



# PFAS Sampling at DEQ

## Statewide PFAS Monitoring Dashboard

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# Agenda

- Overview of PFAS
- DEQ sampling programs
- Statewide PFAS Monitoring Dashboard

# PFAS: An Overview

- Per- and Polyfluoroalkyl Substances (PFAS) are a group of over 4,000 distinct chemical compounds <sup>1</sup>. Roughly 300 commercially relevant PFAS<sup>2</sup>.
- First discovered in the late 1930s.
- Used commercially beginning in 1940:
  - Repels oil, grease, water
  - Industrial products (AFFF)
  - Household products (stain resistance, non-stick applications)
  - Does not readily break down

1. U.S. Environmental Protection Agency. Comptox Chemicals Dashboard: Master List of PFAS Substances (Version2). Accessed August 14, 2023. [https://comptox.epa.gov/dashboard/chemical\\_lists/pfasmaster](https://comptox.epa.gov/dashboard/chemical_lists/pfasmaster)

2. Buck, Robert C., Stephen H. Korzeniowski, Evan Laganis, and Frank Adamsky. 2021. "Identification and classification of commercially relevant per- and poly-fluoroalkyl substances (PFAS)." Integrated Environmental Assessment and Management 17 (5):1045-1055.

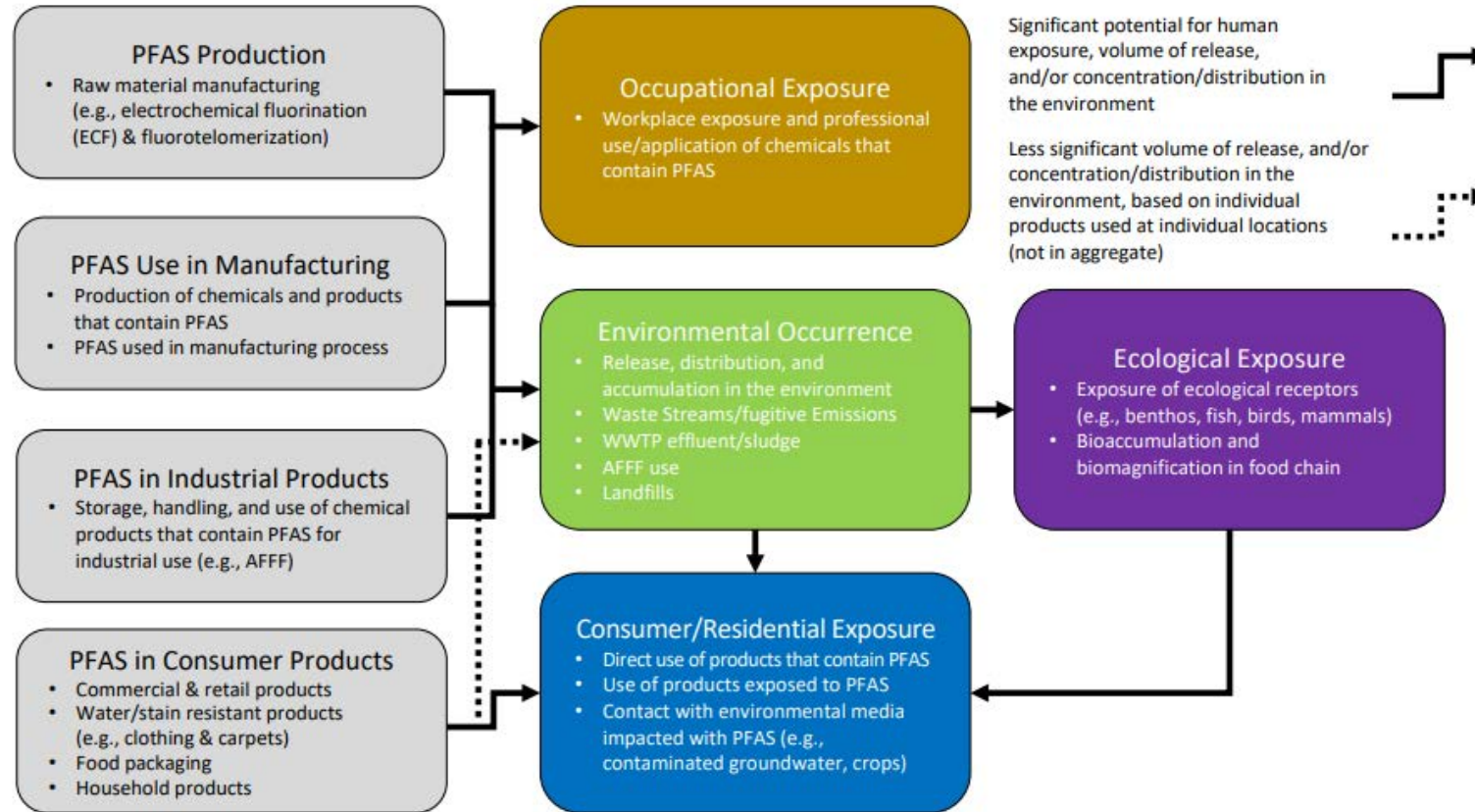
# PFAS: An Overview

- Reliable methods for detecting PFAS in the environment were developed in the early 2000s.
- Long chain PFAS phased out in the US, not elsewhere.
- Short chain replacements developed (GenX).
- Evidence connecting PFAS exposure with negative health effects.

# PFAS: An Overview

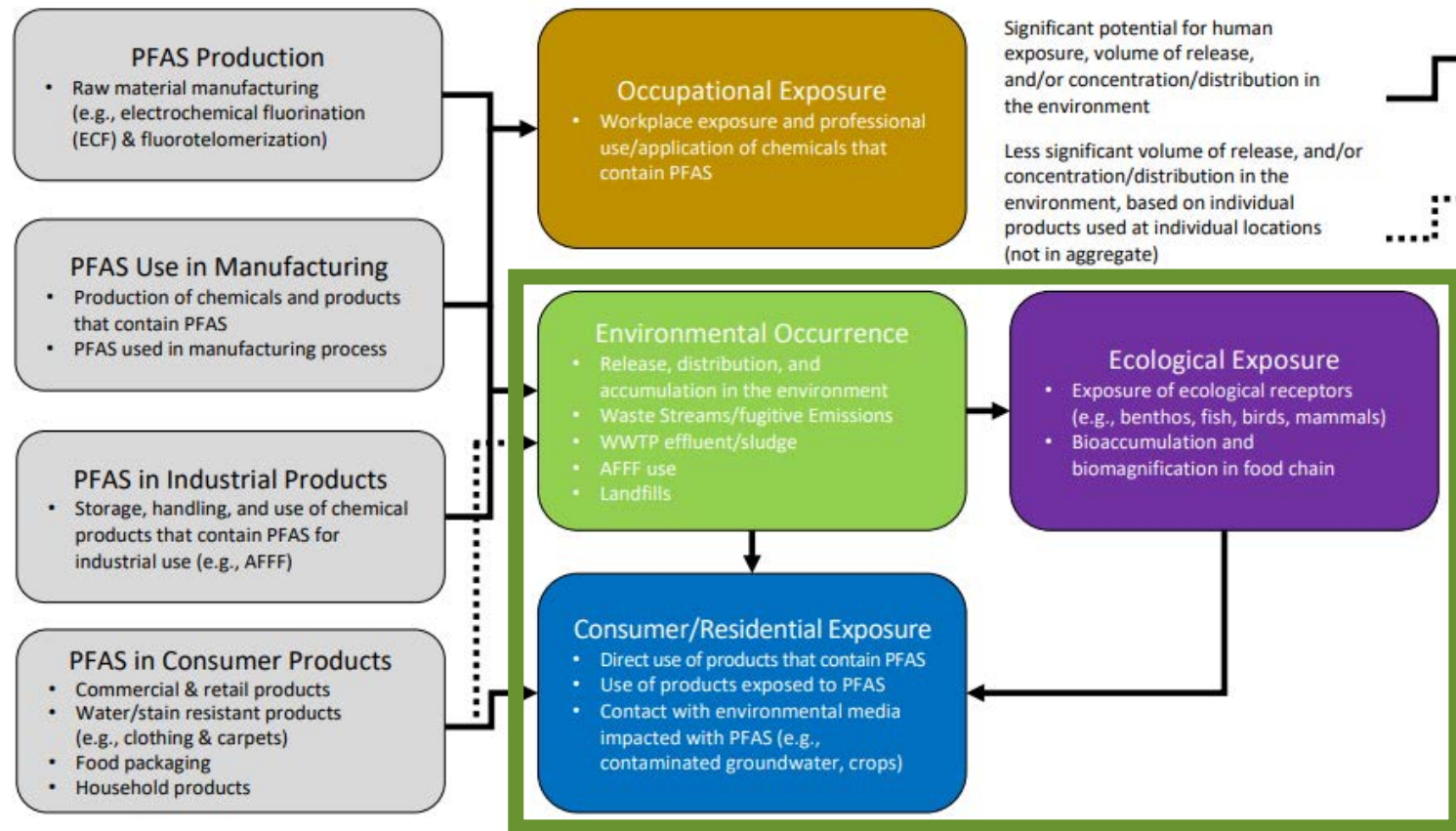
- Exposure to certain levels of PFAS may lead to:
  - Increased risk of some cancers (prostate, kidney, testicular)
  - Impacts on the immune system
  - Interference with hormones
  - Developmental delays
  - Reproductive effects
- Aquatic life impacts at higher exposure levels.

# PFAS Exposure Pathways



**Figure 2. Generalized PFAS uses and relative exposure and environmental impact potential from PFAS life cycle.**

# PFAS Exposure Pathways



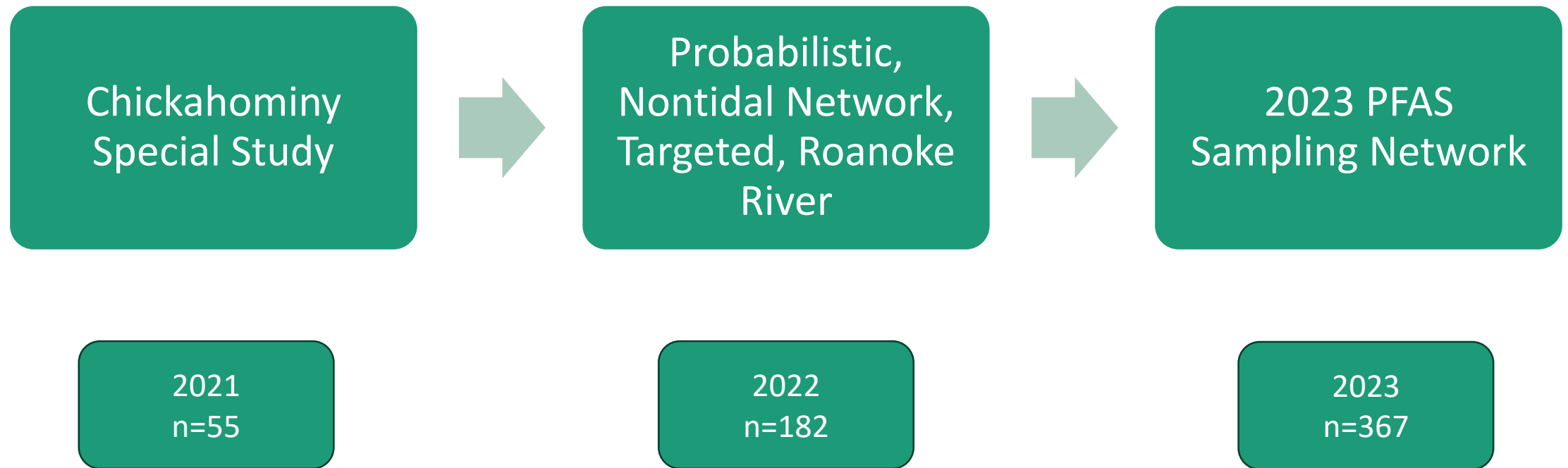
**Figure 2. Generalized PFAS uses and relative exposure and environmental impact potential from PFAS life cycle.**

# Motivations for PFAS Sampling at DEQ

- Response to PFAS detection.
- To better understand the distribution and occurrence of PFAS in the environment.
- To inform Virginia's understanding of PFAS risk to human health.



# Timeline of PFAS Sampling at DEQ



# Chickahominy Special Study (2021)

- Special Study – A sampling effort outside of DEQ’s routine monitoring programs.
- Newport News Water Works notified DEQ of elevated PFAS concentrations in the Middle Chickahominy Watershed (October 2021).
- DEQ, Virginia Department of Health, and Henrico County formed a unified command to coordinate sampling efforts.
- DEQ contracted with the United States Geological Survey to collect surface water, fish tissue, and sediment samples.

# Probabilistic, Nontidal Network, Roanoke River Special Study, and Targeted Sampling (2022)

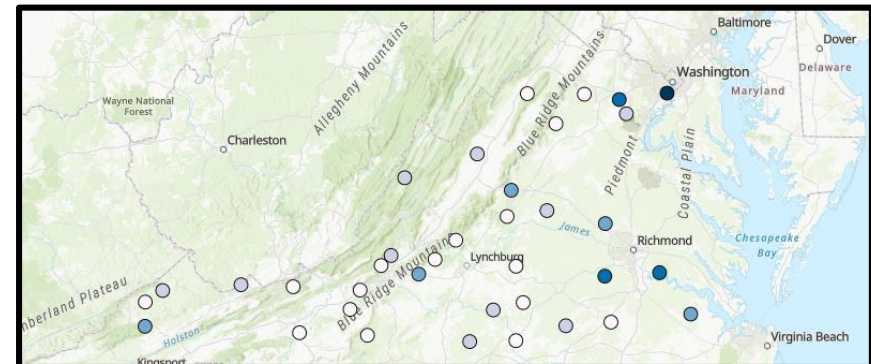
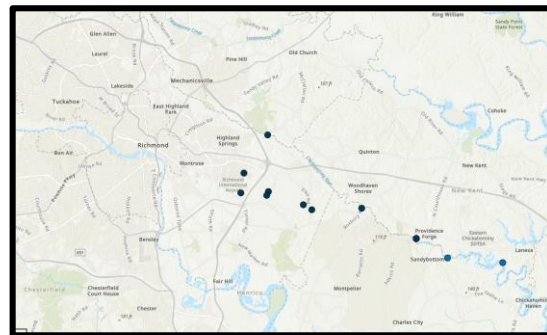
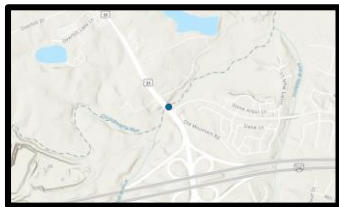
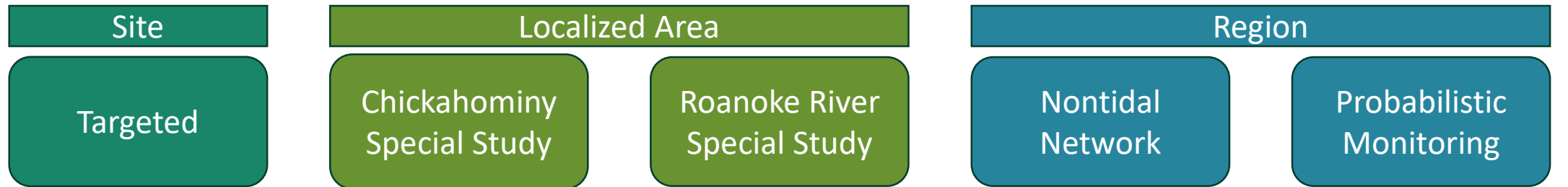
- Probabilistic Monitoring (Probmon) – Sampling that occurs at randomly generated locations. This sampling design allows DEQ to better understand baseline conditions.
- USGS Nontidal Network - Fixed stations that are used to assess concentrations, loads, and trends of nutrients and sediment in the Chesapeake Bay watershed.
- Targeted Monitoring – Samples collected near potential PFAS sites of interest.
- Roanoke River Special Study – Response to GenX detection in Spring Hollow Reservoir.

## 2023 PFAS Monitoring Network

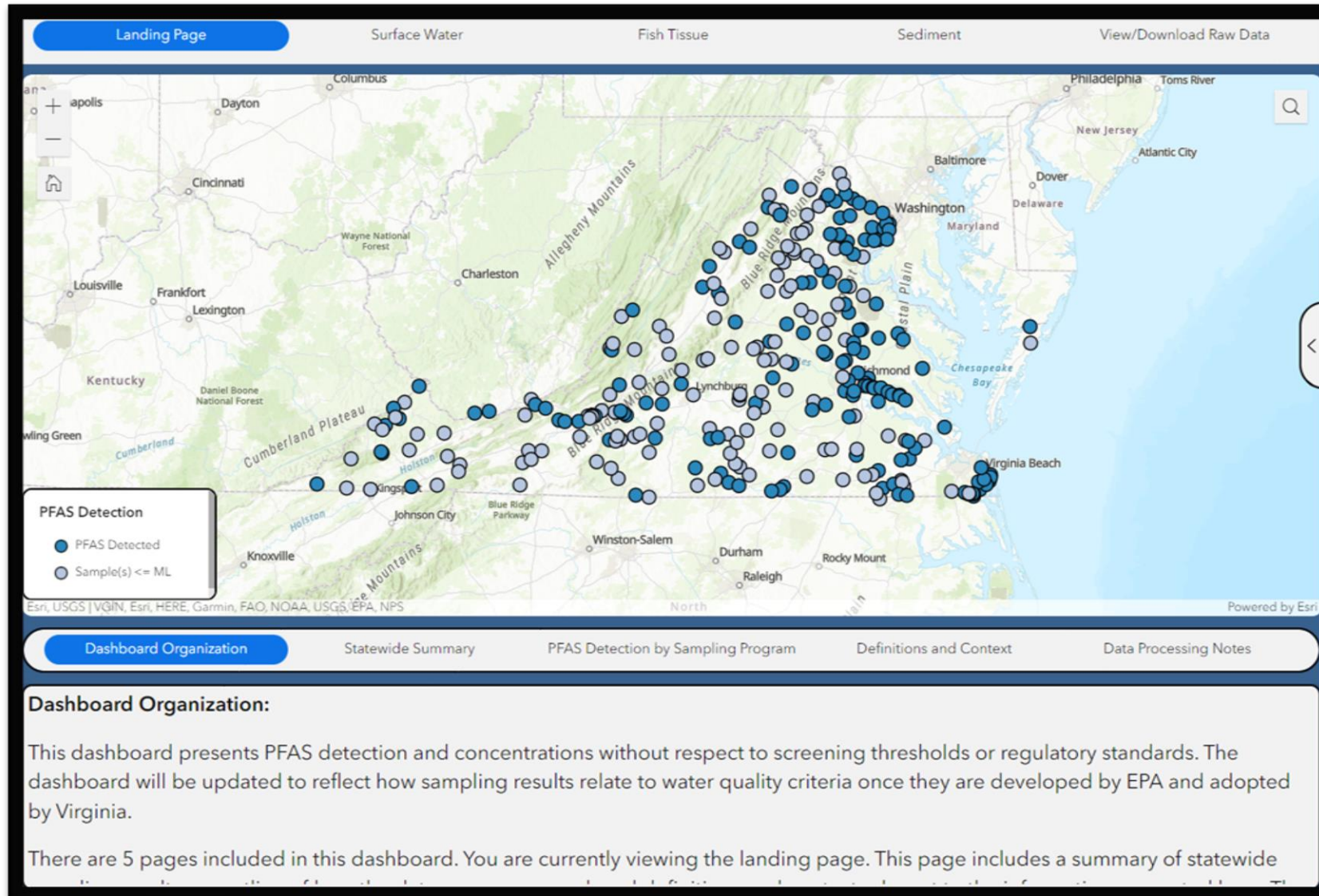
- The Virginia General Assembly appropriated \$320,000 for ambient surface water and groundwater sampling.
- Sampling occurred at fixed stations that the agency routinely monitors.
- 367 routine surface water samples across 228 stations (144 additional QA samples at 82 stations).

# DEQ Sampling Programs

- Sampling programs have distinct sampling designs and objectives and therefore no one program can tell the whole story.



# DEQ Statewide PFAS Dashboard



# Takeaways

- DEQ has sampled for PFAS throughout the commonwealth in the past 3 years using multiple sampling programs and sampling designs.
- These results are publicly available in the DEQ Statewide PFAS Dashboard.
- DEQ will continue sampling for PFAS in the environment.
- DEQ is tracking EPA's PFAS roadmap and is following the development of MCLs and water quality criteria<sup>5</sup>.

# References & Acknowledgements

DEQ, USGS, EPA, Virginia Department of Health, Newport News Water Works, Henrico County, DWR

1. U.S. Environmental Protection Agency. Comptox Chemicals Dashboard: Master List of PFAS Substances (Version2). Accessed August 14, 2023. [https://comptox.epa.gov/dashboard/chemical\\_lists/pfasmaster](https://comptox.epa.gov/dashboard/chemical_lists/pfasmaster)
2. Buck, Robert C., Stephen H. Korzeniowski, Evan Laganis, and Frank Adamsky. 2021. "Identification and classification of commercially relevant per- and poly-fluoroalkyl substances (PFAS)." *Integrated Environmental Assessment and Management* 17 (5):1045-1055.
3. Our Current Understanding of the Human Health and Environmental Risks of PFAS. (2023, June 7). <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>
4. Interstate Technology Regulatory Council. (2022, July). *History and Use of Per- and Polyfluoroalkyl Substances (PFAS) found in the Environment*. [https://pfas-1.itrcweb.org/wp-content/uploads/2022/09/HistoryandUse\\_PFAS\\_Fact-Sheet\\_090722\\_508.pdf](https://pfas-1.itrcweb.org/wp-content/uploads/2022/09/HistoryandUse_PFAS_Fact-Sheet_090722_508.pdf)
5. U.S. Environmental Protection Agency, 2021. PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024. [https://www.epa.gov/system/files/documents/2021-10/pfasroadmap\\_final-508.pdf](https://www.epa.gov/system/files/documents/2021-10/pfasroadmap_final-508.pdf)

