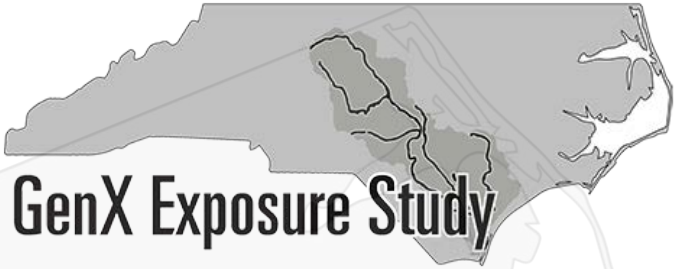
NC STATE UNIVERSITY

Center for Human Health and the Environment



Virtual Fayetteville Community Meeting
June 20, 2020

Welcome and thank you for joining us! A few housekeeping items:

Everyone will remain muted for the session. Please send questions through the Q&A box.

This meeting will be recorded and posted to our website: *GenXStudy.ncsu.edu*.

You can send any follow up questions or comments to *genx-exposure-study@ncsu.edu*.

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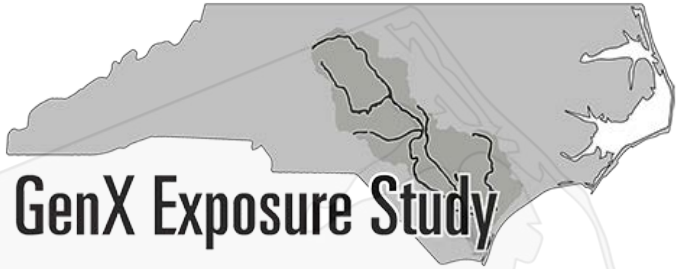


PFAS results for private wells sampled Feb 2019

Jane Hoppin, ScD, jahoppin@ncsu.edu
Nadine Kotlarz, PhD, nkotlar@ncsu.edu

GenX Exposure Study

The GenX Exposure Study is a research study

Funded by the National Institutes of Health (NIH)

Designed to answer community questions about GenX exposure:

- Is GenX detectable in my body? My house?
- What predicts GenX in my body?
- Are there health effects associated with GenX?

GenX Exposure Study

More than just GenX

GenX is part of a family of chemicals called:

- Per- and poly-fluoroalkyl substances (PFAS)

GenX in NC is uniquely associated with Fayetteville Works on the Cape Fear River

- Released to both air and water

Other byproducts of Chemours include

- PFMOAA, Nafion byproduct 2 and others

Also measuring legacy PFAS

GOAL: to get a picture of the overall PFAS exposure

GenX Exposure Study: What did we do?

Enrolled 153 Fayetteville participants in February 2019

- Wells previously sampled for GenX by DEQ/Chemours

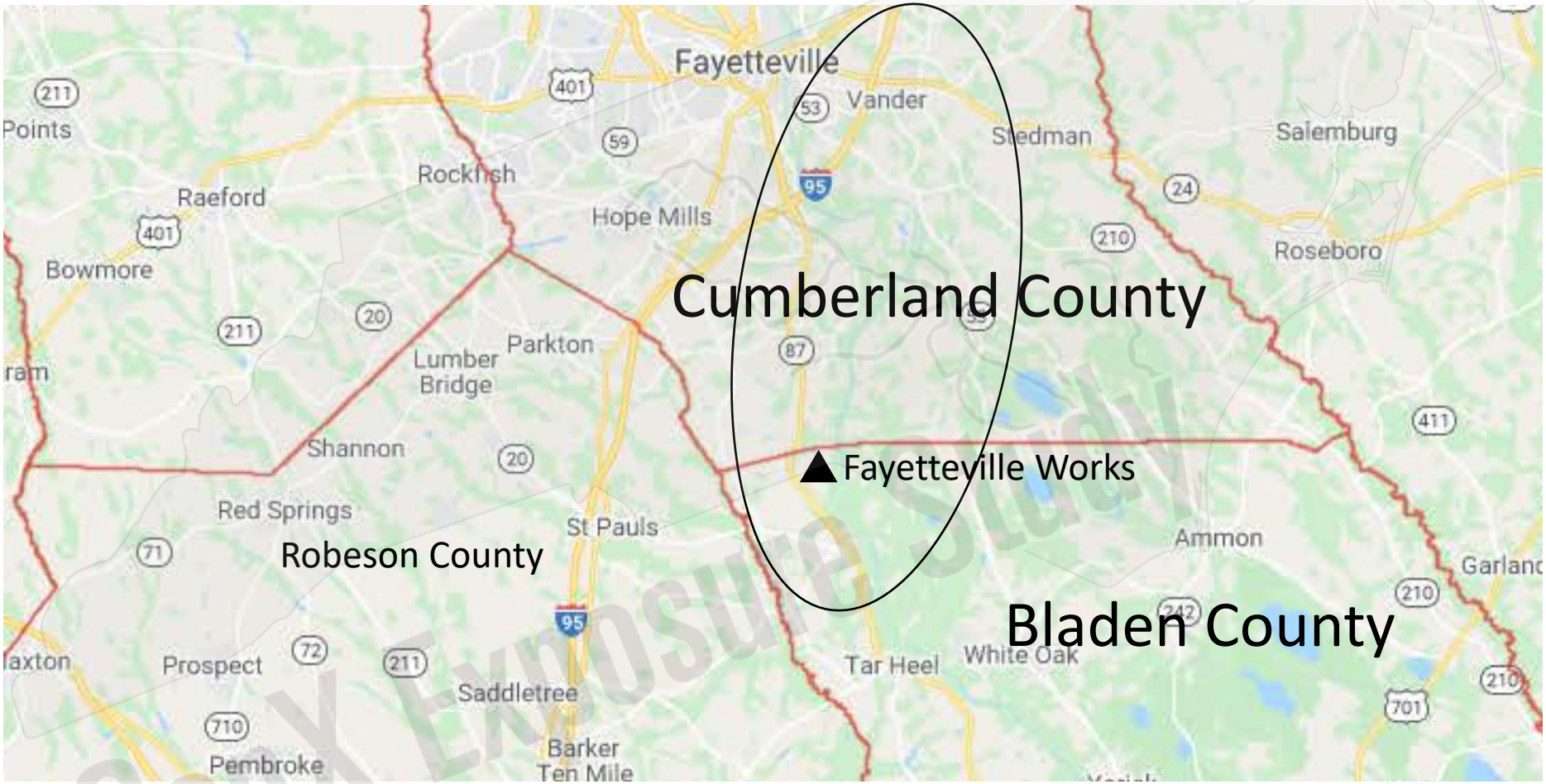
Collected well and tap water to analyze for PFAS

Collected blood and urine samples for PFAS

Analyzed blood for clinical measures

GenX Exposure Study

“Fayetteville cohort”



GenX Exposure Study

Fayetteville Participation – Feb 2019

153 people enrolled

- 137 adults
- 16 children

85 households

- 14 Bladen County
- 71 Cumberland County

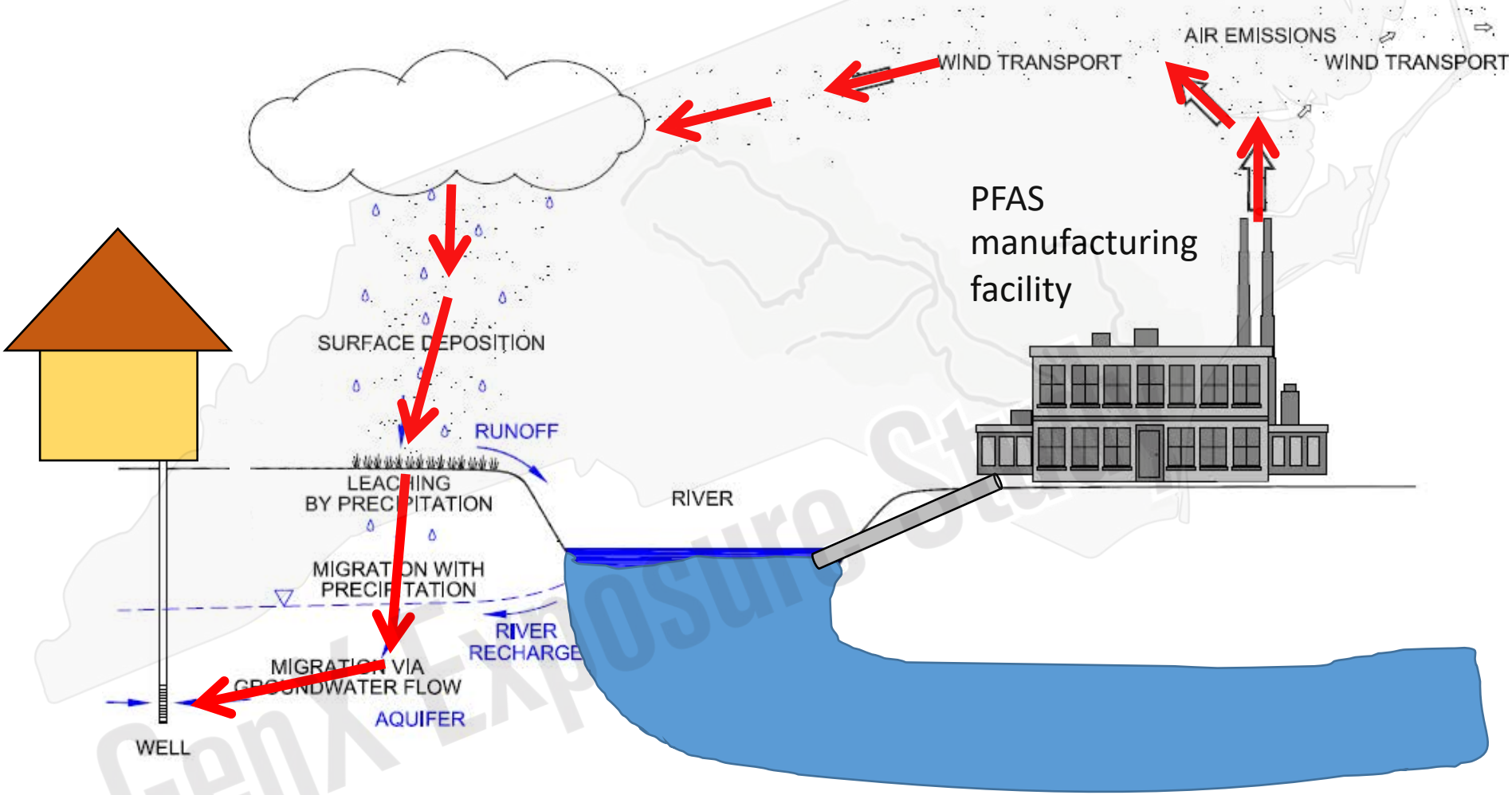
Up to 5 people/household

Lived at current address

- 17% <5 years
- 44% 20+ years

GenX Exposure Study

How did wells get contaminated?



Modified from Davis et al. *Chemosphere* 2007, 67, 2011–2019

Well and tap water sampling

Well sample (84 wells)

Kitchen tap sample (82 taps)

Why collect WELL water samples?

1) Understand sources of PFAS exposure

2) Look for other PFAS besides GenX

Why collect TAP water samples?

Get information about what people are exposed to

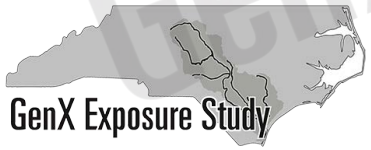
GenX Exposure Study

Timeline

Timeline

Wastewater discharges containing PFAS to Cape Fear River stopped

September, 2017



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DEQ/Chemours start testing private wells

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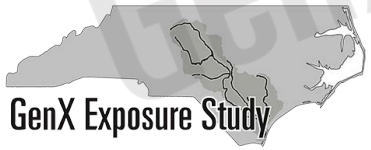

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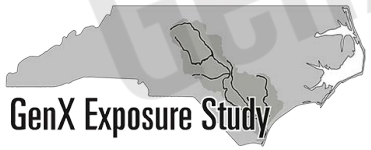

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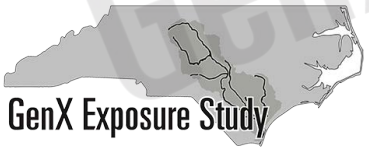

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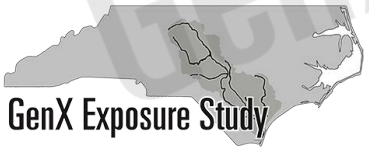
May, 2018

February 20-24, 2019

February 26, 2019



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Fayetteville works thermal oxidizer started operating

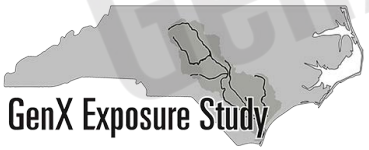
September, 2017

May, 2018

February 20-24, 2019

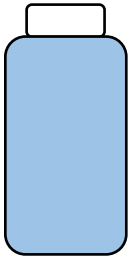
February 26, 2019

December 21, 2019



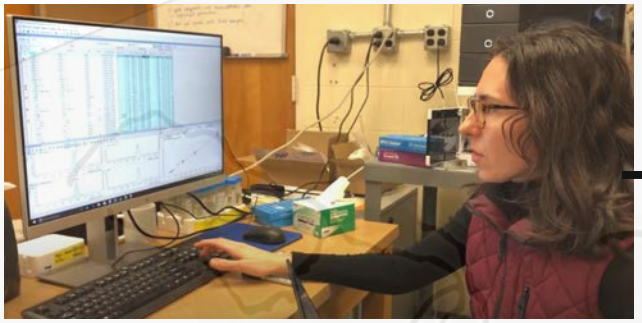
From sample to results

166 samples

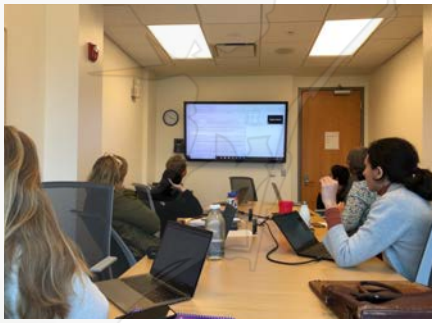


Develop method

Review results for 31 PFAS for each sample



Discuss with team



Discuss with community science advisory board

Draft letter

NC STATE UNIVERSITY Center for Human Health and the Environment

GenX Exposure Study

5/4/2020

«names_of_HHID»
«street_address»
«city», «state» «zip»

Dear «names_of_HHID»,

We hope that you are well during this difficult time.

Thank you for participating in the GenX Exposure Study. This research study is funded by the National Institute of Environmental Health Sciences. We are trying to understand human exposure to per- and polyfluoroalkyl substances (PFAS), including GenX, in the Cape Fear River Basin, North Carolina. The GenX Exposure Study is separate from other PFAS research activities you may have seen in your community, like those by the North Carolina PFAS Testing Network, the North Carolina Department of Health and Human Services, University of North Carolina, Chapel Hill, or other groups.

As early as 1980, GenX and other PFAS have been released from the Chemours Fayetteville Works plant to nearby areas. In response, the GenX Exposure Study began in November 2017 with residents in Wilmington, NC. In February 2019, we expanded the study to include people who live nearby the Fayetteville Works plant and who have private wells.

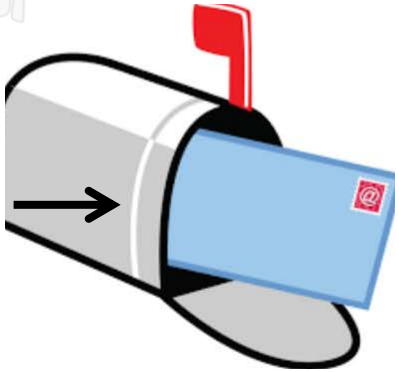
As part of this study, we collected water samples (from private wells and kitchen taps) from 65 homes of 153 residents in the Fayetteville area. This letter reports our initial results for these water samples.

What did we do?

In February 2019, we recruited 153 participants from 65 homes in Cumberland and Bladen County to participate in the GenX Exposure Study. We recruited people whose wells had already been tested for GenX and GenX values were reported to the North Carolina Department of

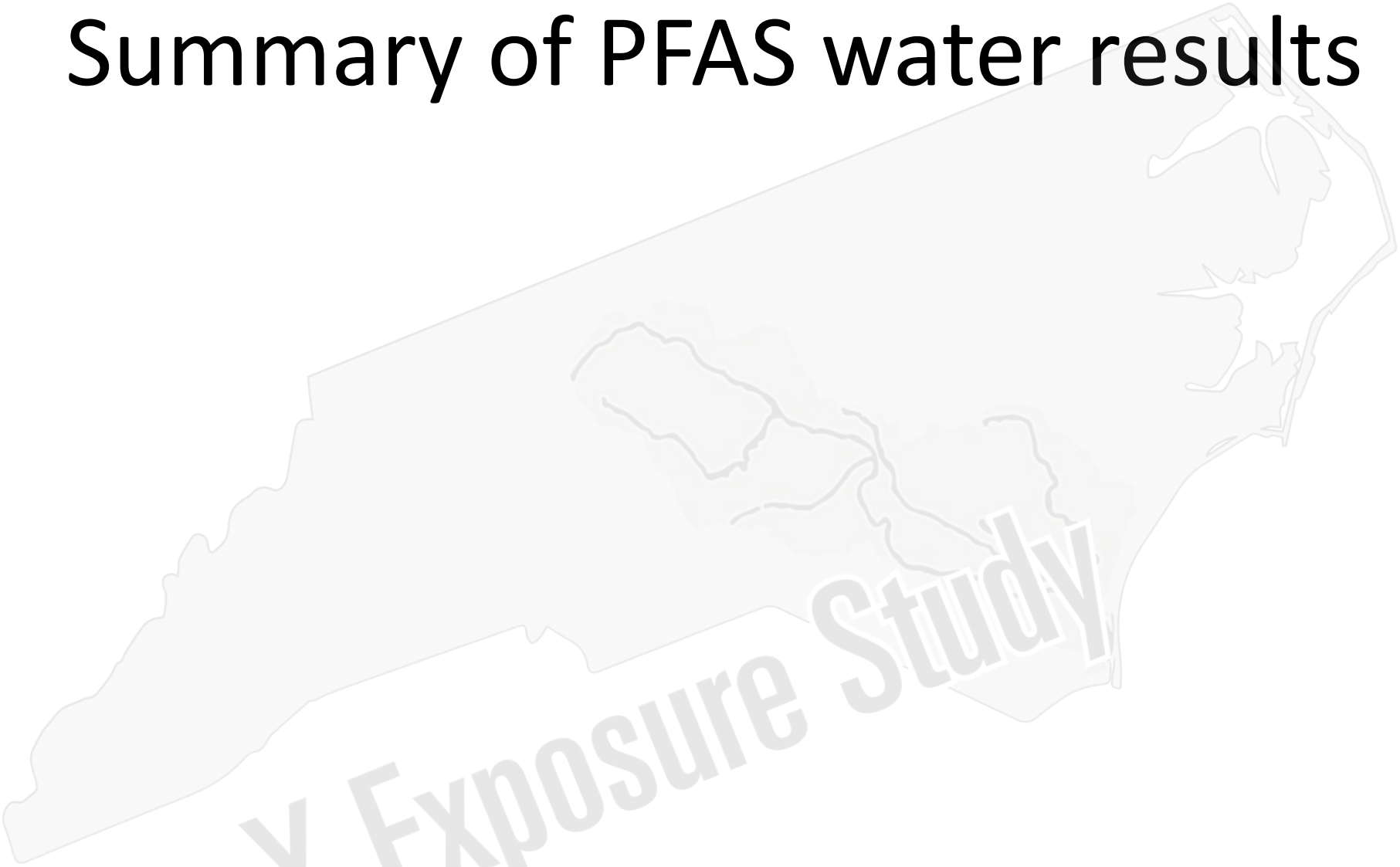
«HHID»

Reviewed by NC State Institutional Review Board



Mail letters

Summary of PFAS water results



GenX Exposure Study

Summary of PFAS water results

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5. Overall, treated taps had lower levels of GenX than untreated taps

Looked for 31 PFAS in water

Unique to Fayetteville Works

1. GenX
2. PFMOAA
3. PEPA
4. PMPA
5. PFO2HxA
6. PFO3OA
7. NVHOS
8. PFO4DA
9. Hydro-EVE
10. PFO5DoA
11. Nafion byproduct 1
12. Nafion byproduct 2
13. Nafion byproduct 4

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"Legacy" PFAS

1. PFOA
2. PFOS
3. PFBA
4. PFBS
5. PFPeA
6. PFPeS
7. PFHxA
8. PFHxS
9. PFHpA
10. PFHpS
11. PFNA
12. PFDA
13. 4:2 FTS
14. 6:2 FTS
15. 8:2 FTS
16. FBSA
17. FOSA
18. FHxSA

Focus on results for 13 PFAS

Unique to Fayetteville Works

1. GenX
2. PFMOAA
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7. NVHOS

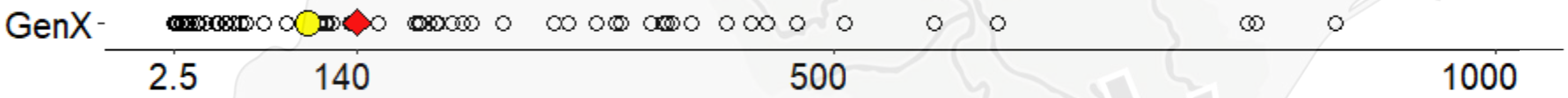
12. Nafion byproduct 2
13. Nafion byproduct 4

"Legacy" PFAS

1. PFOA
2. PFOS
3. PFBA
5. PFPeA

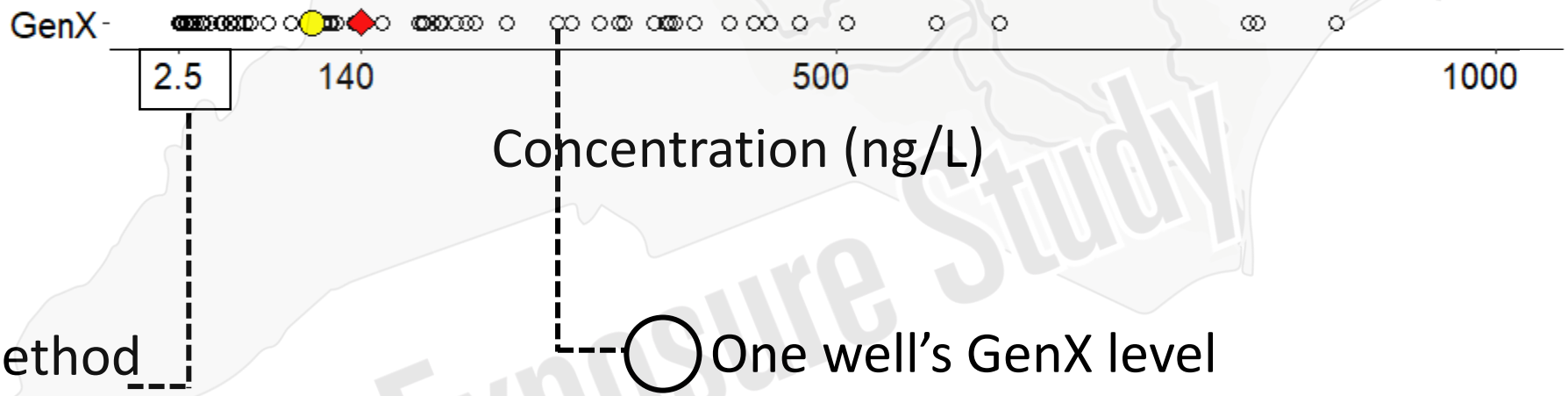
What did we find in wells?

GenX detected in 70 wells



Concentration (ng/L)

GenX detected in 70 wells



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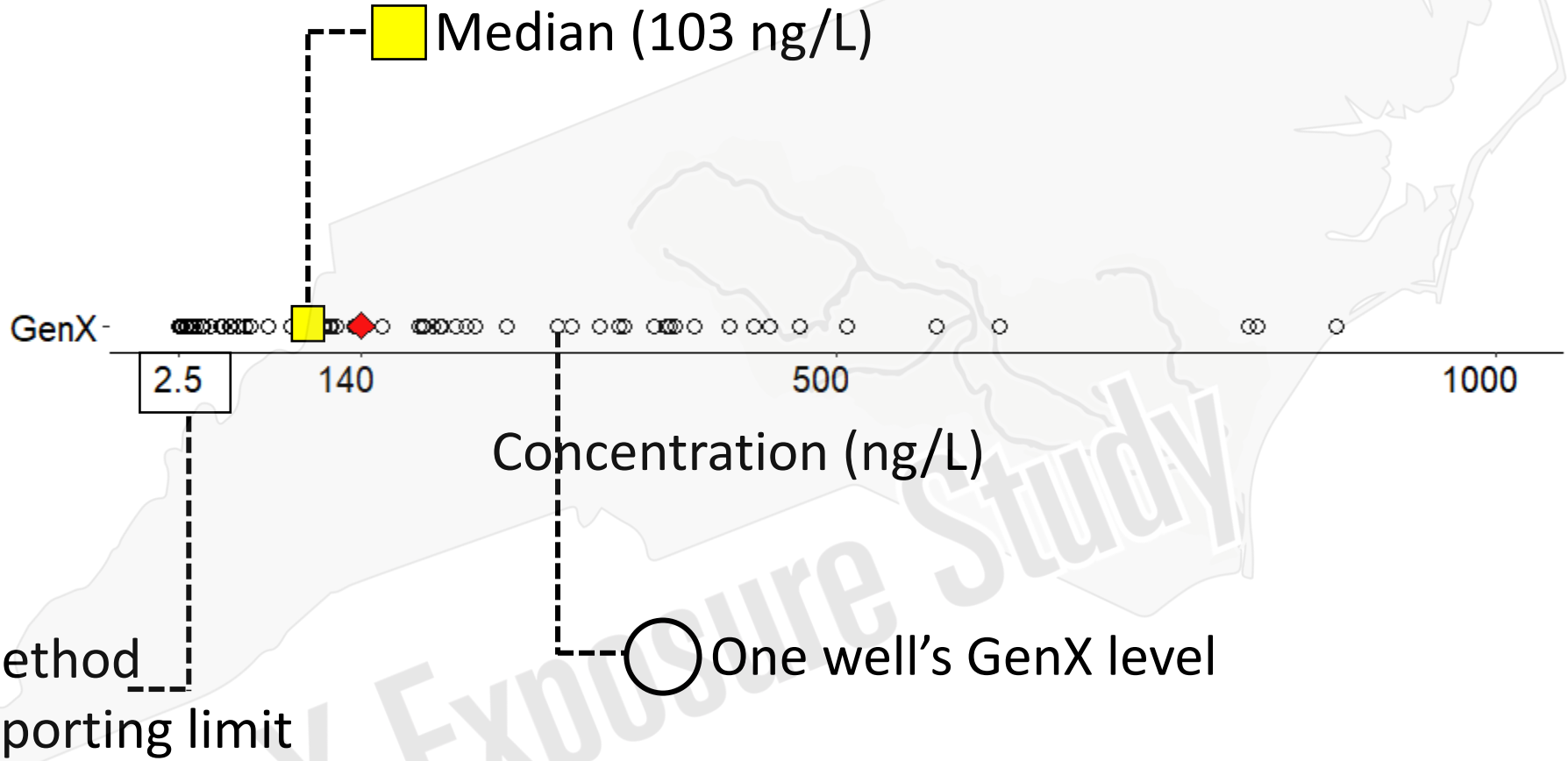

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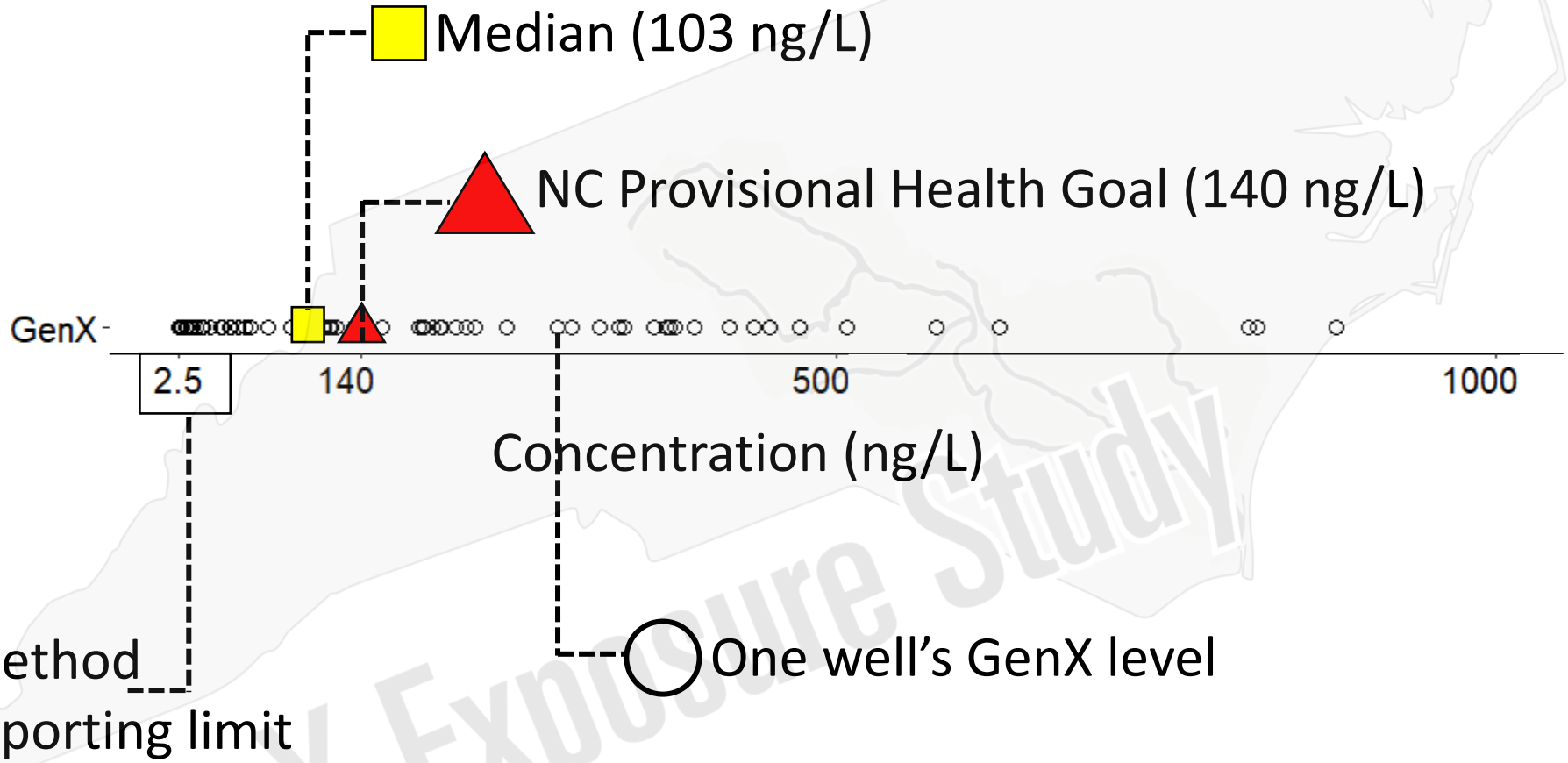


GenX Exposure Study

Drinking water health goal or advisory

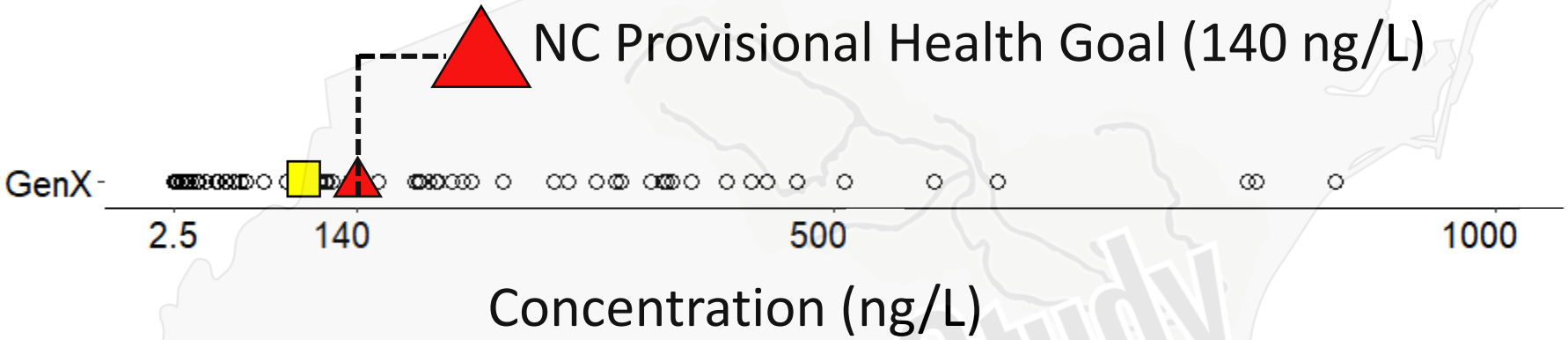
A concentration in drinking water (ng/L)

- NC Dept Health and Human Services 140 ng/L GenX
- US Environmental Protection Agency 70 ng/L PFOA
- US Environmental Protection Agency 70 ng/L PFOS

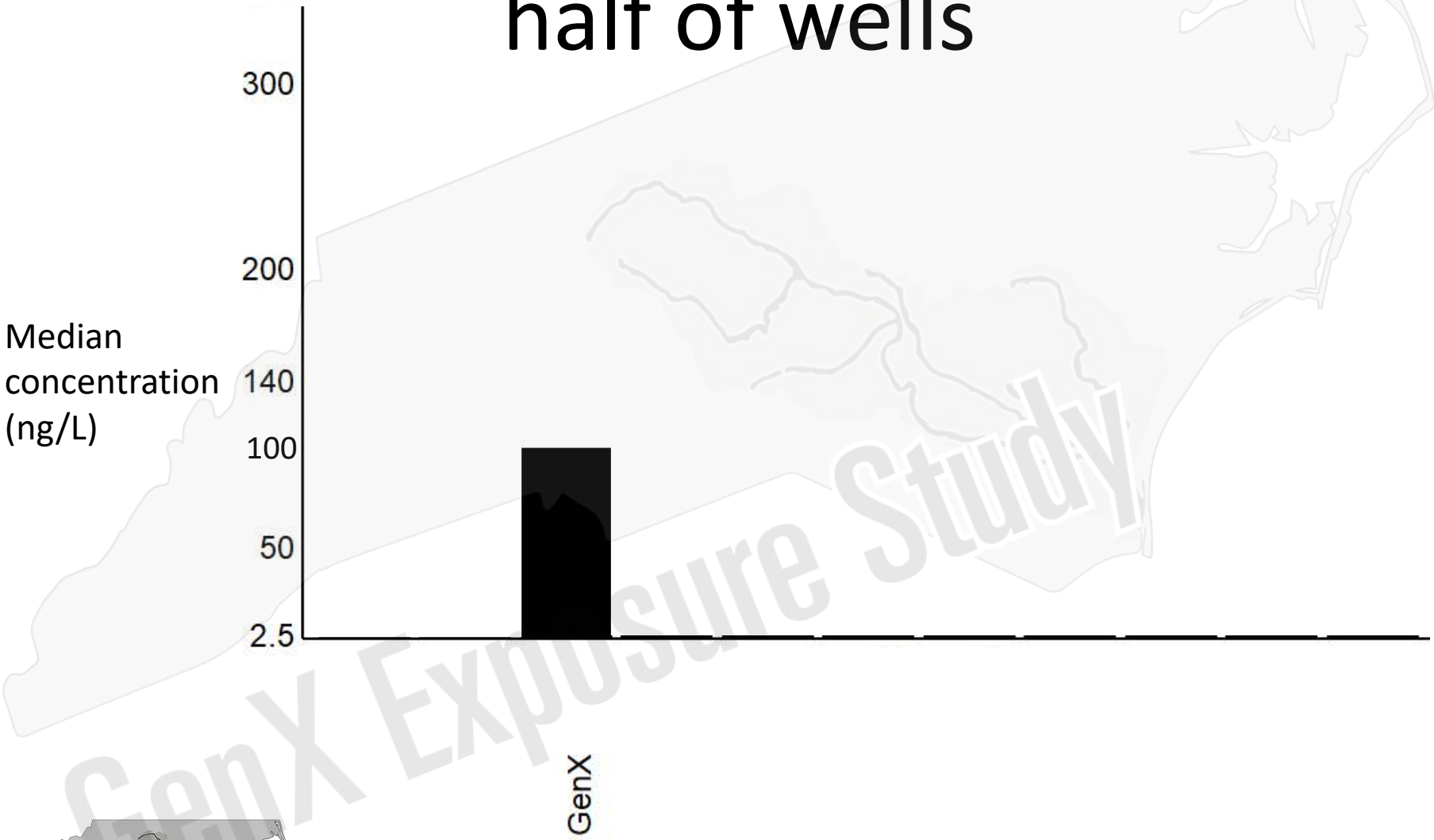
Chosen based on current scientific research

At this level or lower, no human health effects are expected in the most sensitive people over a lifetime of exposure

33 wells had GenX higher than 140 ng/L



10 other PFAS detected in more than half of wells



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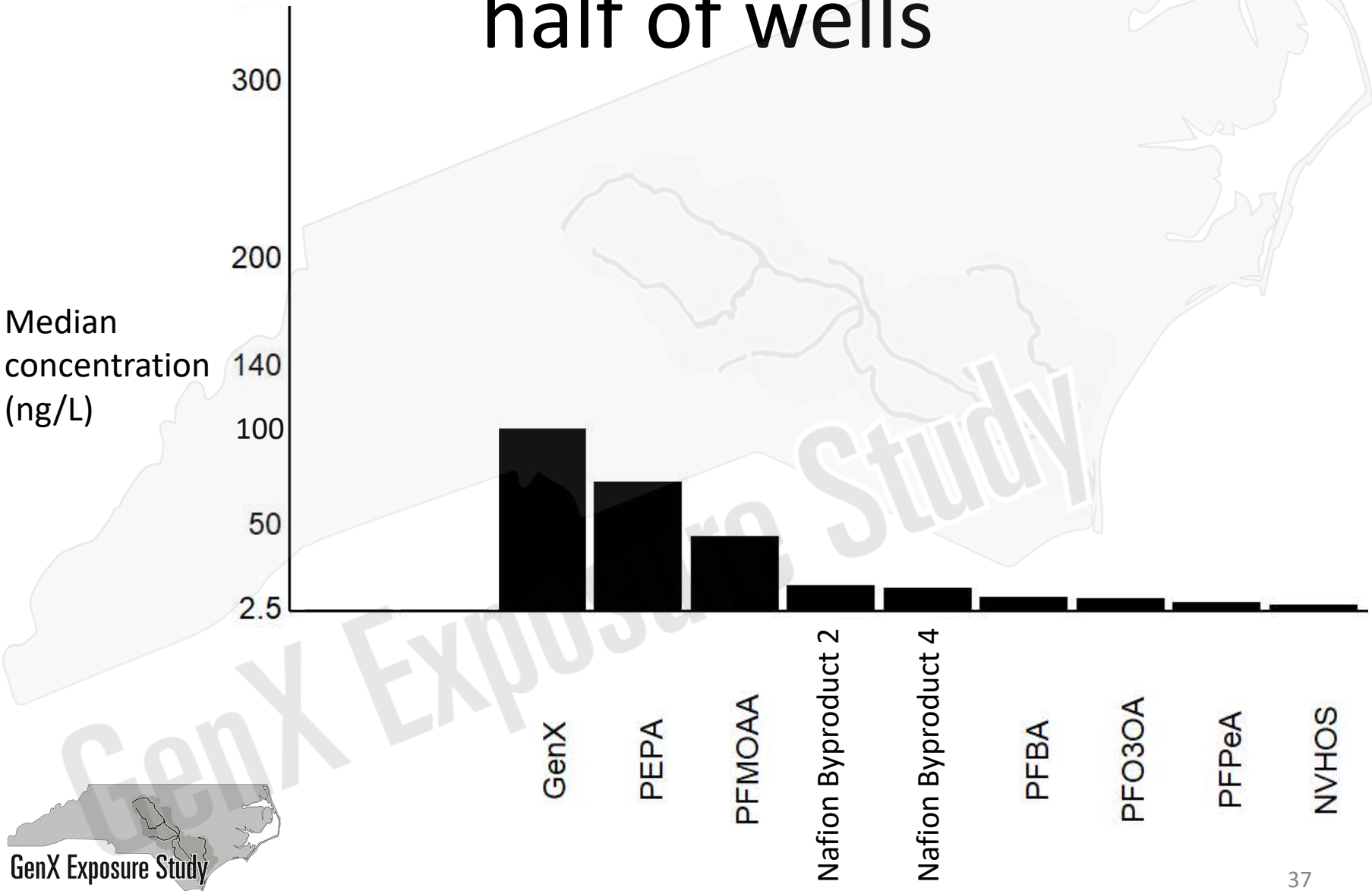

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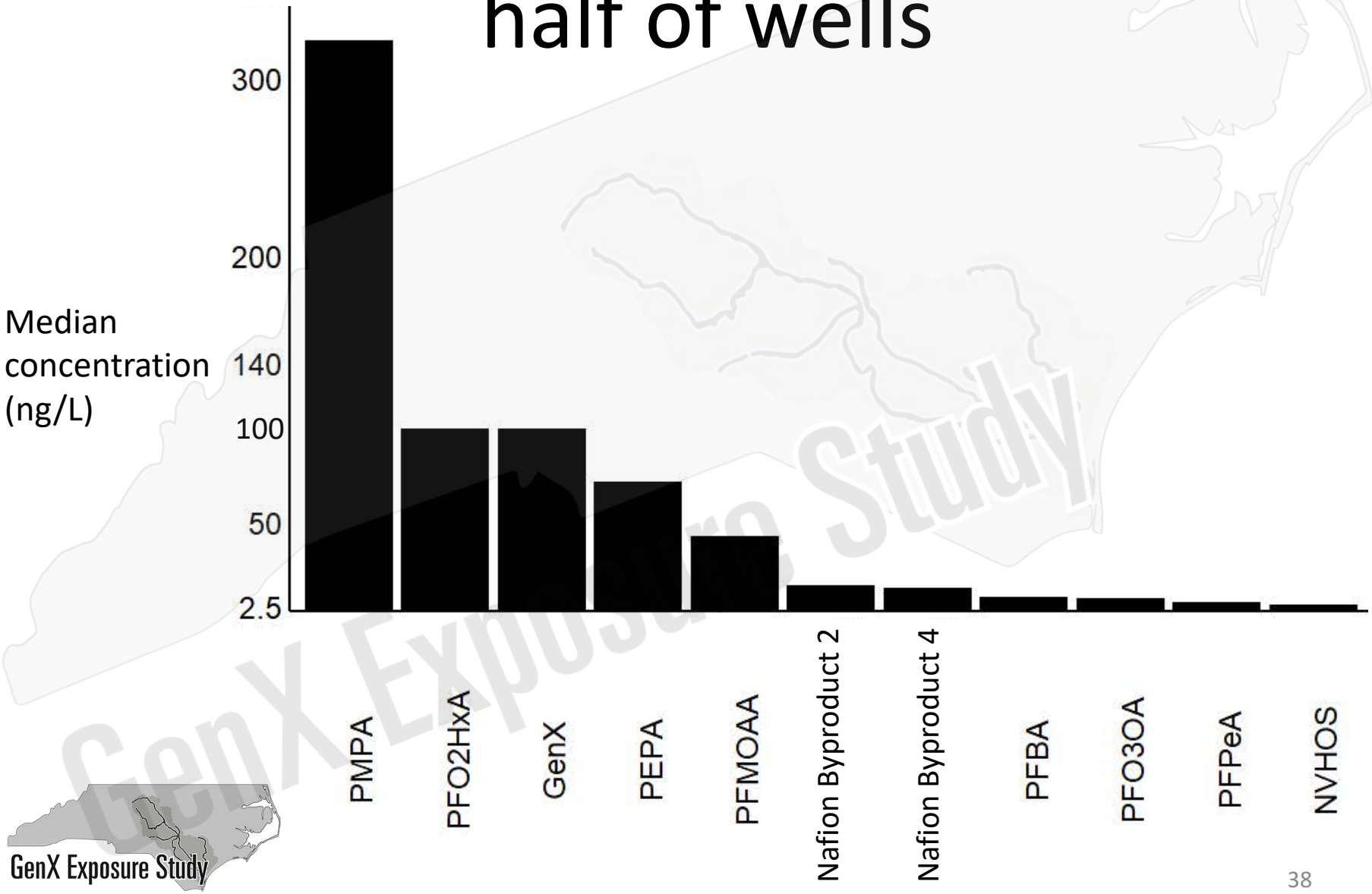

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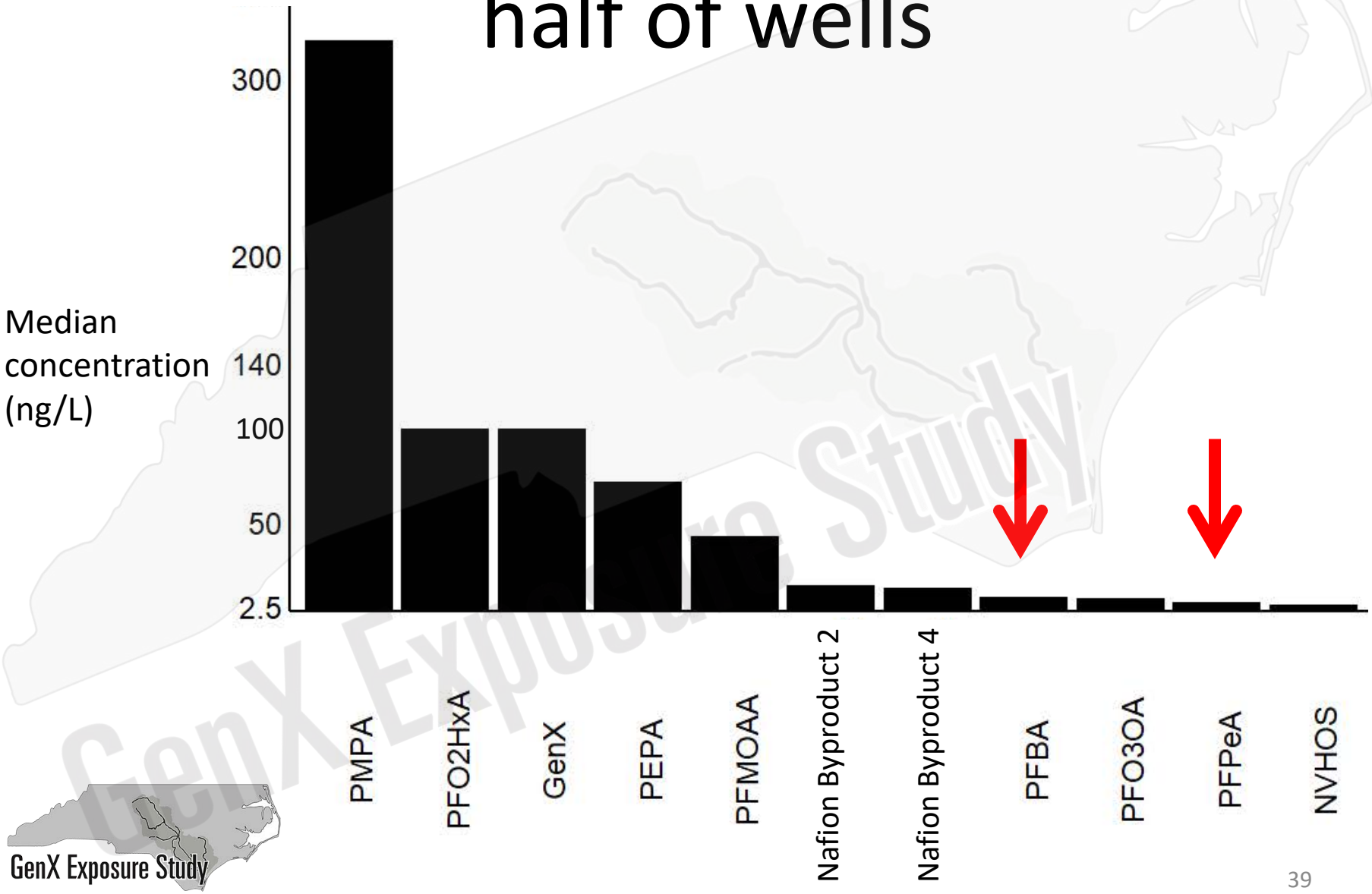
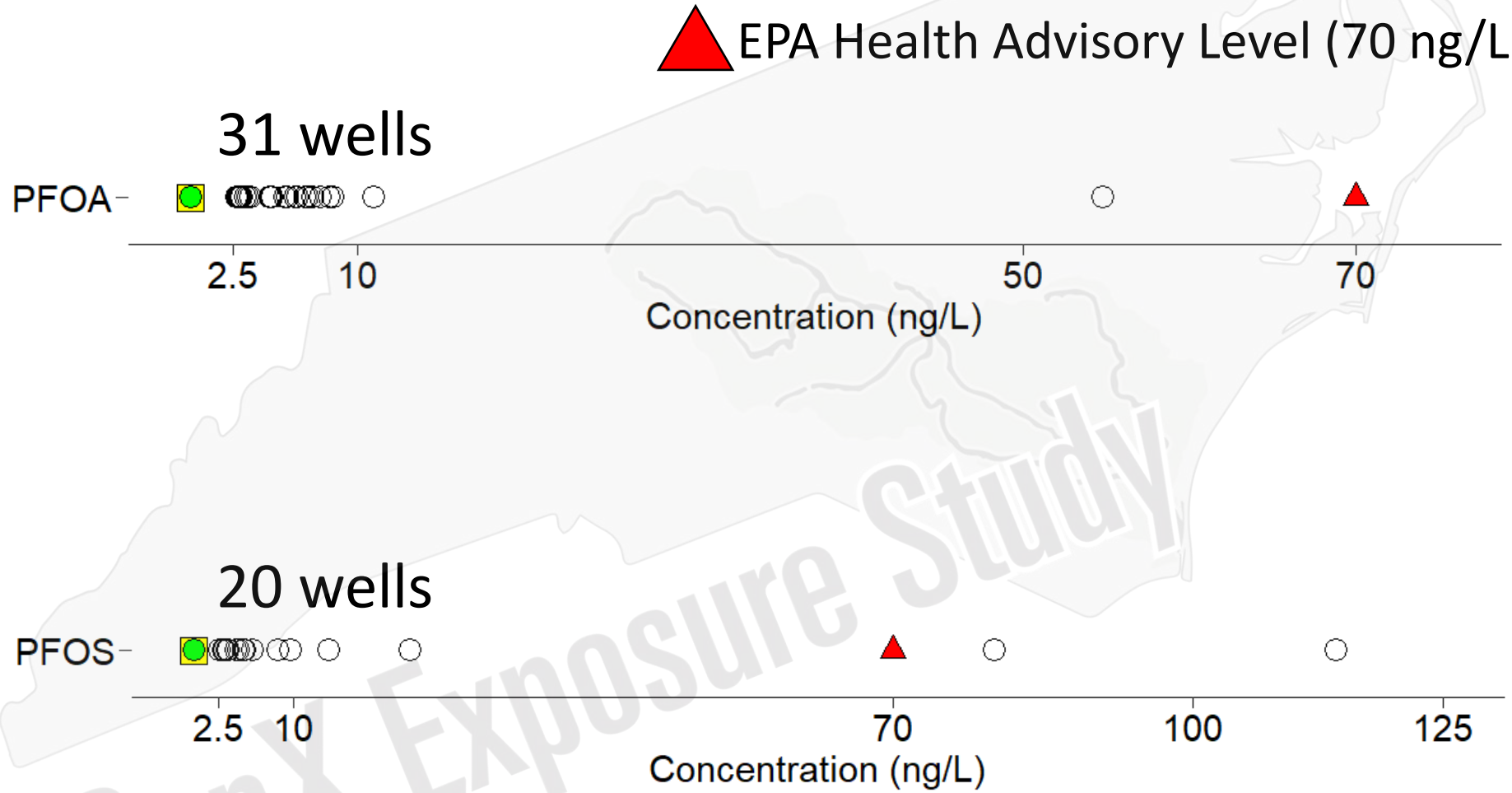
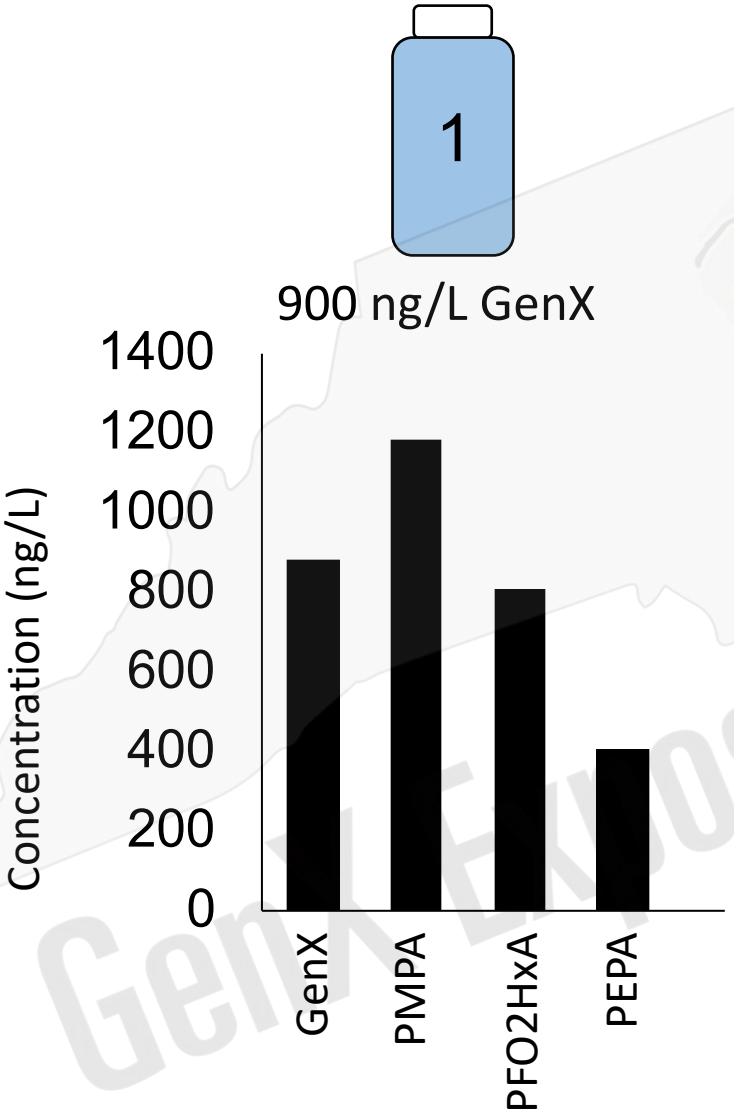


GenX Exposure Study

Detected PFOA and PFOS in some wells



Samples with higher GenX tended to have higher levels of other PFAS



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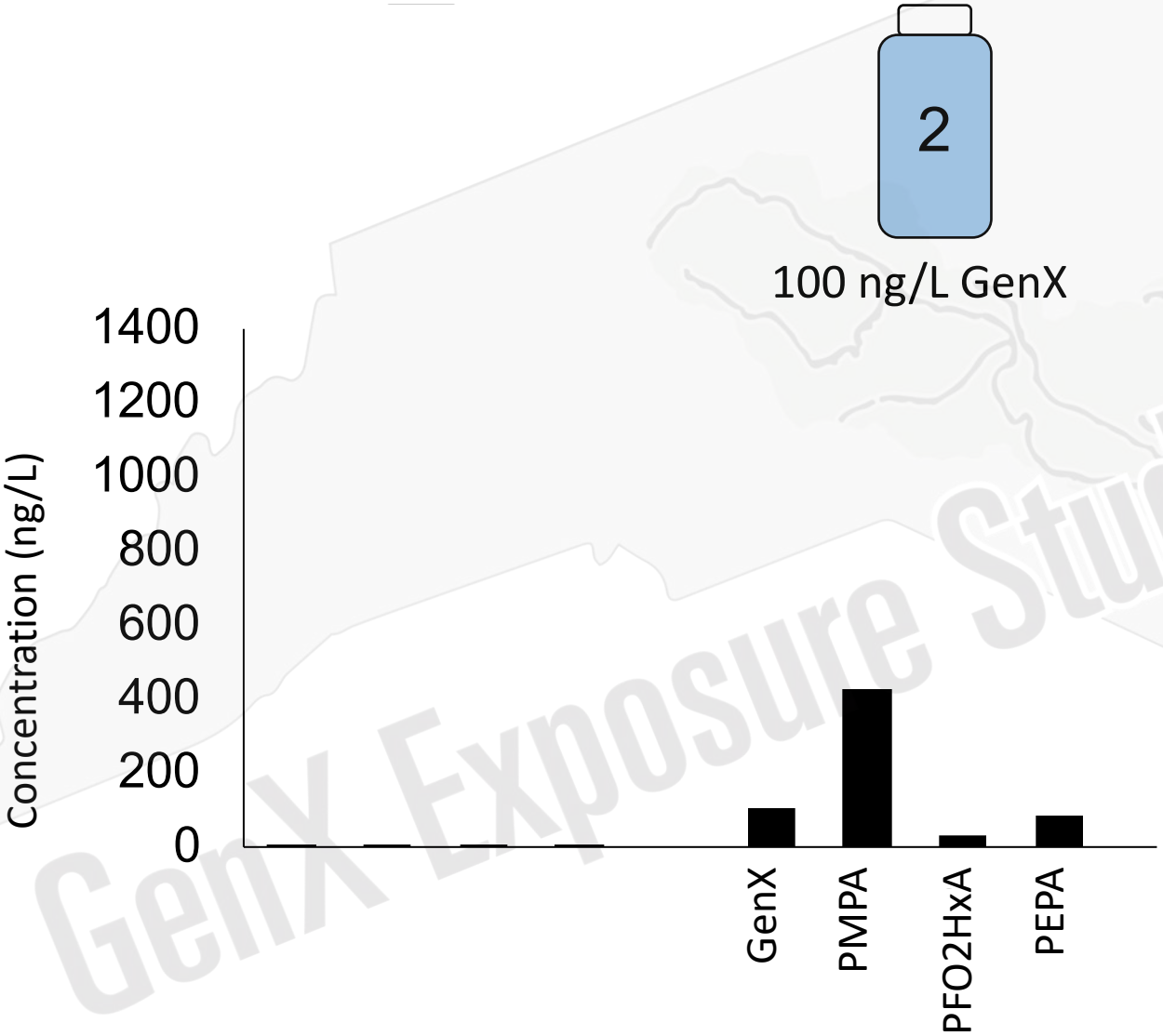

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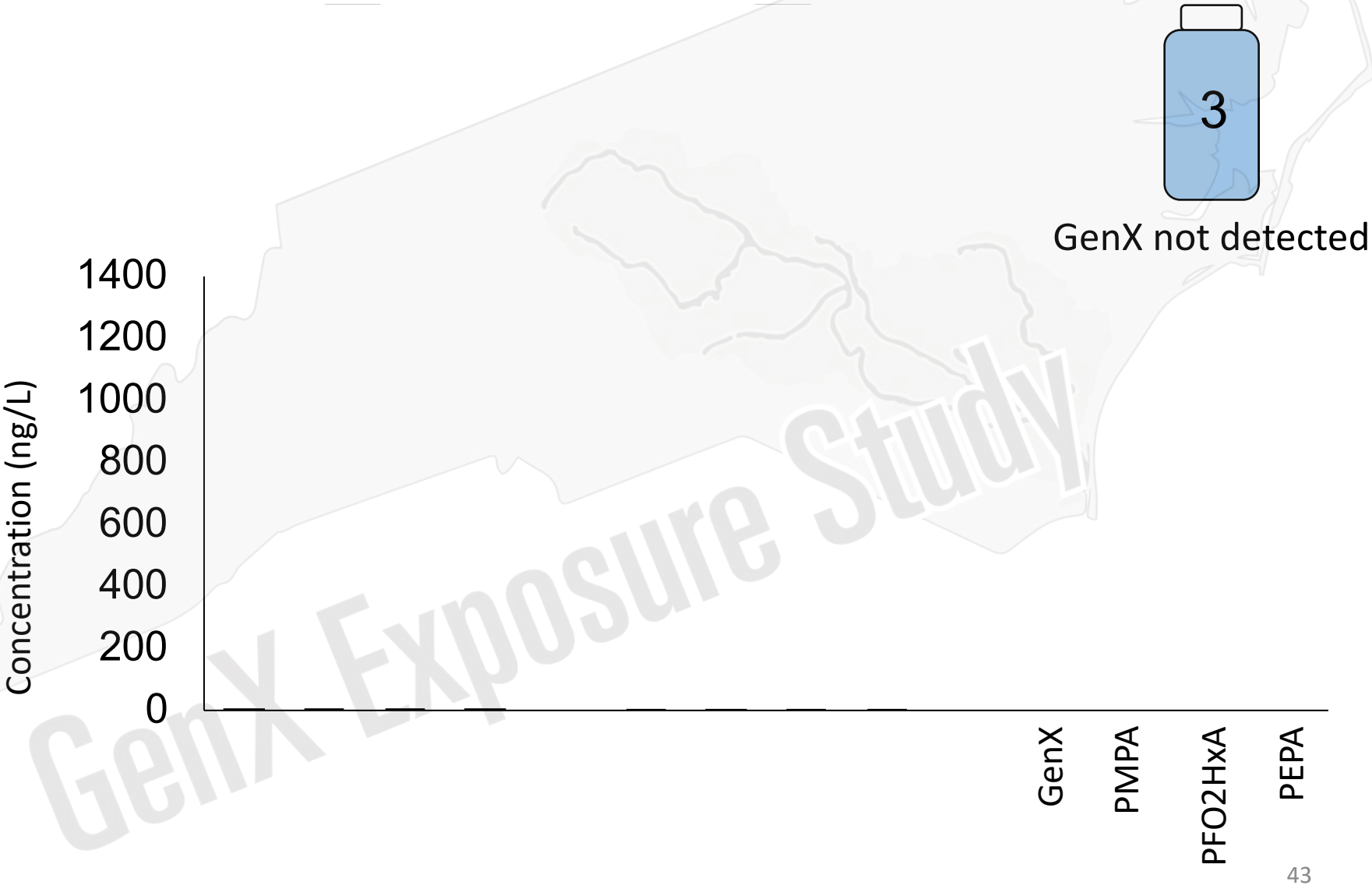

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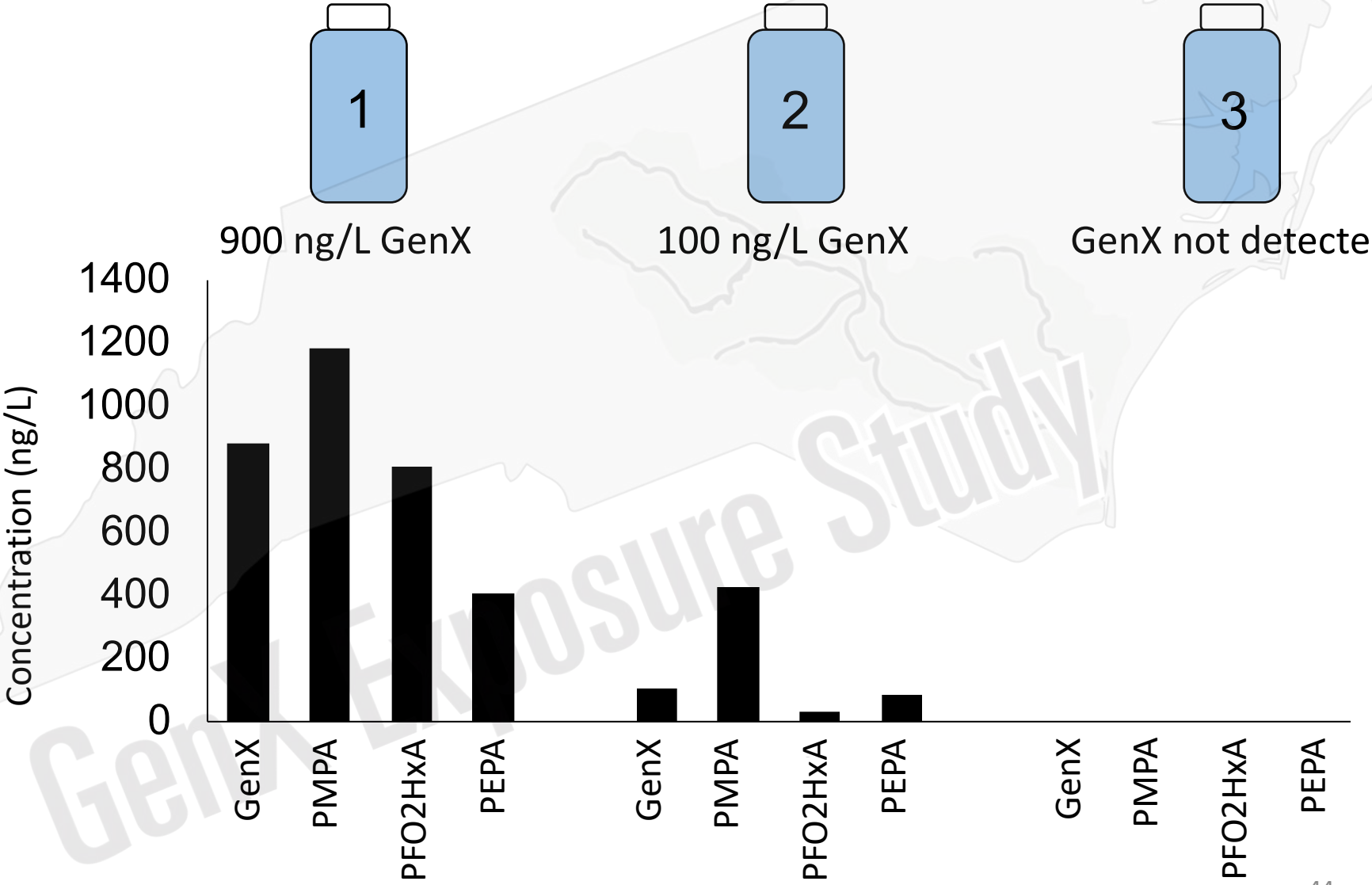

Summary of PFAS water results

1. Wide range of GenX concentrations in wells
2. Found 10 PFAS besides GenX in more than half of wells
3. Legacy PFAS: PFBA and PFPeA detected frequently; PFOA and PFOS detected in some wells
4. Wells with higher GenX tended to have higher levels of other PFAS

Important to know

>3000 private wells impacted by Fayetteville Works emissions identified to date

The 84 wells we sampled were not a random sampling of wells surrounding Fayetteville Works

Our data tell us about our study participants

May not be representative of all contaminated wells surrounding Fayetteville Works

GenX Exposure Study

What did we find in taps?

Kitchen tap water sampling

Sampled *as is*

In February 2019, most treatments were homeowner implemented (not Chemours)

45 out of 82 homes had water treatment in February 2019

	Out of 82 homes
No treatment	32 (39%)
At least one type of treatment	45 (55%)
Public water	4 (5%)
Other water at the tap	1 (1%)

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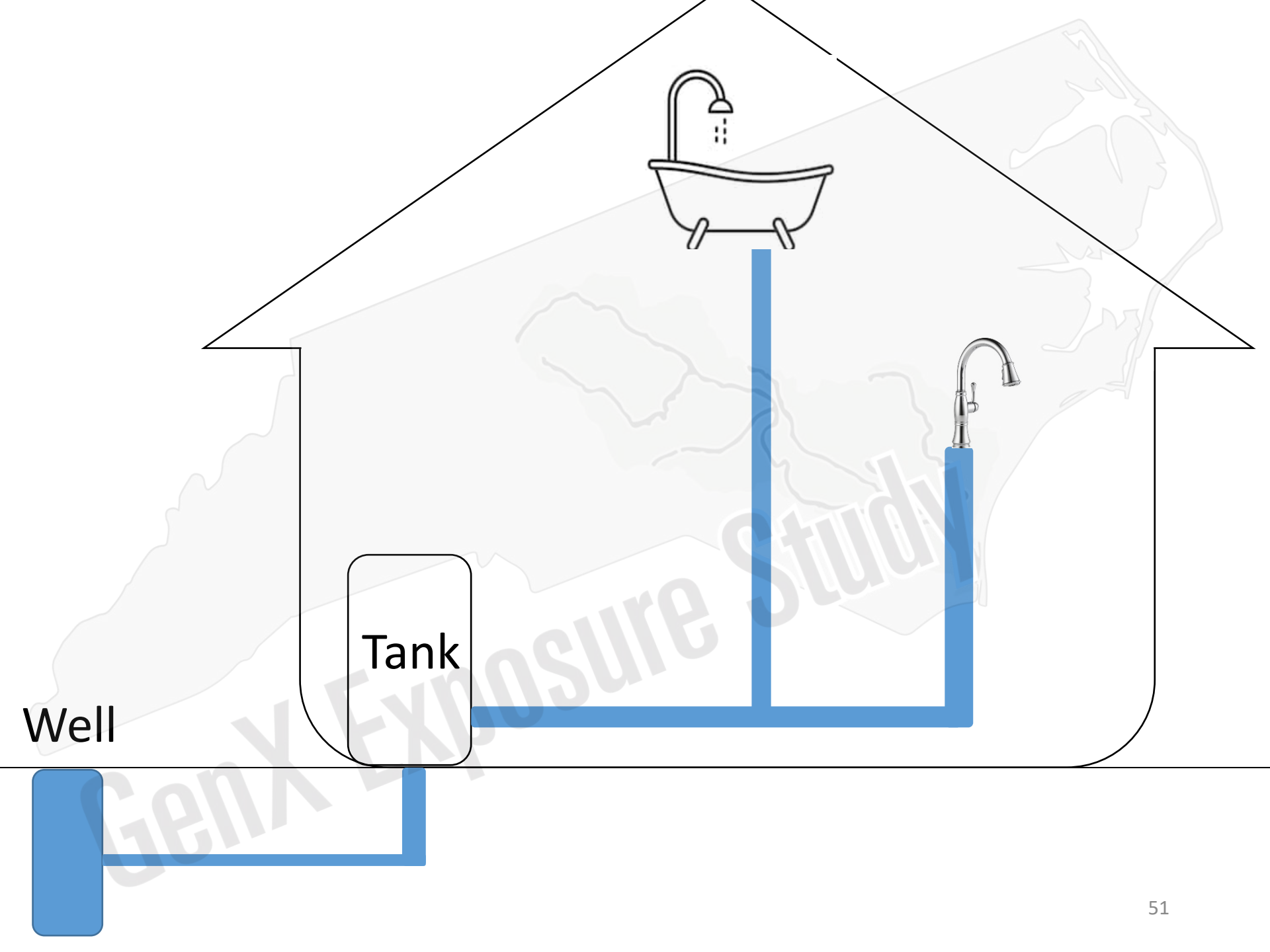
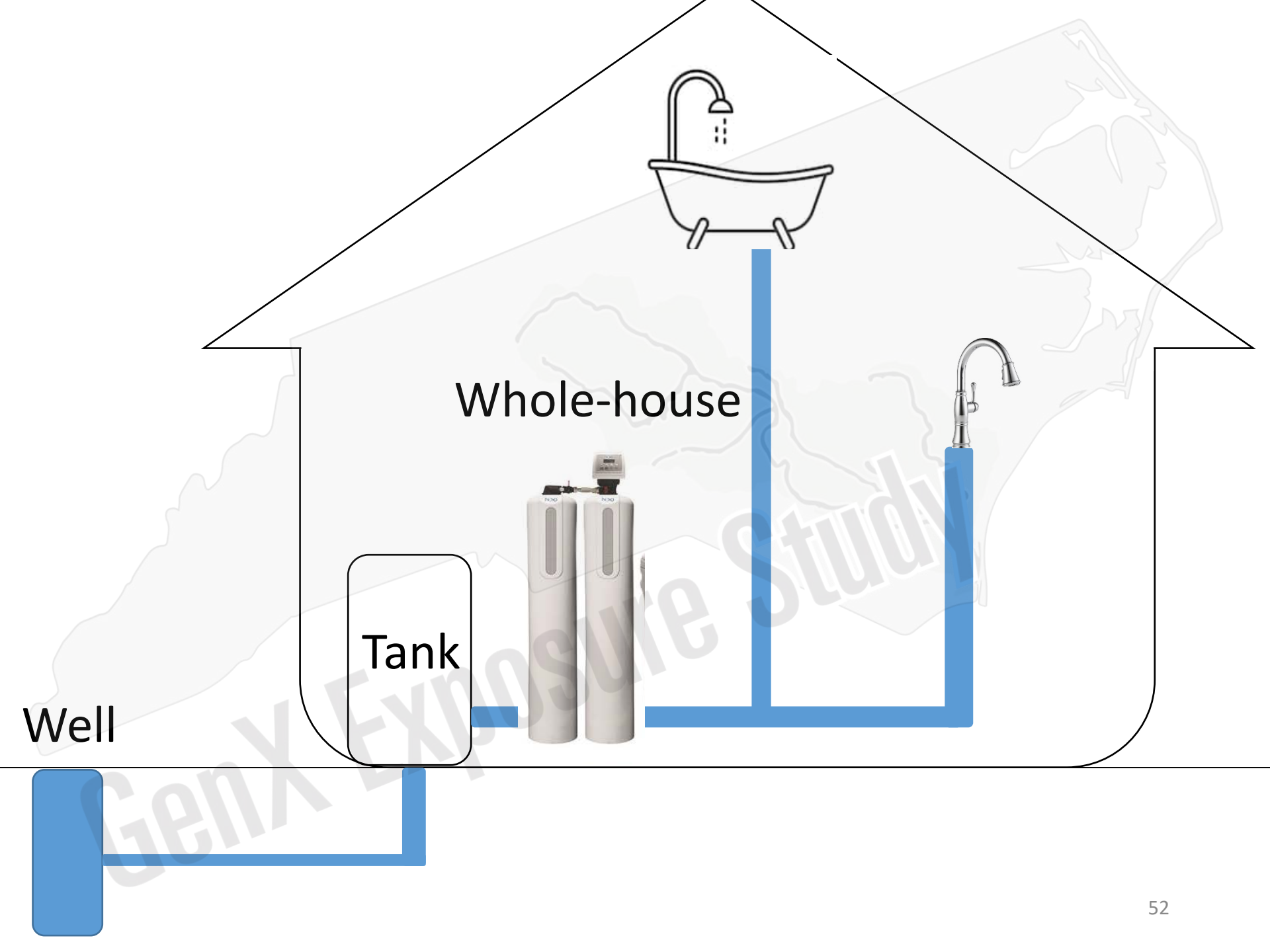
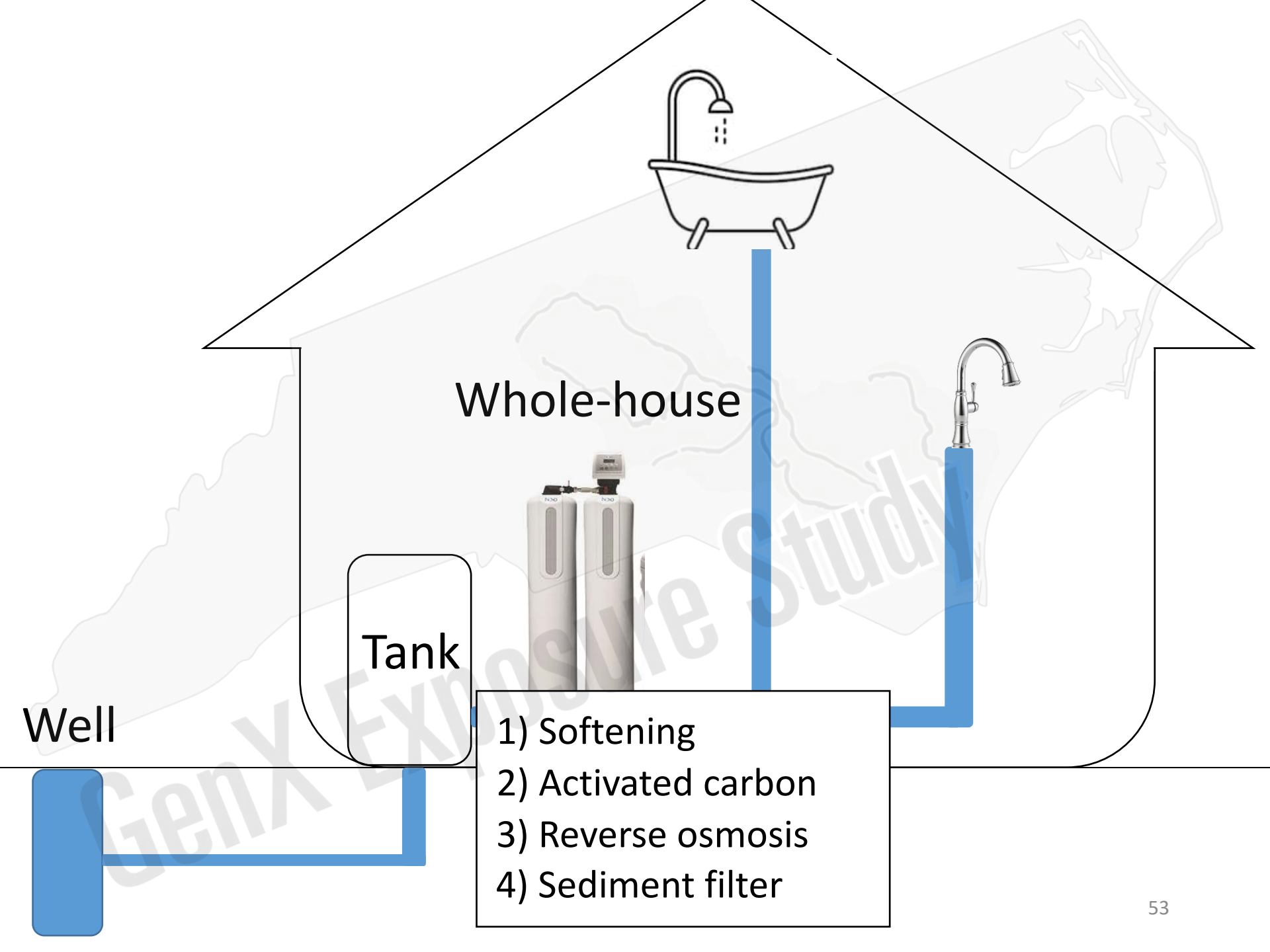
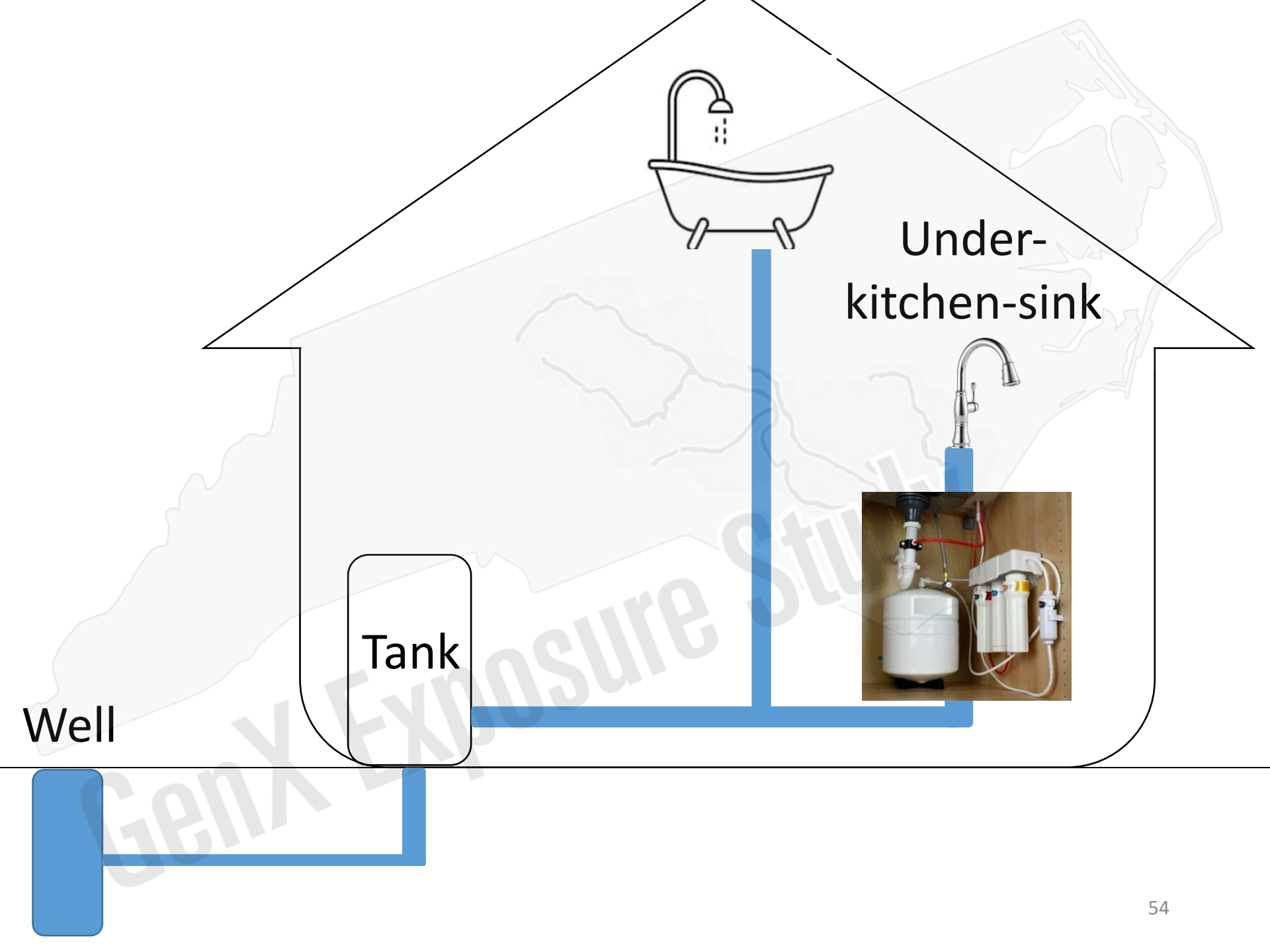
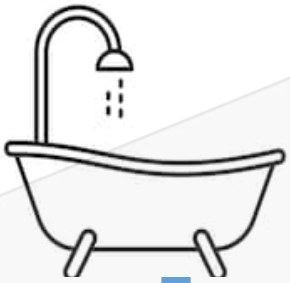










Under-kitchen-sink

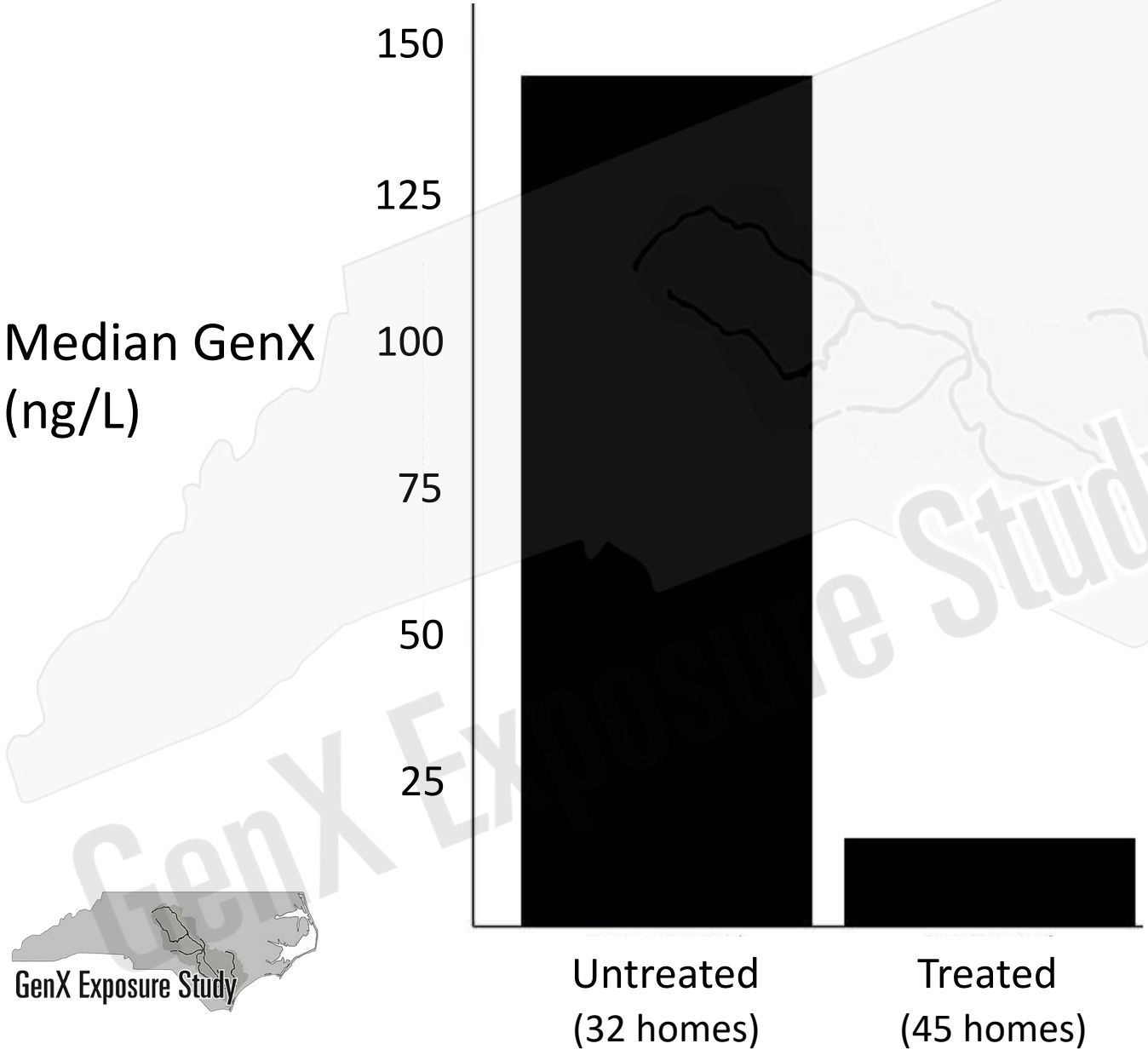
Tank

Well

1) Activated carbon

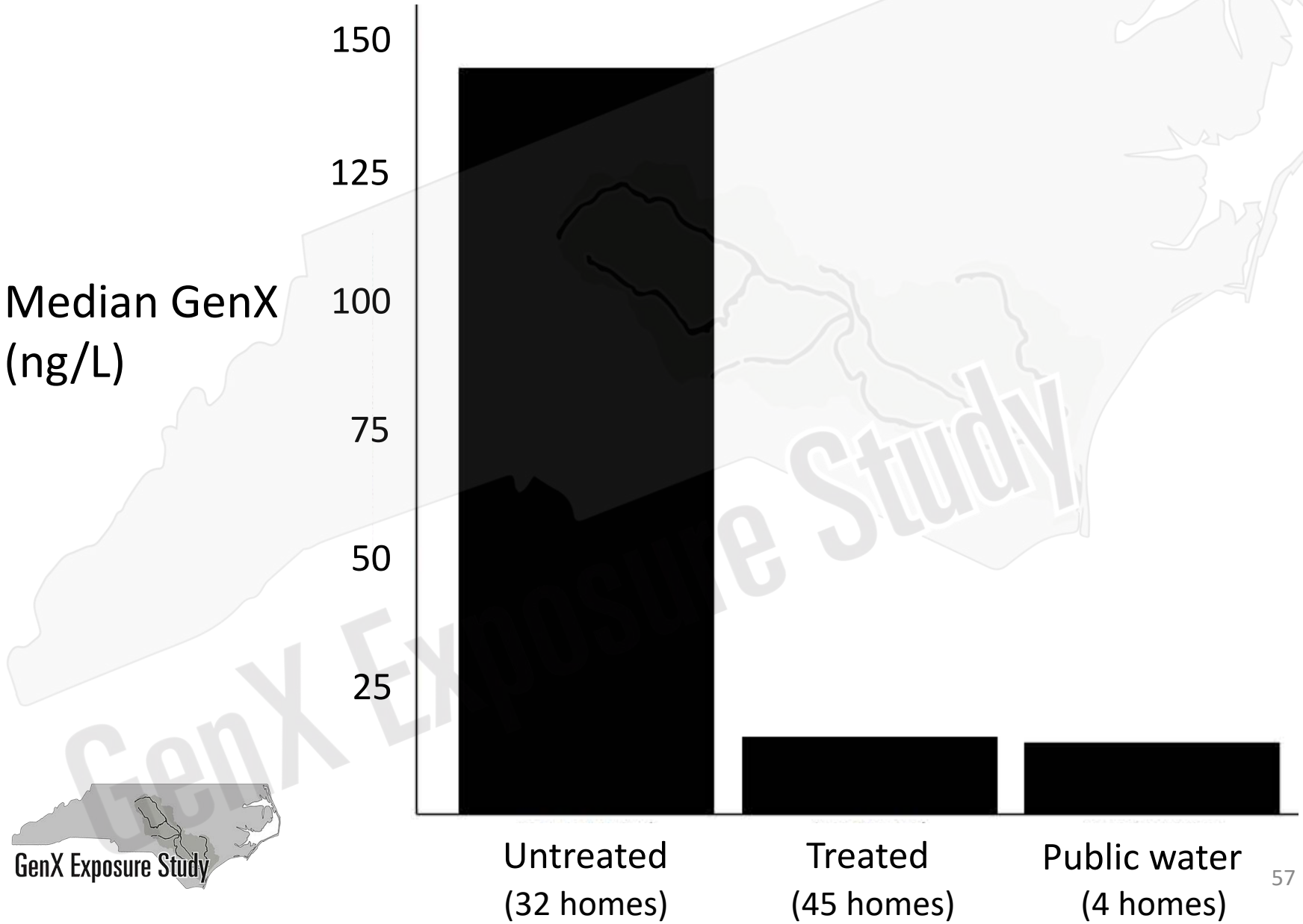
2) Reverse osmosis

Overall, treated taps had lower GenX



GenX Exposure Study

Overall, treated taps had lower GenX



GenX Exposure Study

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Chemours Consent Order

Requires Chemours to

1) Reduce air emissions, remove PFAS from wastewater before discharge, remove PFAS from contaminated groundwater

2) Provide filtration systems or public water for people with contaminated wells

Our study results do not qualify homeowners for Chemours provided treatment

Contact DEQ for additional well testing 919-707-8200

What's next?

Analyze blood samples

- Waiting for labs to reopen to continue

Continue analysis of well and tap water

- Combine results with those from Wilmington

Analyze urine and other samples

GenX Exposure Study will grow

Transition from an Exposure Study to a Health Study

Grow from 500 participants to 1000 participants

- 400 near Fayetteville
- 600 in New Hanover and Brunswick Counties

Increase Minority Recruitment

Five year study

- 2 blood collection events
- Measure PFAS
- Measure thyroid hormones

GenX Exposure Study

Superfund.ncsu.edu

Acknowledgements

NC State

Jane Hoppin, PI
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Suzanne Lea

US EPA

Andrew Lindstrom
James McCord
Mark Strynar

New Hanover County Health Department

Phillip Tarte
Katelyn Matney

Cumberland County Health Department

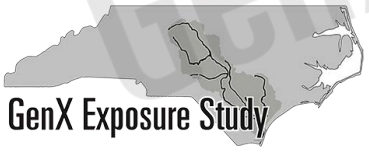
Rod Jenkins
Adrian Jones
Jennifer Green

Cape Fear River Watch

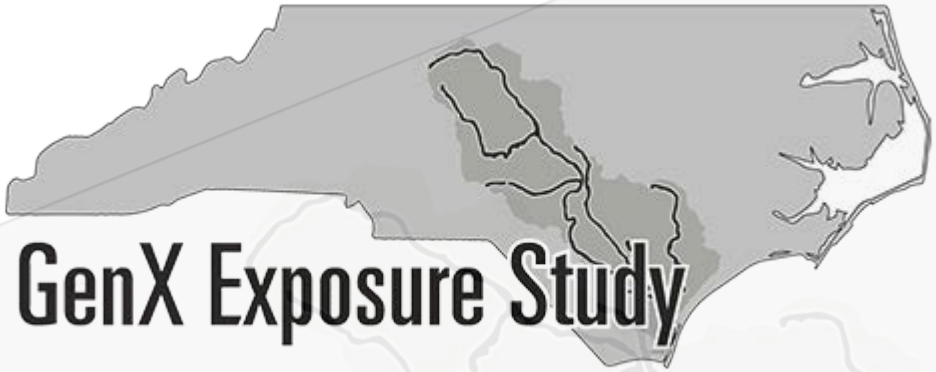
Kemp Burdette
Madi Polera
Amanda Boomershine
Larry Cahoon
Deborah Maxwell

Sustainable Sandhills

Jon Parsons
Jonelle Kimborough



Thank you to study participants



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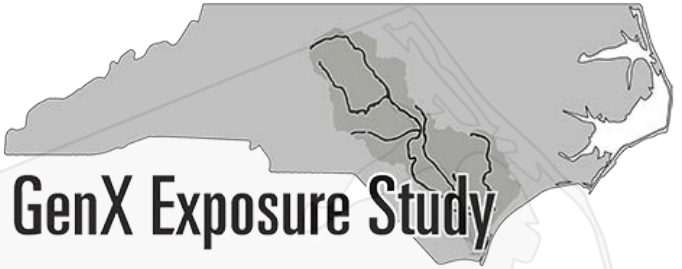

Virtual Fayetteville Community Meeting June 20,2020

Thank you for joining us!

Keep up with the GenX Exposure Study at *GenXStudy.ncsu.edu*.

Follow the Center for Human Health and the Environment on Facebook *@NCStateCHHE*.

You can send any follow up questions or comments to *genx-exposure-study@ncsu.edu*.

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