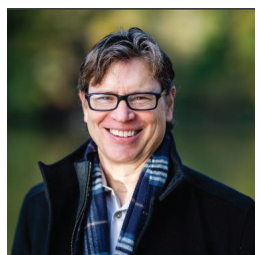
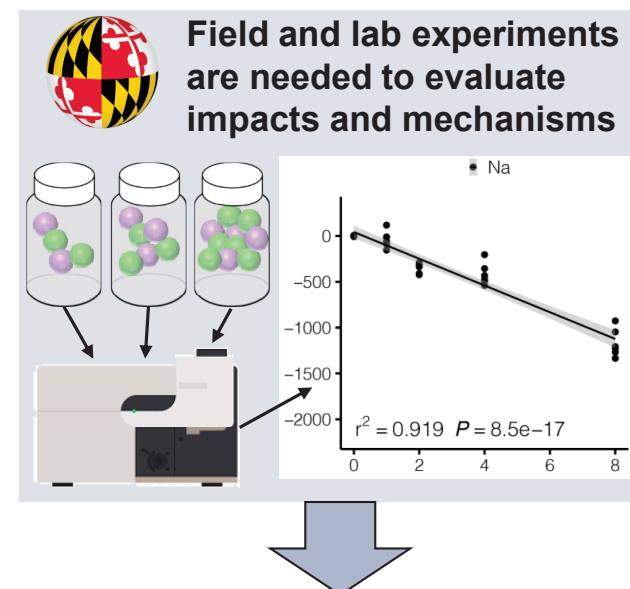
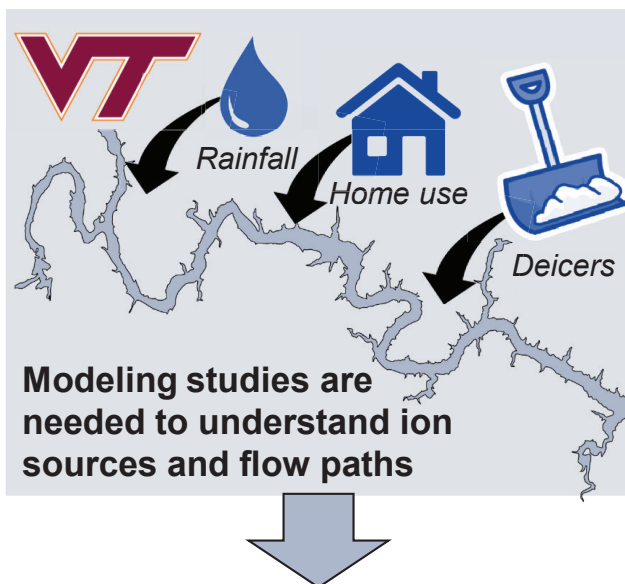
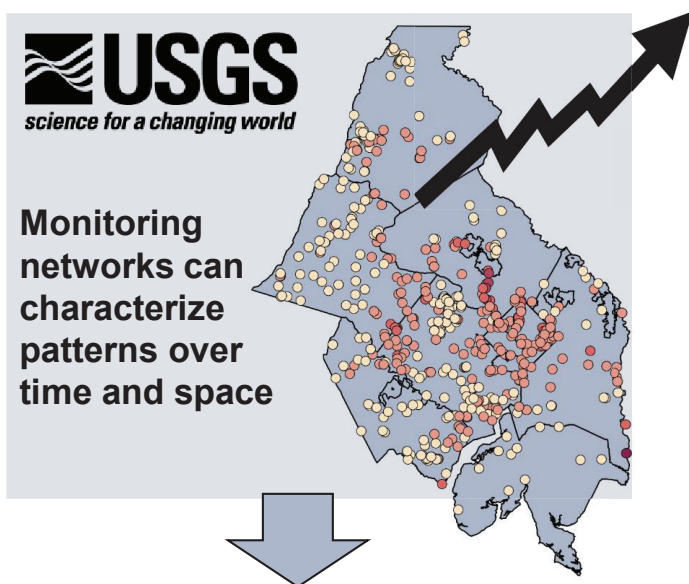


**COG'S FRESHWATER
SALINIZATION SYNDROME
PARTNERSHIP AND SALT
MONITORING ACTIVITIES**

Establishing A Science Partnership to Understand Salinization



Vision: A collaborative scientific partnership is needed to address a complex, regional issue...



Synthesizing this knowledge is needed to understand and manage FSS in the MWCOC region

Outline

1. Salt Is a Major Problem across Chesapeake Bay
2. Tracking Salt along the Watershed Continuum
3. The Potomac Sewage Spill and Lingerin Salty Impacts
4. Salinity Sources and Solutions (Stan Grant)

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State of the Science of Salinity Risks in the Chesapeake Bay and Its Tributaries: Connecting Monitoring, Modeling and Management

Steering Committee: Sujay Kaushal (University of Maryland) (Co-Chair), Stanley Grant (Virginia Tech) (Co-Chair), Steven Bieber (Metropolitan Washington Council of Governments), Greg Noe (USGS), Lewis Linker (EPA, Chesapeake Bay Program), Kaylyn Gootman (EPA, Chesapeake Bay Program), Paul Mayer (EPA), Conor Keitzer (UMCES IAN), Megan Rippy (Virginia Tech), Steven Nelson (WSSC), Rosemary Fanelli (USGS), K.C. Filippino (Hampton Roads Planning District Commission), Matthew Baker (UMBC), Lisa Ragain (MWCOG), Caitlin Bolton (MWCOG), Peter Tango (USGS, Chesapeake Bay Program)





STAC Salinity Workshop
May 26 - 27, 2026



Participants

56 participants met representing universities and research institutions; federal, state, and local government agencies; regional planning organizations and interstate commissions; drinking water and wastewater utilities; environmental organizations

Workshop emphasized freshwater salinization as a serious, cross-cutting environmental challenge with implications for the Chesapeake Bay Program goals and outcomes.

Workshop Objectives

- Our objectives were to assess the state of the science of salinization in the Chesapeake Bay watershed, gain a better understanding of long-term trends and the magnitude and frequency of extreme salinity events, and identify effective ways to anticipate and manage changes in salinization.
- Given that salt now affects the whole system from land to sea, we assessed salinization risks from the headwaters to the Chesapeake Bay.

A Few Example Takeaways

- Freshwater salinization is harming drinking water, ecosystems, agriculture, infrastructure, and economies across the Chesapeake Bay region.
- Freshwater Salinization Syndrome has different stages and risk factors across different geographic areas of the Chesapeake Bay region.
- There are diverse benchmarks for identifying stages and risks of Freshwater Salinization Syndrome.
- Freshwater Salinization Syndrome from watershed pollution and saltwater intrusion is affecting millions of people across the Chesapeake Bay region.

Salty STAC Report Is Coming Soon

We are very grateful for Meg Cole and Tou Matthews and all of our STAC Steering Committee and speakers and participants...

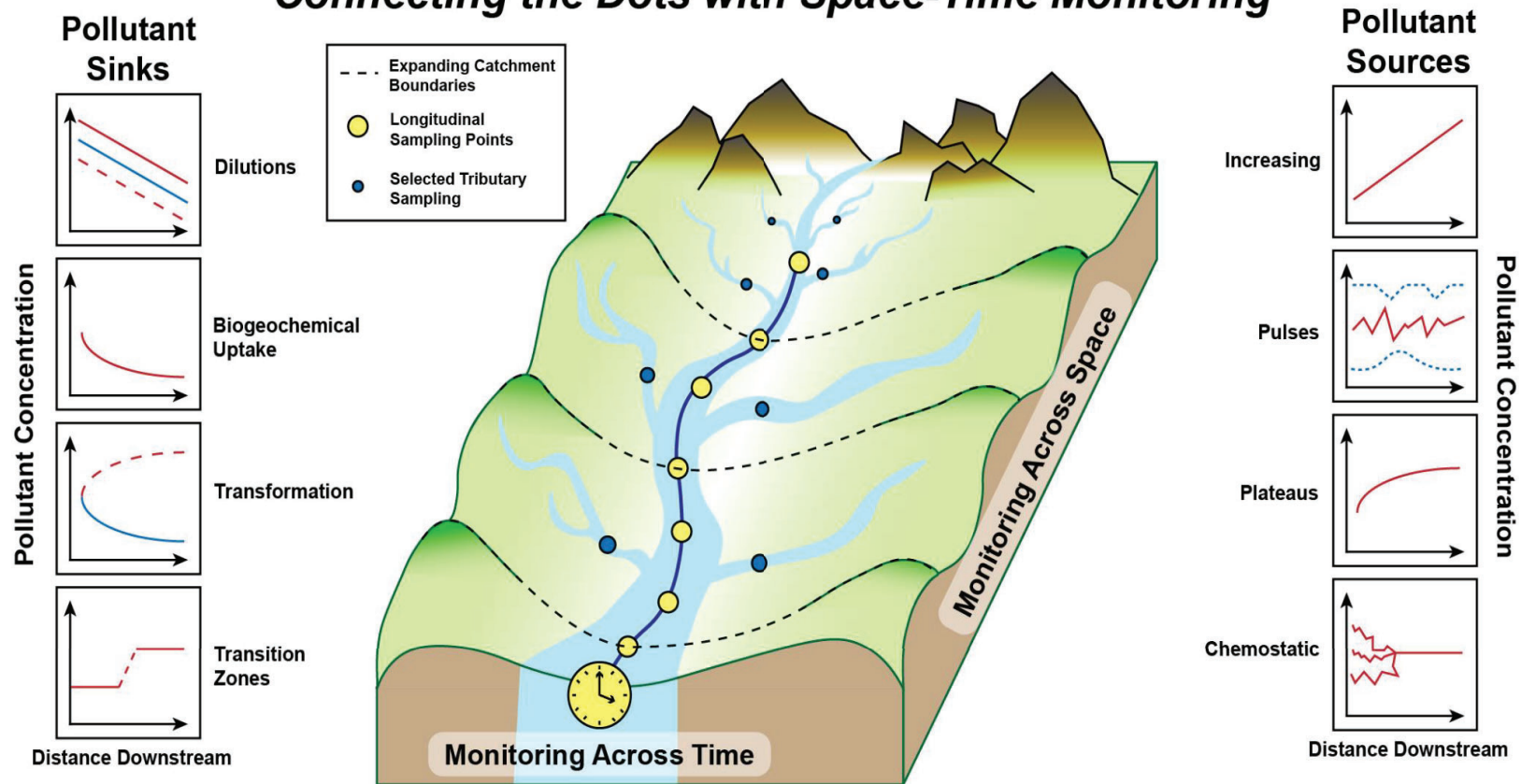


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The Watershed Continuum Approach

Connecting the Dots with Space-Time Monitoring



Establishing A Science Partnership to Understand Salinization



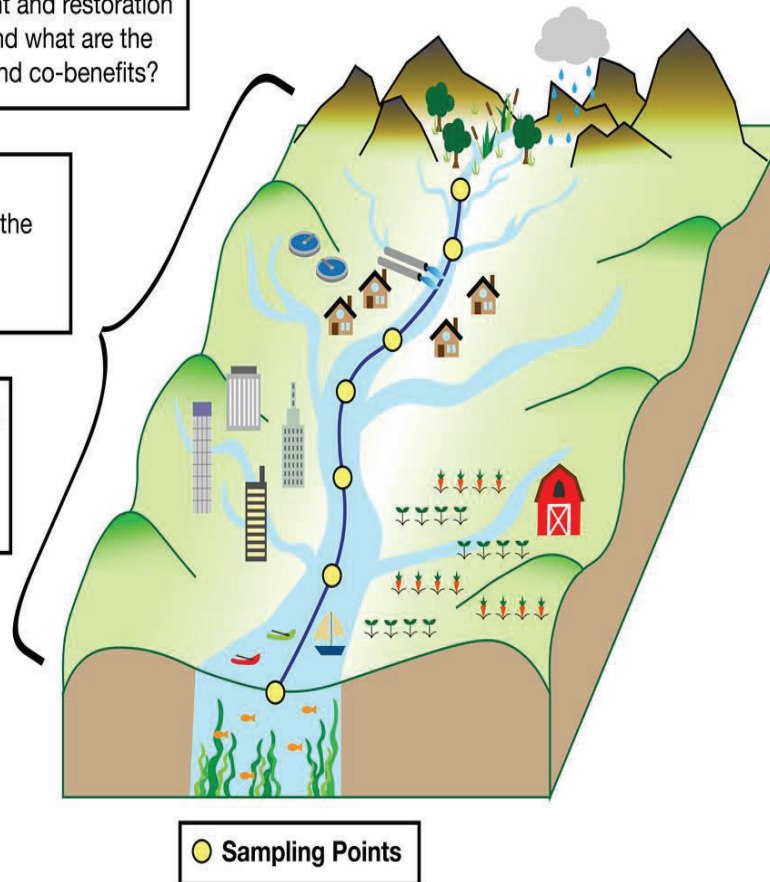
(Kaushal...Grant...and COG Salt Team *et al.* 2026)

< 1 km: Are management and restoration interventions effective and what are the water quality tradeoffs and co-benefits?

< 10 km: Where are the major pollutant sources and what is their fate? What are the relationships between water quality along flowpaths and landscape features?

< 100 km: Can point and non-point source pollutant loads be integrated in order to monitor their transport from regional hot spots (e.g. cities or agricultural areas)?

100 -> 1,000 km: Can information about key water quality processes be modeled across regional and temporal scales to guide efforts to protect drinking water, aquatic life, navigation, recreation, and receiving waters?



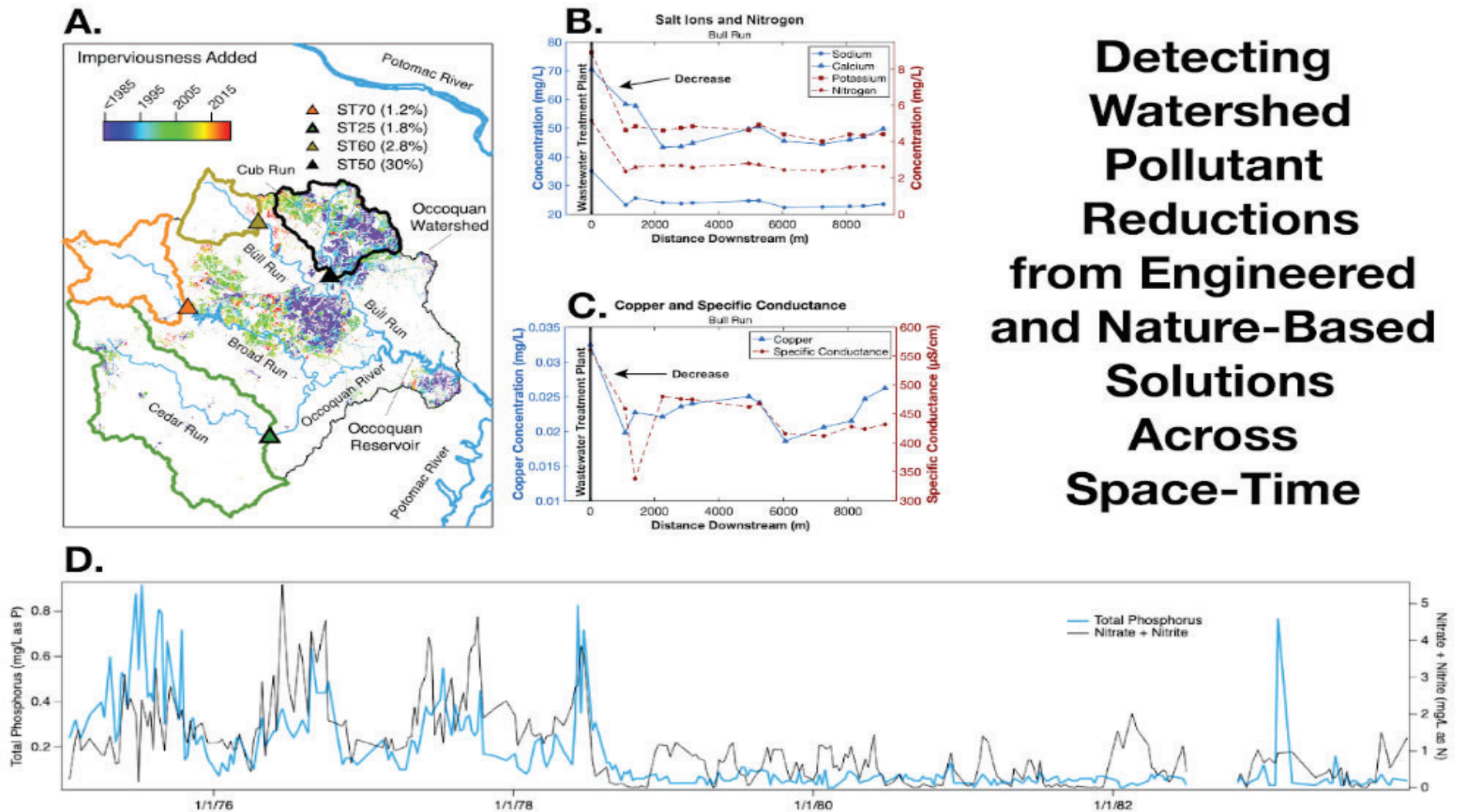
What Questions Can Longitudinal Monitoring Answer Across Expanding Spatial Scales?

Establishing A Science Partnership to Understand Salinization

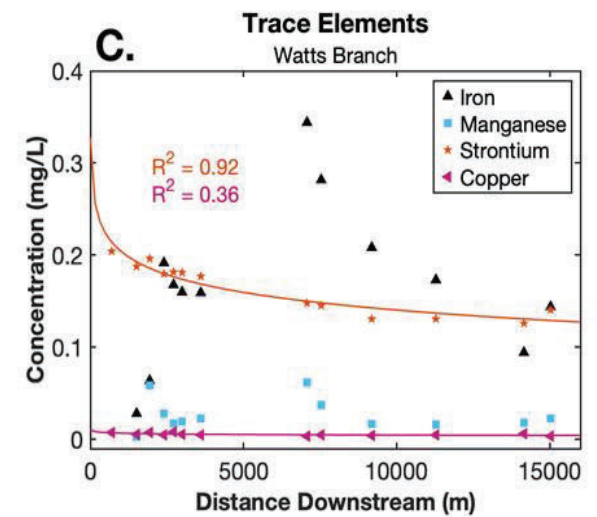
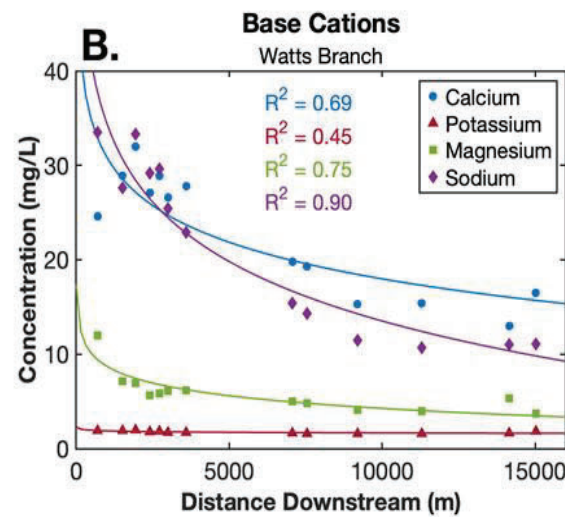
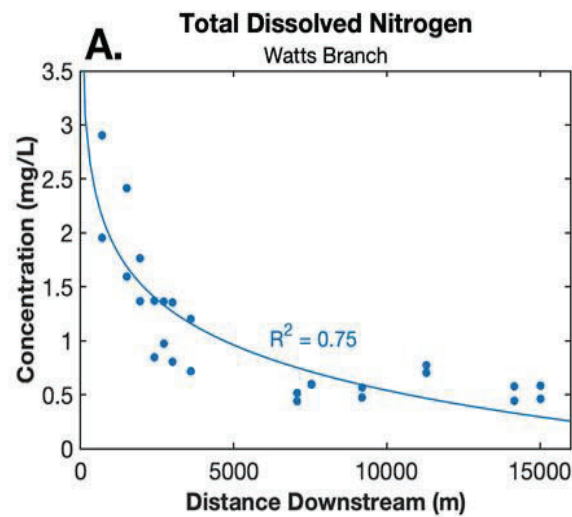


(Kaushal...Grant...and COG Salt Team *et al.* 2026)

Detecting Watershed Pollutant Reductions from Engineered and Nature-Based Solutions Across Space-Time

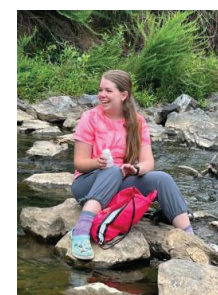
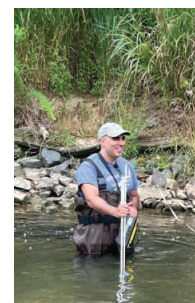


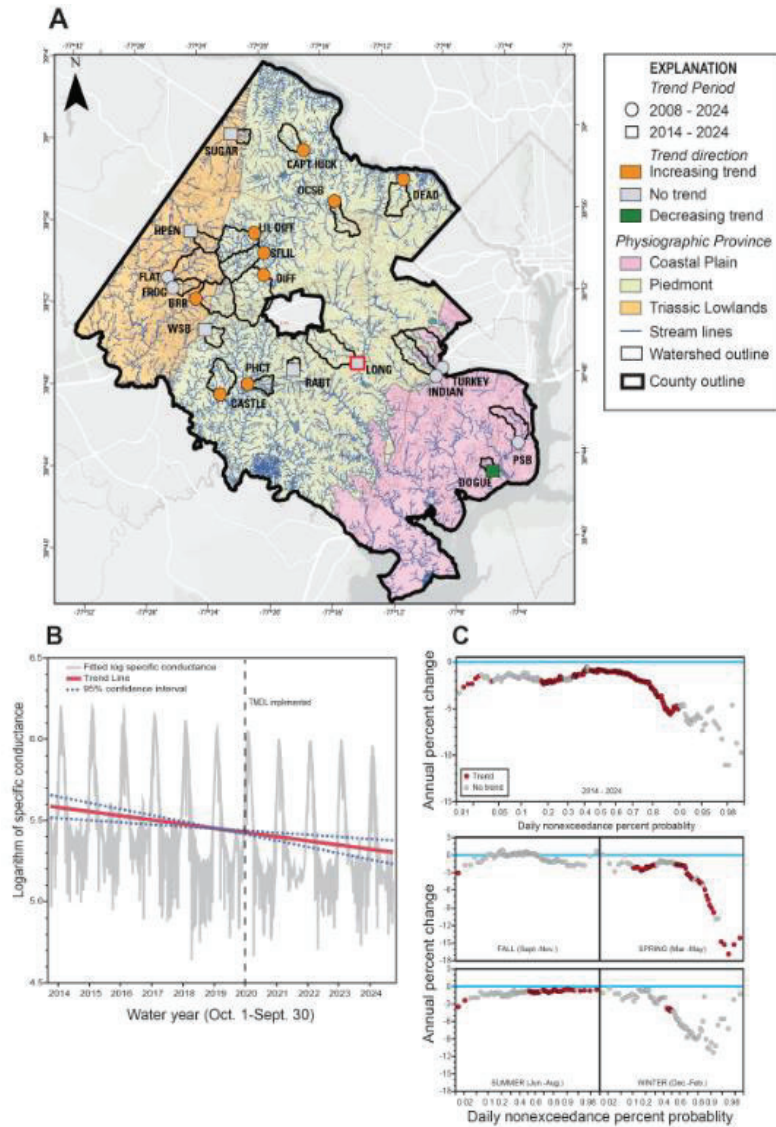
(Kaushal...Grant...and COG Salt Team *et al.* 2026)



(Kaushal...Grant...and COG Salt Team *et al.* 2026)

Forest conservation reduces salinity risks

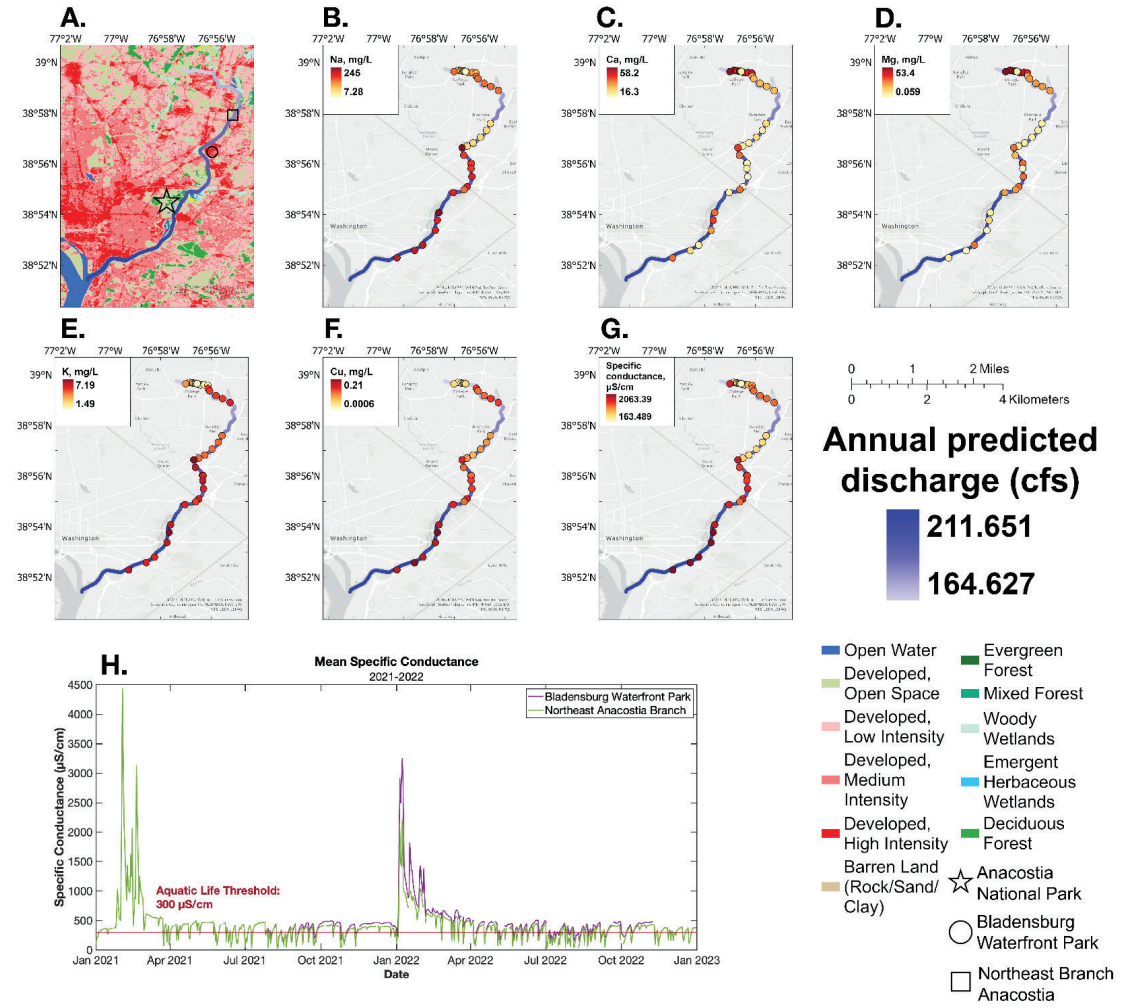




Salinity is decreasing in some watersheds potentially due to stormwater management

(Kaushal...Grant...and COG Salt Team *et al.* 2026)

Freshwater Salinization Syndrome Along the Watershed Continuum



There are ‘hot spots’ of salty chemical cocktails across finer spatial scales

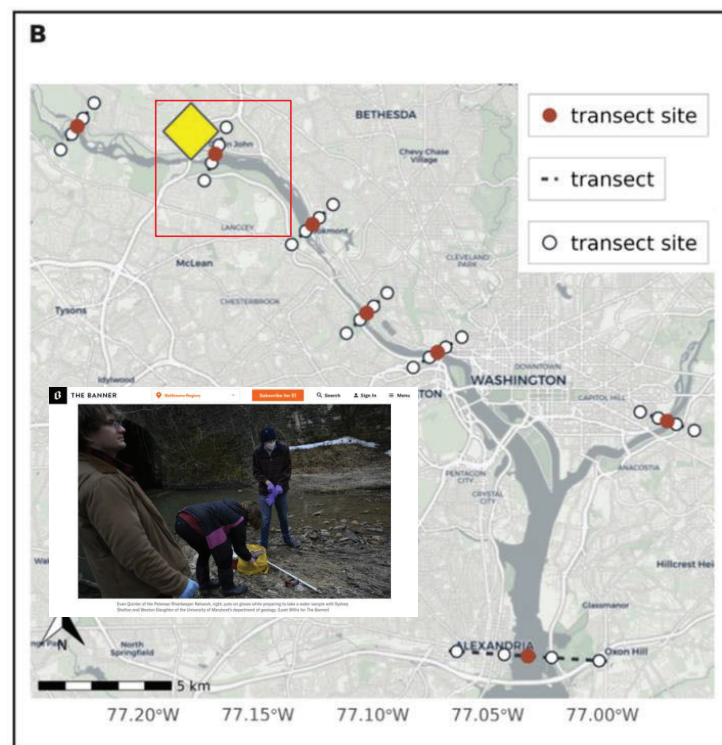
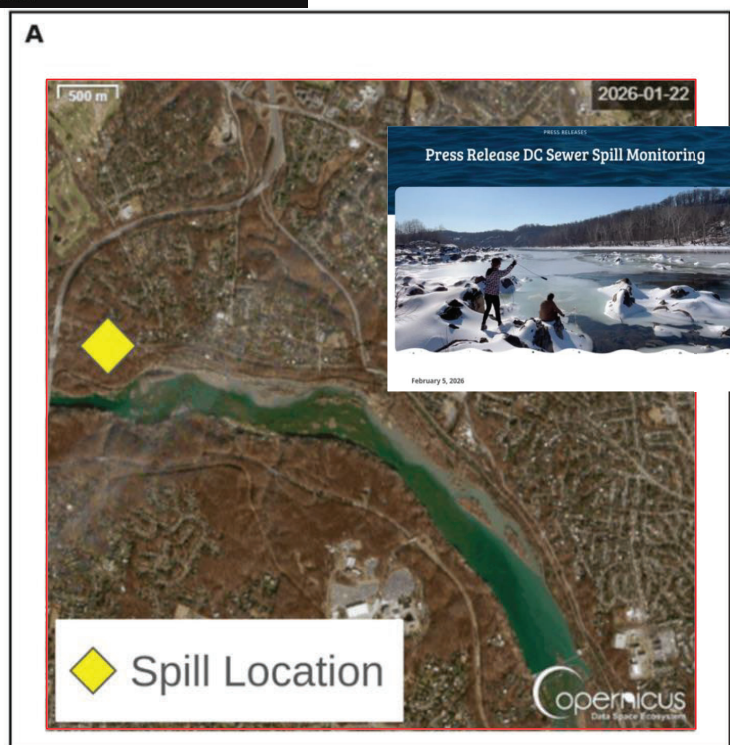
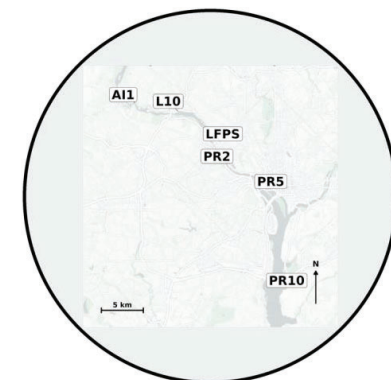
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Potomac Spill Monitoring along the Watershed Continuum

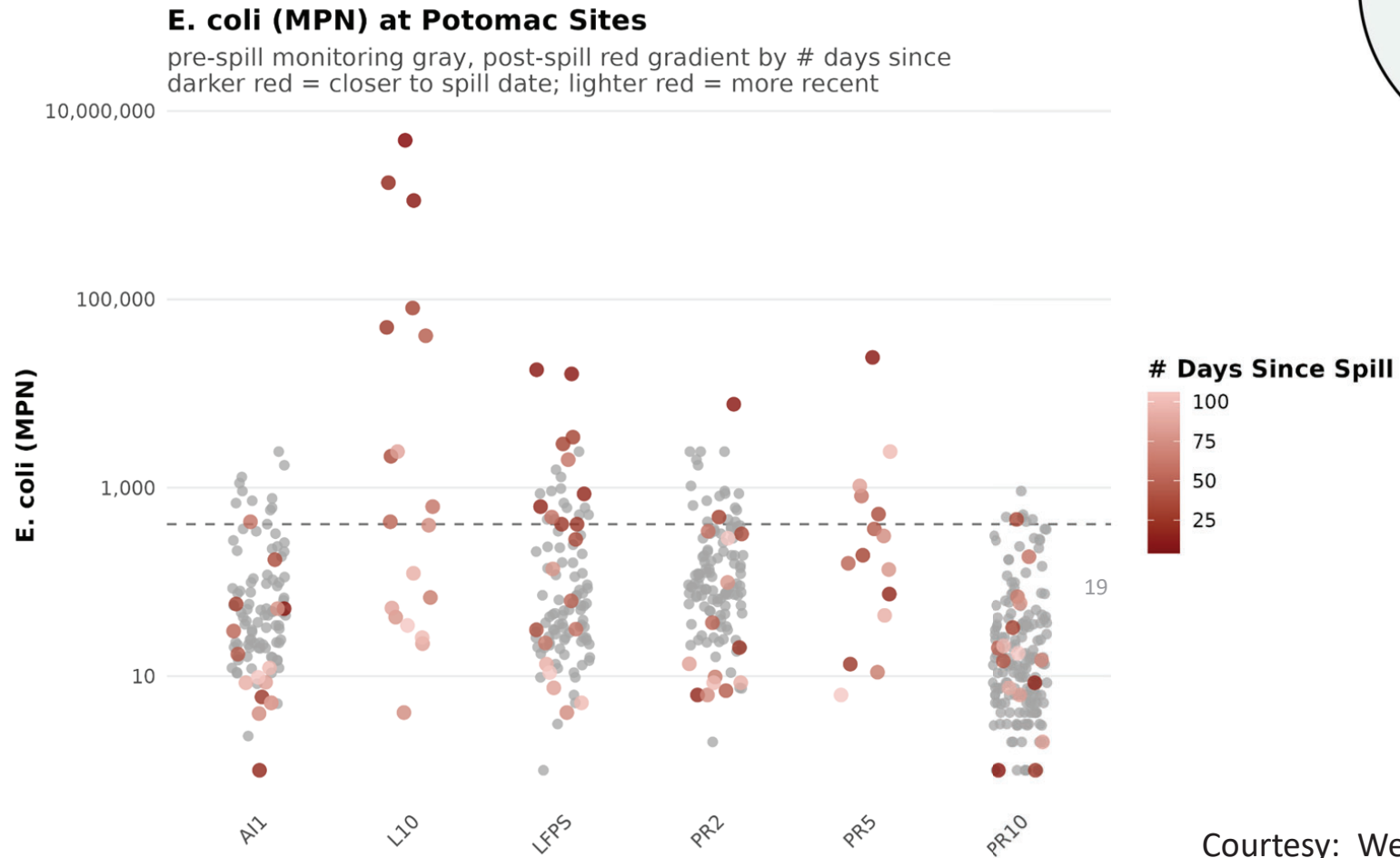


Courtesy: Weston Slaughter

Thanks to Steve and Lisa and others!

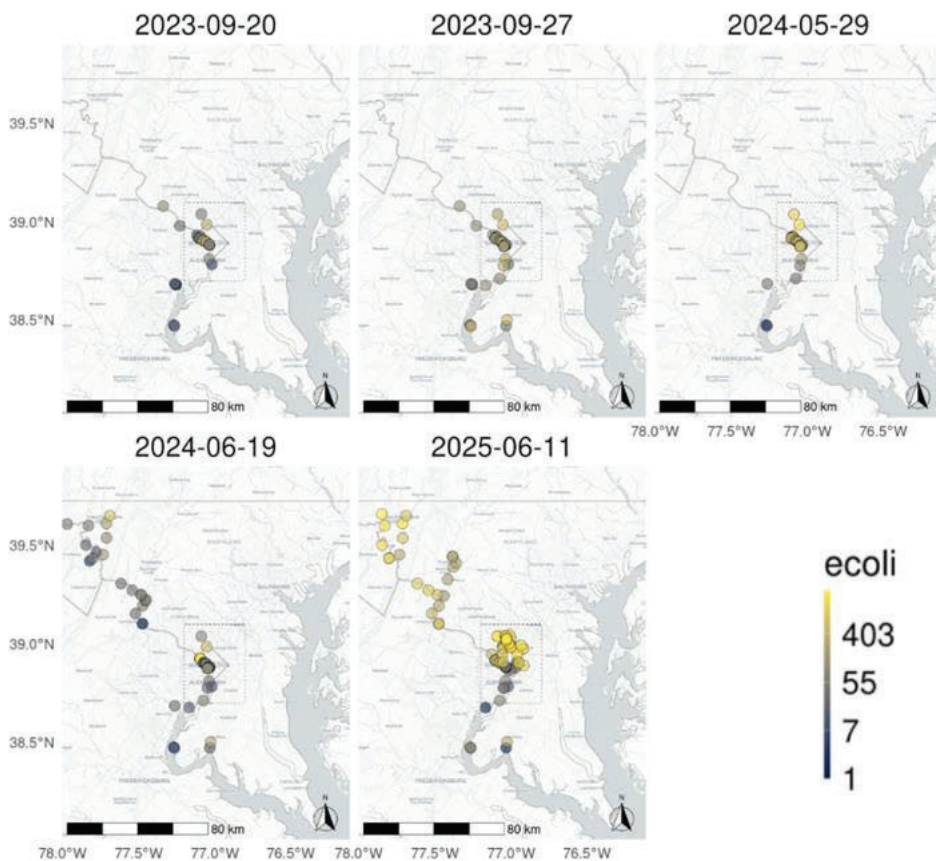
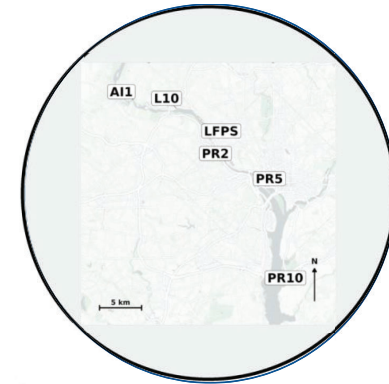


Rapid Declines in *E. coli* Downstream

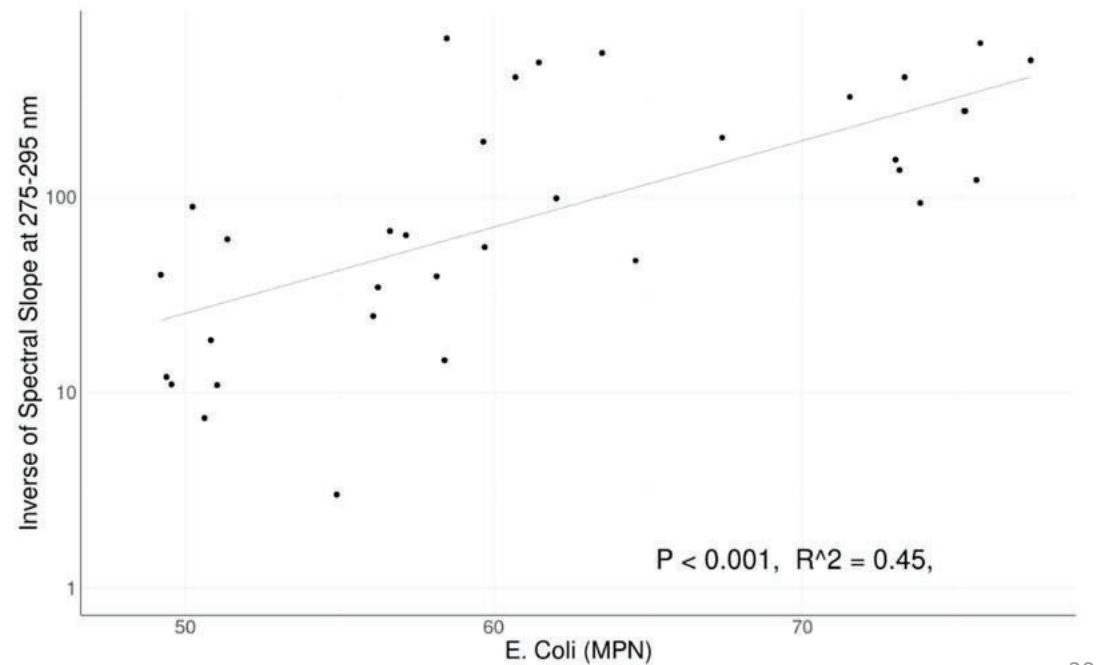


Courtesy: Weston Slaughter

Dissolved Organic Matter Composition Related to *E. Coli* before Sewage Spill

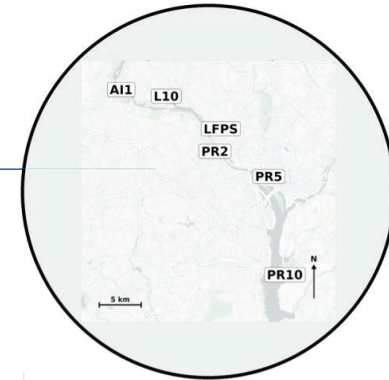


DOC Molecular Weight and Aromaticity Index vs *E. Coli* (MPN)
Potomac River Surveys, 09-20-2023 and 09-27-2023



Courtesy: Weston Slaughter ²⁰

Emerging Issues from Salinity?



The New York Times

A Huge Sewage Spill Is Over, but Contamination Lingers in the Potomac

Though river monitoring shows bacteria levels have declined, scientists and environmentalists said a full recovery isn't yet assured.

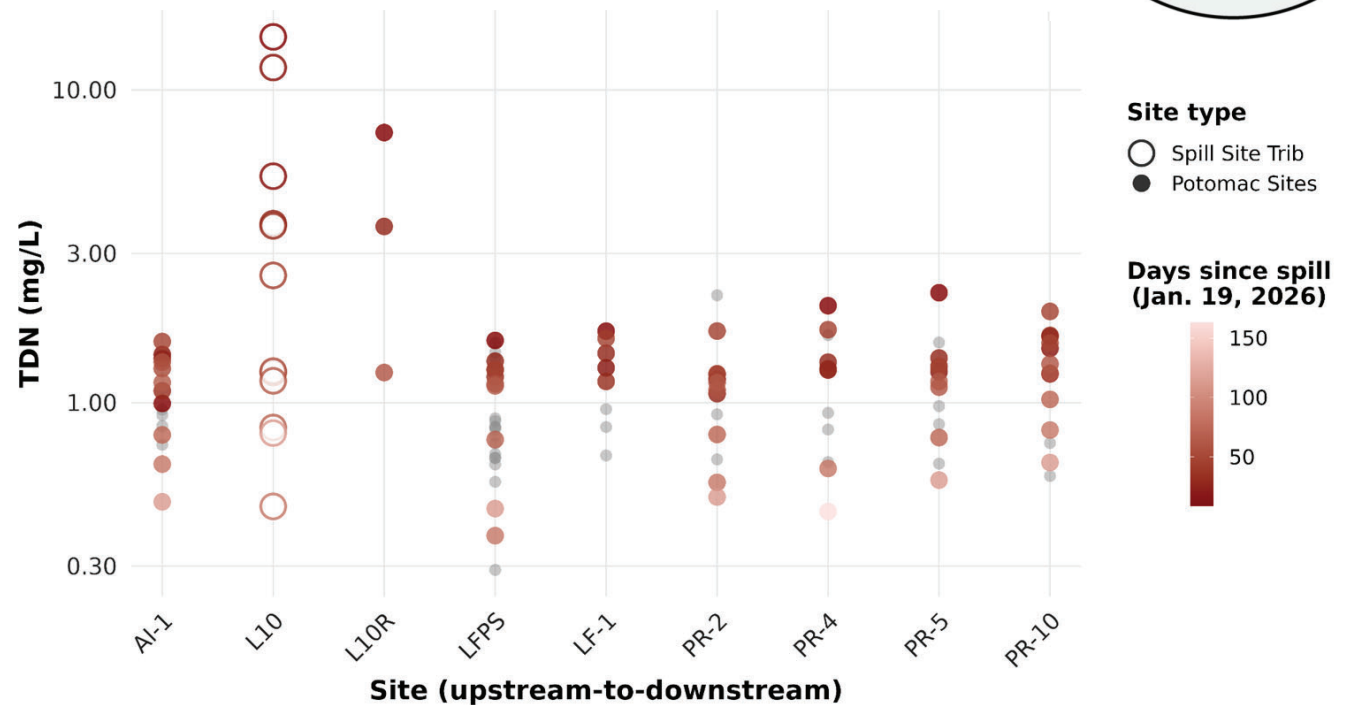
The New York Times CLIMATE A Huge Sewage Spill Is Over, but Contamination Lingers in the Potomac



From left, researchers Ryan Woodland, Judy O'Neil, Kristen Heyer and Javier Lloret with water samples gathered from affected areas of the Potomac River. Michael Noble Jr. for The New York Times

TDN along the Potomac River

Gray points show same-site pre-spill observations

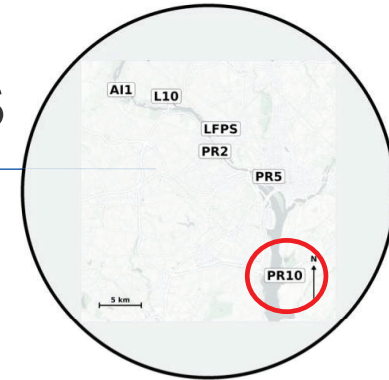


Darker red indicates sampling closer to the Jan. 19, 2026 spill.

New York Times, April 23rd 2026

Courtesy: Weston Slaughter 21

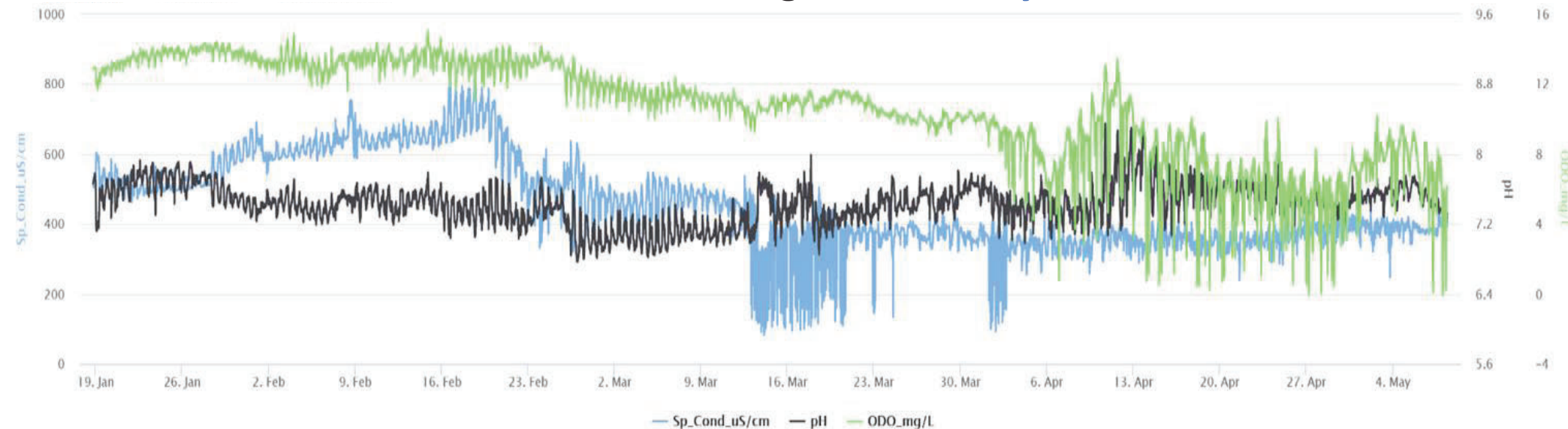
Potomac Spill and Changing Salinity Pulses



National Harbor

Displayed times are adjusted for time zone and DST based on your browser settings.

Changes in Salinity



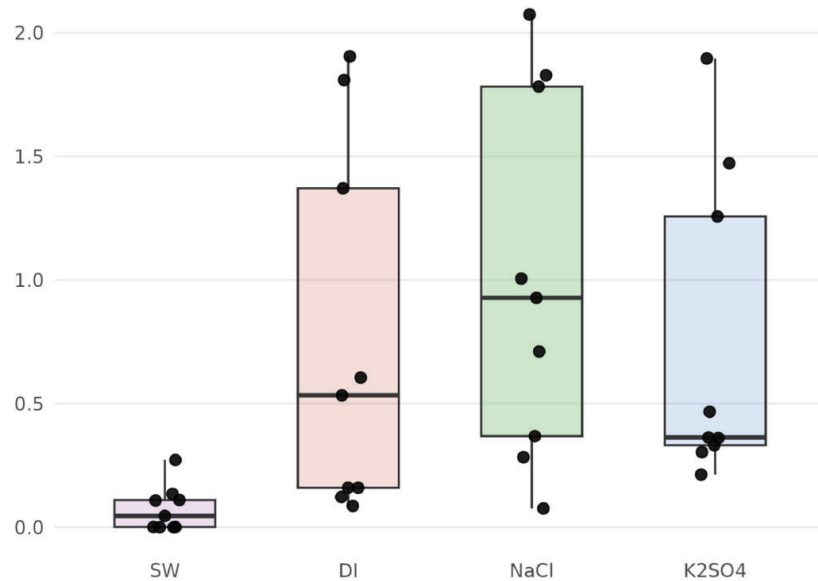
Changes in Oxygen & pH

Courtesy: Weston Slaughter 22

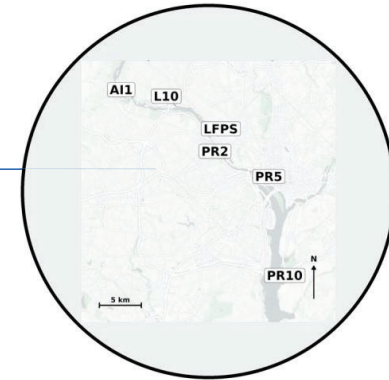
Changes in Salinity Pulses Can Mobilize Phosphorus

UMD-COG Potomac Boat Survey April 14th 2026

Surface Water and Sediment Extractant Experiment, PO_4 (mg L^{-1})



Courtesy: Weston Slaughter



BAY JOURNAL

How long will the Potomac River suffer sewage spill impacts?

Timothy B. Wheeler & Jeremy Cox May 1, 2026

f x e p l q



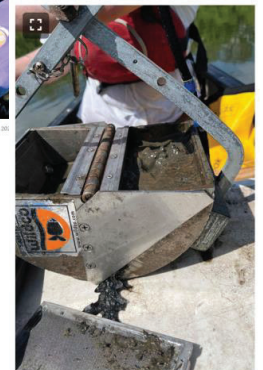
E. coli, bacteria in human or animal waste, tend to decay rapidly in water. In many cases, those and other pathogens can be gone within a few days, but studies show that they can survive longer – for weeks and perhaps months. Their persistence may depend on the water itself, with colder, murkier conditions potentially prolonging their lives.



A volunteer and a graduate student at the University of Maryland collect water from the Potomac Riverkeeper Network.



A student, collects sediment samples from the Potomac River in mid-April 2026.

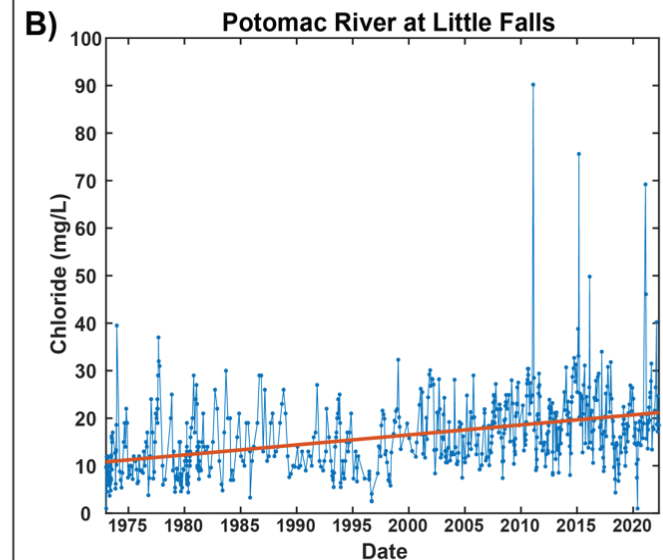
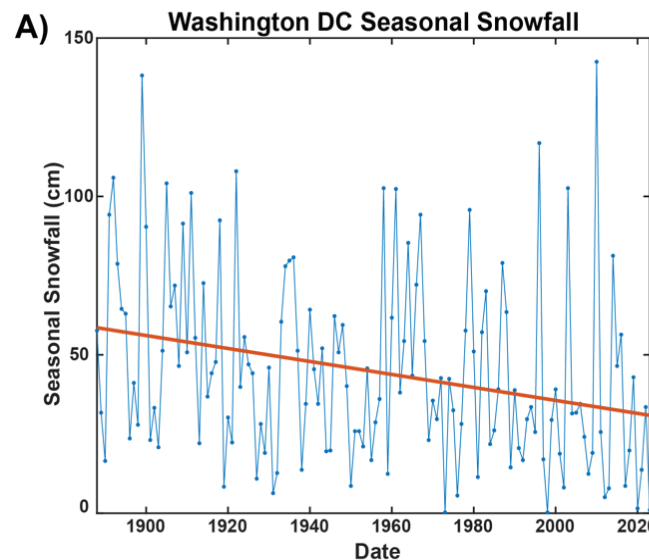


A sampling device holds muck grabbed from the Potomac River bottom during a mid-April monitoring paddle organized by the Potomac Riverkeeper Network.

Chesapeake Bay Journal, May 1st 2026

Snow is
declining, but
salinity pulses
are increasing....

Kaushal...Grant...Rippy et al. (2025)



Salinity sources
and solutions?



Conclusions

- Chesapeake Bay STAC salinity risks report coming soon
- Developed new watershed continuum monitoring approach
- Tracking salty chemical cocktails from Potomac sewage spill
- From salinity sources to solutions (take it away, Stan!)