

Toxics Advisory Committee (TAC)

Meeting Highlights

June 14, 2023

Delaware River Basin Commission

Remote via Zoom Webinar

Members and Alternates:

DNREC

John Cargill

NJDEP

Roop Guha

Sandra Goodrow

Steve Seeberger

NYDEC

Did not attend

PADEP

Maria Schumack

Academia

David Velinsky

U.S. Fish and Wildlife

Sean Bugel

Environmental/Watershed

Tracey Carluccio

Diana Oviedo-Vargas

Industry

Scott Northey

Lisa Pfeifer

Public Health

Eric Bind

Municipal

Jason Cruz

Matt Fritch

EPA Region 2

Makini Valentine

EPA Region 3

Kuo-Liang Lai

Other Attendees:

Benjamin Deatrach (AECOM)

Joella Posey (AECOM)

Maggie Reilly (Aqua America)

Meg McGuire (Delaware Currents)

Will Lutkewitte (DEMALAW)

Avery Lentini (DRBC)

Bailey Adams (DRBC)

Beth Brown (DRBC)

Chris McCann (DRBC)

Elaine Panuccio (DRBC)

Jake Bransky (DRBC)

Jeremy Conkle (DRBC)

John Yagecic (DRBC)

Karl Heinicke (DRBC)

Kevin Pregent (DRBC)

Kristen Kavanagh (DRBC)

Li Zheng (DRBC)

Namsoo Suk (DRBC)

Pam Bush (DRBC)

Steve Tambini (DRBC)

Thomas Amidon (DRBC)

Tim Maguire (Drexel U.)

Nicholas Corso (Eurofins)

Karen Davis (Fox Rothschild)

Timothy Walsh (GHD)

Kristian Fried (Integral)

Brenda Gotanda (Manko, Gold, Katcher, Fox, LLP)

Michael Dillon (Manko, Gold, Katcher, Fox, LLP)

Bidya Prasad (NJDEP)

Brian Pachkowski (NJDEP)

Daniel Millemann (NJDEP)

Gloria Post (NJDEP)

Josephine Bonventre (NJDEP)

Bonnie Boylan (PADEP)

Helen Gregory (PSEG)

Dalia Ghobrial (Trenton Sewer Utility)

Mi-Ling Li (U. Delaware)

Shannon Jones (U. Delaware)

Izak Hill (U. Rhode Island)

Doug Austin (USEPA)
Greg Voigt (USEPA)
Anna Robuck (USEPA ORD)
Michaela Cashman (USEPA ORD)
Carl DuPoldt

Joan Farb

1) Call to Order & Introductions

- Eric Bind kicked off the meeting at 9:02 AM and introduced Jeremy Conkle as the new liaison for the TAC, replacing Ron MacGillivray.
- At 9:03 AM, Jeremy read through DRBC's Zoom Webinar security briefing statement before the panelists' introductions, including committee members.
- At 9:20 AM, Jeremy Conkle returned to introduce himself with a brief presentation to inform meeting participants of his research and work experience.

2) TAC Business and Announcements

- At 9:24 AM, Jeremy moved to discuss TAC business. Recently, the TAC has been reauthorized via [Resolution 2023-04](#) (adopted June 7, 2023), previously reauthorized in 2013 (every 10 years).
- TAC committee member updates
 - Reappointments
 - Academic: David Velinsky, Ph.D. (Academy of Natural Sciences of Drexel University)
 - Environmental/Watershed: Diana Oviedo-Vargas, Ph.D. (Stroud Water Research Center) and Tracy Carluccio (Delaware Riverkeeper Network)
 - Public Health: Eric Bind, M.P.P. (New Jersey Department of Health)
 - New member welcomed:
 - Federal Fish and Wildlife: Sean Michael Bugel, Ph.D. (U.S. Fish and Wildlife Service)
 - Still seeking a member for the Agriculture position

3) Presentations

DRBC Project Update: PFAS Studies, 6-PPDq: Jeremy L Conkle, Ph.D.

Presentation is available on the DRBC website:

https://www.nj.gov/drbc/library/documents/TAC/061423/DRBC_PFAS_ProjectUpdates_conkle.pdf

Dr. Conkle gave updates on several toxics-related projects that were complete or nearing completion, including:

- NFWF Year 1 (2021): PFAS
 - No PFAS were detected in the river's mainstem above Trenton in 2020.
 - PFAS were detected at all tributary sites, with the Brandywine and Christina Rivers having the highest overall concentrations. PFAS concentrations at tributary sites generally increased, moving from upstream to downstream. This is likely due to increases in population densities, urbanization, and industrialization.
 - Sediment sample results indicated no detected PFAS for any mainstem sites but found PFAS in 2 of the 5 tributaries, while PFAS was detected in water samples for the 5 tributaries.
- NFWF Year 2 (2022)
 - Surface water results found the Burlington Bristol Bridge location (RM 118), had the highest relative sum PFAS concentration compared to the other locations (at ~625 ng L⁻¹ sum PFAS).
 - PFAS concentrations generally increased when moving downstream.
 - Sediment and fish tissue results have not yet been processed.
- PACZM Year 1 (2022)

- Dr. MacGillivray drafted a report before retiring, which is currently being edited for release.
- Sum PFAS was under 30 ng L⁻¹ for all mainstem sites. The Burlington spike from the NFWF Year 2 sampling was not observed.
- The results varied across the 7 tributaries. No distinct trend for sediment mainstem PFAS concentrations noted.
- PACZM Year 2 (2023)
 - DRBC received funding to sample 12 sites for water and sediment, and 6 sites for fish tissue collection. Sampling will occur in Summer 2023.
- PDE BIL Toxics in Tributaries Study
 - In the summer of 2023, this project will look for toxics (PFAS, PCBs, PAHs, etc.) in Delaware River Tributaries from Neshaminy Creek to the Christina River.
 - Contaminant source identification is the goal of this study.
- DRBC plans to synthesize current PFAS knowledge to develop a roadmap for future work
- 6-PPDq
 - 6-PPD is added to tires to reduce cracking and increase their lifespan. When it reacts with water, 6-PPDq is generated and is toxic to coho salmon. A growing body of literature indicates that other salmonids, including trout, are affected.
 - A NFWF proposal for this work was submitted in March 2023. The project would quantify 6-PPDq during dry and wet weather events to see if the chemical is detected in the Upper Basin, especially where trout are native or stocked.
 - A PA Sea Grant proposal was submitted last week to study 6-PPDq in the lower Delaware Basin and DRBC will receive notification of award status by October 2023.
- Questions & Discussion
 - Dr. Oviedo-Vargas asked about the sediment PFAS results and how they do not seem to be insignificant concentrations. Dr. Conkle indicated he will reassess the units used.
 - Dr. Oviedo-Vargas asked about the tire-wear particles and the persistence of 6-PPDq in waterways. Dr. Conkle said that the persistence of 6-PPDq is relatively short, not months.
 - Dr. Velinsky inquired about the fish PFAS concentration data. Dr. Conkle Jeremy replied that he has not yet evaluated that data.
 - Mr. Voigt: Asked what medium will be collected for 6-PPDq. Dr. Conkle – surface water.
 - Mr. Cruz asked why 6-PPDq affects salmonids specifically? What causes them to be more sensitive? Were other species studied, and if so, did they have similar outcomes? Dr. Conkle commented that many papers were published within the last 2 years and some studies have included other fish. Overall, salmonids seem to be more sensitive. Not yet clear why.
 - Mr. Cruz commented that the sampling will occur in the lower Basin even though there's no trout there. Dr. Conkle said that DRBC is trying to get an idea of what's out there and will focus on the Upper Basin as well where trout are a concern.
 - Mr. Bind asked if DRBC will be hitting sites multiple times. For example, if we hit a drought period and sample then, are DRBC able to sample again post-rain? Dr. Conkle answered that the 6-PPDq sampling will be done monthly or quarterly (vs. once per year for PFAS).
 - Mr. Bind also asked if the results from the varying volumes were analyzed concurrently (500 mL and 1000 mL samples). Jeremy replied that they were not done within the same year, but it would be a good idea to do this to compare.

PFAS in the Delaware – Anna Robuck, Michaela Cashman USEPA & Izak Hill USEPA/URI

At 10:00 AM, Mr Bind introduced Anna Robuck, Ph.D. from USEPA to the committee.

- Anna Robuck, Ph.D.

- Novel ether-based PFAS compounds have been found in the US (Delaware River) and Northwestern Italy, prompting research on presence in the lower Delaware River.
- Analysis w/URI GSO of surface water, fish, and passive samplers. Compared results with colleagues in Italy.
- PFAS passive samplers were deployed on rafts on the lower Delaware, below Philadelphia (some sampling occurred above that point) including: Delaware River at West Deptford, Delaware River in Pennsville, NJ (Deepwater), and Little Mantua Creek.
- Results reported in raw abundance rather than concentrations since they are novel compounds, and the quantification method is still being tested.
- Previously, 15 PFPECA (perfluoro polyether carboxylate) homologs were found, and now there are 31 novel compounds (paper: Predicting the Formation of PFAS Transformation Products in New Jersey Soils, Marina G. Evich et al).
- Surface water winter data from mainstem Delaware River sites were normalized to the summer flows. Average abundances were compared by season. Chlorinated, hydrogenated, and fluorinated novel compounds were detected. Environmental context and tidal stage are very important to consider when interpreting the results. One aspect of the project included sampling every 2-hours over a 12-hour tidal cycle. The tidal influence in the area is immense.
- Beyond chlorinated ethers, there may be PVDF byproducts (3rd generation). During winter sampling in 2020 and 2021, able to detect some, but no temporal trends yet.
- Fish accumulation of PFAS compounds may vary based on compound chemistry.
- The Bormida River in Northwest Italy had much higher non-normalized concentrations than the Delaware River. When concentrations are flow-normalized, the approximated concentrations are more similar across the 2 rivers. Italian fish seem to have a much higher concentration of chlorinated ethers compared to fish of the Delaware River. PFAS has been banned for much longer in Italy compared to the U.S., so more time for legacy PFAS to deplete from organisms. In Italy, higher abundances of chlorinated ethers in fish than surface water.
- Michaela Cashman, Ph.D.
 - Sampling of PFAS in sediment cores from the lower Delaware River. The goal is to better understand the fate of PFAS contamination and compounds. Sediment core locations: Little Mantua, Woodbury Creek, and other NJ sites (similar to sites Ana Robuck described). Most cores went down to 100 cm. The longer-chain carboxylic acids (sum of about 80 ppm) found in Little Mantua. Each location has their unique patterns. Method development is still underway, so the data may change slightly as it is in the preliminary stage. Cores were also sent out for radiometric dating to date PFAS accumulation in Little Mantua Creek.
- Dr. Robuck returned to the presentation to summarize what was presented:
 - Found concentrations of legacy and novel PFAS in downstream Delaware River in surface waters, fish, and sediments.
 - Different compound distribution compared to the NW Italy Bormida River.
 - “3rd Generation” of PVDF byproducts apparent in surface waters on mainstem Delaware River.
- Izak Hill (ORISE Research Fellow with EPA and a PhD student at URI GSO)
 - Looking at PFAS bioaccumulation in Atlantic Striped Bass. Local anglers, academic partnerships, and regional agencies to accrue whole-body fish. Seeking more samples for 2024-2025. Targeted and non-targeted MS analyses to characterize PFAS burdens.
 - STEEP (Source, Transport, Exposure, and Effects of PFAS) URI Superfund Research Program is working to understand the human exposure pathways of PFAS. The project focus is PFAS remediation tools and the identification of proxies for PFAS bioaccumulation, among others.
 - An additional PFAS study that Izak is working on is in collaboration with DNREC and DRBC to conduct field sampling, share and discuss results, and assess human health risks associated

with the consumption of local fish and shellfish. Bioaccumulation was analyzed in: Striped Bass, White Perch, White Sucker, and others. The passive sampler, a polyethylene tube, provides an integrated measurement of dissolved PFAS in water during the deployment period (28 days). Its PFAS data can be compared to targeted and suspect screening methods to guide approaches for health advisory limits for fish consumption along the Delaware River Estuary.

- Questions/comments:
 - Dr. Oviedo-Vargas asked how to tell the persistence of ether acids in the environment in the sediment cores? Dr. Robuck replied that it is not anticipated that active degradation products occur beyond legacy alkyl acids. Dr. Cashman added that higher molecular weight homologs found and that they are immobile and not migrating downward in the sediment. Compounds that were detected, and what is known about fate and transport in sediment, seem to be good anchors in sediment cores. These cores were analyzed using targeted analysis. If other things appear in the core, like degradation product(s), there will be further clarification.
 - Dr. Velinsky: Historic sediment samples, both dried and frozen, from the Delaware River are available to be analyzed if there is interest. Dr. Robuck would like to revisit this. Dr. Velinsky also has fish tissue collected over the past year or so for PFAS. Izak Hill would like to follow up.
 - Mr. Fritch (to Dr. Robuck): it was mentioned that atmospheric deposition is partly responsible for the release of novel PFAS. At the West Deptford site, there's a suspected outfall (per the map that was shown). Is it suspected that various compounds are transported differently? Dr. Robuck replied that chlorinated ethers no longer in active production, so depending on which compound, the different transport mechanisms may play more or less of a role. The lower molecular weight compounds seem to settle into sediment or POM quickly. If there are no longer active releases, environmental partitioning and recycling still being studied.
 - Ms. Post (in chat): How can the passive sampler data be used to help develop fish consumption advisories? Dr. Robuck said, "to be determined." Hoping that Mr. Hill's passive sampler work will help with this. Mr. Hill chimed in that a mathematical model calculated the uptake rate for many compounds. The idea is to match what is found via the passive sampler compared to fish tissue samples and figure out BAFs.
 - Ms. Post (also in chat): "I am not knowledgeable about this, but have passive sampler data been used to predict fish bioaccumulation for other contaminants?". Mr. Hill replied, yes.

4) Monitoring/Rulemaking updates and discussion from TAC members

At 11:10 AM, Jeremy moved on to monitoring and rulemaking updates from members.

- PWD: Matthew Fritch
 - PWD has not been sampling surface waters but will monitor finished drinking water.
 - Upcoming regulations are important to PWD.
 - Now sampling wastewater and stormwater to figure out what PFAS concentrations are among the various media (and along the different processes).
- DNREC: John Cargill
 - Delaware is still trying to figure out what a PFAS signature really is and what it looks like. Delaware is conducting studies in various media. Started monitoring drinking water for public water providers. Dealing with treatment technologies and getting them online. Going to look into groundwater PFAS distribution utilizing well monitoring program to collect the samples.
 - Analyzed ~100 samples from tributaries last year and trying to hit head-of-tide, along with the mouth of tributaries to characterize concentrations along waterways.
 - Have been collecting fish tissue since 2019 and extended investigations where results are higher than expected or higher than surrounding areas.
- USEPA: Greg Voigt

- EPA has strategic roadmap for host of PFAS issues across multiple programs.
- In WATER program, development of aquatic life and human health criteria for PFAS. A draft recommendation went out ~9 months ago. A final recommendation should be issued later this month or earlier next month.
- Hopefully EPA will get the human health criteria out by next year.
- A couple of states have listed some tribes on 303d list for PFAS as impaired. Figuring out how to implement TMDLs for PFAS.
- NJDEP: Sandra Goodrow
 - A lot going on, especially in this area for suspected sources of PFAS. Pointed out that they are dedicated to protecting surface water and figuring out how to best do that.
 - Working on a research project with ANS (Sea Grant) to analyze saline waters (surface water, sediments, fish). However, SGS AXYS is overwhelmed and has delayed the results.

5) TAC Reauthorization and Future Directions

At 11:20 AM, Dr. Conkle moved to the next agenda item to update the group on the reauthorization of the TAC and that there are some attention items moving forward:

- 1) Updating DRBC water quality criteria for toxic pollutants.
- 2) Development of uniform water quality criteria for toxins in Zone 1.
- 3) Issues relating to CEC, including ambient screening surveys and review and development of fish tissue data.
- 4) Chronic toxicity testing in ambient waters of the Estuary and its tributaries.

6) Public Comments

At 11:24 AM, Dr. Conkle moved onto the public comment period of the meeting and opened the floor to all attendees.

- Mr. Walsh (in chat) asked: “Could you briefly touch on the timeline for updating the water quality criteria again?” Mr. Yagecic said we’ll have more information at the next TAC meeting.
- Mr. Bind asked to clarify what the process is [for updating water quality criteria] and what is expected from the committee. Mr. Yagecic said we typically 1) submit a proposal to the committee, 2) get feedback from the committee, 3) look to the committee to help indicate how to move forward, and then 4) coordinate with the commissioners to get a resolution from them.
- Mr. Cruz: would we compare USEPA and DRBC criteria to see how to proceed. Mr. Yagecic agreed.
- Mr. Cargill asked about the Stage 2 PCBs TMDL. Mr. Voigt said that it’s expected that the draft report will be open to the public in a few months (even though he admitted to saying this often in the past). The timeline: state review in the next month, then go through the public comment process. Mr. Voigt thinks this is realistic, given where we’re at now.

7) Meeting Adjournment

At 11:30, Jeremy thanked everyone for joining the meeting.

- Dr. Velinsky moved to adjourn the meeting and there were no objections. The meeting was adjourned at 11:30 AM.