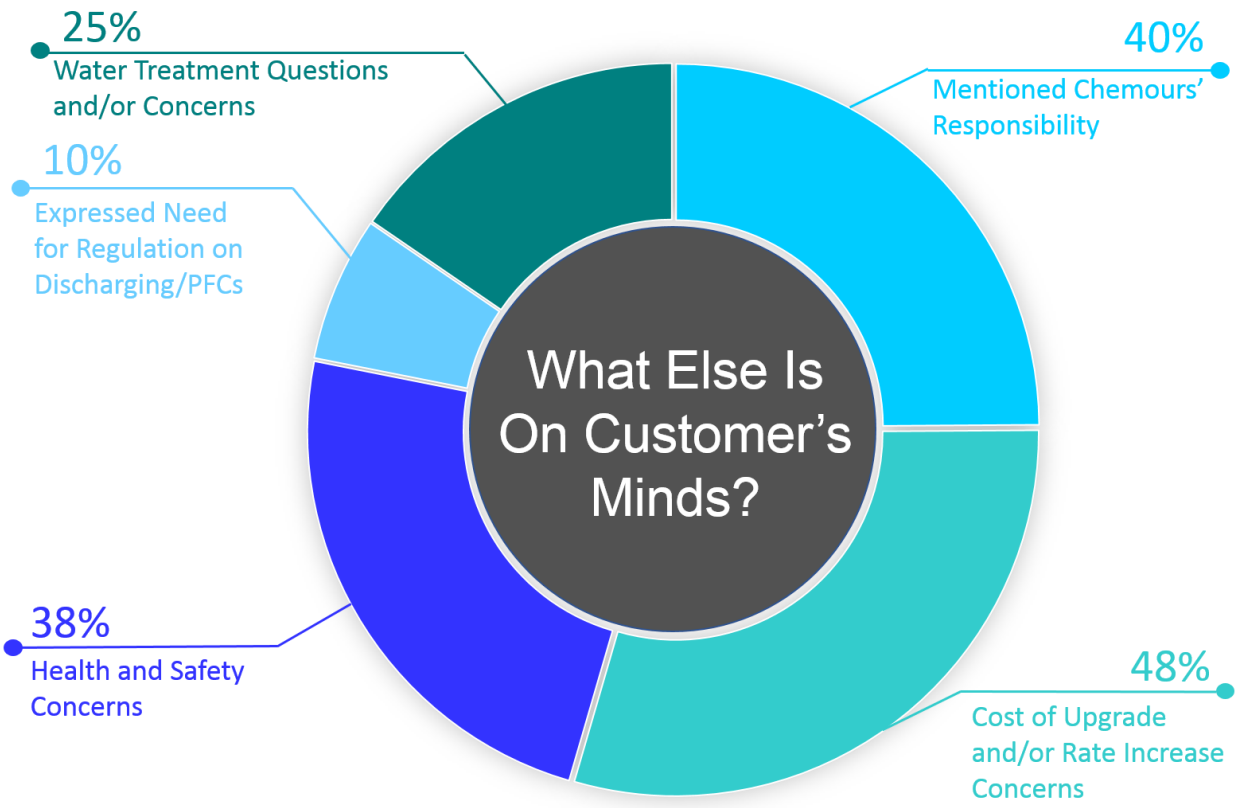


Figure 8. Where respondents' learn about GenX

Survey Question 10: Do you have any other comments, questions, or concerns?

The final question was intended to capture any additional and/or summary comments from respondents. As evident in the below graph, respondents expressed many of the same concerns previously expressed throughout the survey. Some used this space to make comments on CFPUA in general, but most comments were relevant and lended insight into customers' thoughts and beliefs on the circumstances surrounding GenX.



Conclusions

In just under one month, CFPUA staff collected and analyzed the responses of nearly 250 participants in our customer survey. The response rate represents aproximately 0.04 percent of our active accounts and is not a statistically representative sample. However, many of the responses submitted through the survey corroborate feedback that staff has received elsewhere, through phone calls, emails and in letters accompanying payment.

The survey found that respondents are extremely concerned about GenX and other per-fluorinated compounds for a variety of reasons, ranging from health concerns to concerns about the environment and property values. Approximately half of the respondents indicated they did not want to pay an additional amount on their bill for a Plant upgrade, though it became clear when analyzing the comment sections that this was not due to a lack of concern, but because they believed Chemours should be responsible for those costs.

Staff was pleased to see our website as one of the top sources of information for respondents. CFPUA continues to release weekly updates on water quality issues, and we have conducted a series of webpage revisions to ensure the public has access to regular and reliable sampling data.

While we have worked to establish ourselves as a valuable source of information for the community, only 40 percent of respondents indicated they have called into CFPUA for information or to ask questions. In comments associated with this question, some respondents expressed a lack of trust in CFPUA and felt that staff was not able to answer their questions satisfactorily.

To bolster communications and advance CFPUA's position as a source of information, we will be taking the following actions:

- Continue to publish weekly updates through our Notify Me! program on water quality and the issue of emerging contaminants. The weekly updates not only help us communicate our actions to our customers, they also help to encourage public education and awareness of water quality issues.

- Continue to provide staff with One Voice documents to ensure they remain fully informed on this topic and can provide customers and members of the community with accurate and up-to-date information.

- Prepare a communications strategy in the event the Board approves the design contract in September. The communications strategy should address what CFPUA would do if outside funding for the Plant upgrade becomes available.

- Use our Source Water Protection Planning process as a way to solicit feedback from the public and partner organizations on the ways in which we can work together to monitor and reduce levels of per-fluorinated compounds and other contaminants in the Cape Fear River.