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**Chesapeake Bay Program's
Toxic Contaminants Workgroup
Meeting Agenda**

Date: Wednesday, May 10, 2023
Time: 1:00 - 3:00 PM
Location: Conference Call (remote only)
Calendar Page: [May Meeting Materials](#)



Meeting Information*

Meeting Link: <https://umces.webex.com/umces/j.php?MTID=m953da94ddae9ce5926dadae39428a427>

Meeting Number: 2624 365 9229

Password: 3RWmbVWaq46

Join by phone: +1-408-418-9388 United States Toll

Access code: 2624 365 9229

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Agenda Item and Desired Outcome	Time	Background Docs, Notes, and Action Items
<p>1. Introductions and Announcements – Emily Majcher, USGS</p> <ul style="list-style-type: none">• Next PCB Ecoregions symposium June 15, 2023. Focus on source tracking.• PFAS Surface water criteria review paper (Open access)• USDA Summit - The State of PFAS Science in Relation to Agriculture and Natural Resource Challenges May 24-25th• ICPRB and PRDWSPP created a map of PFAS monitoring in the Potomac River Basin	1:05	<ul style="list-style-type: none">• PCB Ecoregions Symposium Meeting Registration - Zoom• U.S. and International Per- and Polyfluoroalkyl Substances Surface Water Quality Criteria: A Review of Current Status, Challenges, and Implications for Use in Chemical Management and Risk Assessment - Ruffle - Integrated Environmental Assessment and Management - Wiley Online Library• USDA Summit Flyer with meeting link
<p>2. PFAS Quarterly Meetings – Objectives and February Follow Ups – Emily Majcher, USGS</p> <ul style="list-style-type: none">• Release of STAC workshop report	1:10	FINAL_STAC-PFAS-Report.pdf (chesapeake.org)

Agenda Item and Desired Outcome	Time	Background Docs, Notes, and Action Items
3. Technical Presentations: Fish Consumption Advisories and Aquatic Species protection - Development of PFAS Thresholds in the Chesapeake Bay watershed <ul style="list-style-type: none"> • Dr. Charlie Brown, EPA Region 3 - Update on Development of National Aquatic Life Criteria. • Ms. Amy Laliberte, MDE - Development of a fish consumption advisory for Maryland and bioaccumulation of PFAS in fish and shellfish in the region. • Dr Anna Robuck, EPA Office of Research and Development - Protocols and operational challenges associated with PFAS measurement in tissues. 	1:15	Presentation slides will be posted to calendar page when available. (Toxic Contaminants Workgroup Meeting, May 2023 (chesapeakebay.net))
4. Work Session: How can we move towards standardized and unified approaches in development of fish consumption advisories and surface water criteria in the CB watershed? <ul style="list-style-type: none"> • Status • No restrictions and no eat concentration thresholds for specific PFAS • Gaps and Needs 	2:30	Jamboard for table summaries (link provided during the meeting)
Wrap Up and Adjourn	3:00	Next meeting: Wednesday, June 14, 2023

Summary of Actions and Decisions

Action: TCW members/jurisdictional partners will contribute to the [jamboard](#) from the meeting by **COB 5/24** with relevant information from their jurisdictions.

Meeting Minutes

1. Introduction and Announcements:

- i. *Next PCB Ecoregions symposium June 15, 2023. Focus on source tracking.*
 - *Agenda on calendar page*
 - *Goes over Beaverdam creek, San Francisco Bay, Superfund site in NYC*
- ii. *PFAS Surface water criteria review paper (Open access)*
- iii. *USDA Summit - The State of PFAS Science in Relation to Agriculture and Natural Resource Challenges May 24-25th*
 - *No cost/registration required. Link in agenda (and above)*

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- iv. ICPRB's PRDWSPP created a [map](#) of PFAS monitoring locations in the Potomac River Basin. Renee Bourassa (ICPRB) confirmed that it primarily consists of drinking water intakes and finished water, but that new sites are being added. Actual data will not be included only location information.
2. **PFAS Quarterly Meetings – Objectives and February Follow Ups** – Emily Majcher, USGS
- a. **Summary:** Emily presented on the origin and purpose of TCWs Quarterly PFAS meetings. The purpose includes knowledge transfer, priority areas for unified approaches, identifying tangible ways CBP can assist with consistency and maximizing collaboration.
 - b. **NOTE:** Slides for Emily's presentation are available on the [May TCW Meeting Calendar Page](#) and via this [link](#).
3. **Technical Presentations: Fish Consumption Advisories and Aquatic Species protection - Development of PFAS Thresholds in the Chesapeake Bay watershed**
- a. Dr. Charlie Brown, EPA Region 3 - Update on Development of National Aquatic Life Criteria.
 - i. **Summary:** Charlie presented on "How Does PFOA/PFOS Criteria Protect Aquatic Life?". He went over the definition of Water Quality Criteria and how they are determined and calculated. He mentioned how the route of exposure is important in arriving at criteria and gave examples of representative species for both salt and fresh water. Data limitations and a new approach for marine/estuarine criteria were discussed, specifically the WEB-ICE model. Finally, the difficulty of determining human health criteria was mentioned, and the expectation of a release for these criteria in 2024 was communicated.
 - ii. **Discussion:**
 - Emily Majcher:* Two things, are there other PFAS compounds that EPA is working on criteria for? Also, while you mentioned human health criteria, I was wondering what the timeline was for the draft aquatic life criteria.
 - Charlie Brown:* That was expected to be finalized in April but now it's expected to be finalized in May. That's about as much as I can say. As for other compounds, that's being considered but right now the focus is on getting PFOA/PFAS standards out.
 - Doug Austin:* On a couple of the slides there where you had the four species for each one there was one column at the top which had GMAV. What is that?
 - Charlie Brown:* That's the Genus Mean Acute Value. If you have multiple species of the same genus and toxicity data for those, the geometric mean is taken for all the species in that genus and then for that genus that's the value used for derivation of criteria. If there's only one species for that genus, it's the same value but defaults to 'GMAV' for the purposes of the calculation.
 - Emily Majcher:* I don't know if you can comment on this, but obviously the criteria for aquatic life are on a totally different scale than what we've been talking about in terms of human health criteria. Parts per million or billion versus trillion or quadrillion. Is it your assessment or feeling that if we're moving in the direction of a TMDL or criteria that human health consumption will take precedence over aquatic life criteria? I can't imagine we're going to have real issues if we were measuring the concentrations that you shared in surface water.
 - Charlie Brown:* Like I alluded to at the end there, the chronic criteria for PFOA/PFAS are very much tied to the human health criteria, so they do interact with each other although the derivation of the human health criteria takes a lot more into consideration. For fish for instance, what's the average grams of fish that people consume and at what ages and different populations. So, there's a lot more work that needs to go into that to really suss out those differences. As for the TMDL, that is going to be massive.
 - Mark Mank (in chat):* Agree with Emily the reality and data to date demonstrates orders of magnitudes of difference. What level of effort to derive the Human Health higher food chain issues since they will drive the process?

Charlie Brown: I'm not sure if I can comment on that, I apologize. Know that a lot of effort is going into it but that's about as far as I can go.

- b. Ms. Amy Laliberte, MDE - Development of a fish consumption advisory for Maryland and bioaccumulation of PFAS in fish and shellfish in the region.
- i. **Summary:** Amy presented on "Overview of MDE's New Fish Consumption Advisory with PFOS Driver". She detailed MDE's PFAS goals in relation to risk management, the mix of funding used by MDE to address PFAS concerns, and an overview of MDE's fish tissue monitoring strategy. A list of PFAS compounds identified was presented including notes on the respective concentrations found in tandem with a list of species sampled. Striped Bass and the various advisories for them were discussed, along with the fact that Crabs and Oysters have yet to be found with PFAS concentrations high enough for consumption screening. Fish consumption advisories (of which there are 457 total in Maryland) were broken down by type, date, and geographic area. Of the 457 advisories, 73 are for PFOS (or 16%). Of those 73 advisories for PFOS, 1% are avoid. Bioconcentration and the variability in concentration among different fish species, mollusks and crustaceans were mentioned. For example, mollusks and crustaceans have not been identified with PFAS, and among fish channel catfish had less than largemouth bass, sunfish, and perch. Finally, a link to MDE's data was provided including interactive maps and county level reports, outreach was discussed, and Fish Consumption Advisory signage was shown.
 - ii. **Discussion:**
 - Mark Mank (in chat):* Couple notes in the MDE data sets, crab tissue more variable, PFAS present, generally low ppb ranges when detected. Oysters very little PFAS in low ppb range. Generally, DLs ~1ppb
 - Jennifer Fesler:* Two questions. 1. There was a slide for middle branch where no PFOS/PFOA were detected, and PCBs were the driver. Any speculation for how/why? 2. How do you determine the difference between children, women, and general population? What factors are considered?
 - Amy Laliberte:* 1. That could be the species that was picked up, it could also be if there was no PFOS/PFOA detected that could be anything. I would estimate for middle branch though it was most likely because of the species. 2. Those are your standard things – it's children under the age of 6, women who are pregnant or will become pregnant and general population is everybody else. The factors that really contribute to that are the meal size and the vulnerability that plays into how we determine the different advisories.
 - Ruth Berlin (in chat):* Are you also looking at the probable sources of PFAS runoff other than the military sector?
 - Amy Laliberte:* Yes, we did. We actually had some really good map layers where we took all potential sources and then I overlaid them with our current advisory areas and that's where we started our search.
 - Emily Majcher:* Just a follow up to that last question, so is the layering of your current consumption advisory monitoring with your potential sources how you landed on the 22 new sampling areas? Were those driven largely by a targeted source perspective or more randomized sampling?
 - Amy Laliberte:* It actually came from two different sources. The first was looking at any kind of source, that's why we went to Piscataway, we suspected it might be a potential PFAS source. There are also facilities there that use firefighting foam in addition to the military. Second, a lot of the other places were driven by vulnerable populations and communities and that was provided by our department of natural resources, which did a fantastic job.

Mark Mank (in chat): We collected surface water and fish simultaneously and urban areas generally had higher surface water concentrations.

Amy Laliberte: Mark is correct. In the very beginning we started pulling fish and realized we also wanted to collect surface water just to see how they compared. Urban areas generally did have higher surface water concentrations and there were actually a few places that we couldn't get fish from. So, we took surface water concentration just to see if it would even be something that we would want to try harder, go back to keep testing.

Adam Mumford: Do you recall seeing different PFAS signatures across the different areas?

Amy Laliberte: Not really, no. We started our initial focus with the Chesapeake Bay, but we didn't really see other contaminants having much impact at all and most of these didn't show up.

Ruth Berlin (in chat): So, no other potential sources of PFAS runoff, for example possibly in chemicals used in agriculture?

Amy Laliberte: We did look at potential from agriculture like bio residuals and biosolids and we couldn't really find anything for fish. That may be very different from some of the other programs and what they're looking at.

Mark Mank (in chat): Surface water data may help supplement and focus source track down. Source distances were shocking in some instances.

Emily Majcher: Mark does that mean shocking in terms of a farther distance than expected?

Mark Mank: Imagine if you released a PCB source in the headwaters of a stream and 15 miles down if you modeled it and went nothing other than drainage basin, so total capture this is what I've got at the headwaters, 1 GPM. When I get to the discharge at the confluence of tributary X, 1000 GPM. Very simplistic, that's the square, this is what it has, this is what we took from the USGS gauge. If you take those concentrations and move down that stream, the level of attenuation is almost nonexistent, I'm talking 15 miles. In your career, which you've done a lot of this, I don't know if you've ever seen anything like that. I would say by mass how many fish are in a stream, well not that many relative to the water going by them. So what it's accumulating to, well if someone is a new graduate student, this field in environmental research is like you just opened the door, there's that much you could do. I've never seen anything in 40 years testing chemicals like this in the distance from source to, and that data exists right now at Piscataway. You know I would challenge those in academia – here's some opportunities, what exists and what can be done. It's shocking, I mean you're at 3000 at the source, with a poorly defined source at this data but lets just call it 3000. You're at 250 14 miles away when it get's into the creek.

Unidentified Voice: That's just dilution

Mark Mank: If it's not just dilution, fill out the model and show me where else it's going. I would struggle to tell you you're reducing any mass into the system, time to travel, residence, time things like that. These are not PCBs, these are not mercury, this is very unique.

Anna Robuck (in chat): Attenuation varies greatly depending on analyte molecular weight, we do see a lot of attenuation for larger MW PFAS.

- c. Dr Anna Robuck, EPA Office of Research and Development - Protocols and operational challenges associated with PFAS measurement in tissues.
 - i. **Summary:** Anna presented on "Operational challenges and considerations associated with PFAS measurement in tissues". She talked though some of the factors one needs to consider when measuring PFAS in fish, invertebrate or other animals including tissue types, species, compounds of interest and preparation/analysis considerations. Anna discussed the different levels of vulnerability to bioaccumulation of different animals, the variable behavior of accumulation depending on type of animal and tissue, and considerations

for species/tissue selection. She emphasized the huge amount of PFAS compounds which makes selecting the right one to analyze difficult, and some potential considerations regarding analytical method selection such as time, cost, and expertise.

ii. **Discussion:**

Emily Majcher (in chat): Mark Mank brought up the differences between labs at the last quarterly call. This seems to be an important topic to address between labs/methods/etc.

Emily Majcher: One question or comment I'd like to bring up is I've seen it before, but I think the comparison of the different components is really interesting particularly compared to water. I know we all hope that we can utilize other media that are easier to sample than fish, but it doesn't appear that that's the case. It's safe to say that many are not sampling for sediment, that's probably less common than collecting co located surface water. Have you looked at sediment concentrations and if you have what does that profile look like compared to other media?

Anna Robuck: So, our team specializes in water, sediment, and biota. We have explored that matrix using both targeted and non-targeted analysis and what we see is that it boils down to partitioning dynamics. The smaller, lower MW chemicals prefer to remain dissolved in general. The medium to large ones is happy to partition into biota and associate with protein receptors in biota. We see some of the largest molecular weight PFAS in the sediment. So this is a partitioning continuum and I think the question isn't whether it's in sediment, it's whether your analyte list is covering the large enough MW PFAS to see whether it's in sediment. For example we routinely see the C-11 to C-17 alkyl acids in sediment and those may not be on everyone's standard list. So while you may not find the PFBA/PFOA you are going to find the larger species in sediment.

Mark Mank (in chat): Given your vast analytical experience with PFAS what remedial pathway would you expect to net the greatest reduction in PFAS mass from an aqueous environment?

Anna Robuck: I wish I had the answer, I probably have a raise on hand if I did. Number one, source reduction, once they're in the environment they're tough to get out. In terms of remedial pathways, I will say that I don't do as much remediation work, I'm really focused on identifying the problems unfortunately. From my vantage point I think many of the most suitable and deployable methods are the mass transfer technologies that involve sorption onto some given sorbent whether that's GAC whether that's some kind of anion exchange resin and then collecting PFAS from the aqueous matrix and then transferring that somewhere else. That somewhere else is a question everyone is figuring out right now.

Mark Mank (in chat): That's your next ten years, from a chemistry standpoint reductions.

Adam Mumford: Have you looked very much at exposure pathways from some of the fluorotelomer alcohols via inhalation?

Anna Robuck: I have not although some of my team at EPA ORD has. We do a lot with nontargeted analysis and what we see in terms of that exposure pathway is in inhalation once in biota those alcohols break down quite quickly into those intermediates. The slide with all those structures was a fluorotelomer alcohol breakdown pathway and that can happen in abiotic matrices, in the wider environment, atmospheric oxidation is a big form of transformation of those molecules, but that also happens pretty quickly in vivo. Whoever breathes them in the transformation occurs quite quickly based on our current understanding.

4. Work Session: How can we move towards standardized and unified approaches in development of fish consumption advisories and surface water criteria in the CB watershed?

- a. **Summary:** The group participated in a jamboard session related to jurisdictional status, no restrictions and no consumption concentration thresholds for specific PFAS, and gaps and needs.

Call Participants

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