

Thank you to our Patrons!

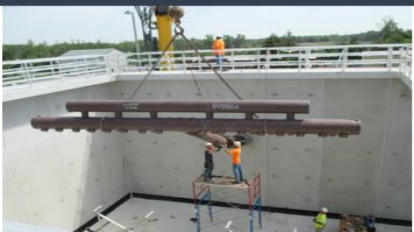


Our Event will begin in a few minutes...

Welcome

The 2023 AAEES Virtual Awards Ceremony and Conference

- Introduction from our MC, Isreal Ray Hodges, Jr., P.E., BCEE
- Opening Remarks: AAEES President David A. Vaccari, Ph.D., P.E., BCEE, F.ASCE
- Keynote Speaker: Paul Westerhoff, Ph.D., PE, BCEE, Professor at Arizona State University
- Individual AAEES Award Announcements
- ABET Presentation: Stephanie Harrington, Director, Constituent Relations
- Intermission
- E3S Awards Announcements
- Superior Achievement Award Winner Announcement
- Superior Achievement Award Winner Presentation
- AAEES Executive Director: Professor Daniel B. Oerther, Ph.D., P.E., BCEE, BCES
- Conclusion: President-Elect Wendy A. Wert, P.E., BCEE
- Closing remarks from Isreal Ray Hodges, Jr., P.E. BCEE



David A. Vaccari, Ph.D., P.E., BCEE, F.ASCE



Our AAEES President, Dr. David Vaccari, P.E., BCEE is a professor of environmental engineering at Stevens Institute of Technology in Hoboken, NJ. He has a masters and doctorate in environmental science and a masters in chemical engineering, all from Rutgers University. Originally focused on wastewater treatment and water pollution, he also specializes in modeling global phosphorus resource flows and in nonlinear statistical modeling in general.

The specialization in phosphorus grew from involvement in planning bioregenerative life support for long-term space missions for NASA, from research for a textbook in Environmental Biology published by John Wiley, and from work on phosphorus pollution in streams for the NJDEP TMDL Task Force. The work in data analysis started with modeling of the activated sludge wastewater treatment process and extended to modeling of pathogens in surface water.

Dr. Vaccari is a Board-Certified Environmental Engineer with a specialty in Water Supply and Wastewater



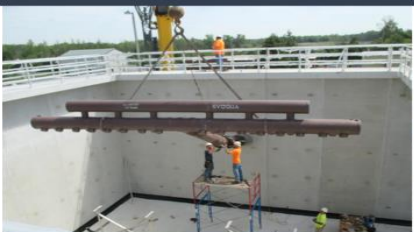
Keynote Speaker

Dr. Paul Westerhoff, Ph.D., PE, BCEE



Dr. Paul Westerhoff is a Regents Professor and Fulton Chair of Environmental Engineering in the School of Sustainable Engineering and the Built Environment at Arizona State University. Since joining ASU he has held various administrative positions.

After serving as the Civil and Environmental Engineering Department Chair he was the Founding Director for the School of Sustainable Engineering and the Built Environment and served later as Associate & Vice Dean of Research in Engineering and ASU Vice Provost for Academic Programming. Dr. Westerhoff is the Deputy Director of a NSF ERC for Nanotechnology Enabled Water Treatment and co-Deputy Director of the NSF STC Science and Technologies for Phosphorus Sustainability Center. He has over 375 journal publications (H-index>100) and multiple patents.





Wastewater effluents impact Per- and Poly-fluoroalkyl Substances (PFAS) concentrations at Drinking water treatment plants

Paul Westerhoff, PhD, PE, BCEE, NAE

Regents Professor & Fulton Chair of Environmental Engineering

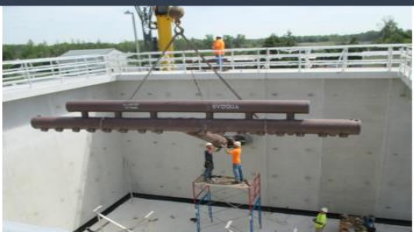
School of Sustainable Engineering and The Built Environment, Arizona State University (Tempe)

Contributors:

Dr. Jacelyn Rice, Dr. Thuy Nguyen, Minhazul Islam

Carollo: Kyle Thompson, & Eva Steinle-Darling

SNWA: Eric Dickenson, Oscar Quiñones

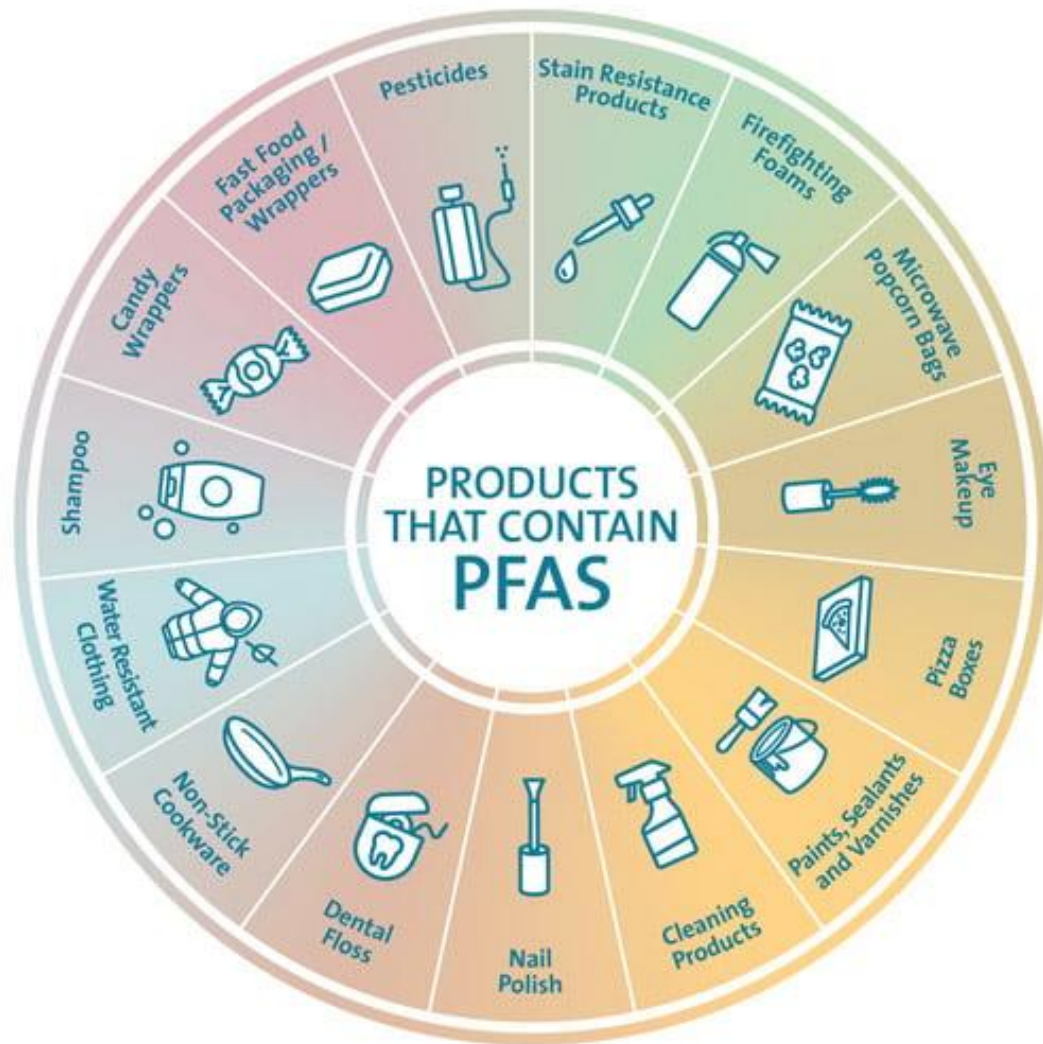


Outline

- Why PFAS in water
- PFAS occurrence frameworks
- Case study of PFAS in surface water
- Contribution of wastewater to PFAS in surface waters
- Summary & Path forward



Many uses of PFAS, but later we discovered...

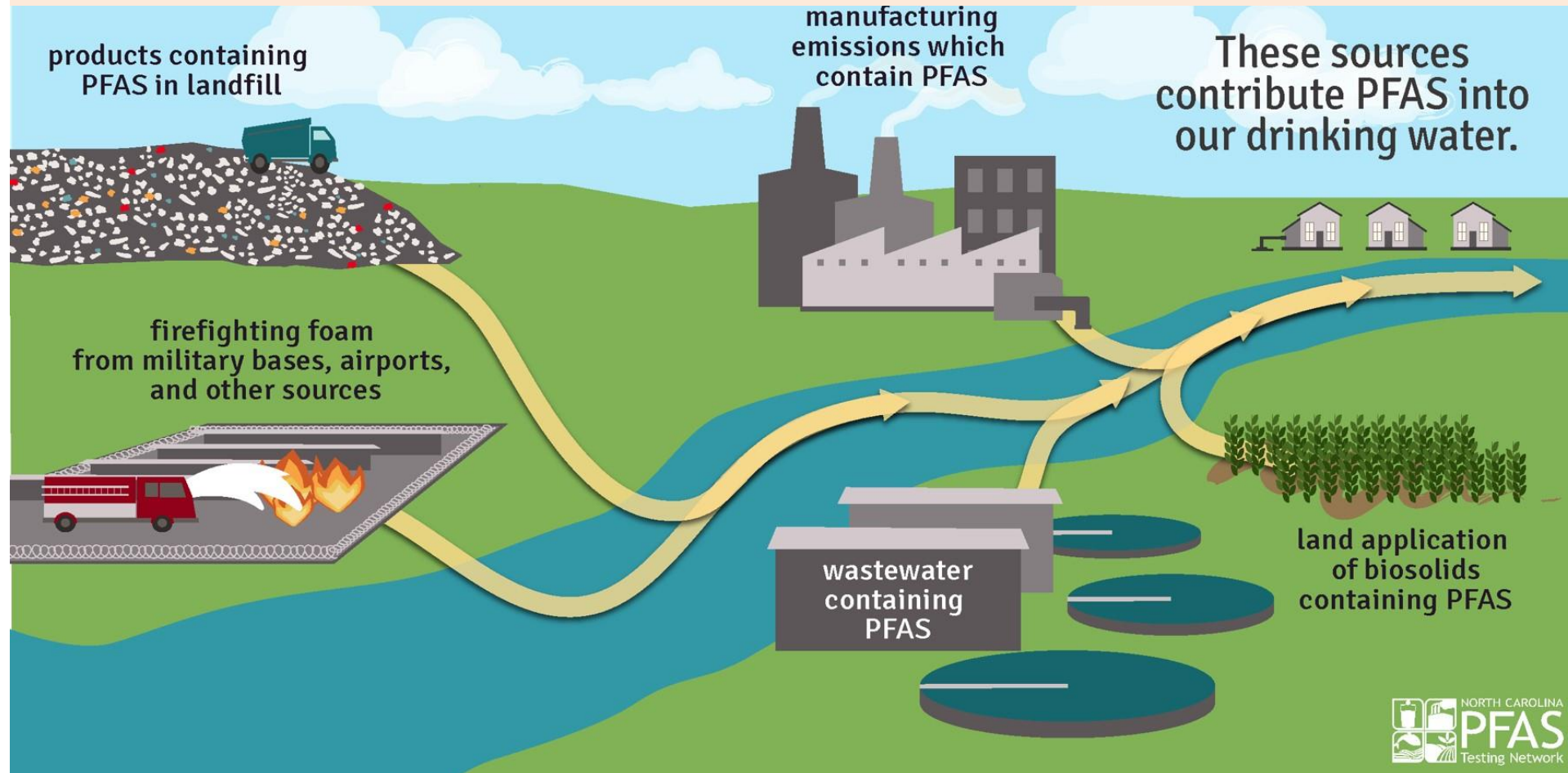


Human Risks Include:

- ❑ Liver effects (serum enzymes/bilirubin, cholesterol)
- ❑ Immunological effects (decreased vaccination response, asthma)
- ❑ Developmental effects (birth weight)
- ❑ Endocrine effects (thyroid disease)
- ❑ Reproductive effects (decreased fertility)
- ❑ Cardiovascular effects (pregnancy induced hypertension)
- ❑ Cancer* (testicular, kidney)

PFAS Sources & Ecosystem Exposure

Exposure: Ecosystems & Human Exposures through Water Systems
PFAS is resistant to oxidation, volatilization, biodegradation → **Persistent**



$$\text{PFAS Risk} = \text{Exposure} \times \text{Hazard}$$

Hazards: EPA Human Health Advisory Levels (June 15, 2022)

PFAS	Health Advisory (in parts per trillion)
PFOA (perflurooctanoic acid)	0.004 ppt
PFOS (perfluorooctane sulfonic acid)	0.02 ppt
GenX (hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt)	10 ppt
PFBS (perfluorobutane sulfonic acid and its potassium salt)	2,000 ppt

PFAS Risk = Exposure x Hazard

Hazards: EPA Human Health Advisory Levels (June 15, 2022)

Drinking Water MCL: Proposed by USEPA (March 2023)

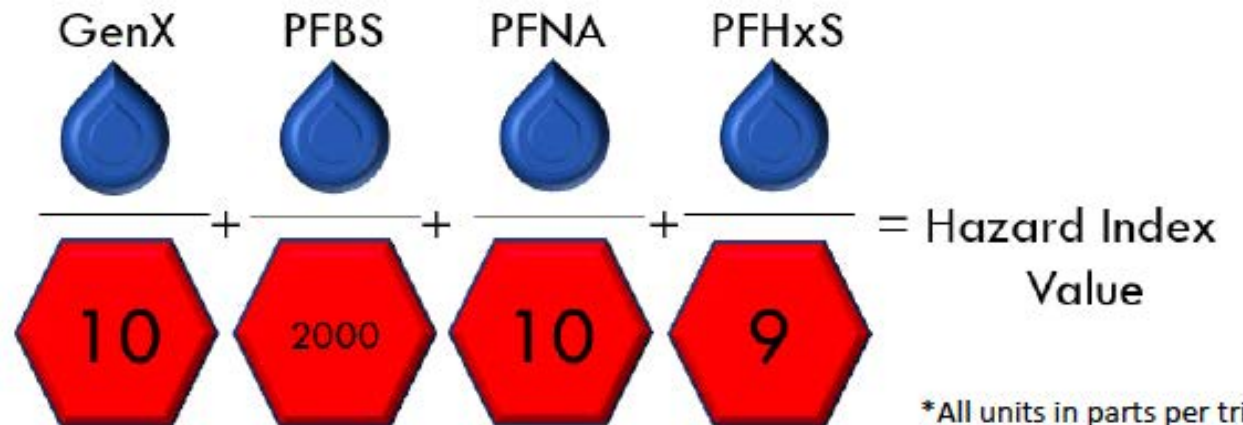
PFOA Proposed MCL = 4.0 ng/L

PFOS Proposed MCL = 4.0 ng/L

Four other PFAS grouped MCL

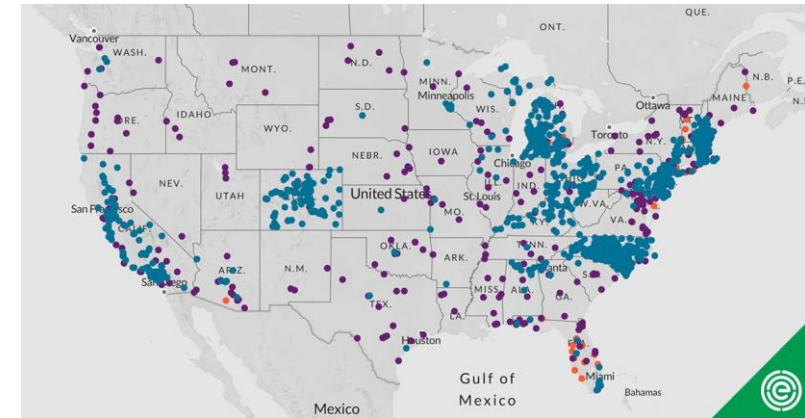
based upon a **Hazard Index**

Value < 1.0

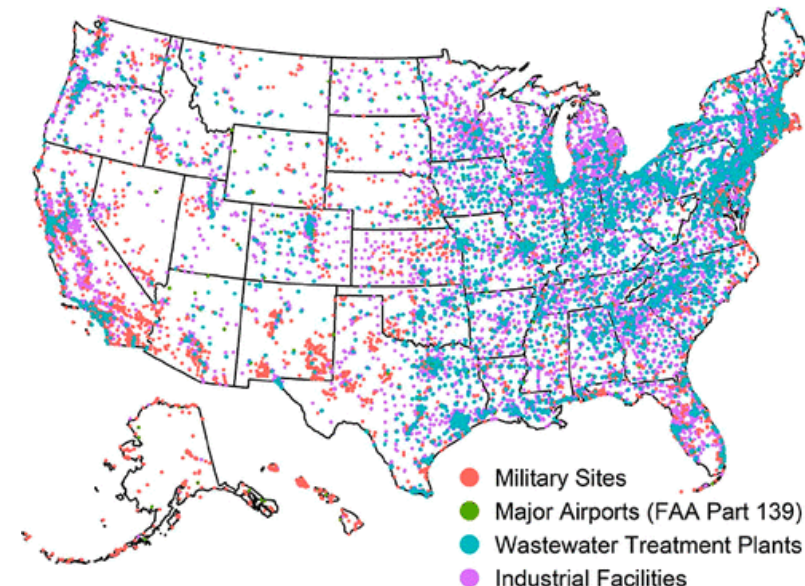


Recent PFAS Monitoring Efforts

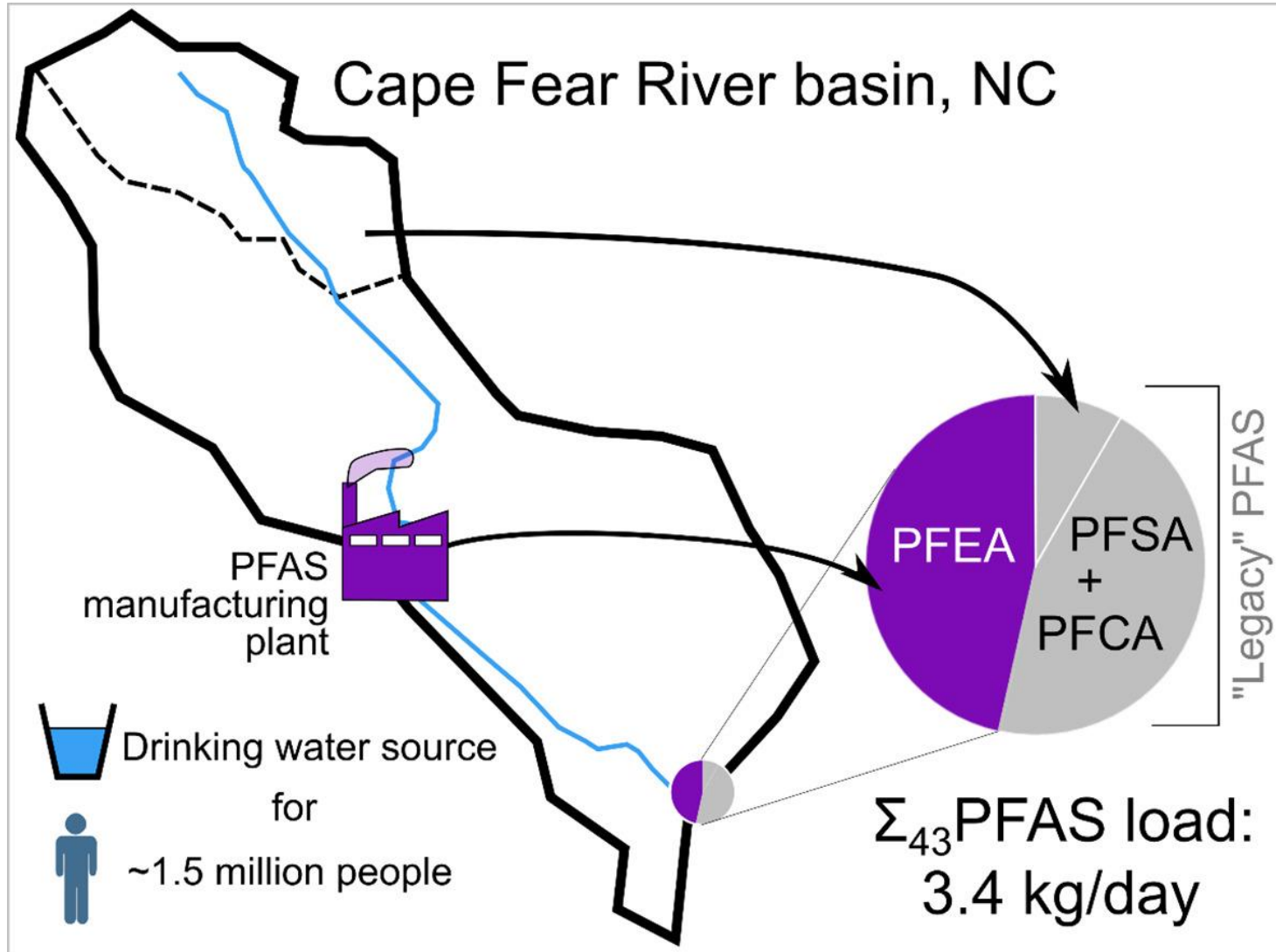
- **Monitoring programs**
 - EPA UCMR 3 & UCMR 5
- **Groundwater Proximity Models**
 - EWG
 - McMahon et al. *ES&T* 2022
- **Surface water Proximity Models**
 - Salvatore et al., *Environ. Sci. Technol. Lett.* 2022
- Current strategies **identify sources** and potential PFAS occurrence, but **few predict PFAS Concentrations**



Presumptive Contamination Sites (n=57,412)



Industrial “PFAS Hot Spot” sources exist



Exposure Challenges / Needs

Challenges:

- Over 4000 PFAS compounds
- Costly PFAS analytical method

Needs:

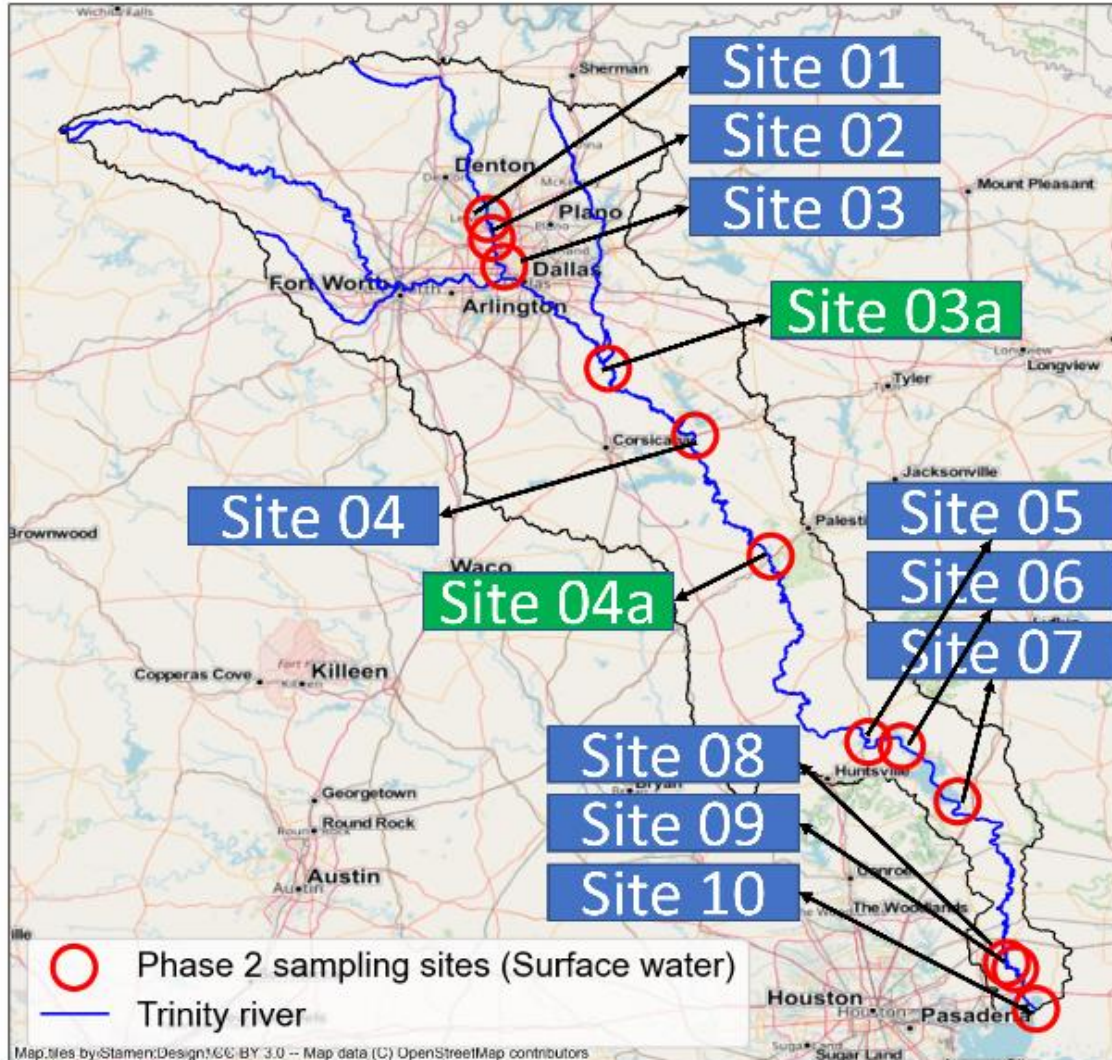
- Framework to identify PFAS sources
- Identify “hot-spots” for sampling or epidemiological study
- Estimate PFAS exposures in aquatic ecosystems (river, lakes)
- Estimate PFAS in surface waters used as drinking water supplies
- Understand where and what type of PFAS treatment is needed in drinking water treatment plants

Outline

- Why PFAS in water
- PFAS occurrence frameworks
- **Case study of PFAS in surface water**
- Contribution of wastewater to PFAS in surface waters
- Summary & Path forward



Case Study: Trinity River (Texas)



18,000 square miles

~990 miles of tributaries

Numerous reservoirs

165 Municipal WWTPs + 12,045 Industrial discharges

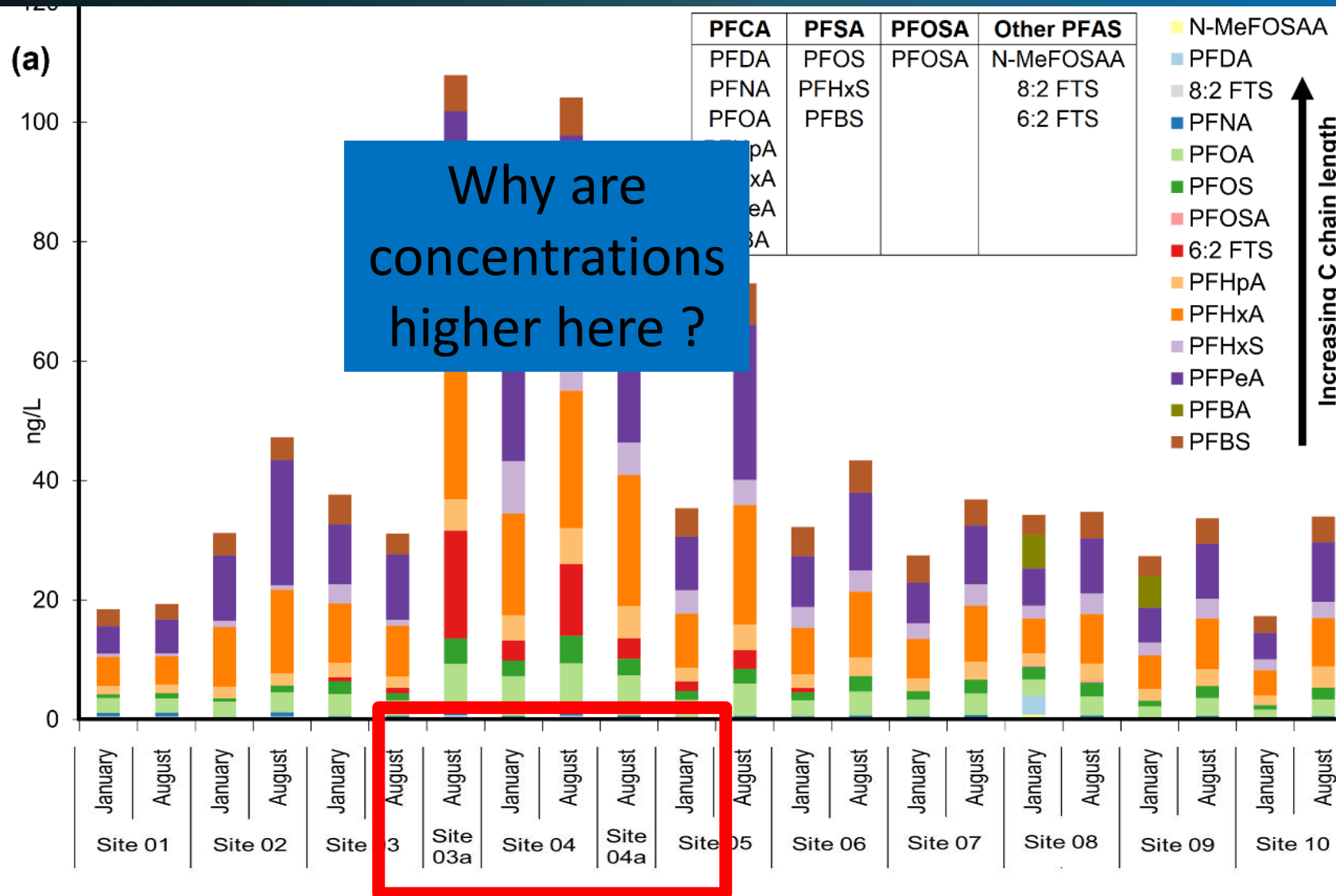
Drinking water supply for ~6 million people from dozens of DWTP intakes

Sampling: High (January) & Low (August) streamflows (2022)

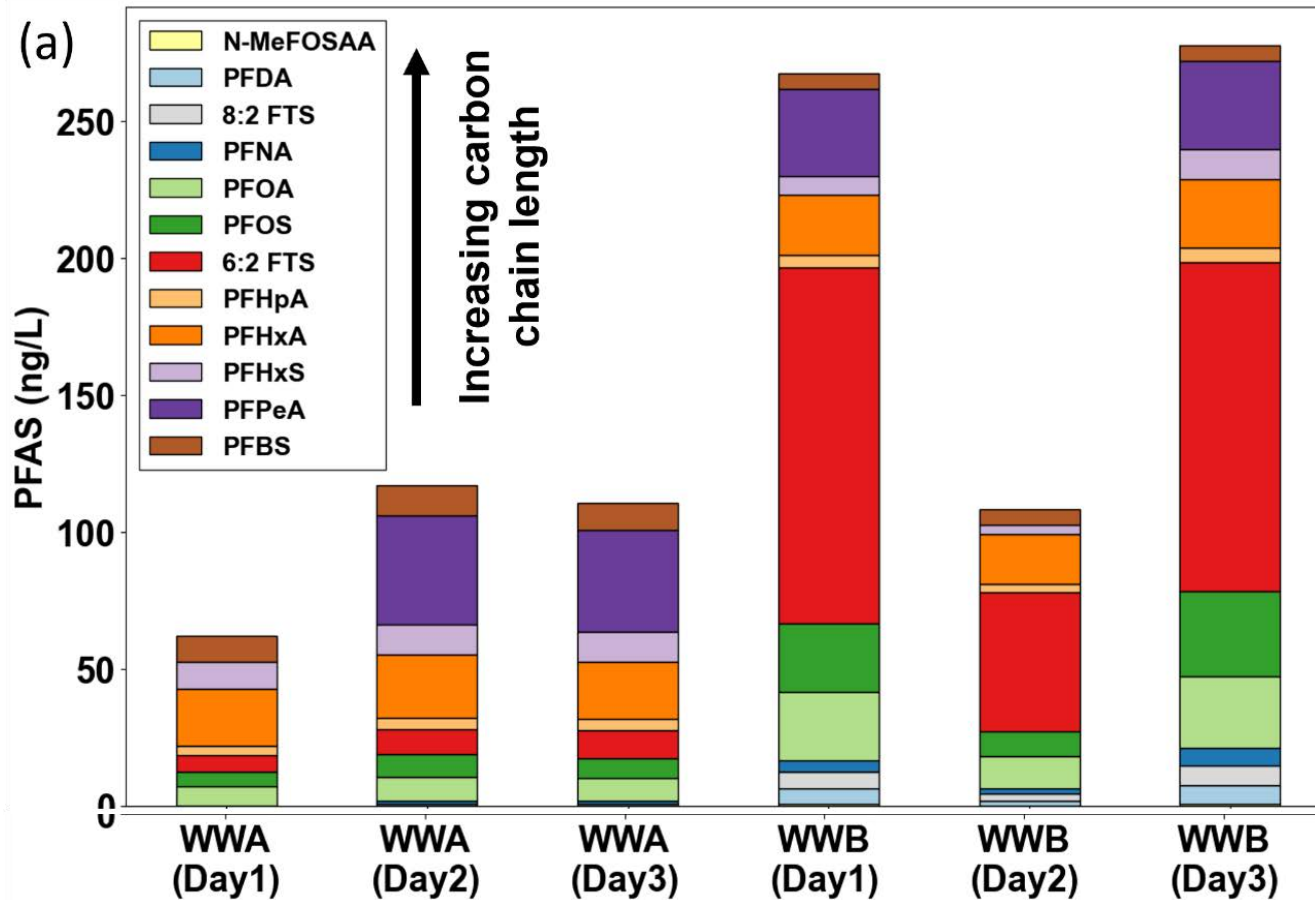
Monitoring Results

for 19 Targeted PFAS = Σ PFAS

Σ PFAS (ng/L)



Treated Wastewater Contains PFAS



2 larger WWTPs in Northern part of watershed - Sampled August 2022

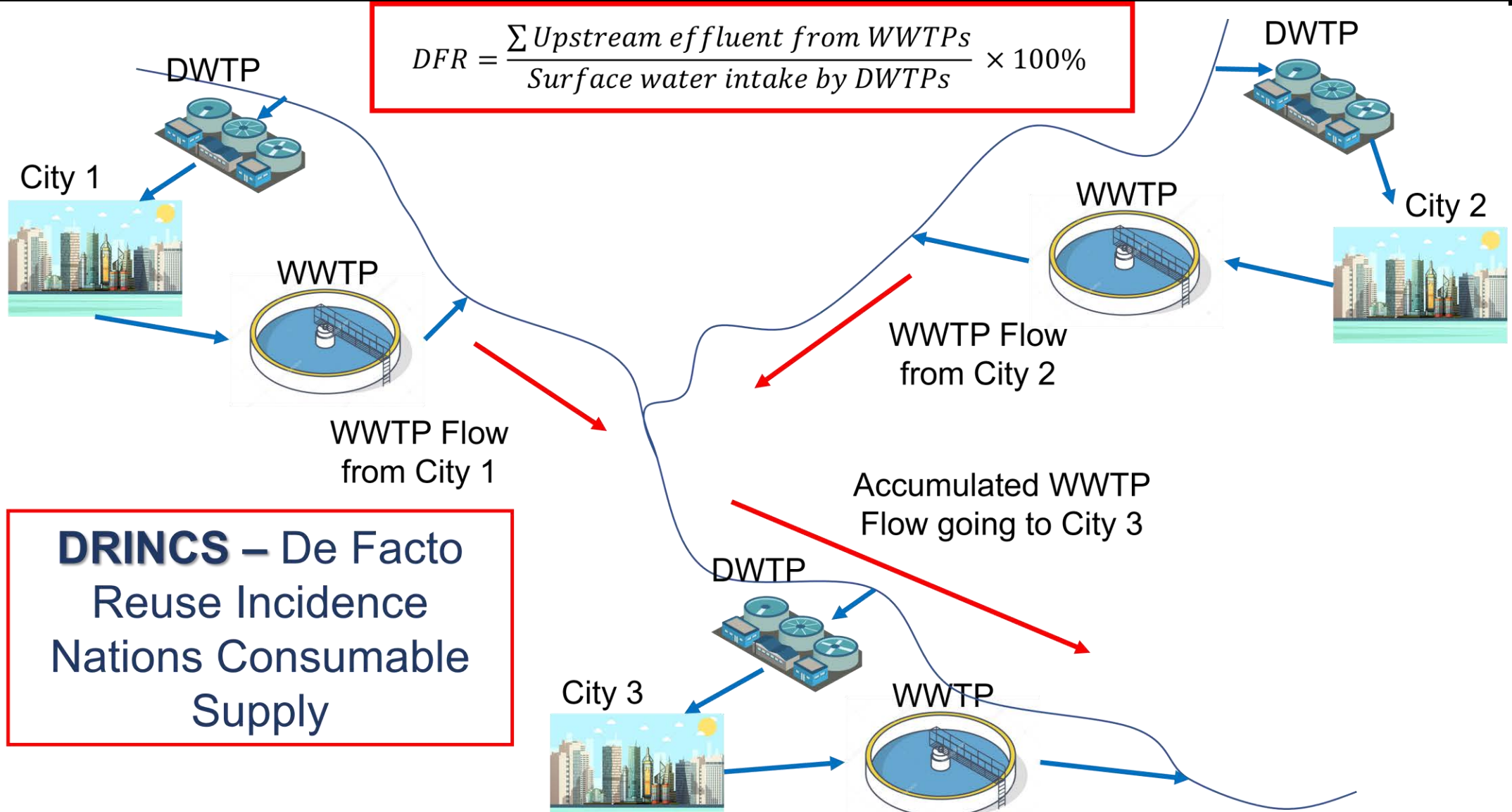
Tuesday (Day 1) Wednesday (Day 2) Thursday (Day 3)

Typical concentrations in WWTP treated effluent based upon nationwide survey in > 20 locations

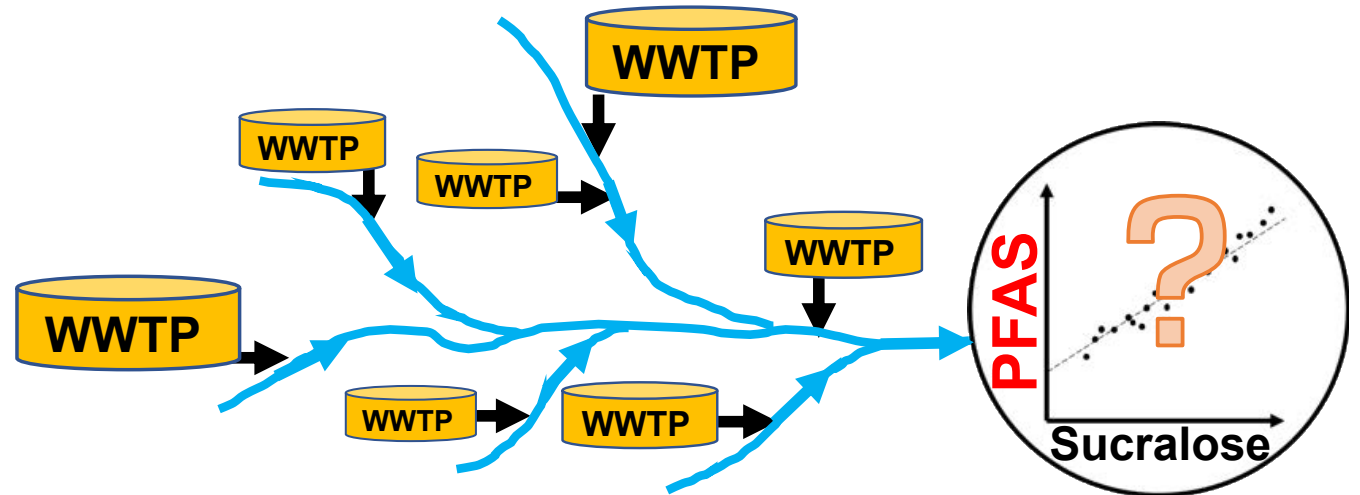
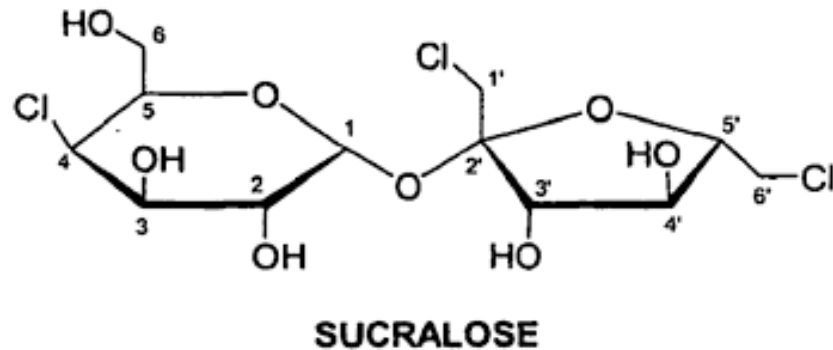
Recall for River samples:

- PFPeA (C4) and PFHxA (C5) dominated Σ PFAS
- Sites 3 & 4 had 6:2 FTS

Hypothesis: Treated wastewater discharged to surface water was a dominate PFAS source

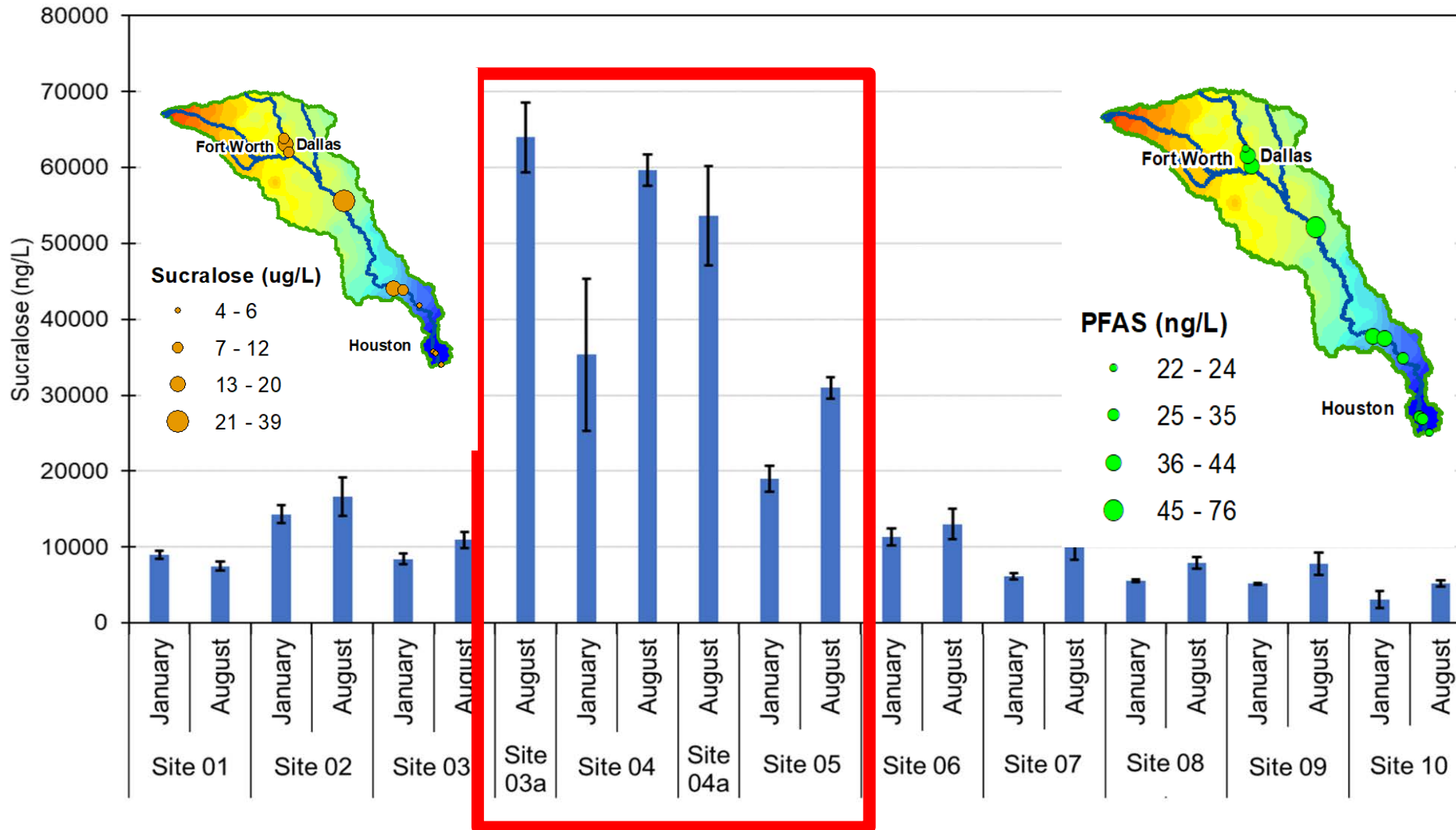


What “indicator” could we use to show WWTP are a major PFAS source ?

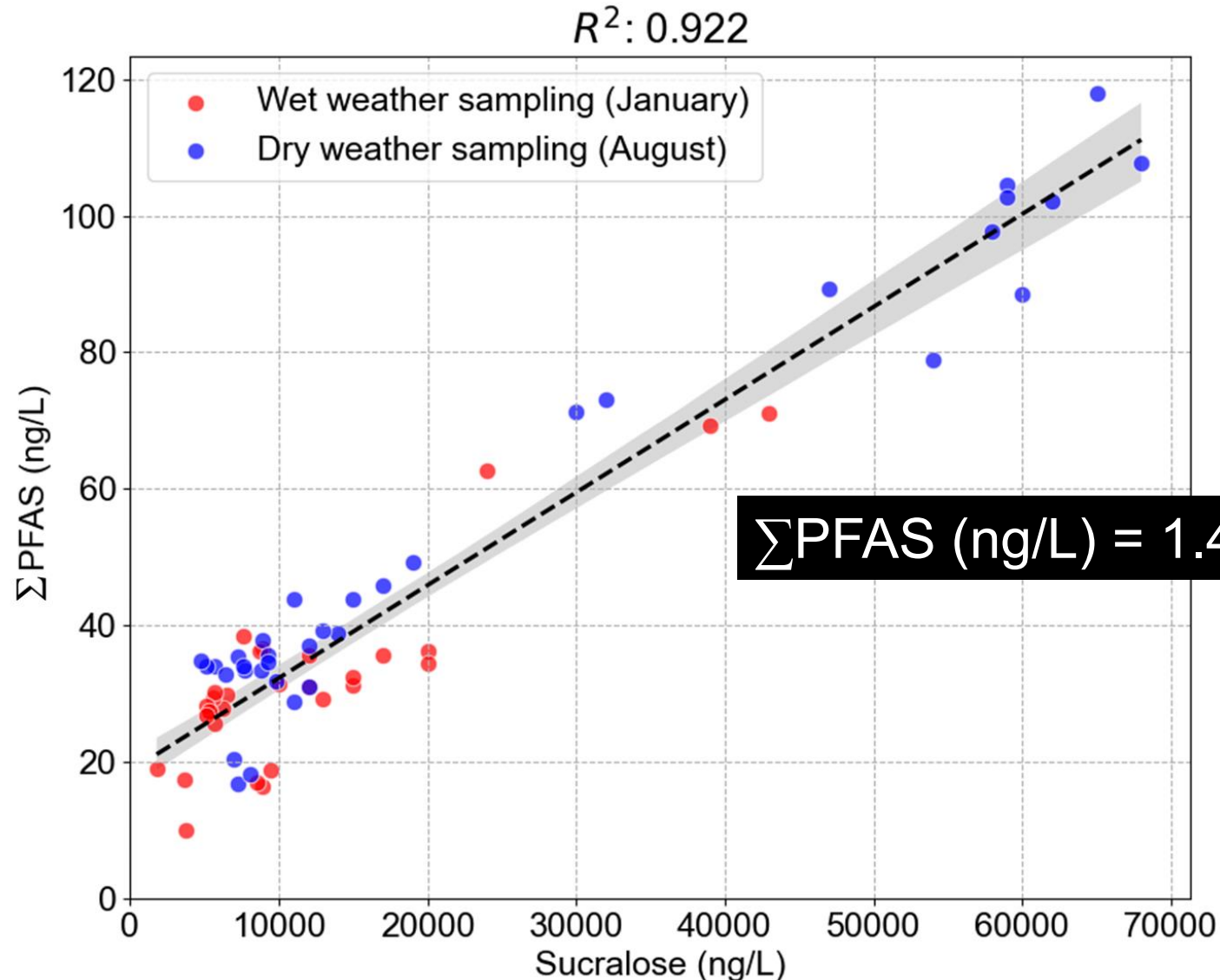


**Nationally & in Trinity River basin:
Sucralose concentrations
in WWTP effluents are
50,000 to 60,000 ng/L**

Sucralose concentration in Trinity River



Linear Relationship between Sucralose & Σ PFAS concentrations in Surface Water in Trinity River



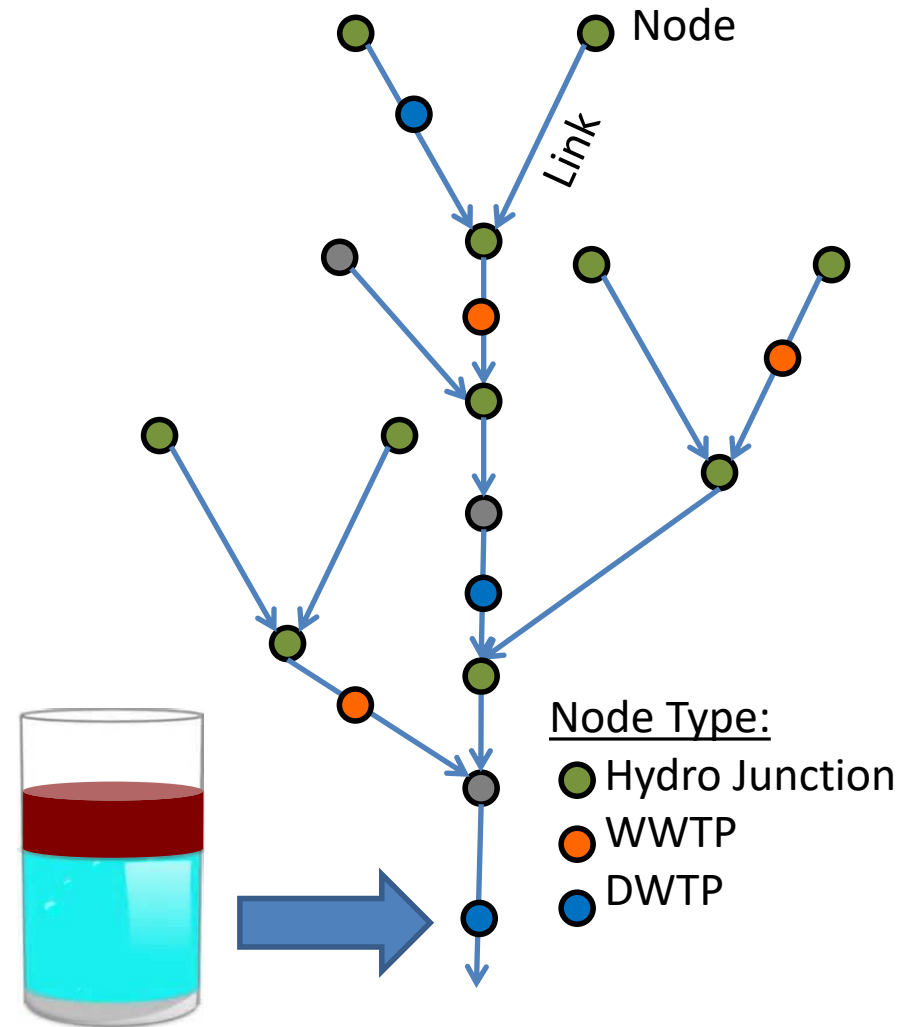
$$\Sigma\text{PFAS (ng/L)} = 1.4 \times [\text{sucralose } (\mu\text{g/L})] + 19 \pm 2.6$$

Islam, Thompson, Dickenson, Quiñones, Steinle-Darling, Westerhoff "Sucralose and Predicted De facto Wastewater Reuse Levels Correlate with PFAS Levels in Surface Waters", *ES&T Letters* (accepted April 2023)

Beyond "GRAB" sampling

- Defacto Reuse in our Nations Consumable water Supply (**DRINCS**)
- Links DWTPs and WWTPs spatially joined to river network

$$\text{DFR} = \frac{\sum Q_{\text{wastewater}}}{Q_{\text{total}}} \times 100\%$$



DRINCS Databases

Base Map: National Atlas of the United States and USGS

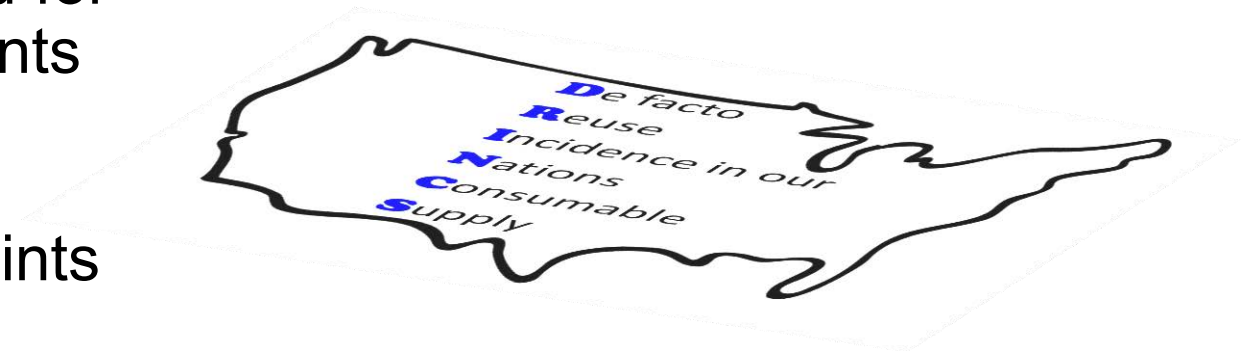
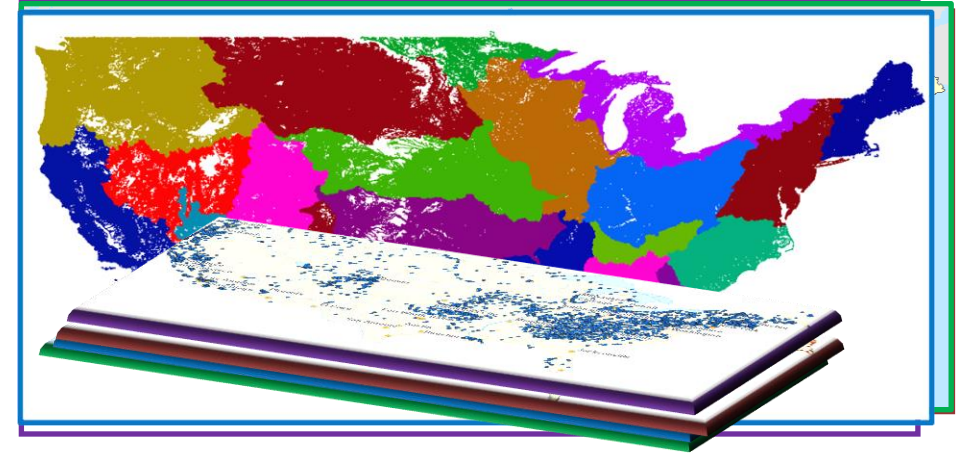
Hydrography: USGS National Hydrography Dataset Plus

WWTPs:

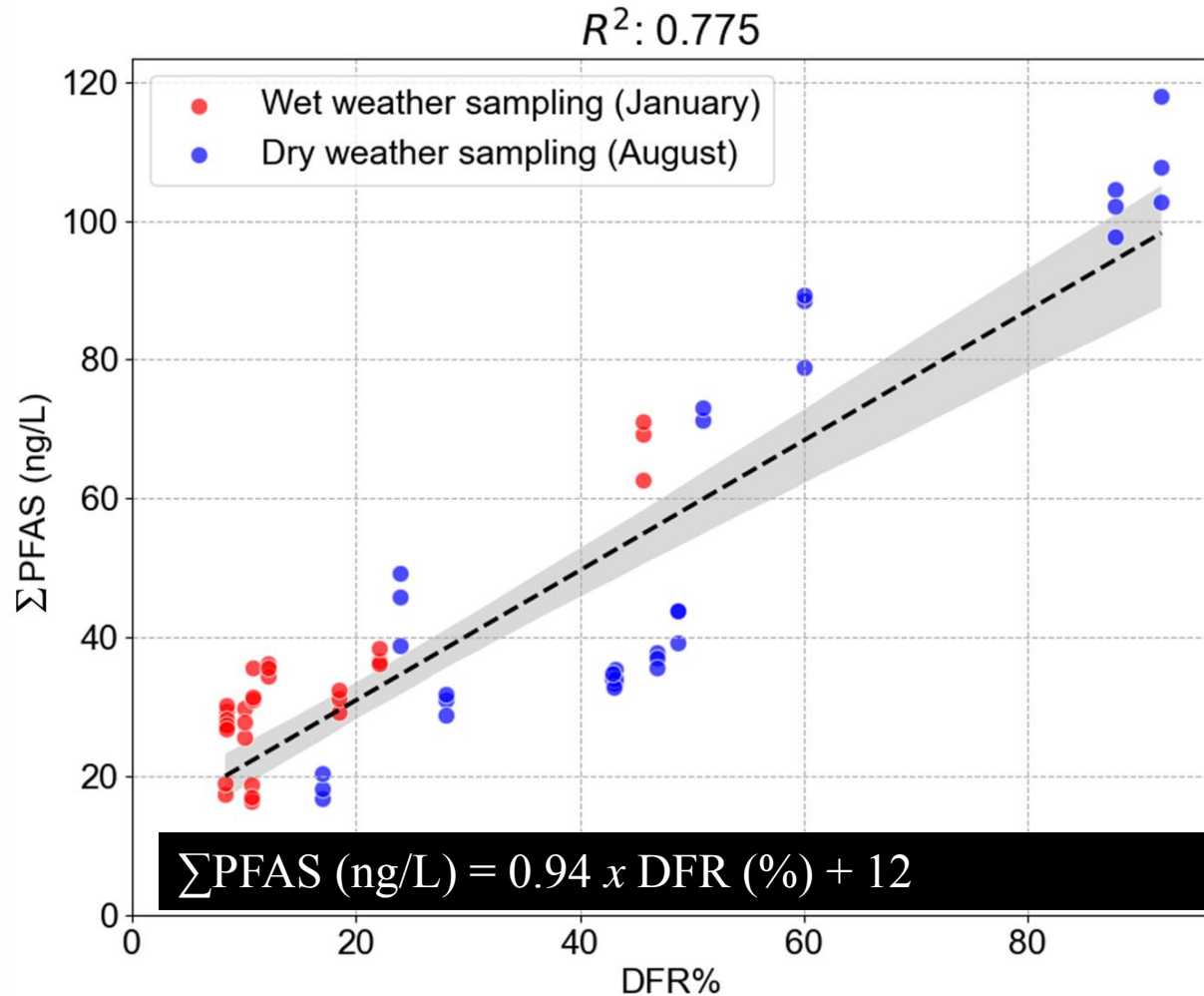
- 15,000 data points
- CWNS 2020
- Permit Compliance System used for data mining missing location points

DWTPs:

- ~14,000 surface water intake points



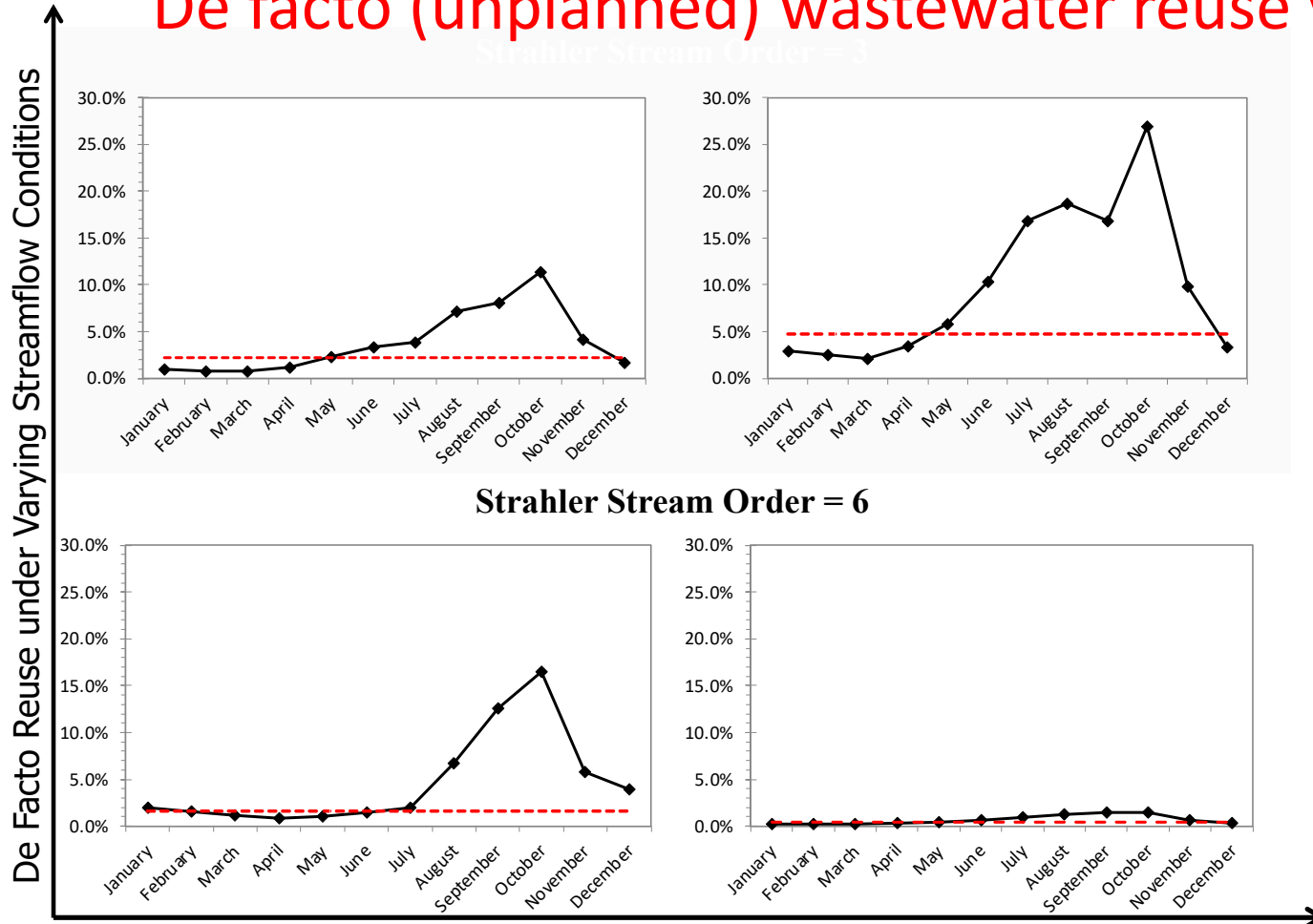
DRINCS Predicts %DFR that correlates well with Σ PFAS



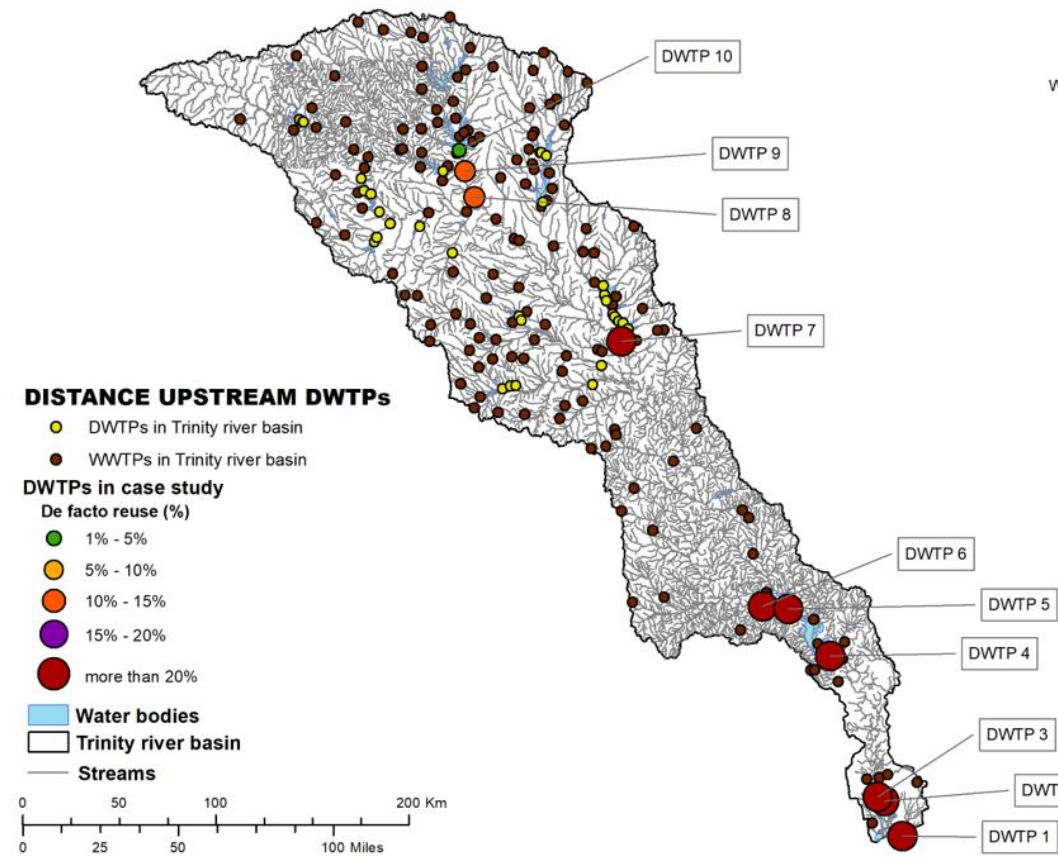
- **Municipal wastewater is the major source of PFAS into the Trinity River watershed**
- **Based upon chemical surrogates in “grab samples”**
- Not shown, but also predicts Sucralose
- Separate analysis of > 10,000 industrial discharges find no patterns or major sources of PFAS in this watershed

DRINCS Model Useful to Understand Temporal & Spatial patterns

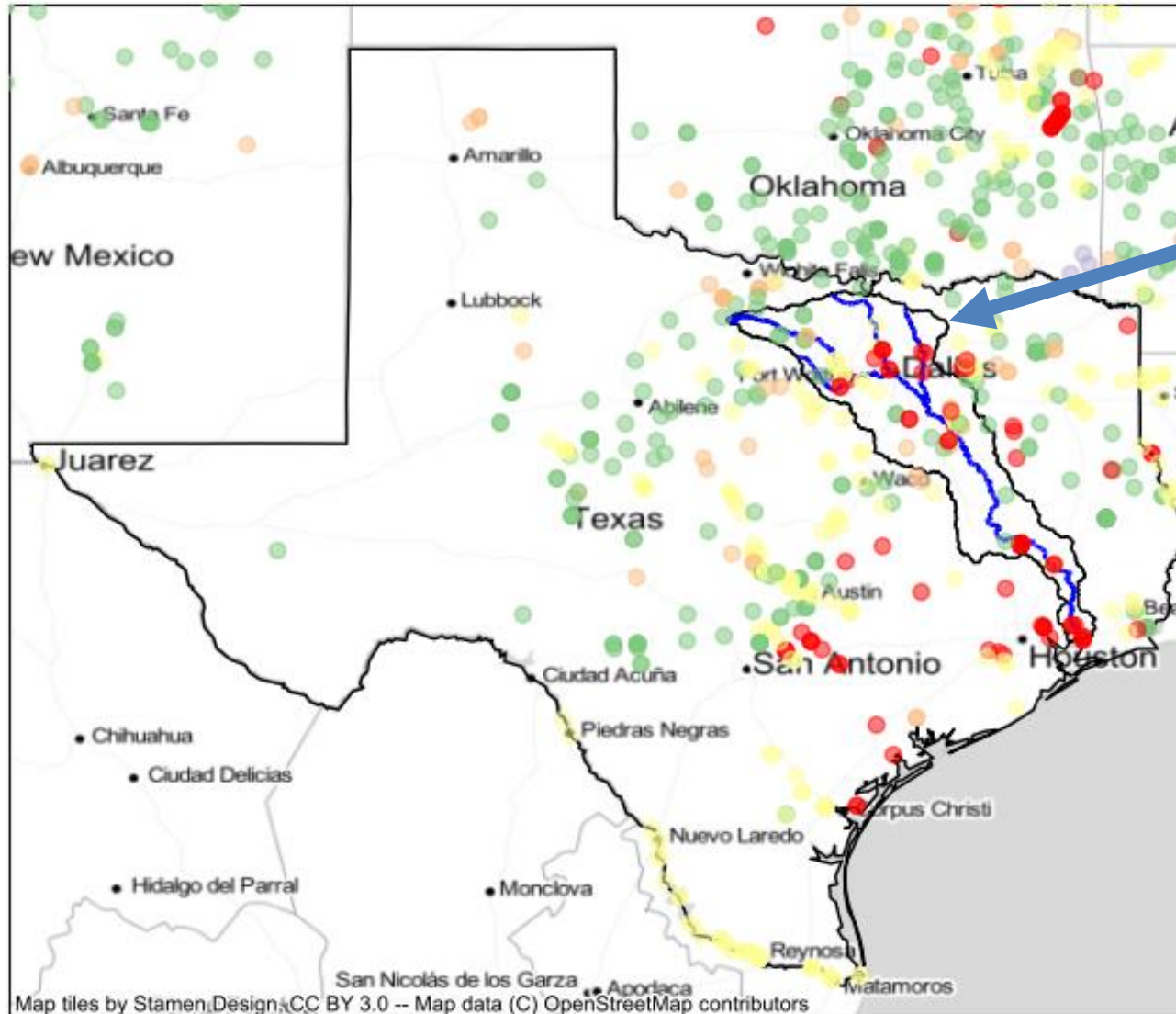
De facto (unplanned) wastewater reuse varies seasonal & spatially



*Red line represents DFR under Average Streamflow Conditions



DRINCS Prediction of PFOA in Texas

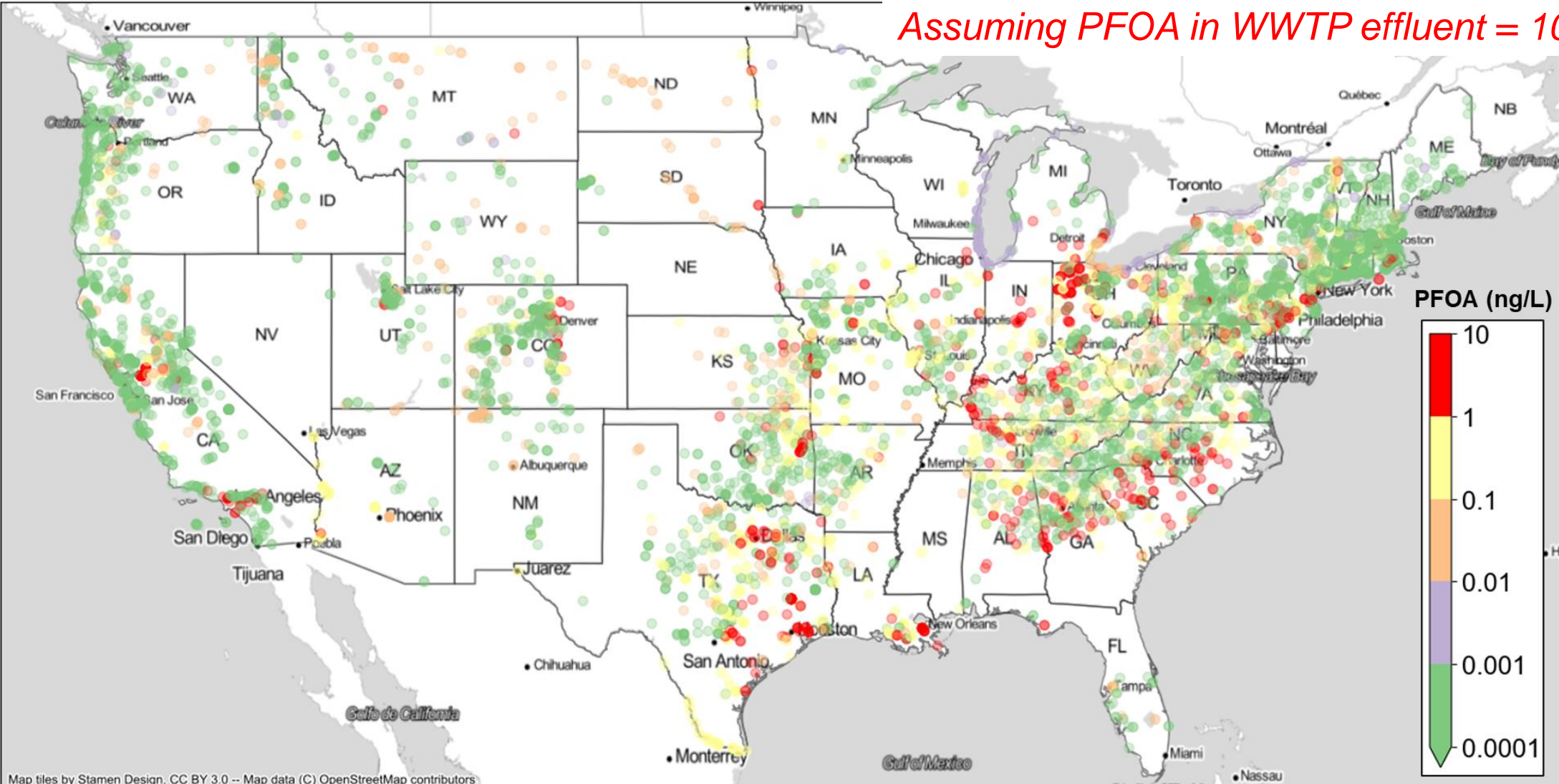


Trinity River Watershed

*Assuming PFOA in
WWTP effluent = 10 ng/L*

DRINCS Prediction of PFOA Nationally

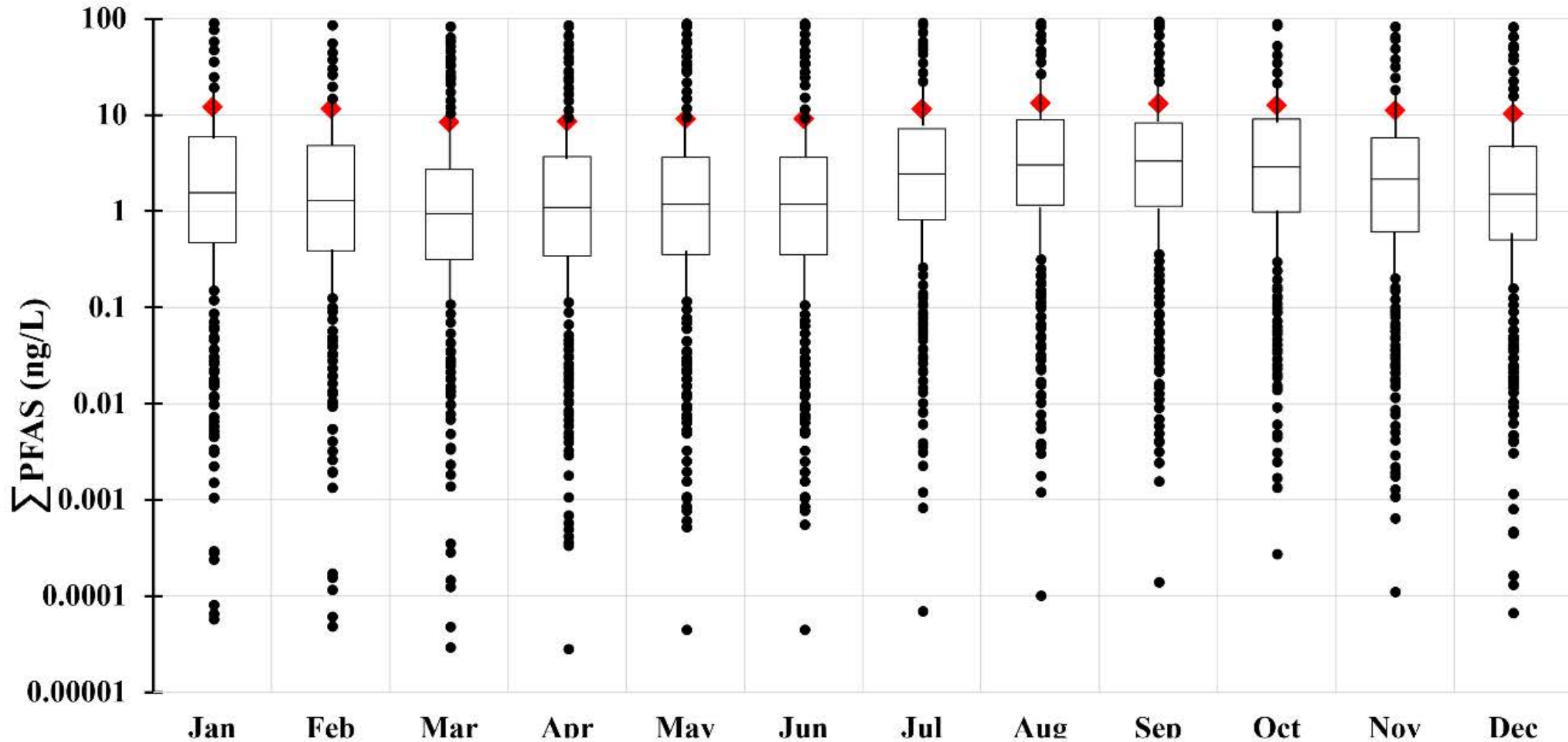
Assuming PFOA in WWTP effluent = 10 ng/L



Map tiles by Stamen Design, CC BY 3.0 -- Map data (C) OpenStreetMap contributors

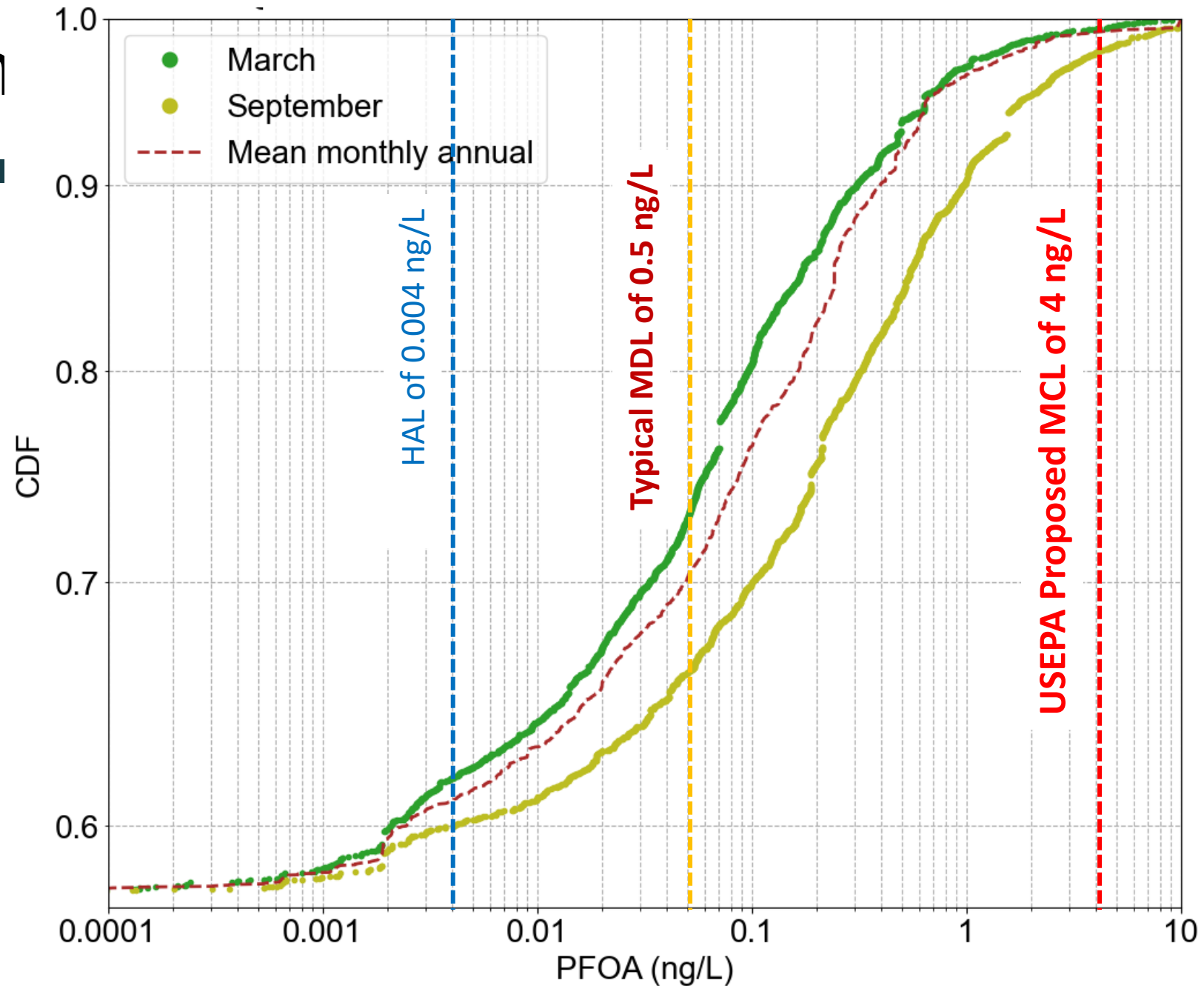
Σ PFAS predicts nationwide trends

Assuming Σ PFAS in WWTP effluent = 100 ng/L



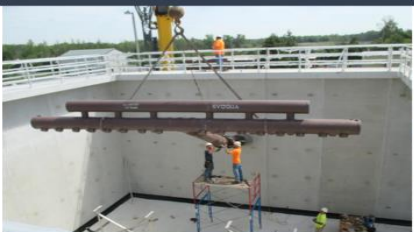
Nation

- Defacto reuse occurs at **~50% of surface water intakes** for DWTPs
- **WWTPs are ONE source** of PFAS into surface waters
- WWTP effluents provide a **ubiquitous BACKGROUND level of PFAS** in surface waters
- DRINCS helps **identify “PFAS hot spots”**
- **Models show limitations of field sampling** (seasonality, detection limits)



Summary

- Per- and Poly-Fluoroalkyl Substances (PFAS) occurs in river water and drinking water intakes due to upstream discharge of treated municipal wastewater
- Surrogates for wastewater (sucralose) are helpful to associate PFAS with wastewater sources: $\sum \text{PFAS (ng/L)} = 1.4 \times [\text{sucralose } (\mu\text{g/L})] + 19$
- DRINCS modeling can (1) identify “PFAS hot spots”, (2) explain PFAS seasonal trends, and (3) identify be used to estimate national treatment costs for new PFAS regulations





Contact: p.westerhoff@asu.edu



Paul Westerhoff, PhD, PE, BCEE, NAE

Regents Professor & Fulton Chair of Environmental Engineering
*School of Sustainable Engineering and The Built Environment, Arizona State University
(Tempe)*

Contributors:

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Islam, M. Thompson, Dickenson, Quiñones, Steinle-Darling, Westerhoff "Sucralose and Predicted De facto Wastewater Reuse Levels Correlate with PFAS Levels in Surface Waters", *ES&T Letters* (accepted April 2023)



Leadership and Excellence in Environmental Engineering and Science

Related DRINCS publications

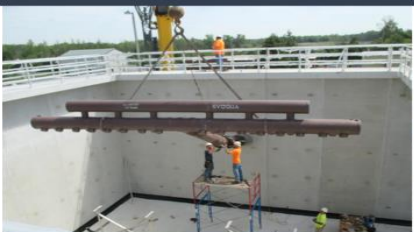
- **Islam**, Thompson, Dickenson, Quiñones, Steinle-Darling, Westerhoff “Sucralose and Predicted De facto Wastewater Reuse Levels Correlate with PFAS Levels in Surface Waters”, *ES&T Letters* (accepted April 2023)
- **Rice, J., Westerhoff, P. Wutich, A.** "Assessment of De Facto Wastewater Reuse across the USA: Trends between 1980 and 2008", *Environmental Science and Technology*, 47:19:11099-11105 (2013)
- **Rice, J. and Westerhoff, P.** “Spatial and Temporal Variation in De Facto Wastewater Reuse in Drinking Water Systems across the USA”, *Environmental Science and Technology*, 49:982-989 (2015)
- **Rice, J., Via, S., Westerhoff, P.** “Extent and Impacts of Unplanned Wastewater Reuse in U.S. Rivers” *Journal American Water Works Association*, 107:11:93 10.5942/jawwa.2015.107.0178 (2015)
- **Rice, J., Wutich, A., White, D.D., Westerhoff, P.** “Comparing Actual De Facto Wastewater Reuse and its Public Acceptability: A Three City Case Study”, *Sustainable Cities and Society*, 27:467-474 DOI: 10.1016/j.scs.2016.06.007 (2016)
- **Rice, J. and Westerhoff, P.** “US Streams at Low Flow Vulnerable to High Levels of Endocrine Pollutants from Wastewater”, *Nature Geoscience*, 10, 587-591 (2017)
- **Wang, Z., Shao, D., Westerhoff, P.** “Wastewater discharge impact on drinking water sources along the Yangtze River (China)”, *Science of the Total Environment*, 599-600, 1399-1407 (2017)
- **Nguyen, T., Westerhoff, P., Furlong, E.T., Kolpin, D.W., Batt, A.L., Mash, H.E., Schenck, K.M., Boone, J.S., Rice, J., Glassmeyer, S.T.** “Modeled De Facto Reuse and CECs in Drinking Water Source Waters”, *J. American Water Works Association* 110:4:E2-E18 (2018)
- **Barber, L.B., Rapp, J.L., Kandel, C., Keefe, S.H., Rice, J., Westerhoff, P., Bertolatus, D.W., Vajda, A.M.** “Integrated assessment of wastewater reuse, exposure risk, and fish endocrine disruption in the Shenandoah River Watershed”, *Environmental Science and Technology*, 53:3429-3440 (2019)
- **Wang, Z., Nguyen, T., Westerhoff, P.** “Food-Energy-Water Analysis at Spatial Scales for Districts in the Yangtze River Basin (China)”, *Environmental Engineering Science* 36:7:789-797 (2019)
- **Nguyen, T. and Westerhoff, P.** “Extent and implications of de facto reuse in Texas”, *NPJ Clean Water* 2:1:1-9 (2019)

2023 Honorary Member Janet G. Hering, Ph.D



At the end of 2022, Prof. Janet Hering retired as Director of the Swiss Federal Institute of Aquatic Science & Technology (Eawag) and Professor at the Swiss Federal Institute of Technology in Zürich (ETHZ) and Lausanne (EPFL). Prior to moving to Switzerland in 2007, Prof. Hering was a faculty member at Caltech and UCLA. She is a former Associate Editor of Environmental Science & Technology and former member of the Board of Reviewing Editors for Science. She is an elected member of the U.S. National Academy of Engineering, the Russian Academy of Natural Sciences (foreign member), and Academia Europaea.

Over her career, Prof. Hering's research interests have included the biogeochemical cycling of trace elements in natural waters, treatment technologies for the removal of inorganic contaminants from drinking water, and knowledge exchange at the interface of science with policy and practice. She has also been very engaged in promoting diversity in academia, particularly in supporting women in academic leadership. She received a Distinguished Women in Chemistry or Chemical Engineering Award from the IUPAC in 2015. Prof. Hering was the founding Vice Chair of the ETH Women Professors Forum, serving as Vice Chair from 2012 – 2016 and Chair from 2016 – 2020.



2023 International Honorary Member

Jiangyong Hu, Ph.D., BCEEM

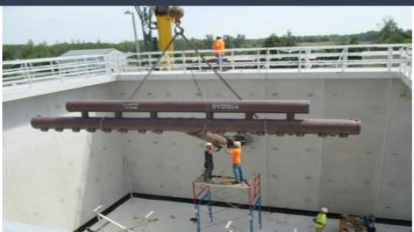


Professor Hu is Director for Environmental Engineering Program and Center for Water Research in Department of Civil and Environmental Engineering (CEE) at National University of Singapore (NUS), specializing in the field of water reclamation. She also serves as Group Head of Environmental Engineering, Hydrology and Hydraulics, and Climate Change at CEE, NUS and Deputy Director, NUS Environmental Research Institute since 2022.

Dr. Hu has published more than 190 papers in various international journals and acted as chairs/co-president for various international conferences. She serves as editor, associate editors, editorial board advisory member, academic editor, section editor, guest editors and editorial board members for various prestigious journals. She was invited to deliver more than 70 keynotes and invited talks in various regional/international conferences. Her research on water reclamation has made significant contributions towards the implementation of Singapore's NEWater for indirect potable applications. Her patented technology on engineering soil has been demonstrated in Singapore and China for stormwater management. Her patented UVLED disinfection system contributes to safe water in Singapore aquaculture system.

Dr. Hu is currently President of Environmental Engineering Society of Singapore, Chair of IWA specialist group management committee on Assessment and Control of Hazardous Substances in Water, and International Ultra-Violet Association Board Member. She is Fellows of IWA and Institute of Engineers Singapore.

Dr. Hu is Board Certified Environmental Engineering Member (by eminence). She is also the recipient of Prosper.net-Scopus Asian Pacific Young Scientist Award in 2009 and Best Environmental Practice Green Apple Award in 2016.



Leadership and Excellence in Environmental Engineering and Science

Stephanie Harrington

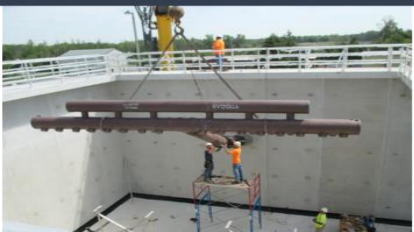
Director of Constituent Relations at ABET



Thank you, ABET for financially supporting the 2023 Excellence in Environmental Engineering and Science Education (E4S) Award

Stephanie has spent over 25 years in STEM education as an expert in academic and professional society environments. With a background as a structural engineer, she brings professional practice expertise to her roles in advancing education. In addition to working with STEM education programs at professional organizations, she has been on faculty at the Catholic University of America and is currently an adjunct at Northern Virginia Community College. Stephanie most recently served as the Director of Marketing and Development at the American Society for Engineering Education. She is currently the Director of Constituent Relations at ABET.

Stephanie received her bachelor's degree in Civil Engineering from the University of Virginia and her master's degree in Civil Engineering from the University of Texas at Arlington.



Leadership and Excellence in Environmental Engineering and Science

2023 Excellence in Environmental Engineering and Science Education (E4S) Award Recipient Sponsored by ABET

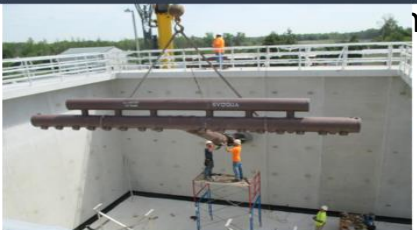


Yuefeng Xie, Ph.D., P.E., BCEE

Yuefeng Xie has been a Professor of Environmental Engineering at the Pennsylvania State University, Harrisburg campus for over 27 years. He is also a Distinguished Visiting Professor in School of Environment at Tsinghua University. Dr. Xie was the Chair of AWWA Organic Contaminant Control Committee and the founding President of Chinese-American Professors in Environmental Engineering and Sciences. He also served as a member of US EPA Science Advisory Board's Drinking Water Committee under three administrations.

With a teaching and research focus on drinking water quality and water treatment, Dr. Xie has published over 100 peer-reviewed journal papers. He also published one book and co-edited two books in disinfection byproducts. Dr. Xie co-founded and directed two centers at Penn State, which provided trainings to approximately 15,000 water professionals (registrations). Dr. Xie co-organized 20-plus professional workshops, including two multi-day ACS disinfection byproduct symposia and six AWWA WQTC Sunday workshops. Dr. Xie has also been extensively involved in water professional training in Canada, Singapore and China.

Dr. Xie received Penn State Harrisburg Faculty Excellence in Research Award and Penn State University Faculty Outreach Award. An IWA Fellow and a Fulbright Scholar, he also received PWEA Professional Research Award, PAAWWA Special Recognition Award, and CAPEES Lifetime Achievement Award. Dr. Xie's 20-plus-year contributions to Penn State's wastewater reuse operation was recognized with an honorary road "Xie Lane" nomination at Penn State University Park. "Water Doc Lane",



2023 W. Wesley Eckenfelder Graduate Research Award Recipient



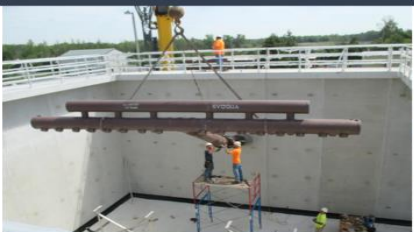
2023 Recipient: Anna Kogler, Stanford University

Faculty Advisor: Dr. William A. Tarpeh, Stanford University

Anna Kogler is a fourth-year PhD student and Stanford Interdisciplinary Graduate Fellow in the Department of Civil and Environmental Engineering at Stanford University. She previously interned as an operator at Stanford's Codiga Resource Recovery Center and worked as an environmental engineering consultant in water treatment. She earned a BS in Chemical Engineering at Washington University in St. Louis.

Now in Dr. William Tarpeh's lab, Anna studies electrochemical ammonia recovery from wastewater, which can reduce the costs and environmental impacts of wastewater treatment and chemical production while facilitating expansion of sanitation systems. She developed and evaluated flexible electrochemical stripping, a novel reactor that facilitates tunable recovery of ammonium sulfate fertilizer and ammonia disinfectant. To evaluate the quality and safety of recovered products, Anna investigates the fate of organic contaminants, including pharmaceuticals and disinfection byproducts, in electrochemical technologies treating urine. She also evaluates performance stability and maintenance requirements during long-term operation of electrochemical stripping to inform scale-up and implementation. Throughout her PhD, Anna has collaborated with practitioners in the U.S. and Senegal to enhance the impact of her research. She has also engaged undergraduate and master's students in her projects to build her mentorship skills.

With undergraduate education and mentorship at the heart of her mission, Anna aims to become a professor at a predominantly undergraduate institution. She hopes to integrate content on electrochemical treatment, environmental justice, and decentralized wastewater systems in her teaching while she conducts interdisciplinary research building on her PhD work and centering undergraduate experiences.



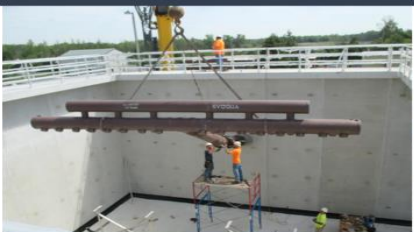
2023 AAEEES Science Award Recipient

Gregory V. Lowry, Ph.D., BCEEM



Greg Lowry is a Walter J. Blenko, Sr. Professor at Carnegie Mellon University and Executive Director of New Initiatives in Civil and Environmental Engineering. He is also an Executive and Associate Editor of the ACS Journal Environmental Science & Technology. He is on the editorial board of the ACS Journal Environment & Health, the RSC Journal Environmental Science: Nano, and Nature: Scientific Data. Lowry holds a B.S. in chemical engineering from the University of California at Davis, an M.S. in civil and environmental engineering from University of Wisconsin at Madison, and a Ph.D. in civil and environmental engineering from Stanford University. He holds a Doctor Honoris Causa of Aix Marseille University.

His research is addressing important global sustainability challenges in agriculture, environmental remediation, and energy through fundamental research in environmental geochemistry, nanochemistry, and nanobiotechnology. Current applications of interest include the development of efficient nano-carriers for efficient agrochemical delivery, remediation and destruction of perfluoroalkyl substances in groundwater, development and testing of robots for autonomous characterization and sampling of contaminated soils, environmental fate of mercury, and biological reduction of selenium in powerplant wastewater.



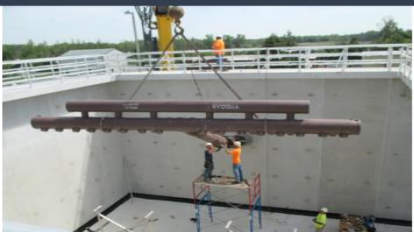
Leadership and Excellence in Environmental Engineering and Science

2023 Brewster Snow Award Recipient

Josh Fuchs

Advisor: Linda Kay Weavers, Ph.D., P.E., BCEE, The Ohio State University

Josh Fuchs is a master's student and researcher at The Ohio State University and will be completing his M.S. degree in spring 2023. His master's project involved developing an ozone design standard for public water systems in the state of Ohio. This project is a collaboration between the Ohio Water Resources Center at Ohio State and various contributors that include Ohio EPA, various design consultants, utility representatives, and the Ohio AWWA Technology Committee. The design standard streamlines an emerging technology in Ohio by lowering the cost, time, and challenges to get regulatory approval for ozone design. The goal of the project is to increase finishing drinking water quality in Ohio by increasing the feasibility for smaller public water systems to implement ozone for common treatment challenges such as microcystins, taste and odor compounds, and disinfection byproducts. After review by Ohio EPA, the design standard will be used for regulatory approval of ozone treatment of drinking water in Ohio. After graduation, Josh plans to return to consulting for water and wastewater improvement projects and gain his PE license. Josh also hopes to work in developing communities in the future to apply engineering experience to solve challenges with water treatment and access.



2023 Paul F. Boulos Excellence in Computational Hydraulics/Hydrology Award Recipient



Tom JW Postma

Advisors: Catherine A. Peters, Ph.D., BCEEM, Princeton University | Michael A. Celia, Princeton University

Tom Postma is a petroleum engineer working on the development of large-scale carbon capture and storage (CCS) projects, as well as on the growth of the global CCS industry more broadly.

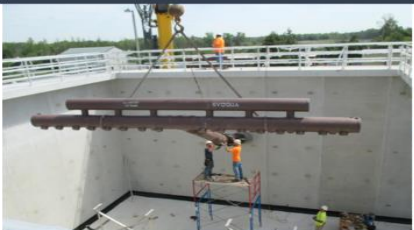
Tom is now a CCS specialist at bp in Houston, Texas. As part of bp's CCS center of expertise, he now works at the interface of R&D, business development and engineering to help expand bp's CCS business on a global scale.



Zhaocheng Wang, Ph.D.

Advisor: Enrique R. Vivoni, Arizona State University

Zhaocheng Wang is a hydrologist interested in remote sensing and numerical modeling. Zhaocheng aims to improve the understanding of hydrologic processes and advance water sustainability and resilience by combining ground observations, remote sensing datasets, and regional hydrologic models. Zhaocheng received his B.Eng. in Water Science and Engineering from the College of Civil Engineering at Hunan University (China) in 2017. He obtained his M.S.E. and Ph.D. in Civil, Environmental, and Sustainable Engineering from the School of Sustainable Engineering and the Built Environment at ASU in 2020 and 2023, respectively. After graduation, Zhaocheng will work as a postdoctoral research associate at Center for Hydrologic Innovations at ASU to advance water technologies and disseminate new technologies to water managers for public impact.



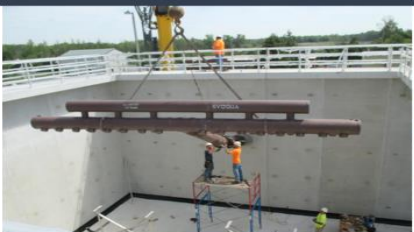
2023 Gordon Maskew Fair Award Recipient

Morton A. Barlaz, Ph.D., P.E., BCEE



Dr. Morton A. Barlaz is a Distinguished University Professor in the Department of Civil, Construction, and Environmental Engineering at North Carolina State University. He received a B.S. in Chemical Engineering from the University of Michigan and an M.S. and Ph.D. in Civil and Environmental Engineering from the University of Wisconsin. He has conducted extensive research on landfills including biological refuse decomposition, methane production, the fate of hazardous wastes, policies for their long-term management after closure, the release of per- and polyfluoroalkyl substances (PFAS), and factors contributing to heat generation and accumulation. Dr. Barlaz is also recognized for his research on the use of life-cycle analysis to evaluate environmental emissions associated with alternate solid waste management strategies.

Dr. Barlaz has published over 150 peer-reviewed publications. He was awarded the Perry L. McCarty Founders' Award and the Frederick George Pohland Medal by the Association of Environmental Engineering and Science Professors (AEESP) and AAEES, the Richard I. Stessel Waste Management Award by the Air & Waste Management Association and is a Fellow of the American Society of Civil Engineers, AEESP and the American Association for the Advancement of Science.



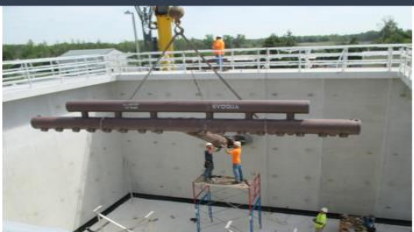
2023 Edward J. Cleary Award Recipient

Rao Y. Surampalli, Ph.D., P.E., BCEE, Hon.D.WRE,
F.WEF, Dist.F.IWA, F.AAAS, Dist.M.ASCE, NAC



Dr. Surampalli has had a highly distinguished career for more than 40 years; and is currently President and Chief Executive Officer of the Global Institute for Energy, Environment and Sustainability. He was with the U.S. Environmental Protection Agency and retired after working for 30 years. Throughout his career, Dr. Surampalli has used innovative and sustainable environmental technologies for recovery and reuse of resource and energy, remediation of contaminated soils and groundwater, wastewater treatment and emerging contaminants removal, solid and hazardous waste management, provided humanitarian technical assistance and built technical capacities in 25 countries across the six continents, and has played a significant role in climate change mitigation and adaptation. He is dedicated to the development of a more sustainable society for social good and global sustainability.

A Distinguished Alumnus and Hall of Fame inductee of both the Oklahoma State and Iowa State Universities, he has received over 30 national awards/honors: including election as a WEF Fellow and Distinguished Fellow of IWA, Member of the European Academy of Sciences and Arts (EASA), Fellow of the American Association for the Advancement of Science (AAAS), Member of the U.S. National Academy of Construction (NAC), and recognized as a Distinguished Member of the American Society of Civil Engineers - the highest honor of ASCE. Several awards from AAEEES: including its Kappe Lecture Award, Gordon Maskew Fair Award, Edward Cleary Award, Superior Achievement Award, and the Grand Prize for University Research.



Leadership and Excellence in Environmental Engineering and Science

2023 Stanley E. Kappe Award Recipient

David A. Chin, Ph.D., P.E., BCEE

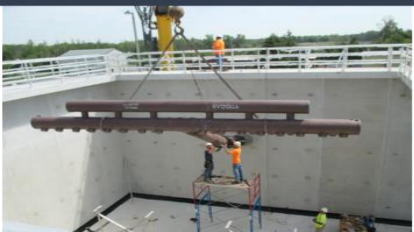


David A. Chin, Ph.D., P.E., BCEE has been involved in the Academy since 1997 when he initially became Board certified in the Water Supply and Wastewater area.

Since then, his contributions to the Academy include:

1. representing the Academy on the Applied and Natural Science Accreditation Commission,
2. representing the Academy on the Engineering Accreditation Commission,
3. chairing of the Education Committee of the Academy, and
4. serving as Vice President of the Academy.

He serves as the Chi Epsilon District Councilor for the Southern District and oversees all Chi Epsilon (honor society) chapters in the southeastern United States. He is a Professor of Civil and Environmental Engineering in the Department of Chemical, Environmental, and Materials Engineering at the University of Miami. He has authored three textbooks, numerous refereed journal publications, and currently serves as the Chief Editor of the ASCE Journal of Irrigation and Drainage Engineering.



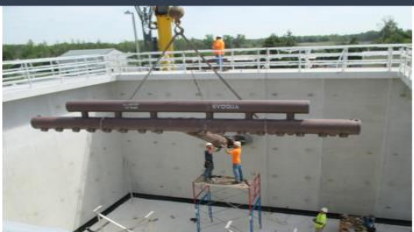


Intermission

At this time, we will take a five-minute intermission so you can stretch your legs, grab a coffee or send an email.

During the break, we will be displaying a list of some recent webinars you may have missed.

**You can find all of our webinar recordings at
<https://www.aaees.org/aaeeswebinarslibrary>**



Recordings of these webinars can be found at <https://www.aees.org/aaeeswebinarslibrary>

Potable Reuse in California: Past, Present and Future

Shane Trussell, Ph.D., P.E., BCEE

President

Trussell Technologies, Inc.



So, you want to be a PE and achieve AAEES Board Certification, but how?

Practical details of education, experience, examination, and continuing professional development



Isreal Hodges, Jr, PE, BCEE
Lead EHS Specialist
Rivian



Daniel B. Oerther, PhD, PE, BCEE, BCES
Executive Director
AAEES

Complying with the New EPA Multi-Sector General Industrial Stormwater Permit: A Range of Cost Alternatives



Tyler Marshall, P.E.



Bill Carrig, P.M.P.



Trent Humphrey

This event is sponsored by



Plastics: Hero or Villain When We Manage Their Afterlife?



Bob Gardner, P.E., BCEE
Senior Vice President
SCS Engineers



Chaz Miller
CEO
Miller Recycling Associates

Recordings of these webinars can be found at <https://www.aees.org/aaeeswebinarslibrary>

The New Era of Climate Change: Turn Risk into Opportunity



Paul Chinowsky
Founder and President
Resilient Analytics, A Stanley
Consultants company



Jacob Helman
Lead Engineer
Resilient Analytics, A Stanley
Consultants company

The EPA's Brownfield Program Little-Known Funding Mechanism to Address Asbestos, Lead: Case Study



Daphnea Ryan
City of Texarkana



Melissa Tidemann
Stanley Consultants



Julie Oriano
Stanley Consultants

Locally Enhanced Electric Field Treatment (LEEFT) for Disinfection

Xing Xie, Ph.D.

Assistant Professor and
Carlton S. Wilder Junior Professor

School of Civil and Environmental Engineering
Georgia Institute of Technology



Stanley Consultants

Converting Organic Waste into Liquid Gold

Jay Brady, Stanley Consultants



Jon Koch, City of Muscatine



Recordings of these webinars can be found at <https://www.aees.org/aaeeswebinarslibrary>

The Role of Leadership in Accelerating Change in US Public Sector Water Organizations

Adel H. Hagekhalil, P.E., BCEE

General
Manager
and Chief
Executive
Officer



THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Robert C. Ferrante, P.E., BCEE

General
Manager
and Chief
Engineer



LOS ANGELES COUNTY
SANITATION DISTRICTS
Converting Waste Into Resources

Locally Relevant Soil Moisture Monitoring for Water Resources Applications

Dr. Noemi Vergopolan
Princeton University



Atmospheric and Ocean Science Program
NOAA Geophysical Fluid Dynamics Laboratory

Environmental Justice at EPA

Dr. Philip Fine

*Principal Deputy Associate
Administrator for Policy*
Environmental Protection Agency



Dr. Philip Fine will discuss the key priorities and actions being taken by EPA and the Biden-Harris Administration to advance Environmental Justice.

Regulations, Sampling and Operating PFAS Treatment Systems in the US

Viraj DeSilva, Ph.D., P.E., BCEE

Senior Treatment Process Leader



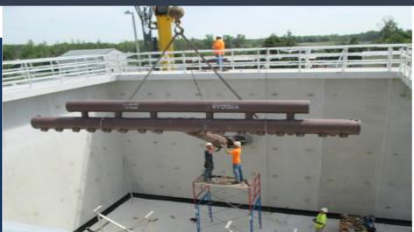
Freese and Nichols, Inc.

Viraj deSilva, PhD, PE, BCEE, leads Freese and Nichols' Treatment Process services. His national and international experience includes specific expertise in PFAS regulation/treatment.

2023 E3S Winners

*Excellence
in Environmental
Engineering & Science™*

The Excellence in Environmental Engineering and Science™ Awards Competition exists to identify and reward the best of today's environmental engineering and science. Its criteria define what it takes to be the best in environmental engineering and science practices: a holistic environmental perspective, innovation, proven performance and customer satisfaction, and contribution to an improved quality of life and economic efficiency.



Design

Grand Prize

A Headworks Divided - The Key to Unlocking Expanded Water Reuse in Orange County, CA

Entrant: Orange County Sanitation District; In Partnership with Orange County Water District

Engineer-in-charge: Shahrzad Namini

Location: Huntington Beach, California

Thank you AAEE judges for recognizing our efforts to develop the world's largest water recycling facility. The success of this project is due to collaboration and partnership which allows us to recycle 100 percent of our reclaimable flow to produce 130 million gallons of water a day.

- OC San and OCWD

Grand Prize

Tomahawk Creek WWTF Expansion

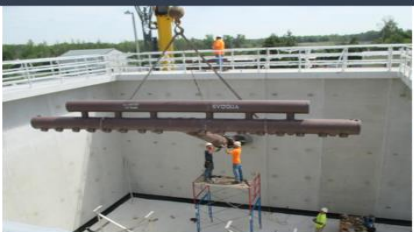
Entrant: Black & Veatch

Engineer-in-charge: John Keller

Location: Leawood, Kansas

We are incredibly proud of the success of this project, which was achieved through a strong partnership with Johnson County Wastewater and our teaming partners. This accomplishment is a testament to the dedication, hard work, and collaborative spirit of everyone involved, and we look forward to celebrating our achievements together.

-Black & Veatch



Environmental Sustainability

Honor Award

8.5 Square Mile Area (SMA) Limited Curtain Wall

Entrant: R.J. Behar & Company, Inc.

Engineer-in-Charge: Juan H. Vazquez, P.E., PH, BCEE

Location: Miami-Dade County, Florida

We would like to express our gratefulness to the South Florida Water Management District for the opportunity to work on this high-profile and challenging project. Thank you to the judges of AAEEES for acknowledging this major accomplishment and hard work by all the parties involved.

- R.J. Behar & Company, Inc.

Grand Prize

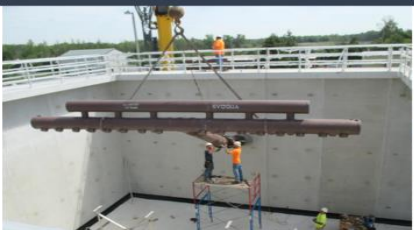
Reducing Our Carbon Footprint: The Sanitation Districts' Greenhouse Gas Reduction Initiatives

Entrant: Los Angeles County Sanitation Districts

Engineer-in-Charge: Robert C. Ferrante, P.E., BCEE

Location: Whittier, California

"The Sanitation Districts are honored by this recognition and proud to have achieved carbon neutrality. We continue to look for more ways to reduce GHG emissions and help make Los Angeles County more sustainable."



Planning

Grand Prize

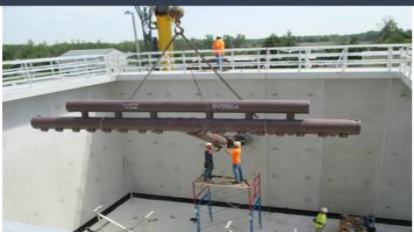
Los Angeles Groundwater Replenishment Project

Entrant: Los Angeles Department of Water and Power

Engineer-in-Charge: Jesus Gonzalez

Location: Los Angeles, California

The LA GWR Project is one of the key strategies to help reduce the purchase of imported water, increase our local water supplies and improve our water reliability; and it could not have come at a more critical time, especially in light of worsening drought conditions in California and the West. The Project is a major milestone for the city and the region, and LADWP and LASAN couldn't be more proud to continue our partnership.



Small Projects

Honor Award

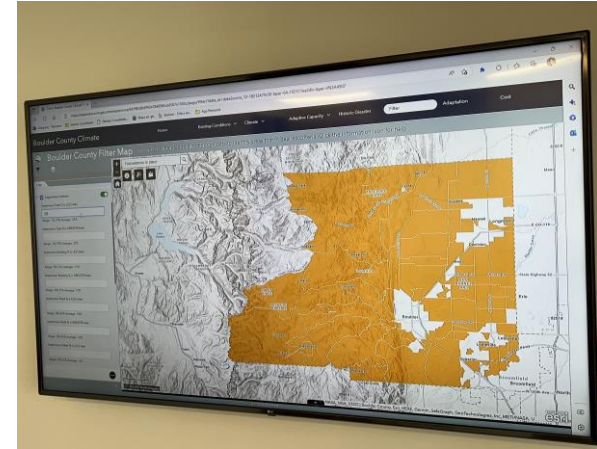
Disaster Equity Reconstruction After the Marshall Fire

Entrant: Resilient Analytics, A Stanley Consultants Company

Engineer-in-Charge: Dr. Paul Chinowsky

Location: Boulder County, Colorado

The equity map was created to identify those most in need after the Marshall Fire. Thank you, AAEEES judges, for recognizing the significance of this new tool, which marks the first-time land use, social data and future climate projections were brought together at a neighborhood level to inform land use and planning.



Grand Prize

Plastic Waste Collection, Processing and Recycling with Employment Generation

Entrant: Bharathi Theertha and Rotary Club of Naperville, IL

Engineer-in-Charge: Dr. Prakasam Tata, Ph.D., BCES, WEF Fellow

Location: Naperville, Illinois

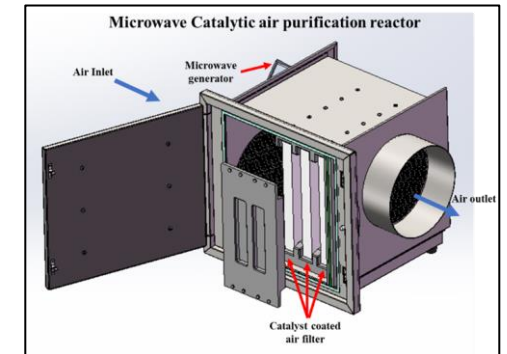
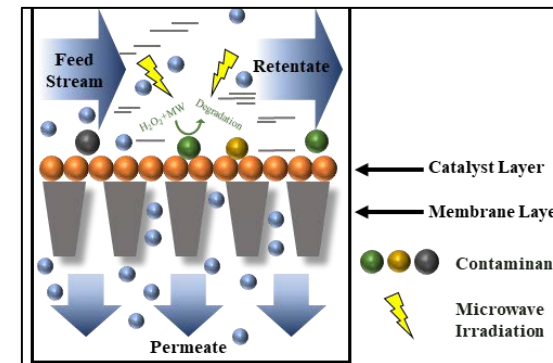


University Research

Grand Prize

Microwave-Catalytic Membrane Technology for Recalcitrant Water Pollutant Removal and Airborne Pathogen Disinfection

Entrant: New Jersey Institute of Technology
Engineer-in-Charge: Wen Zhang, Ph.D., P.E., BCEE
Location: Newark, New Jersey



The utilization of microwave-enabled membrane filtration technology, integrated with catalytic reactions, offers a promising and cost-effective solution to tackle the worldwide issues of ensuring safe water and air. We are grateful to the AAEEES judges for acknowledging the NJIT team's dedication and effort in achieving this outcome.

- New Jersey Institute of Technology



2016 Superior Achievement Award Winner



Every day, around the world more than 5,000 children under the age of five die from preventable waterborne infectious disease. To address this problem in Central America, Professor Daniel B. Oerther partnered with local communities to train village water committees to construct CAWST biosand filters. Between 2009 and 2016, more than 3,500 biofilters were constructed in schools and individual homes by the villagers. A water local water testing lab was established, the Professor Oerther's team was the first to demonstrate Structural Equation Modeling to evaluate the effectiveness of biosand filters. The success of this project improved environmental quality and provided direct social and economic advantage to villagers in the Ixcán region of Guatemala.



Superior Achievement Award

COUVILLION

Subsea Containment System that Captures the Longest Running Offshore Oil Spill in US History

Entrant: Couvillion Group

Engineer-in-Charge: Matthew Couch

Location: Gulf of Mexico, Mississippi Canyon Block 20



The massive success of the MC-20 Rapid Response Solution Project is due to a cohesive team, led by Couvillion Group with the support of the United States Coast Guard, working diligently for a common cause. Thank you AAEEES judges for recognizing the outcome and hard work by all involved.



Couvillion Speakers

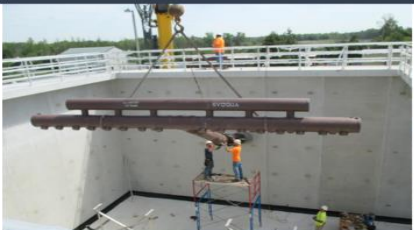
Timothy Couvillion **President/CEO**

Timmy Couvillion is the President and CEO of Louisiana's Belle Chasse-based Couvillion Group which specializes in providing marine construction and salvage, port and vessel maintenance services, emergency response, and disaster recovery for the oil and gas industry.



Dillon Hoffmann **Special Projects/Engineering Manager**

Dillon Hoffmann is the Special Projects/Engineering Manager at Belle Chasse-based Couvillion Group. He has been the project lead on the highly successful, first of its kind subsea oil spill containment and collection system for the longest running oil spill in U.S. history at Mississippi Block 20 site in the Gulf of Mexico. He has overseen the collection, capture and recycle of over 1 million gallons of crude oil that would have otherwise polluted the Gulf waters.



COUVILLION

**Containing the Longest Active
Oil Spill in United States
History**

Presentation Outline

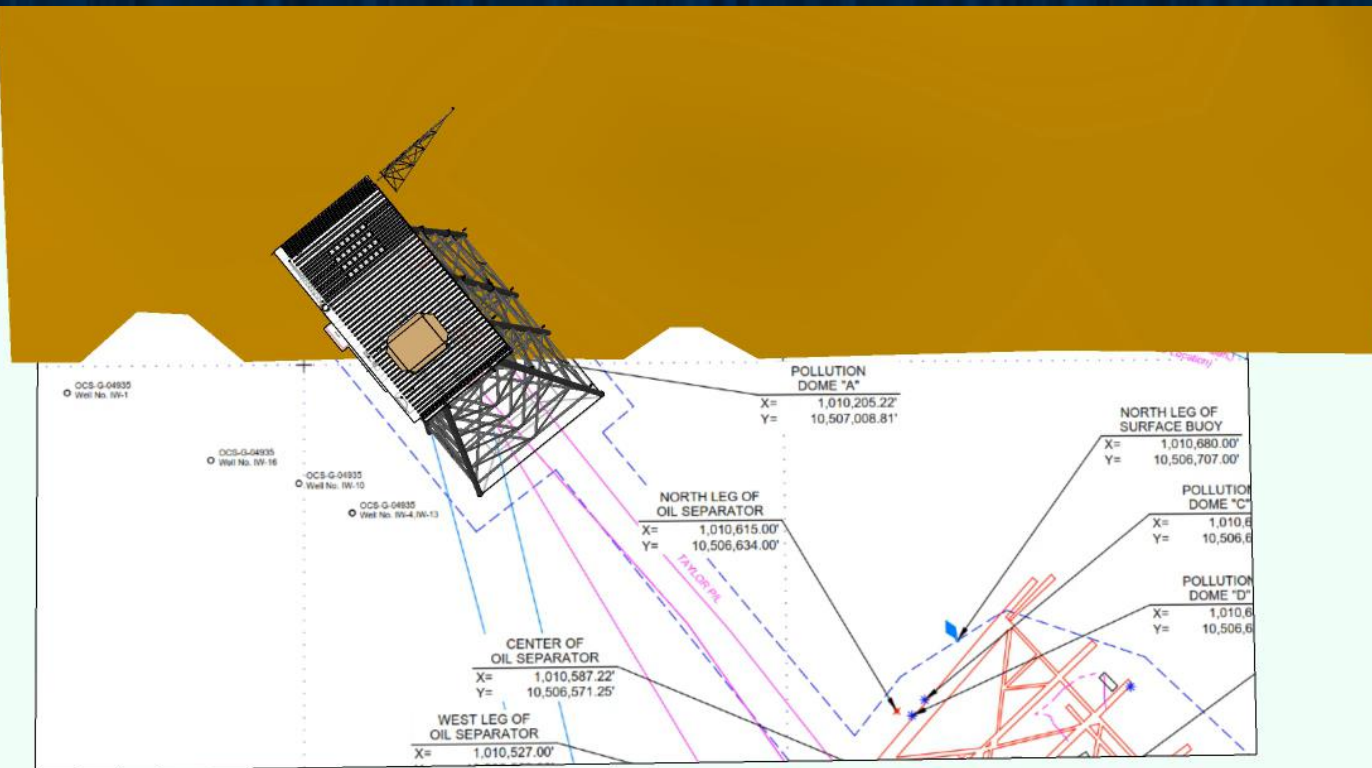
- Oil and Gas industry in the Gulf of Mexico
- 60 Minutes clip on MC 20 background
- Timeline of the Rapid Response System Project
- Fast tracking an oil spill response project
- Engineering studies and challenges
- Fabrication and Installation
- System performance

Oil and Gas Industry in the Gulf of Mexico

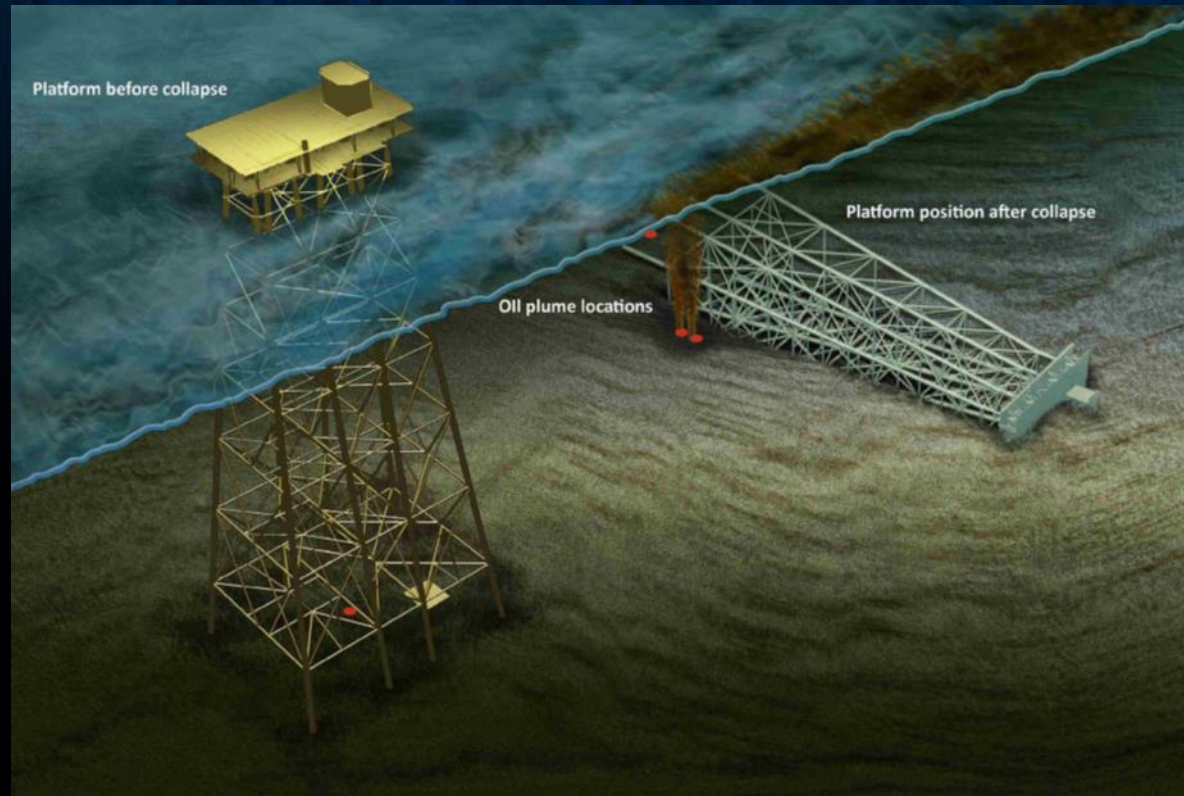
- According to the Bureau of Safety and Environmental Enforcement (BSEE) the Gulf of Mexico is currently home to:
 - Nearly 2,000 offshore structures
 - 13,135 miles of active oil/gas pipelines
 - An average of 1.7 million of barrels of oil per day are produced in the Gulf
 - 15% of total US crude production
 - 47% of the US crude refining takes place on the Gulf Coast



MC-20 Platform Toppling



MC-20 A Platform Pre/Post Hurricane Ivan



MC-20 Oil Response Timeline

- On October 23, 2018 Administrative Order 19-001 was issued to the Responsible Party (RP) to institute a containment system to capture, contain and remove oil from the MC20 site.
- Solicitations were sent to 130 Contractors across the nation.
- The MC-20 Response Team chose Couvillion Group's proposal and gave RP the opportunity to contract directly with Couvillion and they declined to enter into a contract.
- After a notice of Federal assumption, United States Coast Guard (USCG) issued a notice to proceed to Couvillion Group, LLC on 19 November 2018 to install a containment system.
- Within five months of contract award Couvillion Group had designed, fabricated, tested, installed, and was operating the RRS system onsite collecting oil.
- **Oil capture began on April 12, 2019 and continues to this day.**

Design Parameters Provided – “Only One Page”

- Operating Parameters provided by USCG to Potential Subcontractors:
- Water depth is approximately 470 feet. API gravity of source oil 21-38.
- Water temperature at the site in the range of 32-40 degrees F and potential for hydrate formation.
- Seafloor sediment near plumes is unconsolidated.
- Location of the primary plumes of interest incorporates an area approximately 40'x30'
- The primary plumes originate from a spot ~7' from the fallen jacket pilings.

The plumes are believed to originate from the end of the conductor bundle, which is believed to be roughly parallel to the surface buried in ~60' of mud.

- There are significant currents which vary with depth in the water column, but virtually none at the sea floor.
- Visibility is nearly zero for the first 5 feet above the sea floor
- The system needs to be capable of collecting a minimum of 250 bbls per day

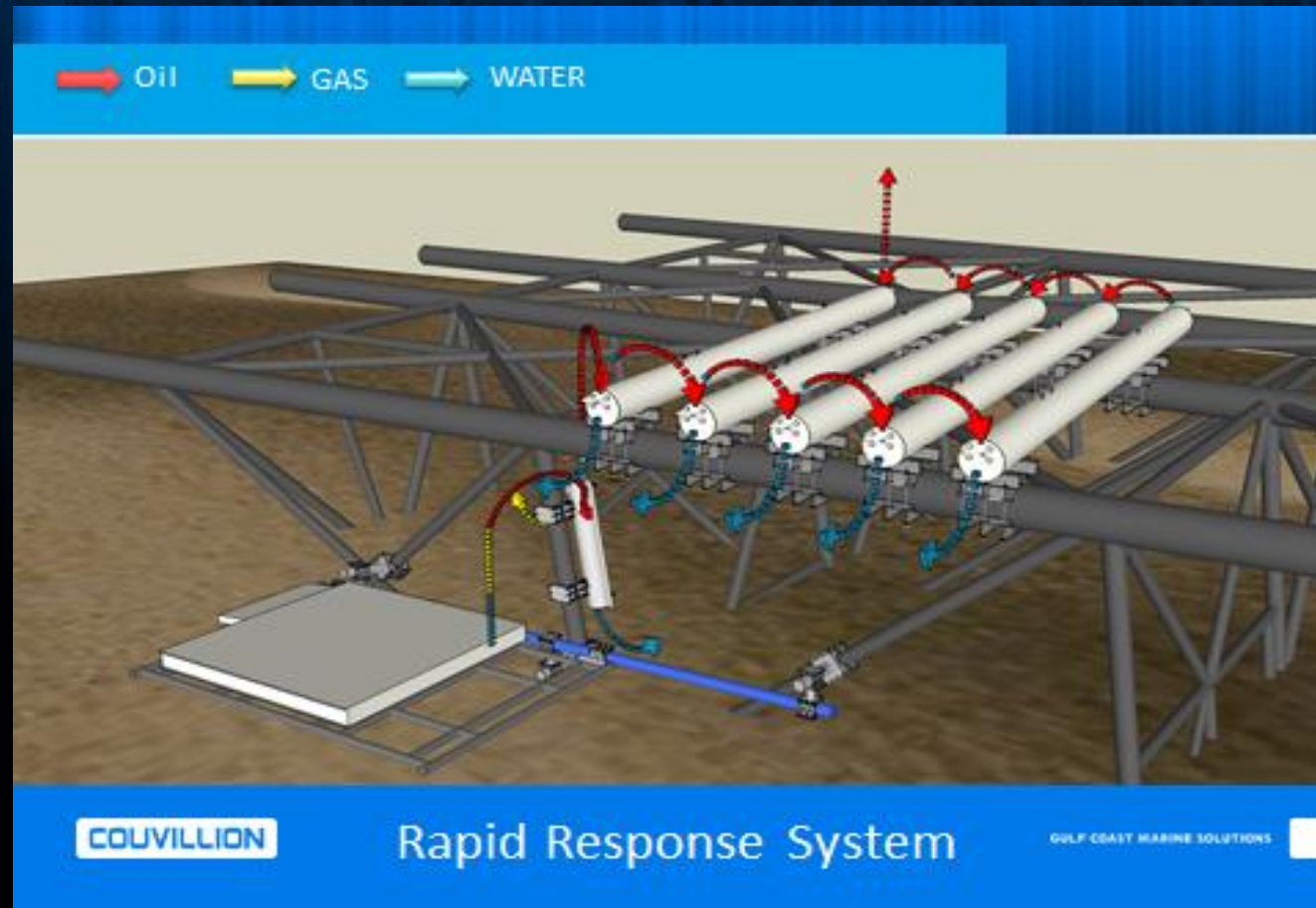
RRS Operations and Installation



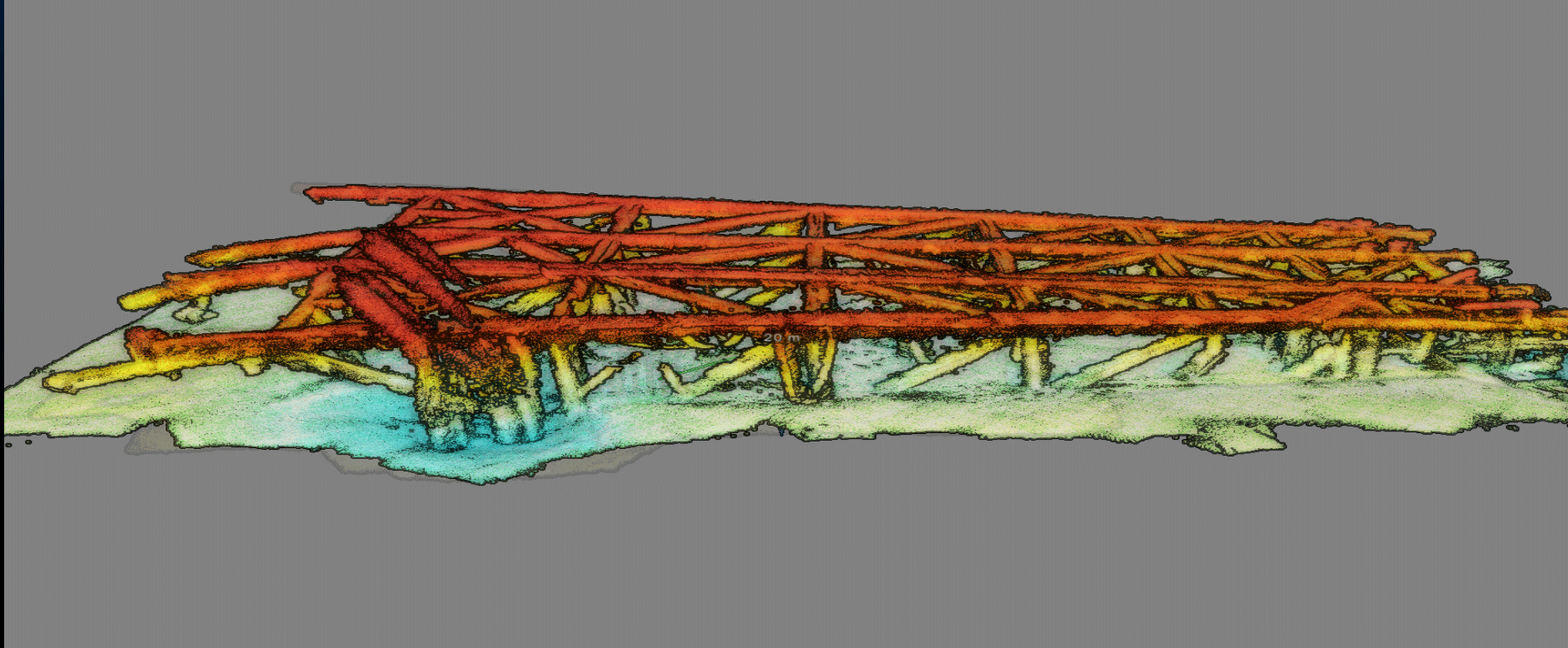
Fast Tracking a Major Project

- Start with clearly defined, accurate and verifiable background information and design specifications
- Conduct conceptual studies and selection using “as simple as possible” concept for the project
- Know and select competent contractors and be careful not to overload them so work scopes should be constrained
- Fast track schedule accomplished by conducting design and fabrication in parallel paths (Engineering and Fabrication in Parallel).
- Conduct full scale testing and fit ups to correct deficiencies before installation.
- Installation must also be completed by a highly skilled and competent contractor with an “A” team of leaders and craftsman.

Rapid Response Solution System



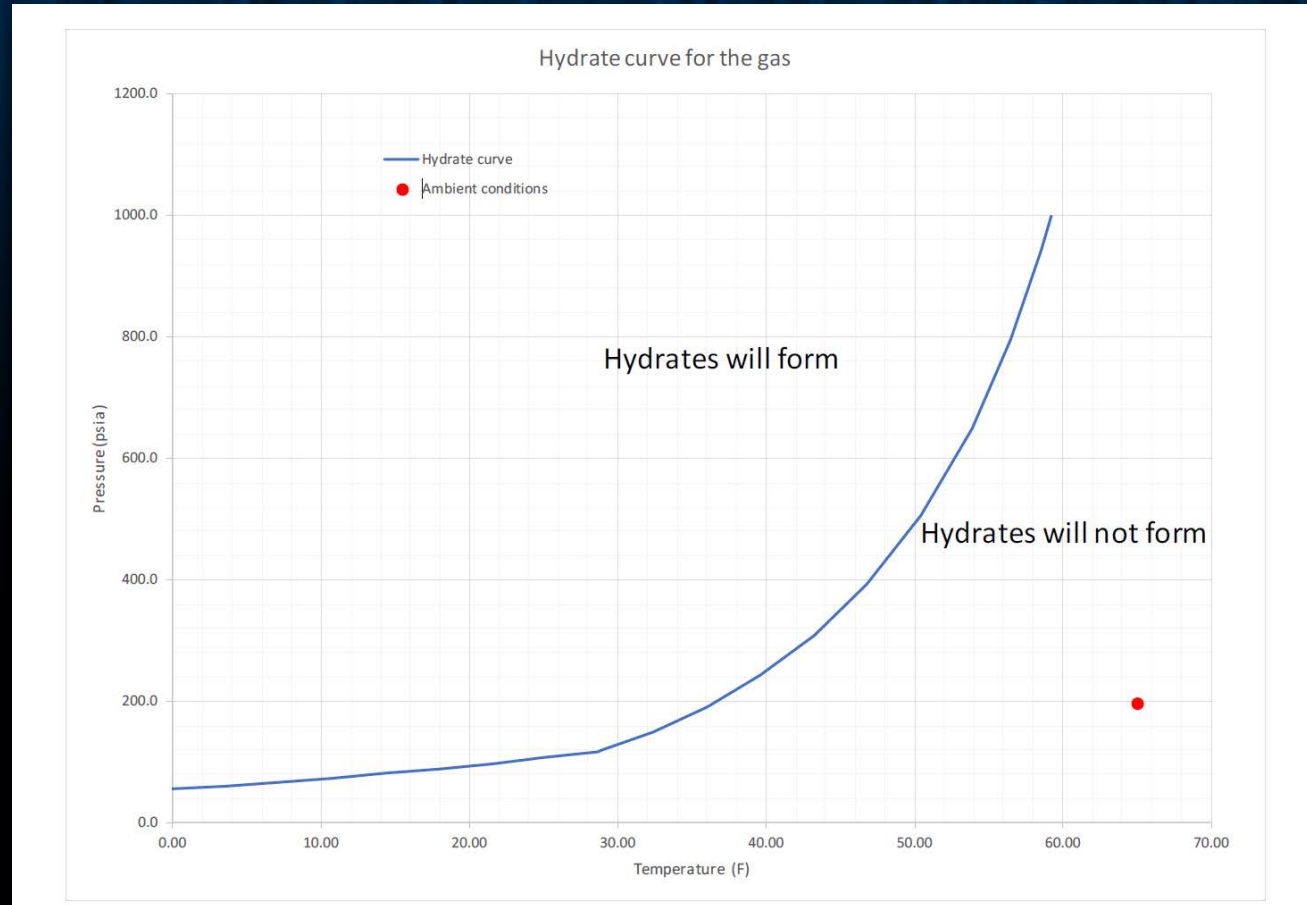
Echoscope Imagery from the MC-20 Site



Contractor and Fabricators

- Project Award – November 19, 2019
- 5 Separate Engineering Teams
- 5 Separate Fabricators across Southern Louisiana
- All system components underwent a rigorous QA/QC and Testing process to verify that all fabrication requirements and specs were satisfied.
- Installation – Offshore Installation occurred from 2/23/2019 to 4/30/2019 with partial collection beginning on 4/12/2019.

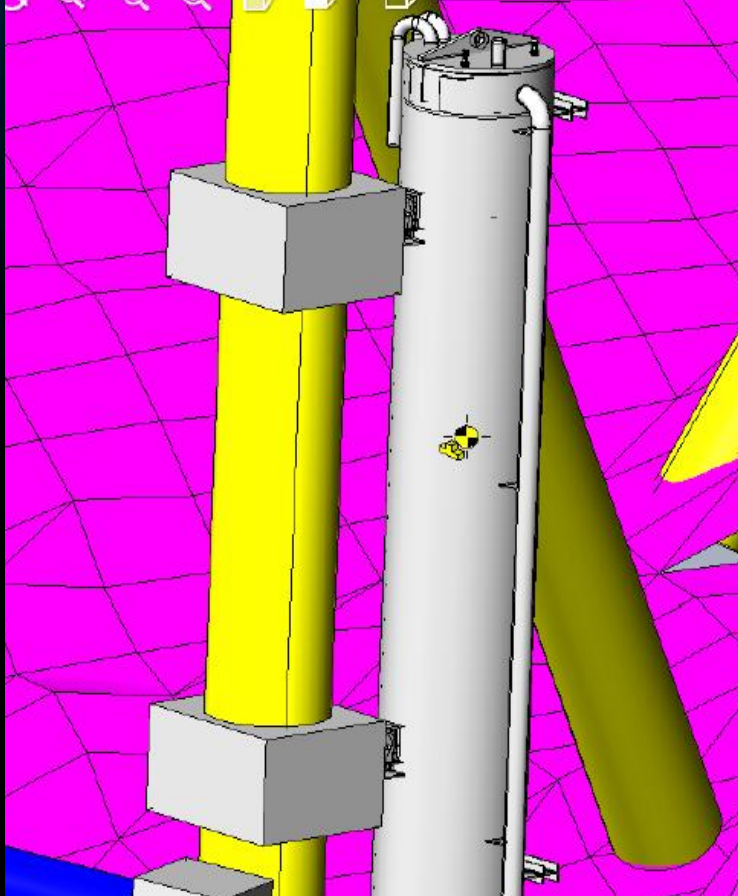
Flow Assurance Study



3-D Articulating Clamp Design



Separator Installation



System Components in Shipping to Oll dock for Final Test fit-up using La Waterways



Test Fit Up

- All components of the RRS were independently inspected and tested. Additionally, all major components went through a test fit up in order to ensure that all of the components would work together and could be installed subsea in environmentally hazardous conditions.



23 February 2019 First Day on Site to Install RRS

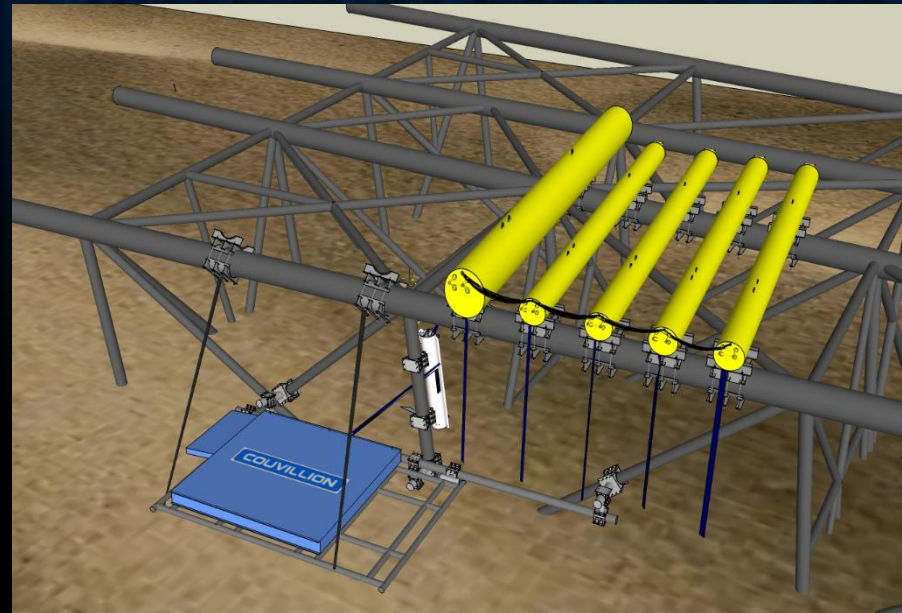


Leaving Site after RRS Installation



Salvaged Hydrocarbon Totals

	Bbl	Gal
Net Oil Collected	28,624.1	1,202,212.2
Total Oily Fluids Collected	32,215.4	1,353,046.8



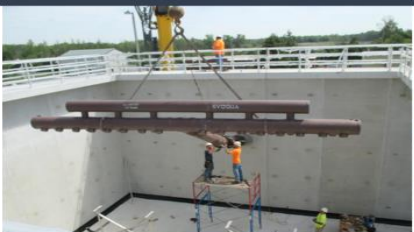
From April 12, 2019 through Jan 31, 2023 Couvillion Group has collected and recycled 1,202,212.2 gal of crude oil from the MC-20 site.

Professor Daniel B. Oerther, PhD, PE, BCEE, BCES



Our AAEES Executive Director and Immediate Past President, Professor Daniel B. Oerther, PhD, PE, BCEE, BCES is best known for leadership bridging engineering and nursing to advance environmental health practice through science diplomacy. Dan joined the Missouri University of Science and Technology in 2010 as the John A. and Susan Mathes Endowed Chair of Civil Engineering.

Dan is currently the Chair of the 8,000-member Chartered Institute of Environmental Health (London, England) and the Treasurer of Engineers Without Borders - USA (Denver, Colorado). Professor Oerther is a Diplomate Laureate of the American Academy of Sanitarians, a Fellow of the Association of Environmental Engineering and Science Professors, and a lifetime honorary Fellow of the American Academy of Nursing. Dan holds specialty certifications in water supply and wastewater engineering as well as environmental microbiology.



Leadership and Excellence in Environmental Engineering and Science

In Memoriam: Joyce "Sammi" Olmo

AAEES Honorary Member



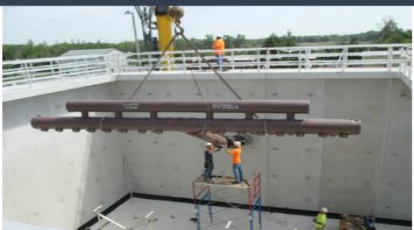
It is with heavy hearts that we announce that Joyce "Sammi" Olmo passed away on March 5, 2023, at the age of 78. Sammi began her career with AAEES in 1985 and retired in January 2021. Having spent more than 35 years with the Academy, Sammi was a familiar face and voice for the organization.

You would have interacted with her if you had ever:

- served on a Committee or as State Representative
- applied for Board Certification
- entered the Excellence in Environmental Engineering and Science Competition
- served on the Board of Trustees or attended a Board of Trustees Meeting
- joined us for the AAEES Awards Luncheon or other AAEES events
- been an award recipient

Sammi's official title of Manager of Special Projects covered a multitude of duties. Her face was often the first to warmly greet you at an Academy event.

If you knew her, you know that she loved family, dogs, the color red, cooking, wine, and chocolate! It was an honor and a privilege to have had her as part of the Academy's legacy.



Leadership and Excellence in Environmental Engineering and Science

AAEES 40 under 40 Honorees, Second Batch 2022-2023



Honoree Name	Organization
Michael Adelman, P.E.	Stantec
Bulbul Ahmed, Ph.D., P.E., BCEE	Keurig Dr Pepper
Nirupam Aich, Ph.D.	University at Buffalo
Onur Apul, Ph.D., P.E.	University of Maine
Lee Blaney, Ph.D.	University of Maryland Baltimore County
Dillon Joseph Devitt, P.E., BCEE	HDR
Colin Fitzgerald, P.E.	Jacobs
Dillon R. Hoffmann, PMP	Couvillion Group
Mohamed Ateia Ibrahim, Ph.D.	US EPA
Syed Md Iskander, Ph.D., P.E.	North Dakota State University

Honoree Name	Organization
Poonam R. Kulkarni, P.E.	GSI Environmental Inc
Christine M. Magers, CWB	Balcones Field Services
Taraneh Dawn Nik-Khah, BCES, CPSWQ	LA Sanitation & Environment
Fabrizio Sabba, Ph.D.	Black & Veatch
Emma (Ruqiao) Shen, Ph.D., P.Eng.	Jacobs
Danmeng Shuai, Ph.D.	The George Washington University
Yang Wang, Ph.D.	University of Miami
Renzun Zhao, Ph.D.	North Carolina A and T State University
Ihsan Ullah Khan, MS	Kpesed



Leadership and Excellence in Environmental Engineering and Science

Wendy A. Wert, P.E., BCEE



Our AAEEES President-Elect, Wendy, is a Board-Certified Environmental Engineer with the Los Angeles County Sanitation Districts. For the past 22 years, she has been working on programs that rely on public participation to integrate water supply, water reuse wastewater facilities planning.

Today, she uses her position as an engineer to support outreach and education programs that explain how the work of the Sanitation Districts identifies community needs then applies engineering and scientific principles to meet them.

Wendy is an award-winning transformative leader anchored in integration, innovation, and inclusion.

Wendy's journey started on a farm in Pennsylvania. Her father is a Navy veteran and, her mother is a retired school teacher. Wendy's mentor Debra Reinhart, Ph.D., P.E., BCEE, encouraged her to join the Academy. Wendy joined in 1997 and discovered a network of peers to help meet the challenges of our field. Family and mentors continue to inspire her career.



History and Mission



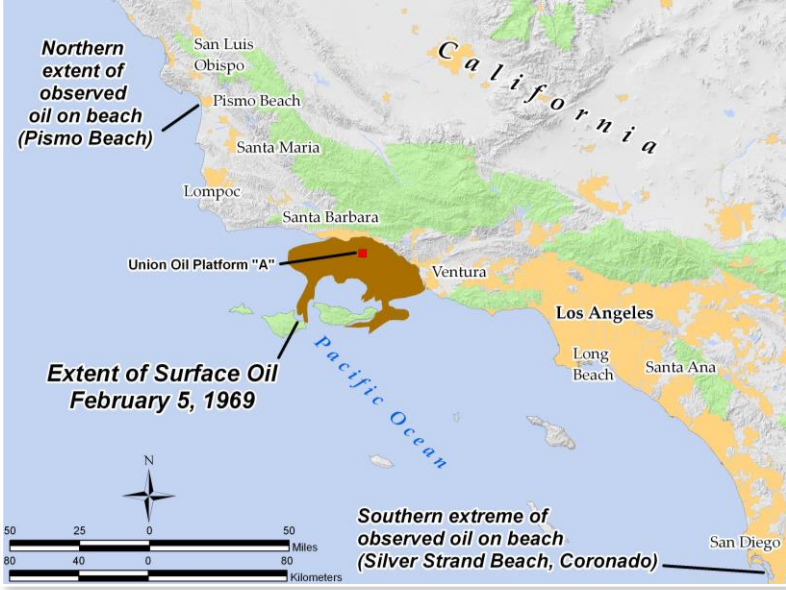
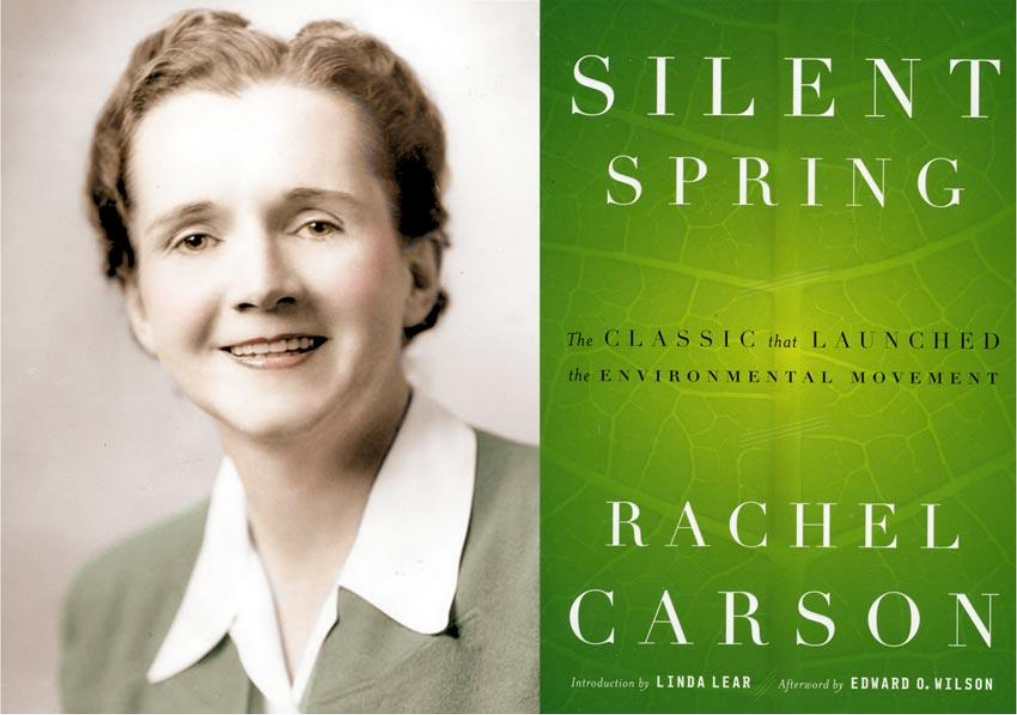
AAEES Founders in 1955



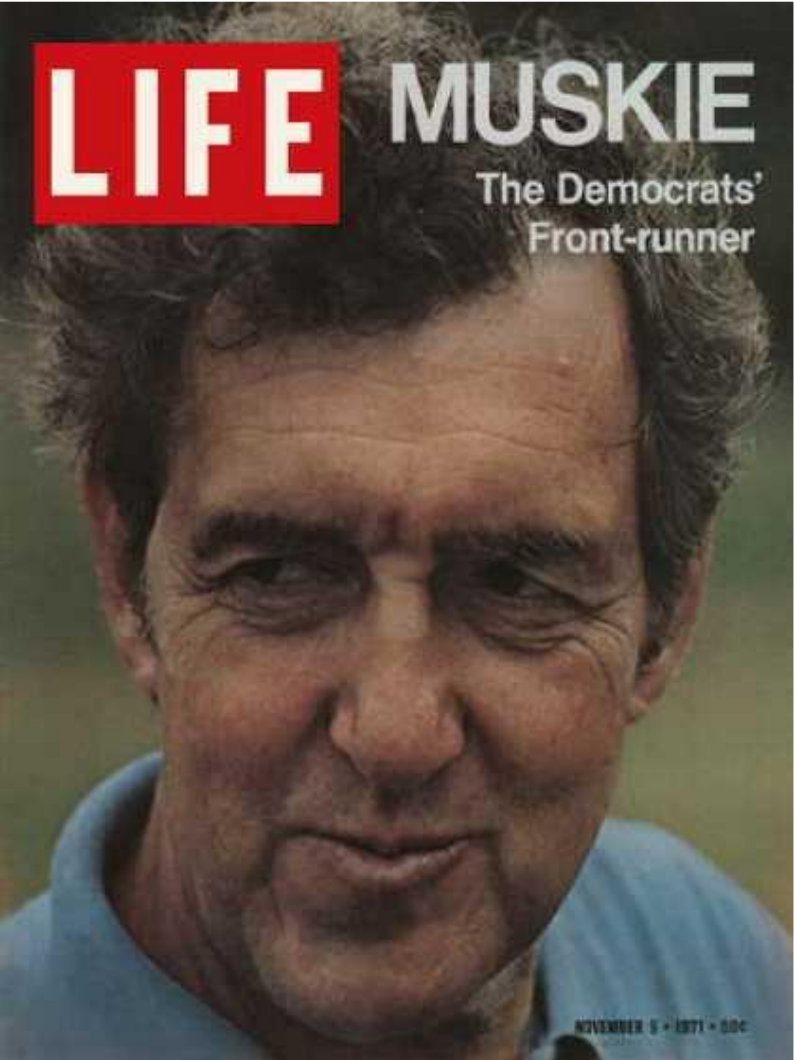


1960s

Looking back, clearly there have been environmental challenges.



The Clean Water Act passed and EPA began in 1972.



Cleaned water would be used to replenish aquifers

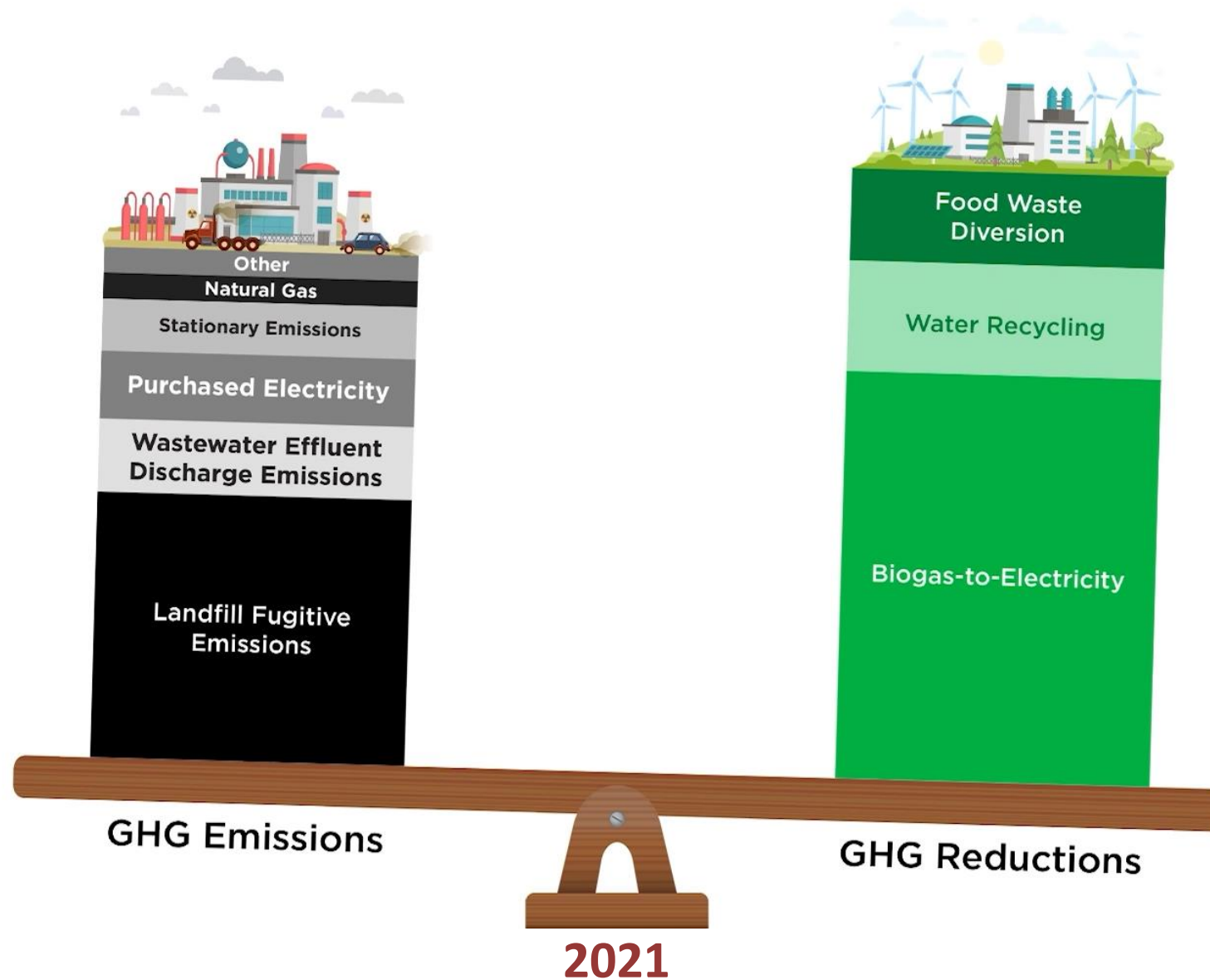


Groundwater Recharge at
San Gabriel Spreading Grounds

A tropical beach scene with palm trees and a stormy ocean under a grey sky. The text "CLIMATE CHANGE" is overlaid in the center.

CLIMATE CHANGE

We are carbon neutral





Lake Mead, 2022

Pure Water Southern California

Demonstration Facility

A NEW SOURCE OF WATER
FOR SOUTHERN CALIFORNIA



OUR WATER
OUR FUTURE



Governor Newsom visited the demo facility



An aerial photograph of a coastal scene. In the foreground, waves with white foam wash onto a pebbly beach. To the right, a paved parking lot is filled with several cars. Behind the parking lot, a steep, eroded cliff face rises, dotted with palm trees and other vegetation. At the top of the cliff, several houses are visible, some with red roofs. The sky is clear and blue.

*Thank
you*

Thank you for attending!

This event recording will be available on our website.



AAEES PDH Certificates will be emailed out tomorrow